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June 2013

منظمة الأغذية والزراعة للأمم المتحدة | 联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Продовольственная и сельскохозяйственная организация Объединенных Наций | Organización de las Naciones Unidas para la Alimentación y la Agricultura

CONFERENCE

Thirty-eighth Session

Rome, 15-22 June 2013

The State of Food and Agriculture

Executive Summary

This document reviews recent trends in global undernourishment and on agricultural markets. In particular it draws attention to the implications of market developments for global food security. In the light of these trends and growing natural resource constraints, it discusses the need for accelerating sustainable productivity growth in agriculture and recognizes the special importance of enhancing productivity in smallholder farming in developing countries.

Suggested action by the Conference

The Conference is invited to:

- Note the persistence of high levels of undernourishment in spite of progress towards the MDG 1 hunger reduction target in many parts of the developing world.
- Note the persistence of higher and more volatile food prices.
- Encourage countries and the international community to step up efforts towards increasing sustainable agricultural productivity, especially in smallholder farming.

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I. Introduction

1. The current world food and agricultural situation is characterized by continued high and volatile international food prices and the persistence of hunger and malnutrition in many parts of the world. This is generating growing concerns over the long-term sustainability of agricultural and food systems. These problems lie at the heart of recent discussions by the G20 Ministers of Agriculture and the United Nations Conference on Sustainable Development (Rio+20 Summit), both held in June 2012, which emphasized the need for sustainable growth in agricultural productivity to help eradicate hunger and ensure more efficient use of natural resources.

2. This report first reviews progress in hunger reduction around the world and current levels and prevalence of undernourishment. It goes on to examine price trends on international and domestic food markets and reviews recent developments in agricultural production, consumption and trade with a special focus on the supply response to higher food prices. It concludes by a discussion of the constraints to future output growth and the need to boost productivity growth in agriculture.

II. Trends in undernourishment around the world[1]

A. Progress towards the MDG hunger reduction target

3. The number of chronically undernourished people around the world remains unacceptably high. About 870 million people are estimated to have been undernourished (in terms of dietary energy supply) in the period 2010-12. This figure represents 12.5 percent of the global population, or one in eight people. The vast majority of these, 852 million, live in developing countries, where the prevalence of undernourishment is now estimated at 14.9 percent of the population.

4. New improved estimates of undernourishment worldwide (see Box 1) indicate that the number of undernourished people in the world declined more steeply than previously estimated since 1990. However, since 2007-09 global progress in reducing undernourishment has slowed and leveled off (Tables 1 and 2).

5. As a result of the more rapid progress in hunger reduction – at least until 2007-09 – the developing world as a whole is found to be relatively close to achieving the MDG target of reducing by half the percentage of people suffering from chronic hunger by 2015. The prevalence of undernourishment in developing countries in 1990-92 – the base period for the MDG hunger reduction target – is estimated to have been slightly more than 23.2 percent of the population, thus implying an MDG target for 2015 of 11.6 percent. If the average annual decline of the past 20 years continues to 2015, the prevalence of undernourishment in developing countries would reach 12.5 percent. The implication is that for the developing country group as a whole the MDG target appears to be within reach, provided action is taken to reverse the slowdown, experienced since 2007-09.

[1] This section is based on: FAO, IFAD & WFP. 2012. *The State of Food Insecurity in the world 2012*. Rome.

Box 1 Improvements in data and methodology for estimating the prevalence of undernourishment

The 2012 edition of *The State of Food Insecurity in the World* presented new estimates of the number and proportion of hungry people in the world going back to 1990, reflecting several key improvements in data and in FAO's methodology used to derive its prevalence of undernourishment indicator. The new estimates incorporate:

- the latest revisions of world population data;
- new data from demographic, health and household surveys that suggest revised minimum dietary energy requirements by country;
- new estimates of dietary energy supply by country;
- country-specific estimates of food losses at the retail distribution level; and
- technical improvements to the methodology.

According to the improved undernourishment estimates progress in reducing hunger since 1990 has been more pronounced than previously believed.

Table 1 – Number of undernourished people in the world, 1990-92 to 2010-12

	Number of undernourished people (millions)				
	1990-92	**1999-2001**	**2004-06**	**2007-09**	**2010-12***
WORLD	**1 000**	**919**	**898**	**867**	**868**
DEVELOPED REGIONS	**20**	**18**	**13**	**15**	**16**
DEVELOPING REGIONS	**980**	**901**	**885**	**852**	**852**
Africa	**175**	**205**	**210**	**220**	**239**
Northern Africa	5	5	5	4	4
Sub-Saharan Africa	170	200	205	216	234
Asia	**739**	**634**	**620**	**581**	**563**
Western Asia	8	13	16	18	21
Southern Asia	327	309	323	311	304
Caucasus and Central Asia	9	11	7	7	6
Eastern Asia	261	197	186	169	167
South-Eastern Asia	134	104	88	76	65
Latin America and the Caribbean	**65**	**60**	**54**	**50**	**49**
Latin America	57	53	46	43	42
Caribbean	9	7	7	7	7
Oceania	**1**	**1**	**1**	**1**	**1**

