Overview of the 2003 U.S. and World Outlook

Major Conditioning Assumptions
The Macroeconomic Environment

FAPRI baseline projections largely depend on two external factors: macroeconomic assumptions and agricultural policy assumptions. Macroeconomic projections used in the 2003 FAPRI baseline were obtained from Global Insight (formerly the DRI-WEFA).

In 2001, the world economy posted both the biggest drop in real growth rate and the lowest rate in the last decade at 1.3%. Recovery is slow, with a growth rate of only 1.6% in 2002. Several important economies, such as Japan and Argentina, were in recession in 2002. Full recovery in most economies is not reached for another two years. Thereafter, countries stay at their long-run growth rate for the remainder of the outlook period.

The U.S. economy grew by only 0.25% in 2001. In the 2002 recovery, some sectors performed better than others, especially motor vehicles, which benefited from aggressive promotion and computer technology, used by many for inexpensive productivity improvement. Aircraft manufacturing continued to suffer. Growth in the U.S. economy peaks in 2004 at 4% and stays at 3.2% for the rest of the decade. Canada’s slowdown in 2001 was not as deep, with its economy growing at 1.5%. Its recovery is also relatively quicker, peaking earlier in 2003 at 3.5%, driven by respectable business confidence, inventory accumulation, and strong government spending. Mexico’s growth path has followed those of the United States and Canada. With the weak economy of its NAFTA neighbors, Mexico was in recession in 2001. Despite concern over inflation, Mexico recovered in 2002 and is expected to maintain a healthy growth rate of 4.6% for the rest of the period.

Although Japan’s weak economy in the last two years (a recession in 2002) affected several other Asian countries, especially Hong Kong, Korea, Singapore, and Taiwan, Asia still posted a modest aggregate growth of 3.0% in 2002, driven by strong consumer demand, loose monetary policy, aggressive fiscal spending, expanding exports, and political stability (for example, in Indonesia). Further growth in investment spending is not expected to recover soon, with some existing capacity still underutilized. Japan is out of recession by 2003 and remains so, with annual rates of growth below 2% for the rest of the outlook period.

China continues to be a bright spot in Asia with an average rate of real growth of 7% per annum. Although structural reform in its state-owned sector may result in some temporary unemployment, China’s accession to the WTO should reinforce its growth. Also, the recent smooth transition of power, with the old guard remaining in positions of influence, strongly suggests continuation of China’s pro-reform economic policies.

The EU-15 region experienced moderate economic growth in 2001 but slowed slightly in 2002. Expected recovery in 2003 is weak, with an aggregate growth rate of only 1.8%. The Stability and Growth Pact in the European Union requires governments to take measures to contain emerging budget deficits, thereby affecting their fiscal flexibility to promote growth objectives. The competitiveness of former East Germany is adversely affected by wages that increase faster than productivity improvements. U.K. productivity gaps remain, with underinvestment in capital. The growth rate for the EU-15 region peaks at 2.7% in 2004 and remains above 2.3% for the rest of the period.

Affected by the EU economy, many of the acceding CEECs have slower growth beginning in 2001 and continuing in 2003. The bigger economies in the CEECs that are closely tied to the EU, including Poland, Hungary, and the Czech Republic, were most affected by this slowdown, with Poland posting the lowest growth at 1.1% in 2001 and 2002. Other CEEC economies are doing relatively better (Romania, Slovakia, Slovenia, and Bulgaria had 5%, 4%, 3.5%, and 3.8% growth rates respectively in 2002). Much effort has gone into making the countries EU-ready, and the growth paths of the CEECs appear to be converging with that of the aggregate EU-15.

Russia, Ukraine, and the Baltic countries are doing better than expected in 2002 and 2003. Annual rates of real growth are expected to stay between 3.7% and 5% after 2003.

Heavy debt burden, political instability, and past unsustainable policies have dampened Latin America’s performance. Since 1999, the economies of Argentina
and Uruguay have contracted, with Argentina experiencing a record contraction of its economy at 13.7% in 2002; both countries do not come out of recession until 2004. For the most part, Brazil seems to have avoided the problems of Argentina, posting an average of 0.87% in the last four years. However, it is expected to fall into a mild recession in 2003, with a growth rate of 0.47%. Venezuela experienced a recession in 2002 driven by civil unrest.

Most currencies depreciated against the U.S. dollar in 2001 but recovered their value in 2002, reflecting lingering softness of the U.S. economy, recovering domestic economies of many countries, and a substantial advantage in interest rates over the U.S. interest rate. With a few exceptions, the currencies of most developed economies, many countries in Europe, and the Baltic region continue to strengthen over the rest of the decade. On the other hand, beset by continuing economic and political challenges, all the Latin American countries are expected to continue to experience devaluation of their currencies relative to the U.S. dollar from 2002 on. Argentine currency devalued by 215% in 2002, and Global Insight forecasts continuing devaluation at double-digit rates until 2006, before stabilizing at a 7.9% devaluation for the rest of the period. Double-digit devaluation of the Brazilian real ends in 2003, but the real continues to devalue at lower rates of 3.7%.

