Is Long-Term Food Insecurity Inevitable in Asia?

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Abstract: This article questions two widely accepted claims on long-term food insecurity in Asia, the world’s (heterogeneous) region with the largest number of undernourished individuals. The first claim is that food production may not grow as fast as the pace of population growth in Asia, which will reach 5 billion by 2050. The second claim is that an unstoppable emergence of a middle class in Asia will dramatically change the composition of food demand. On the first claim, the region’s contribution to high and volatile international food prices is well known, but Asia’s potentially positive contributions toward future price uncertainty and productivity growth are much less cited. On the second claim, the changing composition of future food demand in the region will depend on the extent that poverty reduction effectively leads to middle class expansion, which it is not an automatic process, and its extent still remains to be seen. Past evidence teaches us that poverty reduction on its own will not do the job of eradicating hunger, nor will only increasing food production. The jury is still out, but doomsday predictions are not necessarily justified.
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1. Introduction

The World Bank recently declared victory on halving extreme poverty before 2015 (World Bank 2012a). In contrast, the target of halving the proportion of people suffering from hunger has only modestly improved since 1990, and this relative progress was insufficient to reduce the absolute number of hungry people in the world in the last two decades. Asia is the region that has experienced the most mixed cross-country performance. The percentage of undernourished children in South Asia has improved only modestly from dismal initial levels, despite economic growth and solid progress in poverty reduction. In East Asia, progress has been considerable and, in some cases, outstanding. Still, almost two-thirds of the world’s undernourished live in Asia (FAO 2011).

Two obvious questions arise: Why has progress in reducing undernutrition not been achieved across the entire Asian region? And looking forward, will the region as a whole be able to feed its growing population, estimated to reach 5 billion by 2050, and do so nutritiously? In a recent review of food security in Asia, Fan, Menon, and Brzeska (2013) make clear that because of the multi-dimensionality and complexity of hunger and undernutrition, only a comprehensive set of policies simultaneously improving the targeting and scaling up of nutrition-specific interventions, empowering women, promoting technological innovation, addressing sanitation
and health care, and promoting the capacity of local governments will substantively dent
undernutrition in the region. It is the different extent to which all these policies are aligned that
explains different levels of hunger and nutritional achievements. Looking ahead, analyses of
future food demand agree that Asia will continue to be a major contributor to world food price
spikes. They also agree that its inevitably richer population will not only demand more food, but
also a more diversified diet (Nelson et al. 2010; ADB 2011; USGC 2011; Alexandratos and
Bruinsma 2012; FAO 2009).²

This paper contests both claims. More specifically, it questions the certainty of the region’s
hopeless vulnerability to food price spikes and other food insecurity threats, and the inevitable
emergence of a middle class in the region. In contrast, this paper argues that the region has also
played and will most likely continue to play a critical role in averting deeper and longer global
price spikes. Furthermore, it is unclear that a richer Asian region will necessarily swell the ranks
of its middle class to the extent expected to incur substantial changes in dietary diversity.

The paper is organized as follows: section 2 reviews the nutrition trends in the Asian region and
compares them with poverty achievements in the same period. In section 3, the region’s
contributions to the recurrent global food price hikes and volatility since 2007 are compared with
its potential contributions to slow down and reverse such trends in the future. Section 4 discusses
the role that future sociodemographic changes will likely have on the demand for more food and
a more diversified diet in Asia. Section 5 discusses the comprehensive policy set necessary to
make a significant dent in eradicating undernutrition.

2. Reducing Extreme Poverty Is Not Enough to Eliminate Hunger
On February 29, 2012, the World Bank (2012) announced that in 2010, the developing world had managed to meet the first target of the first of the Millennium Development Goals—namely, to reduce extreme poverty by half (as measured by the population living under US$1.25 a day). This milestone was achieved despite the international financial crisis. The reduction of poverty in East Asia, led by China and followed by reductions in Indonesia, accounts for a large part of this achievement. The figures are spectacular, both in absolute and relative terms. At the beginning of the 1980s, the region had the highest indexes for poverty (surpassing even those seen in Africa), with 77 percent of its population living on less than US$1.25 a day per person. By 2008, this percentage had dropped to only 14 percent.