* Projections

Source: FAO

Table 2 – Prevalence of undernourishment in the world, 1990-92 to 2010-12

	Prevalence of undernourishment (percent)				
	1990-92	**1999-2001**	**2004-06**	**2007-09**	**2010-12***
WORLD	**18.6**	**15.0**	**13.8**	**12.9**	**12.5**
DEVELOPED REGIONS	**1.9**	**1.6**	**1.2**	**1.3**	**1.4**
DEVELOPING REGIONS	**23.2**	**18.3**	**16.8**	**15.5**	**14.9**
Africa	**27.3**	**25.3**	**23.1**	**22.6**	**22.9**
Northern Africa	3.8	3.3	3.1	2.7	2.7
Sub-Saharan Africa	32.8	30.0	27.2	26.5	26.8
Asia	**23.7**	**17.7**	**16.3**	**14.8**	**13.9**
Western Asia	6.6	8.0	8.8	9.4	10.1
Southern Asia	26.8	21.2	20.4	18.8	17.6
Caucasus and Central Asia	12.8	15.8	9.9	9.2	7.4
Eastern Asia	20.8	14.4	13.2	11.8	11.5
South-Eastern Asia	29.6	20.0	15.8	13.2	10.9
Latin America and the Caribbean	**14.6**	**11.6**	**9.7**	**8.7**	**8.3**
Latin America	13.6	11.0	9.0	8.1	7.7
Caribbean	28.5	21.4	20.9	18.6	17.8
Oceania	**13.6**	**15.5**	**13.7**	**11.9**	**12.1**

* Projections

Source: FAO

6. There are, however, significant differences among regions and countries in terms of progress, and some countries have even moved further away from the MDG target. Regionally, the rate of progress in the reduction of undernourishment has been highest in Asia and the Pacific and in Latin America and the Caribbean. Within Asia, South-Eastern Asia has experienced the most rapid reduction (from 29.6 to 10.9 percent), followed by Eastern Asia. Western Asia has seen a continuous increase in the prevalence of undernourishment since 1990-92. In sub-Saharan Africa the prevalence of undernourishment has declined over time, albeit less rapidly than in Asia and in Latin America and the Caribbean.

7. Different rates of progress in hunger reduction have led to significant changes in the distribution of the undernourished people in the world between 1990–92 and 2010–12. The share of the world's undernourished people declined most significantly in South-Eastern Asia and Eastern Asia (from 13.4 to 7.5 percent and from 26.1 to 19.2 percent, respectively), while declining from 6.5 to 5.6 percent in Latin America. Meanwhile, the share of Southern Asia has increased from 32.7 to 35.0 percent, that of sub-Saharan Africa from 17.0 to 27.0 percent and that of Western Asia and Northern Africa from 1.3 to 2.9 percent.

B. Undernourishment in recent years

8. The period since 2007-09 has been characterized by food price and economic crises and has seen a significant slowdown in progress, bringing hunger reduction essentially to a halt for the developing countries as a whole, as the number of hungry stagnated and the rate of decline in the prevalence slowed down. Again, the overall picture masks very different trends across regions and countries. In Western Asia, the prevalence of undernourishment was increasing before 2007 and continued its upward trend. In sub-Saharan Africa, the progress in reducing the prevalence of undernourishment achieved during the preceding years was reversed. Progress slowed in Latin America and the Caribbean and Eastern Asia and slightly in South-Eastern Asia.

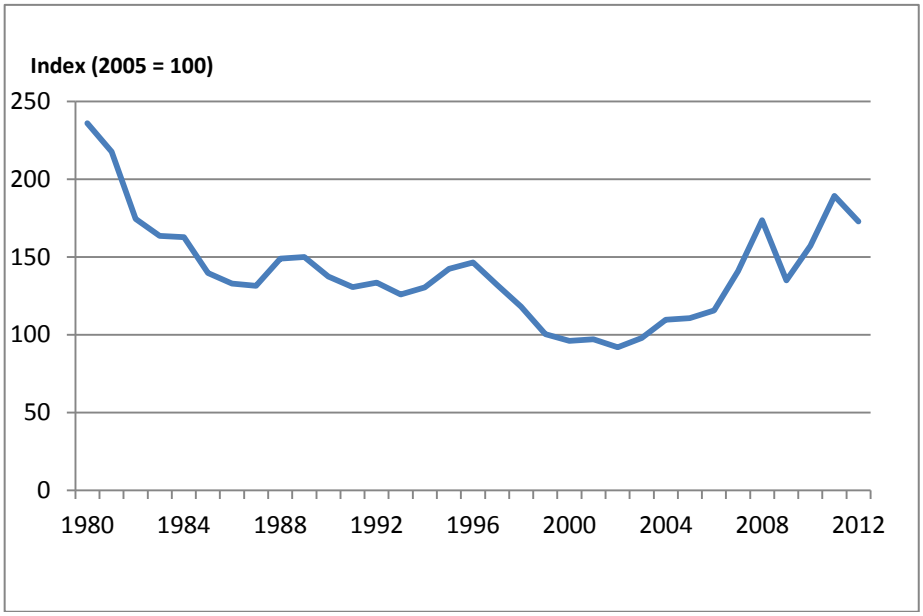
9. Behind these regional divergences lie different capacities to deal with economic shocks (such as price increases and economic recessions), including different levels of vulnerability in the face of global recession and differences in the ability to take advantage of higher prices through increased supply response, depending on market infrastructure, technology levels and natural resource endowments.

10. The methodology used for estimating prevalence of undernourishment does not effectively capture the impact of short-term price and other economic shocks, unless these are reflected in changes in long-term food consumption patterns. However, it is clear that progress in reducing the prevalence of undernourishment has slowed considerably since 2007 and that many regions are unlikely to achieve the MDG hunger target without early resumption of progress, requiring inclusive economic recovery as well as food price stability. In addition, the experience of recent years has also shown that the consequences of food price rises and other economic shocks are diverse and complex, involving more than simply total dietary energy intake; they range from a deterioration of dietary quality to possible cuts in other types of consumption that are fundamental for human development and growth in both the short and longer term.