The EU’s currency has depreciated relative to the U.S. dollar over the last six years but started to recover in 2002. The euro is expected to continue to appreciate gradually over the next six years. The yen depreciated in 2001 and 2002 relative to the U.S. dollar. Beginning in 2003, the yen appreciates moderately for the rest of the projection period. The problem of temporary unemployment in China may affect its exchange rate policy. Global Insight forecasts the renminbi to strengthen over the next six years. For the rest of Asia, with the exception of Thailand and Taiwan, most currencies devalue. Also, because of lingering political instability and the threat of war in the region, most currencies in Africa and the Middle East lose their value relative to the U.S. dollar over the next decade.

**Agricultural Policy Assumptions**

The FAPRI baseline assumes that all government programs and international agreements currently in effect will remain in place over the projection period. The biggest policy change incorporated in the 2003 baseline is the implementation of the Farm Security and Rural Investment Act of 2002, which governs U.S. federal farm programs for the next six years. Specific program provisions are presented in Box 1 on the following page.

The provisions of the Berlin Accord are implemented in the baseline as outlined in the legislation, including the dairy sector reforms from 2005 to 2007. The core spirit of the reform is to substitute distortionary price support with decoupled compensatory payments.

Even though a formal agreement on the financial aspects of enlargement was finalized during the December 2002 summit in Copenhagen, leading to a formal invitation to the 10 candidate countries (Poland, Hungary, Czech Republic, Slovakia, Slovenia, Estonia, Latvia, Lithuania, Cyprus, and Malta) by the 15 member countries, final signing of the Accession Treaty is not until April 16, 2003, in Athens. Moreover, after the signing, the 15 member countries must ratify the treaty, and acceding countries must accept membership through nationwide referenda. For this reason, the 2003 FAPRI baseline makes no assumption of enlargement of the EU. However, provisions in the zero-for-zero and double-profit agreement between the EU and individual acceding countries are included in the baseline.

Under the Uruguay Round Agreement in Agriculture, the commitment schedule of developed countries for export subsidy limits, TRQ expansion, import duty reduction, and domestic support reduction are fixed at 2000 levels. Developing countries continue to implement their commitments through 2004, and their commitments are held fixed from 2004 to 2012. China became a member of the WTO in December 2001, as did Taiwan in January 2002. The FAPRI baseline includes all policy provisions of the accession of these two countries. The 2003 FAPRI baseline does not include any conjecture regarding future policy changes brought about by the Doha Round initiated in November 2001 at the ministerial meeting of the WTO. Market liberalization in Mexico in 2003 under the NAFTA is included in the baseline.

Country- and commodity-specific provisions are also in the baseline. In livestock and poultry, the OTMS in the EU is assumed to be terminated in March 2004. The deficiency-type payments in Japan, modern-
**Box 1: U.S. Agricultural Policy**

In the case of the United States, the analysis incorporates provisions of the Farm Security and Rural Investment Act (FSRIA), the 2002 farm bill. FSRIA continues many important features of previous U.S. farm legislation but also makes a number of critical changes to U.S. farm policy.

FSRIA continues, with some revisions, the system of fixed payments established by the Federal Agriculture Improvement and Reform (FAIR) Act, the 1996 farm bill. As under the 1996 bill, producers are eligible for payments (now labeled “direct payments”) that are not tied to current crop production. For grains and cotton, payment rates are slightly greater than the rates scheduled to be paid on the 2002 crop under the FAIR Act. Producers are given a one-time opportunity to update the base acreage eligible for payment, with certain restrictions. FSRIA also allows producers to establish base acreages for soybeans, peanuts, and other oilseeds that did not qualify for fixed payments under the FAIR Act.

The marketing loan program also continues under FSRIA, with some modifications. Loan rates for wheat and feed grains were increased for the 2002 crop, while soybean loan rates were reduced. A marketing loan program is established for peanuts as part of a general reform that replaces the former quota-based system with a program similar to that for other field crops.

Perhaps the biggest innovation in FSRIA is the creation of countercyclical payments (CCPs) for grains, oilseeds, and cotton. Producers are eligible for CCPs when the season-average farm price of a commodity falls below the target price less the direct payment rate. CCPs are made on the same base acreages eligible for direct payments and do not depend on current production. The yield used to compute CCPs for an individual producer will often be different than the yield used to compute direct payments, given the yield updating rules established by FSRIA.

The U.S. sugar price support program is also continued by FSRIA, with the loan rate for raw cane sugar maintained at $0.18 per pound. A formula establishes allotments for cane sugar and beet sugar marketings.

FSRIA continues the dairy price support program, but it also establishes a payment program for milk producers for the 2002-2005 period. Payments under the Milk Income Loss Contract (MILC) program are made each month when the class I price of milk in Boston falls below $16.94 per cwt. Payments to individual operations can be made on no more than 2.4 million pounds of milk in a given year. The program is scheduled to terminate on September 30, 2005, and the baseline assumes these payments are not available in later years. The baseline includes full funding of the Dairy Export Incentive Program (DEIP) contained in FSRIA for NFD milk.