These achievements in poverty stand in stark contrast to the global trend in hunger. According to recent figures from the Food and Agriculture Organization (FAO 2012a), the percentage of hungry people in the world—unable to consume 1,800 kcal per person per day—declined only slightly during that time, from 16 percent in 1990 to 13 percent in 2008. This modest improvement was not enough to offset the absolute number of people facing starvation, which rose from 848 million in 1990 to 850 million in 2008. This number has been rising due to successive crises in the cost of food, the international financial crisis, and the recent famine in the Horn of Africa. Estimates of the nutritional effects of crises since 2007 (Tiwari and Zaman 2011; Brinkman et al. 2010) indicate that between 63 and 91 million more people have been added to the total population facing starvation. In fact, the FAO (2012b) estimates that 950 million people around the world were suffering from hunger in 2010, and of these, 578 million were in Asia. In 2011 alone, the increase in food prices added 400,000 more children to the number of those whose lives are at risk (Save the Children 2011). The emergency (and
subsequent famine) in the Horn of Africa is estimated to have affected at least 13 million more people (OCHA 2011).

In its latest report on fulfillment of the Millennium Development Goals, the United Nations warns that if the historic trends in hunger reduction and the high prices of food (not to mention their volatility) continue, it will be very difficult to meet the goal of reducing hunger in many regions of the world (United Nations 2012). But the regions in which this target will be met by 2015 are East Asia and Latin America. The enormous progress seen in China since 1990, as well as in Indonesia and the Philippines, supports these predictions. In China alone, the population at risk of hunger declined from 210 million in 1990 to 129 million in 2008 (FAO 2012c). At the same time, major progress has been made in average caloric intake in China, which increased from 2,580 kcal a day per person in 1990 to 2,990 in 2008 (FAO 2012c). In East Asia, the rates of undernutrition in children under five years old have been cut in half, from 15 percent in 1990 to 6 percent in 2009.

These absolute and relative trends, however, are not consistent throughout Asia. In contrast to the promising results in East Asia, the percentage of undernourished children in South Asia has declined less impressively, from 52 to 43 percent between 1990 and 2009, despite the area’s economic growth and reduction in poverty. Even more disturbing (and inexplicable) are the figures on child undernutrition according to socioeconomic level. In effect, it is well known that shortages of nutritious food, poor diet and hygiene, lack of access to sanitary facilities, and the resulting high incidence of diarrheal diseases contribute to very high rates of undernutrition in poor children (about 60 percent in 2009). However, it is much more difficult to explain that as
many as 40 and 26 percent of South Asian children in the fourth and fifth wealthiest household quintiles of the distribution, respectively, are also undernourished (United Nations 2012).

Yet another finding emphasizes the heterogeneous nature of the situation in Asia. In the 17 countries of East Asia and South Asia in which the United Nations monitors progress toward the goal of eliminating hunger (United Nations 2012), only 2 (Myanmar and Vietnam) have achieved the target of reducing their 1990 undernutrition levels by half. Of the others, five (Cambodia, China, the Philippines, Sri Lanka, and Thailand) are on track to reach the target, but five more have made insufficient progress (Bangladesh, Indonesia, Lao People’s Democratic Republic, Mongolia, and Nepal), and three have not made any progress or have lost ground (India, the Democratic People’s Republic of Korea, and Pakistan).

All of these absolute and relative numbers point to two conclusions. First, progress on the reduction of extreme poverty (and, though it is not emphasized here, economic growth) is not in perfect alignment with progress on nutrition, at least when measuring poverty uni-dimensionally in terms of income and consumption. Second, Asia is not at all homogenous in terms of reducing poverty and meeting nutritional targets: East Asia—particularly China—has made a disproportionate positive contribution to global progress in terms of both poverty and hunger, while South Asia’s contribution has been much more modest.