III. Global Food Prices

11. The recent trends in global undernourishment have strengthened concerns over long-term food security. An important factor is the apparent reversal since the early 2000s of decades of decline in real food prices. In real terms, the FAO food price index declined consistently through the 1990s in line also with previous long-term trends. International food prices began rising in 2002 (Figure 1). This has been accompanied by a significant increase in price volatility, with major food price spikes in 2007-08 and again in 2011. Significant is the fact that real food prices have remained above their previous low for more than ten consecutive years. This is the longest sustained cyclical rise in real prices experienced in the last 50 years. While international food prices have come down slightly from their 2011 peak, they still remain well above historical averages.

Figure 1. FAO Food Price Index in real terms, 1980-2012



Note: Based on international prices for cereals, oils and fats, meats, dairy and sugar. The United States GDP deflator is used to express the index in real rather than nominal terms.

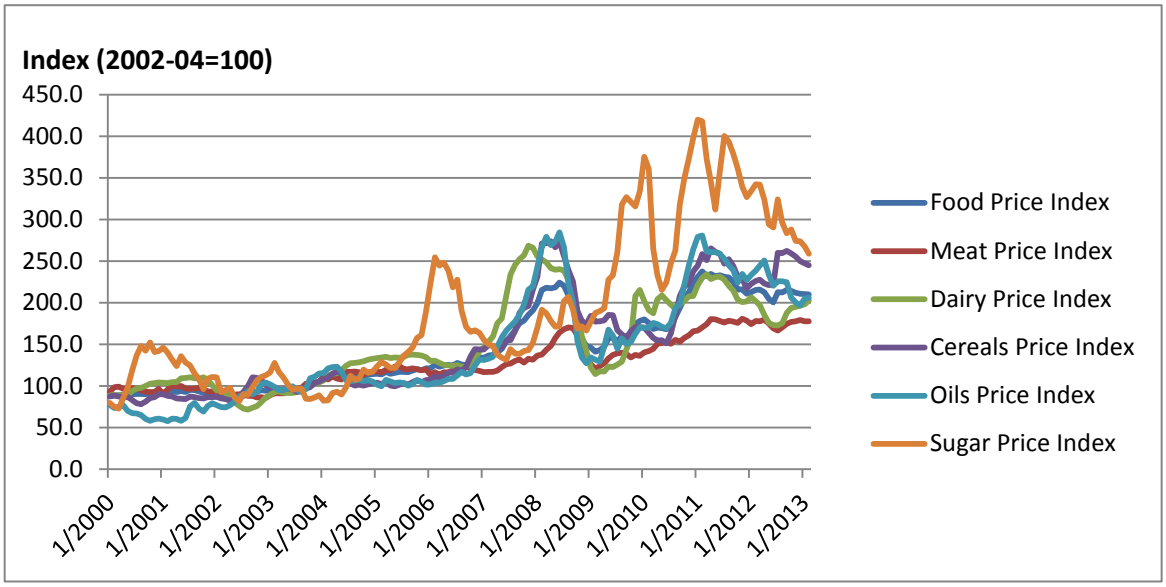
Source: FAO

12. In nominal terms, by 2011, the FAO Food Price Index reached more than double its level during 2000–02 (Figure 2). Among the commodities that make up the FAO Food Price Index, prices for sugar, oils and cereals showed the sharpest increases in 2010 and early 2011. The volatility of sugar prices has been even more pronounced than that of the other commodities in the index. Meat prices have risen least and have shown less marked fluctuations. Dairy prices have been below the FPI average since late 2010 and have fallen markedly in recent months. International commodity prices are projected in the *OECD-FAO Agricultural Outlook 2012–2021* to remain on a higher plateau for the next decade. [2]

13. The higher international food prices have also affected consumers. Indeed, consumer food prices have risen more rapidly than overall consumer prices since 2000 in all but three of the countries for which data are available (Figure 3). In most countries food price inflation exceeded overall consumer price inflation by up to 20, but in several the difference was more than 20 percent.

[2] OECD-FAO. 2012. *OECD-FAO Agricultural Outlook: 2012-2021*. Paris, OECD and Rome.

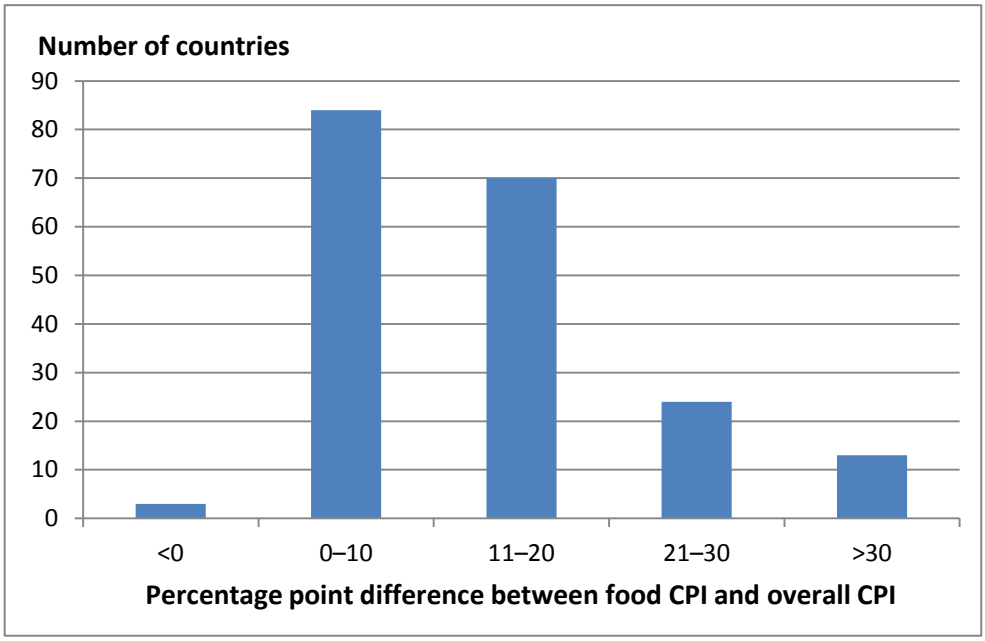
Figure 2. FAO Food Price Index by commodity group, 2000-2013 (monthly averages)



Note: Data are monthly averages.