The Conservation Reserve Program (CRP) is continued and expanded under FSRIA, with the acreage cap raised to 39.2 million acres. FSRIA also expands a number of existing conservation programs and creates several new programs. Mandated spending on the Environmental Quality Incentive Program (EQIP) is increased several fold to assist farmers in addressing water quality, soil erosion, and other environmental issues on their operations. The new Conservation Security Program (CSP) is intended to provide stewardship payments on working lands.

While FSRIA is scheduled to expire in 2007, these projections assume that all of the provisions in place in 2007 are extended indefinitely into the future. Because the baseline was prepared in January 2003, it does not incorporate provisions of the fiscal year 2003 appropriation bill approved in February 2003. Among other things, the appropriations bill provided an estimated $3 billion in disaster payments but offset that expenditure by limiting future growth in spending on the CSP.
ization programs in the poultry sector in Taiwan, and the “Hanwoo” Integrated Measures Program of support payments in South Korea are assumed to continue.

In crops, the Berlin Accord CAP reform is meant to decrease the intervention support price and increase compensatory payments. Also, oilseed direct payments are progressively reduced and aligned with those for cereal production. Cereal and oilseed set-aside is set constant at 10% in the baseline. The limit on oilseed area under the Blair House Agreement is removed. In rice, the current EU regime is assumed to remain unaltered throughout the baseline. Import tariff reductions included in the “Everything But Arms” treaty are implemented as scheduled. The Japanese area diversion program is assumed to continue through 2012.

In dairy, the current EU milk quota system is retained under Agenda 2000. The Australian Dairy Market Support scheme was dismantled, freeing farmgate prices to be determined by market forces. To assist the adjustment of dairy farmers to the new economic environment, the Australian government introduced an AU$1.78 billion Dairy Industry Adjustment Program (DIAP). The current dairy support program in Canada provides market price support for butter and NFD and is assumed to remain intact for the baseline period. The two-tiered pricing system that reduced the cost of milk processed for exported products is eliminated in accordance with recent WTO rulings.

The Outlook for U.S. Agriculture

Crops

Reduced 2002 yields contributed to a short-term increase in U.S. market prices for feed grains, wheat, and soybeans. The increase in prices contributes to a projected increase in the area planted to wheat and corn in 2003. Given the baseline assumption of average growing conditions, the result is a significant increase in projected U.S. grain production in 2003. For soybeans, a small reduction in 2003 planted area is more than offset by the recovery in yields, so projected soybean production also increases.

The projected increase in grain and oilseed production translates into lower prices during the 2003/04 marketing year. Stocks rebuild, hindering any recovery in market prices in 2004/05, in spite of slight reductions in 2004 wheat and corn production.

In later years, projected wheat and feed grain prices increase slowly in nominal terms in response to steady increases in demand, especially for corn. A large increase in U.S. exports, driven by a significant shift in China’s net trade position, is the main source of growth in U.S. grain demand.

U.S. soybean prices also post a mild recovery between 2004/05 and 2007/08, but strong competition from South America limits growth in U.S. exports and contributes to a modest decline in soybean prices in later years. While U.S. soybean area is essentially unchanged after 2004, continued increases in yields per acre contribute to modest increases in U.S. production. Most of the increased production is crushed domestically, with the majority of the resulting meal consumed by the U.S. livestock industry.

After falling sharply in 2001/02, U.S. and world cotton prices have recovered in 2002/03, and further increases are projected. A slight increase in U.S. cotton acreage between 2002 and 2005 is reversed in later years, when increased competition from imported textiles is projected to result in a further weakening of domestic cotton mill demand.

U.S. rice prices also recover from very low levels. As in the case of cotton, the increase in prices does not translate into higher returns to U.S. producers, because marketing loan benefits decline as market prices increase. Rice acreage falls slightly over time, and the projected increase in yields is not sufficient to keep up with growing domestic consumption. As a result, U.S. exports decline during the projection period.

The outlook for the sugar industry is contingent on developments in U.S.-Mexican trade in sugar and high-fructose corn syrup (HFCS). The projections assume that continued trade frictions limit growth in Mexican imports of U.S. HFCS, and this in turn limits growth in U.S. imports of Mexican sugar. With slow growth in imports, the marketing allotments established by the 2002 farm bill are binding on the U.S. sugarcane industry. The result is only slight increases in U.S. sugar production and steady market prices. Even small changes in U.S.-Mexican trade or in domestic sugar demand could significantly alter the outlook.
Livestock, Poultry, and Dairy

Prices for cattle, hogs, poultry, and milk all declined in 2002. Supplies of meat to the U.S. market were larger than anticipated, largely because of increased production, but also because the interruption of U.S.-Russian poultry trade resulted in a significant reduction in U.S. broiler meat exports. Milk prices fell by nearly $3.00 per cwt in 2002 as supplies responded to the strong prices of 2001, and demand for many dairy products was soft.