3. **The Asian Contribution to Turbulent World Food Prices Today… and to Their Possible Solution**
Much has been said about the challenge of feeding today’s global population of 7 billion and tomorrow’s population of 9 billion, particularly in the midst of severe threats to environmental sustainability and, more recently, because of the rising and volatile cost of food at both the global and national levels (FAO 2009; Godfray 2010; Nelson et al. 2010; USGC 2011; Alexandratos and Bruinsma 2012; EJDR 2013). The key question is whether the pace of future agro-technological progress will be sufficient to meet the increasing food demand of the growing population. Using FAO data, Beddow, Pardey, and Alston (2009) have shown that average annual crop yield growth rates for corn, wheat, rice, and soy declined between 1961 and 1989, and again between 1990 and 2007. However, these global rates conceal marked regional differences. Increases in productivity in China went from 2.29 to 4.45 percent per worker and from 2.81 to 4.50 percent per hectare from 1961 to 1989 and from 1990 to 2005 (compared with world levels of 1.12 and 2 percent), respectively. However, this spectacular growth in productivity is not a phenomenon that extends to the rest of Asia. When China is excluded, the growth of productivity in Asia actually slowed during the period in question, as it did in the rest of the world, with the exception of Latin America. Interestingly, projections by Alexandratos and Bruinsma (2012) that maintain current agricultural yield growth suggest that the world would be producing more grain than required by the estimated demand through 2050. Yields would expectedly increase by 44 kg per hectare per year up to 2050, in line with the historical trends observed since 1960. But world average cereal yields, growing almost perfectly linearly with annual increments of 44 kilograms per hectare between 1960 and 2007, imply declining yield growth rates: from 3.1 percent in the early 1960s, 2.4 percent in the early 1980s and 1.3 percent in the mid 2000s. More optimistic scenarios from Nelson et al. (2010) in terms of overall productivity and yield growth specific to maize, wheat, and cassava (exceeding 2 percent
increases per annum) in developing countries further confirm a favorable ending to the challenge.

The increase in returns, along with (more modest) improvements in land use and manpower, have made it possible to address the global aggregate demand to feed a population that has been growing at an accelerated pace over the last four decades (Southgate 2009). With regard to land use, it is interesting to note that worldwide expansion of the area devoted to grain production actually has been rather modest, from 648 million hectares in 1961 to 676 million in 2001, whereas the area used for the cultivation of fruit, vegetables, and oils nearly doubled during the same period. Tilman et al. (2011) estimate that if yields in developing countries croplands increased to levels close to high-yielding nations, the future global demand for arable land expansion would be still relatively modest (less than 200 million hectares by 2050) compared to the scenario with current productivity gaps between developed and developing countries (with a required additional billion hectares of land to be cleared). But even in a modest productivity growth scenario, the East Asia outlook is tighter. In fact, arable land per person has been decreasing since 1960, almost halving to 0.25 hectare per person from 0.44. And these declining trends have been more marked across Asia, resulting in lower available land per person in Asia than other developing regions and the developed world (FAO 2012d). The USGC (2011) study predicts increases of 53 million hectares devoted to the production of grains and oils in the Asian region alone. This figure is equivalent to total land use for any type of cultivation in the last 30 years anywhere on the planet. These estimates assume that there will be relatively modest increases in productivity of at least 1 percent per year. If the productivity of grains and oils is maintained at 2010 levels, the required increase in land devoted to agriculture would be more
than 400 million hectares, which is totally unattainable. In sum, evidence points to agricultural returns and land use as the key factor behind the growth of food production. Looking ahead, it is unreasonable to expect that substantive expansions in land use could make up for potentially poor productivity growth in Asia.6

Available data on current and future caloric intake support a more positive outlook. At the start of the 21st century, agricultural production was guaranteeing 17 percent more calories per person than 30 years earlier, despite a 70 percent increase in population. To be sure, even though the population increased by 70 percent, the production of calories during the same period increased by 100 percent. FAO calculations indicate that this increase is sufficient to ensure a daily intake of 2,720 kcal per person (FAO 2012b). Nelson et al. (2010) report a range of caloric availability for the developing world in excess of 3,000 and below 2,400 kcal per person depending on assumptions on yield productivity, population and income growth, and climate change. These improvements may bring about reductions in undernourishment rates of children under five of between 10 and 45 percentage points for the period 2005–50.