Source: FAO

Figure 3. Difference between increases in food prices and overall consumer prices, 2000-2012



Source: FAO

14. The shift towards higher and more volatile agricultural commodity prices can be explained by many factors including, *inter alia*, population growth and higher per capita incomes, urban migration and associated changing diets in developing countries, weather-related production shocks, trade policy shocks and rising demand for biofuel feedstocks.[3] These factors, combined with tighter natural

[3]Ibidem.

resource constraints, raise questions regarding the capacity of global agriculture to keep pace with growth in demand.

IV. Trends in agricultural production, consumption and trade

A. Long-term trends in agricultural production

15. Global agricultural production growth declined somewhat from the 1960s through the 1980s, before resuming higher rates of growth in recent years (Table 3). This pattern broadly reflects the long-term price trends discussed above, with the acceleration of production growth in the most recent decade being at least partially attributable to higher price incentives. Total production growth for crops largely mirrors that for all agriculture, whereas total production growth for livestock has barely increased in the most recent period, perhaps because prices for livestock products have not risen as much as for crops. In per capita terms, growth in agricultural production declined slightly in the 1970s and 1980s before accelerating significantly, especially in the last decade.

Table 3. Average annual growth in agricultural production

	1962-71	1972-81	1982-91	1992-01	2002-11
	Percent				
All Agriculture					
Production	2.7	2.3	2.3	2.3	2.7
Production-per capita	0.7	0.5	0.5	0.9	1.5
Crops					
Production	2.9	2.2	2.1	2.4	2.8
Production-per capita	0.9	0.4	0.4	1.0	1.6
Livestock					
Production	2.8	2.3	2.3	1.9	2.1
Production-per capita	0.7	0.5	0.5	0.5	0.9

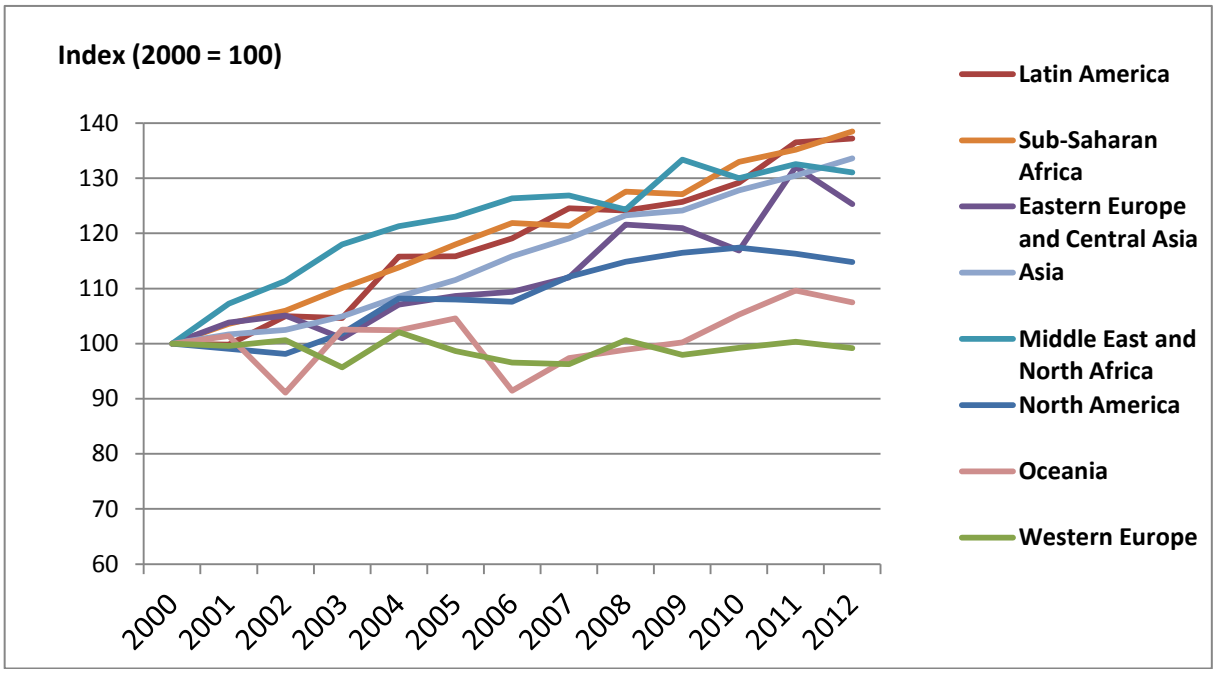
Note: Annual average change in index of net agricultural production. Net production is gross production of crops and livestock net of feed and seed evaluated at 2004-06 constant international reference prices.

Source: FAO

B. Food production, consumption and trade since 2000

16. A key question for global food security is how food production has responded to higher food prices since 2000. The production responses by the different regions over the last decade appear to have been very diverse (Figure 4). In Latin America and sub-Saharan Africa, food production increased by almost 40 percent from 2000 to 2012. Also in Asia and in the Middle East, production expanded by more than 30 percent. Eastern Europe and Central Asia expanded production by almost 25 percent, and the region is emerging as a key global supplier. In North America, on the other hand, agricultural output has increased only by about 15 percent since 2000, while production stagnated in Western Europe.