Projected U.S. cattle inventories continue to decline and prices continue to strengthen until 2005. After several years of positive returns, beef cow numbers begin to recover in 2006, leading to increased production and lower prices in later years of the baseline. Per capita consumption of beef increases after 2005 but still falls short of the 2002 level even in 2012. Even with a decline in per capita consumption of beef over the period, this baseline reflects stronger beef demand than in previous years’ projections.

Low hog prices in 2002 contribute to a reduction in projected sow farrowings in 2003. Reduced production, in turn, results in an increase in hog prices through 2005. Hog prices cycle during the projection period, ranging from $37 to $47 per cwt. Slaughter capacity remains an issue, and the projected levels of hog slaughter for 2007 and later years can only occur at the projected prices if new slaughter capacity is available.

Chicken demand was unexpectedly weak in 2002, partly because of the reduction in Russian imports. Poultry production growth in 2003 is expected to be exceptionally slow, and the projected rate of growth in later years is substantially below the levels experienced in recent history. While domestic demand rises, the pace at which U.S. consumers are substituting poultry for other meats appears to have slowed. Exports of broiler meat expand at a solid rate during the projection period, as world demand slightly outpaces production from competing exporters.

U.S. milk production grows by approximately 1% per year throughout the projection period. Prices for NFD milk (and SMP) remain at government support levels, as production outstrips commercial demand at current support prices. While cheese demand continues to show strength, the pace is not sufficient to generate significant upward pressure on cheese and milk prices.

Projected U.S. all-milk prices remain below $12.50 per cwt during the life of the MILC payment program (2002-2005), and below $13.00 per cwt through 2012.

Government Outlays and Farm Income

U.S. government spending on farm programs fell significantly in fiscal year 2002 (October 2001 through September 2002). While the 2002 farm bill expanded a number of existing programs and created others, much of the new spending is delayed by the payment schedules established by the bill. Further, the increase in market prices for feed grains, wheat, and oilseeds limits expenditures on the marketing loan program and the new CCP program in fiscal years 2002 and 2003. In turn, the reduction in grain and oilseed market prices in 2003/04 contributes to increased government expenditures in fiscal years 2004 and 2005.

In later years, government spending on marketing loans and CCPs declines, as higher grain and cotton prices more than offset weak oilseed prices. Expenditures on conservation programs grow throughout the projection period, as the conservation reserve and new programs created by the 2002 farm bill expand. Net spending under the crop insurance program averages approximately $3 billion per year.

U.S. net farm income declined sharply in calendar year 2002, driven largely by the price-driven reduction in livestock sector cash receipts. In 2003, projected net farm income recovers to a level near the 1999-2001 average, as livestock sector receipts recover and government payments increase. In later years, net farm income varies over a relatively narrow range, as the growth in receipts for both crops and livestock is offset by rising production costs.

The U.S. projections reported here represent FAPRI’s deterministic baseline, assuming average weather conditions and demand conditions, as well as all the other assumptions described earlier. FAPRI also prepares a set of stochastic baseline projections that represent 500 alternative futures for the U.S. agricultural sector, based on random draws on crop yields and a variety of other factors affecting supply and demand. Given the manner in which the stochastic projections are developed, the average of the 500 alternative futures is generally similar to the deterministic projections reported here.
Given the nature of U.S. farm programs, however, there are often large differences between deterministic and stochastic projections of indicators such as government program costs and net farm income. In general, average levels of government costs and farm income are greater in the stochastic analysis than in the deterministic projections reported here. The principal reason that the U.S. loan and CCP programs are very asymmetric in their effects—payments can be very large when market prices are lower than average, but they can never be negative when market prices are above average levels. More about FAPRI’s stochastic analysis and stochastic results for government costs and net farm income can be found in the FAPRI 2003 U.S. Briefing Book (www.fapri.missouri.edu).

The Outlook for World Agriculture

Wheat

World wheat area has been declining steadily since its highest point in 1996/97, but in 2002/03, world wheat area totals only 212.2 mha, marking a new record-low. Fueled by the recovery in price, and rebounds in Australia and Canada, world wheat area is projected to increase by 8.7 mha in 2003/04. Over the next 10 years, world area decreases slightly, reaching 218.4 mha. Thus, the increase of 101.3 mmt in world wheat production is projected to come primarily from yield growth.

The world wheat price has increased significantly in 2002/03 to $162.1 per mt, owing to lower area, diminishing world stocks, and sustained demand. With the recovery in area and production, the world wheat price decreases 18% in 2003/04 to $136.3 per mt. The stocks-to-use ratio decreases steadily to 26.4% in 2012/13 from 28.8% in 2002/03. This maintains an upward pressure on the wheat price after 2003/04. The Gulf FOB wheat price is projected to grow 1.1% annually after 2004/05.

World wheat production was low in 2002/03 because unfavorable weather conditions in major producing countries resulted in lower area and yields. With recovery in those countries (for example, Canada and Australia), production is projected to increase by 37 mmt in 2003/04 to 604.5 mmt. An increase in consumption comes from both feed and food use, at 0.90% and 1.2% respectively.