Unsurprisingly, FAO (2002) concludes that the world is producing enough food to feed everyone, and even to respond to the diversity of demand. Fundamentally, the problem is that many people do not have land to cultivate, enough income to purchase food, or access to adequate safety nets. That conclusion does not mean to downplay the actual challenge of feeding the world’s increasing population, but brings “access to” and not simply the production of food to the center of the debate. Moreover, current yield growth rates still need to be sustained for decades at an annual cost that FAO estimates in the vicinity of US$83 billion in additional investment in agriculture across developing countries. That amount represents a financing gap of
50 percent of the current private and public investments in agriculture in the developing world, which average US$142 billion per year (FAO 2009).

In addition to lack of incomes to buy food and additional resources for agriculture productivity, a sustained but volatile increase in the nominal prices of food began at the start of the 21st century and gained strong momentum starting in 2007. The World Bank’s Global Food Price Index (2005 = 100) went from 77 in January 2000 to 220 in June 2008, and, after a series of fluctuations, ended up at 223 in February 2011 (World Bank 2012b). In the case of East Asia, UNICEF (2011) estimates that domestic prices increased by almost 90 percent between January 2007 and April 2008; domestic prices then fluctuated until November 2010, when they matched the peak in 2008 and remained at these levels through the first half of 2011. With this trend, East Asia has become the region with the fastest rise in food prices, surpassing South Asia, the rest of the developing regions, and average prices worldwide (FAO 2010; UNICEF 2011).

Much has been written about the causes and consequences of the recent food crises (see IFPRI [2008], Mitchell [2008], and Compton, Wiggins, and Keats [2011] for comprehensive summaries, and Timmer (2010) for a lucid comparison with the 1973/74 food crisis). Cuesta (2010) has summed up the causes of what he calls a “perfect storm,” where a series of factors and circumstances have converged to trigger a sudden surge in prices. According to this hypothesis, the most widely accepted of several interpretations, at the end of 2006, food prices began to recover after decades of stagnant and declining levels. This recovery has been attributed to a number of causes, including a notable rise in the standard of living in India and China; the expanded production of biofuels, which diverts agriculture away from food production; the depreciation of the dollar; and the effects of climate change. Another sharp acceleration of prices
took off in mid-2007 as a result of speculation; rising oil prices; the adoption of restrictive trade policies; poor management of inventories; and, ultimately, widespread panic. In this explanation (Timmer 2008; FAO 2007), long-term structural factors converged with unforeseeable circumstantial factors to create a perfect storm.

In the perfect storm hypothesis, the structural causes cited most often have to do with increased demand—as well as changes in its composition—in emerging countries, led by China and India. In an example of poor policy making, during 2007 and 2008, the governments of China, India, and Vietnam imposed bans or restrictions on the export of rice to neighboring importers within the region, such as Indonesia, Bangladesh, and the Philippines. In fact, some would argue that it was panicked hoarding and not demand and supply fundamentals that explains the lion’s share of the 2007/8 rice price crisis (Timmer 2010). Another recent example of this type of policy is the credit program for growers in Thailand, known as the Rice Mortgage Scheme. In this program, the Thai government guarantees domestic farmers prices well above market levels, which has resulted in substantial loss of competitiveness in Thai rice exports vis-à-vis other exporters in the region (to the point of India stripping Thailand of its status of the world’s leading exporter of rice in 2012/13; USDA 2013). 7