Figure 4. Net food production growth by region, 2000-2012

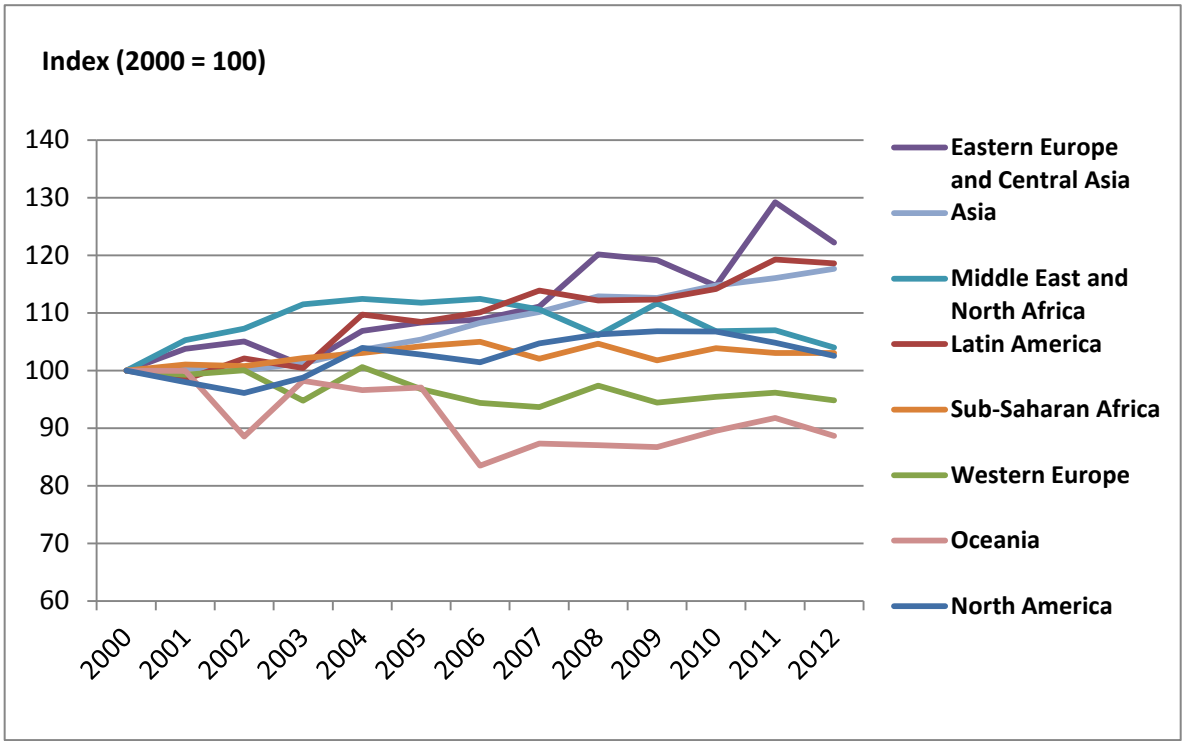


Note: Net production is gross production of cereals, oilseeds, sugar crops, meats, fish and dairy products net of feed and seed evaluated at 2004-06 constant international reference prices. Data for 2012 are projections; those for 2011 are provisional estimates.

Source: FAO

17. Despite higher prices, rapid income growth has supported robust increases in per capita food consumption in most emerging and developing countries (Figure 5). Eastern Europe and Central Asia experienced the strongest growth in per capita food consumption since 2000, at 22 percent, followed by Latin America and Asia at almost 20 percent. In sub-Saharan Africa, per capita consumption grew from 2000 to 2006, but higher prices in the latter part of the decade appear to have limited further growth, and per capita consumption in the region was only 3 percent higher in 2012 than in 2000. Not surprisingly, given the already high consumption levels, per capita consumption of food has been almost stagnant in North America and declining in Western Europe.

Figure 5. Per capita food consumption growth by region, 2000-2012



Note: Food consumption of cereals, oilseeds, sugar crops, meats, fish and dairy products evaluated at 2004-06 constant international reference prices. Data for 2012 are projections; those for 2011 are provisional estimates.