World wheat net trade is projected to grow 3.6% annually, reaching 104.2 mmt by 2012/13. Growth in imports from Asian, African, and Middle Eastern countries accounts for most of this increase because of growing demand and limited capability to increase production. Asia’s net imports increase by 12.4 mmt over the next 10 years, followed closely by those of Africa and the Middle East at 11 mmt. Net imports of Latin American countries decrease slightly to reach 9.6 mmt in 2012/13, as Argentina increases its production and exports.

Because of its accession to the WTO, China, as well as other newly industrialized East Asian countries, shows the strongest growth in net imports. In 2003/04, China is projected to become a net importer of wheat, though a small one because of insufficient demand and decreasing stocks. Imports increase rapidly after that, mainly because of higher food demand. Imports decrease after 2007/08 because of depreciation of its currency. China’s net imports reach 6.8 in 2007/08 and only 4.7 mmt in 2012/13.

Indian net exports are projected to increase in 2003/04 to 9.5 mmt because of low domestic use. After that, net exports are expected to decrease as consumption outpaces production, reaching only 3.4 mmt in 2012/13.

Japanese imports increase only 1% over the next 10 years, reaching 5.4 mmt in 2012/13 as little growth is expected in food consumption, and feed use declines.

Among Latin American countries, Brazil is the largest market for wheat. Net imports reach 9.2 mmt in 2012/13. Increasing domestic consumption drives Mexican net imports of wheat up to 3 mmt in 2012/13.

African and Middle Eastern countries make up more than half of the market for wheat imports, and they are the second fastest growing market for wheat. Egypt’s net imports reach 7.9 mmt in 2012/13 because of lower prices and higher per capita consumption. Iran’s net imports reach 4.8 mmt in 2012/13.

On the exporter side, with the recovery in area and yields in 2002/03, the EU produces 103.7 mmt. Production grows at an annual rate of 1.1% over the next 10 years. In 2003/04, a slight decrease in wheat area is projected because of lower gross returns of the grains-to-oilseeds payment ratio. From 2003/04 on,
most of the production increase comes from yield growth, as only limited area substitutions are expected. By 2012/13, EU exports reach 11.5 mmt, growing at around 7% over the projection period, while in the middle of the period the EU is projected to subsidize wheat exports. Over the next 10 years, the EU is expected to increase its market share from 7.5% to 11.1%.

Boosted mainly by enhanced competitiveness on the world market, yield growth, and low domestic demand, Argentine production grows 4% annually, reaching 19.1 mmt in 2012/13. Exports increase steadily, reaching 13.8 mmt in 2012/13, allowing Argentina to capture a higher market share of 13.2% in 2012/13.

Canadian wheat area and yields are projected to recover in 2003/04 from the effects of the drought. This boosts production to 22.7 mmt in 2003/04. Production then grows 4.2% annually, reaching 32.9 mmt by 2012/13. With the recovery in production, Canada is projected to regain its market share, though it takes until 2011/12 to reach its 2001/02 level. Canadian net exports increase by 13.6 mmt over the projection period, totaling 21.3 mmt in 2012/13.

Australia’s production of wheat is projected to reach 22.4 mmt in 2003/04, as area and yields recover from unfavorable weather conditions, increasing to 25.5 mmt in 2012/13. Exports follow the same path, reaching 15 mmt in 2003/04 and 17.4 mmt in 2012/13. Australia’s market share recovers in 2003/04 though it is not sustained, as production slows down for wheat because of relatively higher gross returns in barley and higher sheep stock numbers.

The U.S. net export of wheat is 23.1 mmt in 2002/03, and this number increases to 25.5 mmt in 2012/13, because of higher demand from developing countries. Nevertheless, the U.S. loses its market share over the projection period as Canada and Australia recover. Argentina uses the advantage of its devaluing currency, and the EU benefits from a meager increase in domestic demand. The U.S. market share decreases from 31.5% in 2002/03 to 24.5% in 2012/13.

Coarse Grains

Coarse grain prices have been relatively high in 2002/03, though not reaching their levels in 1995/96, which is attributable to the decrease in area and stocks. With higher grain prices in 2002/03, world coarse grain area is projected to increase in 2003/04 by 3.7 mha, reaching 234 mha. With falling prices after that, world coarse grain area decreases slightly, reaching 231.2 mha in 2012/13, though this is still higher than its level in 2002/03. Corn’s share in area increases slightly at the expense of barley and sorghum, reaching 60% in 2012/13 because of relatively higher returns. Production increases by 142.6 mmt over the next 10 years, reaching 916.8 mmt in 2012/13, mostly because of yield growth. In 2002/03, world coarse grain consumption totals 801 mmt, 26.9 mmt above the world production. This difference decreases over the course of next 10 years, as stocks are depleted, and production increases faster than consumption. Consumption increases around 13% over the projection period because of strong demand from Asian countries and higher livestock production. World coarse grain trade is projected to grow at an average annual rate of 2%. Boosted by the recovery in production and exports in Canada and Australia, barley markets experience the fastest growth in trade among coarse grains, increasing their share in grain trade from 14.5% in 2002/03 to 17.7% in 2012/13.