An important aspect of the volatility that surrounds international food prices is their high sensitivity to a variety of factors, including uncertainty about the actual food stocks that are available. Again, the role that Asia plays in this uncertainty is a major determining factor, even more so in the current context of low stock levels, which in the case of corn have never been lower. The new G-20 Agriculture Market Information System (AMIS), which is designed to improve information about agricultural markets, shows substantial differences in the estimates of
grain stocks in Asian countries, depending on whether the data are reported by the FAO or the United States Department of Agriculture—although it remains unclear why these differences are so stark, as there are no systematic, obvious biases in the observed gaps across time or country. Thus, for example, the differences in grain stock estimates vary by 13 percent in China, 32 percent in Indonesia, and 53 percent in Vietnam (similar to differences of over 40 percent in Brazil or Kazakhstan), according to AMIS (2012). Importantly, the lack of a single set of comprehensive and reliable statistics on truly available grain stocks does not help quell anxiety when food price uncertainty unfolds and market volatility increases. With respect to safety nets—a critical instrument to mitigate the effects of high and volatile food prices and natural disasters—a recent World Bank report (World Bank 2011b) indicates that between 2008 and 2011, 80 out of the 137 countries analyzed had weak or non-existent social welfare systems, and only 9 of these countries had made a decisive effort to improve their systems. Of the nine countries, only one of them is in East Asia—namely, Cambodia. Others, such as Thailand, Vietnam, and Malaysia, have not made major improvements. China already had strong capacity in this area, and it has continued to improve its social protection systems.

These arguments show the importance of the Asian contribution to the recent food crisis. Less cited, however, is the contribution that the region can make—and, in fact, is already making—toward being better prepared for future food crises. Despite the shortcomings mentioned above, several Asian countries decided voluntarily to participate in the AMIS. Recently, countries such as Pakistan, India, Myanmar, and Cambodia have stepped up to fill the worldwide gap created by Thailand’s increased prices for rice exports. Also, the Asian region—along with Africa—leads the way in developing innovative agricultural production practices, which have come to be referred to as “smart climate agriculture.” The goal of smart agriculture is to simultaneously
offer increased agricultural productivity (thus reducing poverty and food insecurity); improved crop resistance to extreme weather conditions (adaptation); greater sequestration of carbon emissions; and curtailment of deforestation (mitigation). Illustrative, rather than exhaustive, examples of smart climate agriculture include programs for the restoration of mangrove forests in Vietnam’s Mekong Delta and reforestation of the Loess Plateau in China, which acts as a line of defense against typhoons and floods. Another widely cited example is the development of financing mechanisms that compensate farmers during their transition to lower carbon emissions in the province of Qinghai in the north of China. Also in China, the use of biogas for cooking in the province of Guangxi is estimated to have saved women up to 60 days a year in time they formerly spent collecting wood and tending to cooking fires (World Bank 2011a).

The Asian region is also witnessing other innovative agro-technological practices, such as biofortification and vertical farming. Research institutes in the Philippines and Bangladesh alongside the International Rice Research Institute are currently developing and evaluating biofortification techniques for rice. The resulting variety, popularly known as golden rice, contains beta carotene. This is a natural antioxidant found in fruits and vegetables—but not in rice—that is converted into vitamin A when eaten. The biofortified rice is expected by many to be a viable solution to combat vitamin A deficiency in children and pregnant women in the region (IRRI 2013). Vertical farming, an expansion of the traditional indoor farming, consists of harvesting in multistory buildings in quantities and varieties enough to sustain large cities without significantly relying on resources beyond the city limits (Despommier 2010). Whether vertical farming will result in considerable increases in agricultural productivity will depend to a large extent on the ability of its technology to use the abundant and cheap natural light, rather than artificial light, as is currently the case (The Economist 2010).
Even these few cited examples underline that their scale varies considerably from case to case. Whether or not the region will be able to scale up these interventions and sustain them over time will determine to a large extent Asia’s exact contribution to solving the challenge of feeding its population in the future. Current evidence reveals the potential to scale up these interventions, but also that scaling up smart agriculture projects is by no means automatic or spontaneous. The jury is still out, but dire predictions of Asia’s inevitable helplessness to food price spikes are not fully justified.