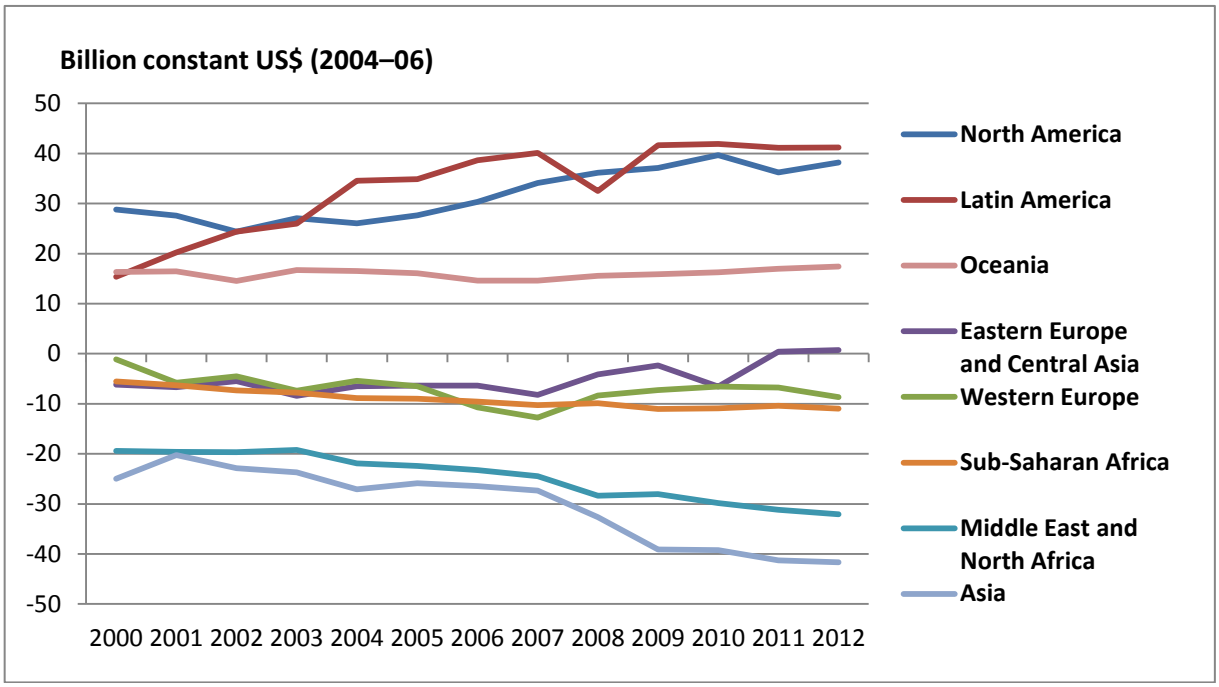
Source: FAO

18. Biofuel production has expanded rapidly over the past 10–15 years as a source of demand for food commodities, particularly in the United States of America, Brazil and the European Union (EU). By 2012, ethanol production absorbed over 50 percent of Brazil's sugar cane crop and closet to 40 percent of the coarse grain crop in the United States of America. Biodiesel production absorbed almost 80 percent of the EU vegetable oil production. Growth of the biofuel sector has been driven largely by policies – such as mandates, blending credits or subsidies and various supportive trade policies – although higher petroleum prices have played a clear role in stimulating demand. The sector has proved the largest source of new demand for agricultural production in the past decade, and represents a new "market fundamental" that is affecting prices for all cereals.[4]

19. Global trade patterns for major food commodities have changed significantly since 2000 in ways that reflect the underlying trends in production and consumption (Figure 6). The growth of net trade (exports minus imports, in constant dollars) in Latin America has been the strongest of any region as a result of its significant production growth, notwithstanding its sustained consumption growth. For products considered in this analysis, North America remains the second-largest net exporter, owing primarily to stagnant consumption in the region. Eastern Europe and Central Asia appears to be moving from a net-importing to being a net-exporting region, while Western Europe's trade position remains stable as a net importer. Sub-Saharan Africa's net imports have been growing gradually as high population growth outpaces that of domestic food supply. The Middle East and North Africa is becoming an important and rapidly growing net-importing region, as food production is not keeping pace with demand. However, the most rapidly growing net importer is the rest of Asia, and in particular China.

[4] De Gorter, H. and Just, D. 2010. "The social costs and benefits of biofuels: The intersection of environmental, energy and agricultural policy". *Applied Econonomic Perspectives and Policy*. 32(1): 4-32.

Figure 6. Net exports of food by region, 2000-2012



Note: Net exports of cereals, oilseeds, sugar crops, meats, fish and dairy products evaluated at 2004-06 constant international reference prices. Data for 2012 are projections; those for 2011 are provisional estimates.

Source: FAO

V. Future prospects and challenges

20. The major conclusion from the assessment above is that global agriculture appears to be facing a demand-driven expansion, supplied primarily by new and emerging exporters rather than traditional suppliers. However, higher input costs and the higher costs of access from more remote areas have been driving food prices upwards in real terms. The question is whether production will keep pace with demand in the coming years, so as to either stabilize real prices or bring them down to historical trends, or whether prices will continue to rise under growing demand pressures.

21. As argued in the *OECD-FAO Agricultural Outlook 2012–21*[5], food prices are expected to remain on their higher plateau for the next decade. Furthermore, according to the *Outlook* (based on assumptions of "normal" growing conditions, firm economic growth in developing regions and rising real energy prices), the average annual growth in global agricultural production through 2021 will slow to 1.7 percent, down from the 2.6 percent of the previous decade. Agriculture in many countries has grown at a pace that cannot be sustained. Rising input costs and potential supply constraints appear on the immediate horizon. These derive from the availability and quality of resource inputs and the prospects for sustainable productivity growth.

A. Resource constraints

22. Globally, most of the best land is already being used in agriculture. Analysis of global agro-ecological zones data reveals that much of the additional land that could be brought into production is in Latin America and sub-Saharan Africa but is either environmentally sensitive or in remote locations, far from population centres and agricultural infrastructure and cannot be brought into production without investments in infrastructure development. Where the potential to expand agricultural land exists, there is also competition from urban growth, industrial development,

[5] OECD-FAO, op. cit.

environmental reserves and recreational uses, while other areas are not readily accessible or are of poorer quality.

23. Degradation of land and water systems is also a concern. According to a recent FAO report, approximately 25 percent of the world's agricultural land area is highly degraded.[6] These pressures have reached critical levels in some areas, and climate change is expected to worsen the situation.[7] [8] There are also other serious resource constraints, especially concerning water. At present, agriculture accounts for over 70 percent of global water use, but the share of water available for agriculture is expected to decline to 40 percent by 2050.[9] The availability of freshwater resources shows a similar picture to that of land: sufficient resources at the global level are unevenly distributed, and an increasing number of countries, or parts of countries, are reaching critical levels of water scarcity. Many of the water-scarce countries in the Near East and North Africa and in South Asia also lack land resources. Due to their vulnerability, coastal areas, the Mediterranean basin, the Near East and North African countries and dry Central Asia appear as locations where investment in water management techniques should be considered a priority when promoting agricultural productivity growth.