In 2002/03, low world corn production led to an increase in the world corn price to $109.9 per mt along with a decrease in the stocks-to-use ratio of nearly 4%. In 2003/04, the nominal Gulf FOB corn price decreases 11.6% because of recovery in production. Driven up by increasing demand from world markets, the corn price is projected to grow 0.8% annually after 2003/04, reaching $106 per mt by 2012/13. The stocks-to-use ratio decreases to 14.8% by 2012/13. In 2002/03, world corn area totals 136.1 mha, 5.4 mha below its 1996/97 peak. Because of the recovery in prices, world corn area increases in 2003/04 by 3.2 mha, and stays approximately at the same level. Production was low in 2002/03 at 590.5 mmt. Production is projected to be 635 mmt in 2003/04 and it increases by 121 mmt over the projection period, mainly because of yield growth.

Because of slowly increasing per capita consumption and recovery in the livestock sector, the main increase in demand for corn comes from feed use. Feed use is projected to reach 499.7 mmt by 2012/13, increasing by 66.9 mmt over the baseline. Food use increases by only 28.8 mmt over the next 10 years.
In 2002/03, a large releases of stocks and lower feed use led to a decrease in world corn trade. Larger area in 2003/04 fueled by the rise in the world price in 2002/03 increases production faster than consumption, lowering exports in 2003/04. With growth in livestock production and trade liberalization, world corn trade increases steadily after that, reaching 81.4 mmt in 2012/13.

A small increase in area and strong yield growth allows Argentina to increase its corn production. Net exports increase, as the country takes advantage of the devaluation of its currency as well. Argentina’s net exports reach 12.1 mmt in 2012/13. Hungary’s exports reach 2.4 mmt in 2012/13, whereas South Africa exports 2.5 mmt in 2012/13. Although these three countries increase their production and exports over the projection period, the U.S. benefits from new market opportunities and captures most of the increase in demand, increasing its market share from 67% in 2002/03 to 82% in 2012/13.

The fastest-growing market for corn remains Asia, which nearly doubles its corn imports as China becomes a net importer in 2006/07. Upon China’s accession to the WTO, its increasing imports of corn enjoy a low 1% tariff. Fueled by growth in the livestock sector, feed use grows more than 2.4% annually on average. Lower prices and income growth drive food and industrial use up 2.3 mmt over the baseline. Despite a large release of stocks, demand surpasses supply. Chinese net imports are projected to reach 5.9 mmt by 2012/13. Growth in domestic use remains relatively slow in Asian markets such as Taiwan and Malaysia, with a mild decrease in Japan. In contrast, stronger import growth is expected to come from other Asian countries, such as South Korea, Indonesia, India, and Vietnam, where domestic use grows relatively faster. Latin America is also a growing market. Mexican net imports increase by 1.7 mmt over the baseline. Brazilian net exports are projected to increase by 1.6 mmt over the next 10 years. Imports by African and Middle Eastern countries increase by 2.6 mmt in total over the baseline.

World sorghum trade reached an all-time low in 2002/03 because of low production. This trend is projected to change in 2003/04, as area and production increase because of a high world price in 2002/03. The world sorghum price is $115.5 per mt in 2002/03 but decreases 17% in 2003/04. Recovery in world sorghum trade is mild, reaching only 7.2 mmt in 2012/13. This higher demand is supplied mostly by the U.S. Japanese imports recover in 2003/04 because of lower world sorghum price and stay relatively stable at that level, reaching 1.8 mmt in 2012/13. Mexican sorghum imports decrease until the middle of the projection period because of low feed use and increase afterwards as feed use recovers, reaching 4.8 mmt in 2012/13.

World barley trade grows steadily at an annual rate of 4%, fueled by higher demand from China and Saudi Arabia. The world barley price decreases 16% in 2003/04 and reaches $118.2 per mt in 2012/13. Higher yields and a meager increase in demand lead the EU to increase its net exports of barley to 8.4 mmt in 2012/13. Australian production and exports recover in 2003/04, with net exports reaching 3.5 mmt in 2012/13. With recovery in yields and area, Canada increases its barley exports at the beginning of the projection period, while this growth is reversed later because of increasing domestic feed demand.

**Rice**

In 2002, world rice area dropped 5.5 mha, with more than 80% of the decline occurring in India due to drought. China’s rice area has dropped substantially in recent years in response to changes in government procurement policies. Production shortfalls in China and India drew world rice stocks down by 23.7 mmt in 2002, and rice stocks are expected to drop another 22 mmt over the next two years. Large carry-in stocks are able to absorb the global shortfall in 2002 without putting substantial pressure on world prices. However, continued tightening of world rice supplies boost international rice prices 16.7% by 2004. After 2004, rice prices continue to rise 2.5% annually. World rice area grows less than 0.2% after 2006, implying that the bulk of the growth in production is derived from yield increases. Continued development and adoption of higher-yielding varieties in many countries keep average rice yields rising 1.0% annually. Supply control policies and a greater emphasis on quality dampen yield growth rates in the EU, Japan, South Korea, and Taiwan well below world average levels.