4. Closing the Circle: Income Equalization (or Not) of Asia Will Largely Determine Its Food Future

Looking to the future, according to United Nations projections, by 2040, the world will be home to at least 9 billion inhabitants, one-third of whom will be living in India and China. The U.S. Grain Council (USGC 2011) estimates that real per capita income of the citizens of the world will increase considerably over the next 30 years, from US$9,727 to US$25,000. Tilman et al. (2011) estimate increases in the 2005 levels of per capita GDP for Asian nations—including the most populous countries in East and South Asia—of between 2.5 and 4 times by 2050. The Asian Development Bank (ADB 2011) estimates that the middle class in China, which currently represents 12 percent of its population, could become as high as 75 percent, and that it could reach 70 percent in India and 80 percent in Indonesia by the year 2050. Parallel to this process, the upper classes are also expected to increase their global presence, reaching 190 million in China, 210 million in India, 40 million in Indonesia, and 35 million in the Republic of Korea. The population of Asia is expected to age considerably, reaching an estimated over-65 cohort of 580 million, which in the case of China will represent 27 percent of all its inhabitants, a
considerable change from its current level of 10 percent. The USGC study also indicates that the role of women is likely to change in important ways, with an increase in trends such as marrying at a later age or deciding not to marry at all, which are beginning to be seen in the wealthier Asian countries and in the Chinese middle class. Increasingly, Asian women are joining the workforce, acquiring more education, and consequently enjoying higher incomes. Other processes, such as urbanization of the developing world (with urban concentration in China estimated to increase from 34 percent of the population in 2010 to 70 percent in 2040) and epidemiological transitions toward a greater prevalence of diseases that used to be the exclusive domain of the wealthy countries, could also have important nutritional consequences (Fan, Menon, and Brzeska 2013).

The obvious implication would be the increased demand for food, but there could also be important changes in diet composition, with a relative reduction in the demand for grains in favor of meat, fish, oils, and fruit. In fact, conservative estimates of the annual per capita rise in consumption (of 0.2 percent) imply a 70 percent increase over current levels of consumption through 2050. But, more critically, USGC (2011) simulations indicate that the demand for meat could increase by as much as 201 million metric tons between 2010 and 2040 (more rapidly than the increase of 164 million between 1980 and 2010), mainly as a result of greater demand from China and the rest of East Asia. There would be even larger increases in the demand for dairy products, estimated at 505 million tons (compared with 305 tons in the past 30 years), again because of demand from China and the rest of East Asia, given that current levels are relatively low. For fish and shellfish, a moderate increase of 49 million tons is expected between 2010 and 2040, less than the increase of 67 million tons seen in the last 30 years, largely reflecting a slowdown in demand from China, and in a context of overfishing and current high levels of
consumption. On the other hand, the increased production of vegetable oils is expected to double its rise over the last 30 years, though not necessarily led by the demand from China in this case, but rather because of strong demand in India and Africa. The consumption of grains will not keep pace with population growth: although consumption will increase in India, this will not be the case in China or the other emerging countries, which are expected to see their relative consumption decline as income goes up.

Based on these simulations, the USGC analysis concludes that most of the projected increases in future world demand will depend—in a context of technological improvement and greater and more efficient land use—on the preferences of the new emerging population. In other words, the magnitude of the new supply will depend on whether the preferences of the Asian middle classes, especially in China, will be more or less the same in 2040 as the preferences of the current middle classes in the United States and Europe. In fact, increases in demand and the relative changes that result from aging or population growth itself, without any changes in people’s preferences, would produce relatively modest changes in the overall demand. To put it another way, the future pressure on the food supply will not come from population growth, but rather from the change in preferences of the emerging population, which in turn will depend on a process of socioeconomic equalization—that is, substantial growth of the middle class.

Two considerations are important at this point. Regarding the possibility of producing enough to feed the population, East Asia is already beginning to show promising technological advances that could lead to the introduction of important improvements in agricultural production. Some of these improvements, like current climate-smart agricultural practices mentioned earlier, come either from innovation, as in the case of vertical cultivation (which would relax the severe
constraints on availability of land), or from improved use of existing technology and practices, such as more economical production in terms of water, feed, or renewable energy. East Asia, and China in particular, has already implemented interventions in both of these areas, as well as strong investment programs. In fact, China’s 12th Five-Year Plan (2011–15) identifies biotechnology as one of the seven key industries for investment and development over the next five years. More controversial is the use of genetic engineering technologies. They include innovative grain varieties that are resistant to diseases, natural disasters, and saline soils, to cite a few benefits. But there is some uncertainty around genetic engineering’s repercussions on health, and its poor social acceptance is a real impediment to more decisive development in the near term. Nevertheless, society’s eventual familiarization with the phenomenon—by 2050, genetic engineering technologies will have been in operation for decades—and further technological advances (such as genetic erasing) pose an interesting argument for predicting a greater role for genetic technology in future food production in Asia and the rest of the world. Once again, the extent to which these advances materialize and consolidate in the region will contribute to Asia’s ability to feed its population.