B. Prospects for productivity growth

24. Several studies point to slowing productivity growth in agriculture. For crops, for instance, some evidence suggests a slowdown in yield growth rates in recent decades. The 2008 World Development Report[10] highlighted the decline in annual average yield growth rates for maize, wheat, rice and soybeans since the 1980s. Alston, Beddow and Pardey[11] reported similar results for developing and developed countries – in particular for cereal yields – in the majority of large producing countries.

25. While certain measures of partial productivity growth, such as crop yields, may be slowing in some regions, total factor productivity (TFP)[12] growth does not appear to be slowing (Table 3). Indeed, estimates show recent annual growth in TFP in the 2.2–2.5 percent range in both developed and developing regions.

Table 4. Total Factor Productivity growth in agriculture in world regions - average annual growth rate by period (percent)

[6] FAO. 2011. *The State of the World's Land and Water Resources for Food and Agriculture. Managing systems at risk*, FAO www.fao.org/nr/solaw/solaw-home/en/.

[7] IPPC (Intergovernmental Panel on Climate Change). 2012 *Managing the risks of extreme events and disasters to advance climate change adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change, edited by C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.- K. Plattner, S.K. Allen, M. Tignor & P.M. Midgley. Cambridge, UK, and New York, USA, Cambridge University Press.

[8] Easterling, W.E., Aggarwal, P.K., Batima, P., Brander, K.M., Erda, L., Howden, S.M., Kirilenko, A., Morton, J., Soussana, J.-F., Schmidhuber, J. & Tubiello, F. 2007. "Food, fibre and forest products". In M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden & C.E. Hanson, eds. *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 273–313. Cambridge, UK, Cambridge University Press.

[9] OECD. 2012. *Environmental Outlook to 2050*, OECD, Paris.

[10] World Bank. 2007. *World Development Report 2008. Agriculture for development*. Washington, DC.

[11] Alston, J.M., Beddow, J.M. and P.G. Pardey. 2010, "Global Patterns of Crop Yields and Other Partial Productivity Measures and Prices", Chapter 3 in Alston, J.M., B.A. Babcock, and P.G. Pardey (eds.) (2010), *The Shifting Patterns of Agricultural Productivity Worldwide*, CARD-MATRIC Electronic Book, Center for Agricultural and Rural Development, The Midwest Agribusiness Trade Research and Information Center, Iowa State University, Ames, Iowa. Available at: www.matric.iastate.edu/shifting_patterns

[12] Growth in TFP represents that part of production growth that cannot be attributed to increased use of inputs and factors of production but rather by other things such as technological progress, human capital development, improvements in physical infrastructure etc.

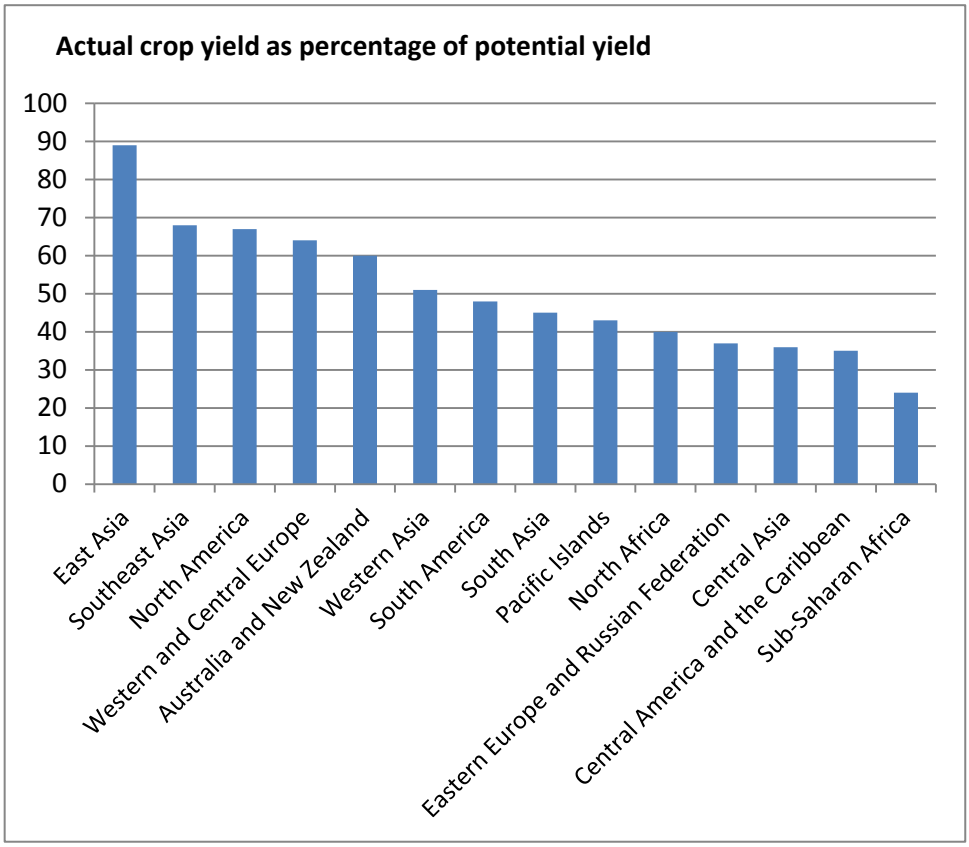
	1961-70	1971-80	1981-90	1991-2000	2001-09
All developed countries	**0.99**	**1.64**	**1.36**	**2.23**	**2.44**
All developing countries	**0.69**	**0.93**	**1.12**	**2.22**	**2.21**
North Africa	1.32	0.48	3.09	2.03	3.04
Sub-Saharan Africa	0.17	-0.05	0.76	0.99	0.51
Latin America - Caribbean	0.84	1.21	0.99	2.30	2.74
Caribbean	-1.00	0.57	-0.26	-0.55	-0.16
Central America	2.83	1.95	-1.69	3.05	2.33
Andean Countries	1.49	1.18	0.55	2.12	2.60
N.E. of S.America	0.25	0.60	3.02	2.62	4.03
Brazil	0.19	0.53	3.02	2.61	4.04
Southern cone	0.58	2.56	-0.82	1.61	1.29
Asia (except West)	0.91	1.17	1.42	2.73	2.78
Northeast Asia	0.94	0.67	1.71	4.10	3.05
China	0.93	0.60	1.69	4.16	2.83
Southeast Asia	0.57	2.10	0.54	1.69	3.29
South Asia	0.63	0.86	1.31	1.22	1.96
West Asia	1.21	2.21	0.95	1.70	1.34
Oceania	-0.14	0.47	-0.73	0.54	1.33
Transition countries	0.57	-0.11	0.58	0.78	2.28
Russia	0.88	-1.35	0.85	1.42	4.29
World	**0.18**	**0.60**	**0.62**	**1.65**	**1.84**