Despite rising total rice consumption, world average per capita consumption declines 2.5 kg over
the next decade. The downward trend is driven by urbanization, rising incomes, and diversification of diets in a number of populous Asian countries, including India, China, and Indonesia. Increases in rice per capita consumption mainly occur in non-traditional rice-consuming countries, such as Australia, the United States, and the EU, and in rice-consuming countries experiencing stable economic growth, such as the Philippines and Nigeria. Rising consumption outside the traditional rice producing and consuming areas in Asia is an important factor driving growth in rice trade. Imports from these regions account for more than 50% of the growth in total imports.

Total rice trade grows 2.5% annually, reaching 33.8 mmt (7.6% of production) by 2012. The combined imports of Bangladesh and Indonesia comprise 34% of the total growth in rice imports. Per capita consumption declines in both countries, but rapid population growth drives consumption to rise 1.8% annually in Bangladesh and 1.0% in Indonesia. Abundant stocks prompt Philippine rice imports to drop more than 40% in 2003, but stable economic growth increases Philippine per capita consumption by 4.5 kg over the coming decade. Philippine imports gradually rise 1.69 mmt by 2012.

Given a no-war macroeconomic forecast for the Middle East, per capita rice consumption in Iraq grows 1.8 kg over the baseline, and Iraqi imports rise by 400 tmt. Abnormally low yields in Iran in 2002 caused rice stocks to dip below 200 mmt. Although Iranian rice yields return to normal levels in 2003 and area continues to grow, growth in per capita consumption keeps import levels above 1.7 mmt throughout the baseline. Saudi Arabian rice imports in 2003 reach 1 mmt, and continued gradual growth in consumption increases Saudi imports to 1.37 mmt by 2012.

Since the relaxation of rice import restrictions in 1997, Nigeria has become the world’s second largest import market for rice. Per capita consumption is projected to grow 4.5 kg over the baseline, causing Nigerian rice imports to increase to nearly 2.6 mmt by 2012. South Africa and Cote d’Ivoire combined are projected to import more than 2 mmt by 2012.

EU rice imports grow 1.9% annually until 2008, when the recently concluded “Everything But Arms” agreement opens EU rice markets to exports from less-developed countries. Imports surge by more than 400 tmt from 2008 to 2012 and account for 50% of total consumption. Despite falling domestic prices, EU domestic policies keep rice production stable. Excess production enters government storage, pushing stocks to a record 1.43 mmt in 2012.

Mexican rice consumption grows 2.6% annually during the baseline. Despite annual yield growth of 1.6% and stable rice area, Mexican rice imports increase 215 mmt on a milled basis by 2012. With declining per capita consumption in Brazil, population growth drives the 0.6% annual increase in rice consumption. Brazilian production expands 1.3% annually, resulting in a gradual reduction in imports over the decade.

Thailand, Vietnam, and India dominate rice exports, with these three countries combined accounting for 66% of global exports in 2002. Their share grows to 70% by 2012. Thailand’s rice production expands slowly, by 1.1% annually over the decade. However, a 1% annual decline in per capita consumption enables exports to rise from 7.75 mmt in 2002 to nearly 9 mmt by 2012. Similar consumption trends are observed in Vietnam. A substantial expansion of Vietnamese rice production is driven by a 1.7% annual increase in yields, resulting in a 62% rise in exports over the baseline. Unfavorable monsoons reduced India’s exports by 2 mmt in 2002. Baseline projections reflect a full production recovery over the decade, with rice area returning to a previous peak of 45 mha and annual yield growth rates of 1.1%. India’s rice exports increase from 6 mmt in 2003 to 6.9 mmt by 2012.

China’s rice exports remain stable at 2 mmt throughout the baseline period, primarily as a result of declining rice production area, an increased focus on improving rice quality, and slight declines in per capita consumption. Rice exports from Myanmar of 1 mmt in 2002 are drawn largely out of stocks. With marginal increases in output and stable consumption over the baseline period, rice exports from Myanmar increase from 426 mmt in 2003 to 1.1 mmt by 2012.

Following two successive years of record production, U.S. rice exports peaked at 3.3 mmt in 2002. Total U.S. rice consumption grows from 3.9 mmt in 2002 to 4.65 by 2012. U.S. rice area declines slightly, and annual yield increases of 1% do not fully offset domes-
tic consumption growth. Consequently, baseline exports decline slightly over the decade to 2.8 mmt. Argentine exports increase slowly, as the economy recovers from its recent recession. Rice area in Uruguay expands by 3.9% annually. Nearly all of Uruguay’s production is channeled into the export market, increasing shipments from 626 tmt in 2002 to 1 mmt in 2012.

Oilseeds

World soybean prices climbed strongly in 2002/03 as demand grew faster than supply. Soybean prices are expected to weaken next year under the pressure of record supplies. High oil demand boosted sunflower prices in 2002/03 despite an expansion of world production. The continued decline in rapeseed production caused rapeseed prices to increase for the third straight year. In the long run, all oilseed prices are expected to return to their historic relationships.