The second consideration has to do with the process itself of increasing the middle class of global society, ultimately the expected key factor in the change of the relative composition of the food supply. Even though the expansion of middle classes may look like an irreversible process, evidence for Asia, particularly in China, shows that greater economic growth does not automatically lead to the equalization of incomes. World Bank estimates cited at the beginning of this article (World Bank 2012a) indicate that the great majority of the 649 million poor people in the world who ceased to be poor (according to the criterion of US$1.25 per day per person) between 1981 and 2008 still continue to be poor by the standards of middle- and upper-income
countries. More importantly, within their own country standards, these people remain vulnerable to slipping into poverty again in the face of shocks. When speaking of moderate poverty—that is, persons with incomes above US$1.25 a day but less than US$2 a day—progress in the last three decades has been much more modest than in the case of extreme poverty. In fact, in absolute terms, the numbers of moderately poor increased from 648 million in 1981 to 1.18 billion in 2008. In Latin America, the region that has seen the most impressive reduction in poverty, only countries like Argentina, Costa Rica, Mexico, and Uruguay have a middle class of around 50 percent of the population—measured as those earning income between US$10 and US$100 a day—which is far above the proportions in other countries of the region (Cárdenas, Kharas, and Henao 2011). Even more demanding figures on the expected share of middle class in the total population are reported for Asia by 2050: 70 percent in India, 75 percent in China, and 80 percent in Indonesia after using a US$2–US$4 per day per person to define middle class (ADB 2011).

Ultimately, evidence shows that the reduction of extreme poverty, as critical as it may be, does not necessarily imply an automatic increase in the middle class, even in the medium to long run, much less in the magnitude needed for substantive changes to take place in the world’s demand for food.

5. Conclusions

Asia has seen substantial progress in the fight against hunger and undernourishment, accompanied by impressive economic growth and poverty reduction. Unfortunately, this has not been a regionwide story, but one limited to beacons of prosperity (such as China and Vietnam), alongside dismal missed opportunities (India and Pakistan). Economic growth alone and, more
importantly, poverty reduction on its own, will not do the job of eradicating hunger and malnutrition. Nor will only an increased production of food.

A right combination of sound domestic policies and global (regional) public goods is needed—along with economic growth, poverty reduction, and increased food production. Asia is currently in a decisive position to reduce the uncertainties that are affecting the levels and volatility of global food prices. It can become a model for good policies, for example by avoiding panic behavior at the time when agile international trade is most needed. Asia is currently developing smart agricultural practices that simultaneously improve yields, adapt better to extreme weather, and sequester green house gas emissions. There are multiple examples from the region of such practices, but Asia must still demonstrate that these are scalable beyond subnational regions. The short-term challenge is to not only strengthen the region’s leadership in contributing concrete solutions on agriculture and trade policies, but also strengthen its safety nets and nutrition policies to combat food insecurity.

The bottom line is that the future will see sizeable population increases and demographic changes that will affect the total demand for food, as well as the composition of that demand. Regardless of the accuracy with which current simulations project future increases in agricultural productivity and land use, the challenge is to ensure that these innovations are sufficiently substantial and sustainable over time to meet the overall increase in demand for food by the region’s growing population. Changes in the preferences of emerging populations will determine whether the world is capable of responding to the diversity of the new diets. But for this change in demand to happen, the reduction of poverty in the future will need to lead to the effective expansion of the middle classes and not, as has been happening up to now, simply the rise of
moderate poverty, which does not eliminate the possibility of the vulnerable population slipping back into extreme poverty.