Note: estimated using FAOSTAT data.

Source: Fuglie, K.O. 2012, "Productivity Growth and Technology Capital in the Global Agricultural Economy", in Fuglie, K.O., S.L. Wang, and V.E. Ball (eds.) (2012), *Productivity Growth in Agriculture: An International Perspective*, CAB International, Oxfordshire, UK.

26. One of the salient characteristics of both partial and total productivity measures is the large differences in absolute productivity among countries. While growth rates may be similar or higher, productivity in developing regions is often a fraction of that in developed regions. Many developing regions also have large gaps relative to their potential. In sub-Saharan Africa, for example, crop yields reached only about 24 percent of their economic potential in 2005 (Figure 7). Closing these yield gaps – by, *inter alia*, providing female farmers and other smallholders with equal access to productive resources – could have a significant impact on crop supply, both regionally and globally, and hence on market balances and commodity prices.

Figure 7 - Ratio of crop yield to economic potential yield, 2005.



Note: Assuming optimization of inputs and management in relation to local soil and water conditions. Estimates are for cereals, roots and tubers, pulses, sugar crops, oil crops and vegetables combined.

Source: FAO. 2011. *The State of the World's Land and Water Resources for Food and Agriculture. Managing systems at risk.*

27. Simulation experiments with the Aglink-Cosimo model employed in the *OECD-FAO Agricultural Outlook*[13] suggest that reducing cereal yield gaps in developing countries by just 10 percent would increase global cereal supply by about 1.3 percent, 1.8 percent and 2.6 percent for wheat, coarse grain and rice, respectively. Such production increases would lower international prices by 13, 14 and 27 percent, respectively, for each of these commodities. Closing the yield gaps could thus have a considerable impact on agricultural markets and prices.

28. Reducing food losses and waste is another way to increase food supplies. Global food losses and waste are estimated at roughly 30 percent for cereals; 40–50 percent for root crops, fruits and vegetables; 20 percent for oil seeds; and 30 percent for fish.[14] Food losses occur in both high- and low-income countries. In middle- and high-income countries, food is largely wasted at the consumption stage, whereas in low-income countries it is lost mostly during the early and middle stages of the food supply chain. Investing in more efficient systems that reduce losses or waste would also help to reduce greenhouse gas emissions – both directly, as wastage typically generates methane emissions during food disposal, and indirectly, through the need for fewer resources.

[13] OECD-FAO, op. cit.
[14] FAO. 2011. *Global food losses and food waste, extent, causes and prevention*, by J. Gustavsson, C. Cederberg, U. Sonesson (Swedish Institute for Food, and Biotechnology) and R. van Otterdijk and A. Meybeck (FAO). Rome.

29. In 2012, at the request of the G20, a number of international organizations – coordinated by FAO and OECD - jointly prepared a special report on *Sustainable agricultural productivity growth and bridging the gap for small family farms*.[15] This underscores the importance governments place on enhancing productivity growth, particularly of smallholder farms. The study assesses the challenges of increasing production and calls on governments to step up their efforts to improve sustainable productivity growth in agriculture by encouraging better agronomic practices, creating the right commercial environment and strengthening innovation systems.

VI. Conclusion

30. Progress in reducing the prevalence of undernourishment has been significant; however levels of undernourishment remain persistently high and progress has slowed since 2007 as a result of economic crisis and higher food prices. The persistence of high levels of undernourishment worldwide and recent trends in agricultural prices, production and consumption confirm the major challenges facing world agriculture over the coming decades, notably meeting increasing demand from a growing world population, contributing to eradicating hunger and malnutrition and preserving the natural resources upon which agriculture and we all depend. To meet these challenges we need to improve agricultural productivity, while conserving and enhancing natural resources, allowing farmers to increase global food supplies - as well as their own incomes and food security - on a sustainable basis. In this context, the role of small farmers and their families in increasing productivity sustainably is crucial.

[15] Bioversity, CGIAR Consortium, FAO, IFAD, IFPRI, IICA, OECD, UNCTAD, Coordination Team of UN High Level Task Force on the Food Security Crisis, WFP, World Bank & WTO. 2012. *Sustainable agricultural productivity growth and bridging the gap for small family farms.* Interagency report to the Mexican G20 Presidency (available at http://www.fao.org/ economic/g20/en/).