Although this paper cannot predict the future in terms of the scalability of climate-smart agriculture, biotechnology advances, social tolerance or the pace of middle class expansion, it does emphasize that the ability of the world to produce more food should not be alone at the helm of addressing the challenge of feeding a growing population. Changes in preferences, the proliferation of panic policies, the recurrence of weather vagaries, and other threats to food security will determine the ability of the region to feed its population. Finally, it will be to the extent to which several of the agricultural and socioeconomic processes described in this analysis converge, that will determine whether the region will be an inescapable doomsday position of long-term food insecurity.
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Endnotes

1 This analysis follows the United Nations classification of geographical regions (United Nations 2013). Asia in this paper refers to Southeast Asia, South Asia, and East Asia subregions. Southeast Asia refers to Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste, and Vietnam. South Asia includes Afghanistan, Bangladesh, Bhutan, India, the Islamic Republic of Iran, Maldives, Nepal, Pakistan, and Sri Lanka. East Asia refers to China, Hong Kong SAR (China), Macao SAR (China), the Democratic Republic of Korea, the Republic of Korea, and Mongolia.

2 The paper does not address other factors that may affect longterm food insecurity, such as climate change, political economy issues or individual tastes and preferences, which would need be taken into account to determine whether or not Asia will be food secure in the future. For a recent survey on each of these aspects, see Atkin (2013); Warham, Fisher-Lamb, and Beddington (2013); Gillespie et al.(2013); Haddad (2013); and Jensen and Miller (2011).

3 It is worth noting that although widely accepted and used, the poverty line of US$1.25 per day per person is not free of caveats and continuous debate (Ravallion 2010a). There are lingering questions on the validity of an absolute threshold—globally representative—versus relative thresholds to better capture the notion of poverty. There are also issues regarding what the poverty line should really cost, that is, those minimum basic needs in a given society, or the cost of the necessary food energy intake. More recently, there have been calls to include in the poverty line costing those additional resources needed to ensure against intolerable risks. Furthermore, recent work includes estimating several absolute lines that will not only capture extreme poverty, but also moderate and middle class income groups. For a discussion and revision of literature around these caveats, see Hagenaars and van Praag (1985); Zheng (1997); Foster (1998); Cafiero and Vakis (2006); Banerjee and Duflo (2008); and Ravallion (2010b).

4 In addition, the initial levels in 1990 were so low (under 5 percent) that the target was not considered relevant in two cases, the Republic of Korea and Malaysia.

5 Improvements in global land use and manpower averaged annual increases of 0.3 percent and 1.1 percent, respectively, since 1961 (Southgate 2009).

6 Interestingly, increases in land use also will not necessarily improve welfare conditions. After conducting a back-of-the-envelope analysis on the correlation between arable land and poverty rates for a sample of 40 developing countries (8 from Asia), results showed that the correlation of these two variables was 0.46 for the period circa 1990 and circa 2010. That is, increasing land use is associated with increases in poverty rates, not poverty reduction. This result is robust to alternative specifications without outliers. Data come from FAO (2012b) and World Bank (2013). The sample was determined by availability of information on poverty rates for circa 1990 and circa 2010 (results available upon request).

7 Specifically, the government gives loans to rice growers who put up their harvest as collateral, valued at prices well above the market. When the loan falls due, if the market price for rice is lower than the initial estimate, the farmer is allowed to “default” on the loan in exchange for leaving the rice in government warehouses. In this way, the government collects large volumes of domestic rice from the growers at a subsidized price (that is, a price above the market). The export price of rice from Thailand has risen dramatically (along with restrictions in the supply after flooding at the end of 2011), so that it costs US$100 more per ton than competing rice from India, Pakistan, and Vietnam.

8 Another strategy that is gathering increasing international attention is the creation of livestock super farms. They are argued to increase productivity and improve food security. Detractors argue that they threaten the environment and might spread diseases among livestock. Pilots of such super farms are currently being developed in China’s northwestern provinces of Heilongjiang and Jilin.