In 2001/02, the expansion of soybean, sunflower, and oil palm areas overcompensated the reduction in rapeseed and peanut areas. As a result, total oilseed area increased by about 1%, to 155.1 mha. Next year, the area expansion is expected to be led by rapeseed and sunflower area growth. Total oilseed area increases by 14.3 mha during the baseline. More than 60% of the growth in total area occurs in the South American soybean sector. Total oilseed production reaches 354 mmt in 2012/13, with the increase driven by growth in both area and yields. Oilseed crush increases 25% to meet the rising demand for oilseed meal and oil. Strong income growth in developing countries increases the demand for vegetable oils and livestock products, which increases the demand for oilseed oils and meals. Each importing country’s domestic policy and crushing capacity dictate whether oilseeds or oilseed products are imported. Considering these factors, world oilseed trade is projected to increase by 45%, while meal and oil trade increase 25% and 27%, respectively.

Soybean area in 2002/03 increases 2% compared to last year, with the largest growth occurring in Brazil. Over the course of the baseline, world soybean area expands by 12%. Yield improvements and area expansion lead to a total production increase of 50 mmt by 2012/13.

Soybeans account for the bulk of the growth in import demand, followed by rapeseed and sunflower seed. The majority of the increase in soybean imports occurs in China and numerous smaller importers in the Middle East and North Africa. In 2008/09, China surges the EU to become the largest importer of soybeans because of strong per capita oil demand, demand for meal from the livestock sector, and Chinese grain policies. Chinese soybean net imports almost double over the baseline, rising from 13.7 mmt in 2002/03 to 26.2 mmt in 2012/13. The EU, currently the largest importer of soybeans in the world, increases its imports by 1.1 mmt over the baseline. Brazil captures 61% of the trade expansion, and the U.S. and Argentina capture 9.1% and 8.9% respectively. Rapeseed trade rebounds by 64% in 2003/04 and then grows at an annual rate of about 3.5%, reaching 6.8 mmt by 2012/13. Canada dominates the export market for rapeseed, while China and Japan account for more than 60% of rapeseed imports.

Oilseed meal consumption increases sharply from 167 mmt to nearly 209 mmt by the end of the projection period. The highest absolute increase is expected in soy meal consumption, which grows by 34 mmt. Soy meal also accounts for the majority of the growth in oilseed meal trade. The EU is the largest importer of soy meal, and its imports increase from 15.2 mmt in 2002/03 to 16.9 mmt in 2012/13. Driven by strong expansions in their livestock sectors, China consumes an additional 8.6 mmt by 2012/13. U.S. consumption increases 2% annually, but the U.S. share of world consumption falls slightly.

Increasing incomes in less-developed countries play a crucial role in the more than 19-mmt increase in vegetable oil consumption by 2012/13. On a per capita basis, world vegetable oil consumption is expected to increase by an average of 0.13 kg per person annually over the baseline. Except for peanut oil, consumption of all other vegetable oils grows more than 2% annually. China is expected to reduce oil imports because of its focus on domestic production. India remains the largest soybean oil importer, with its net imports reaching 2.7 mmt. India is also the largest importer of palm oil, and continued growth in population and income increases its imports from 3.8 mmt in 2002/03 to 5.1 mmt by 2012/13.
Sugar

World harvested area for sugarcane increases 4.7% while that of sugar beets increases 11.9% between 2002/03 and 2012/13. World sugar production increases 23.8% by 2012/13 and world sugar consumption grows an average of 2% per year during the projection period. After experiencing low levels in the last few years, the world sugar price increases steadily, to nearly 10.5¢ per pound by 2012/13, an increase of 29.2% over the baseline. The stocks-to-use ratio peaked in 2000/01 at 27.9% and is projected to decline to 15.2% by 2012/13. Following a 15.7% drop in world sugar trade in 2000/01, trade grew 12.5% in 2001/02; it is expected to increase by another 12.5% in 2002/03 and to rise by nearly 4 mmt between 2002/03 and the end of the projection period.

Australia, Brazil, Cuba, the EU, South Africa, and Thailand are the major sugar-exporting countries. Together they are expected to account for 92.2% of world sugar trade in 2002/03 and for over 98% of trade by 2012/13. These countries, with the exception of Cuba, have seen significant increases in production in 2002/03. Brazil, the world’s largest sugar supplier, continues to increase sugar production in 2002/03 because of favorable weather conditions and higher yields. The steady devaluation of the Brazilian currency, the real, is expected to further stimulate sugar exports in 2002/03, and exports are projected to reach 14 mmt by the end of the projection period. Per capita sugar consumption in Brazil continues to grow in response to population growth and an expected increase in the industrial use of sugar. Sugar production in Australia increases 20.5% between 2002/03 and 2012/13 because of gradual increases in area planted and higher yields. Sugar consumption increases 16.5% during the projection period. Australian exports increase by 22.2%, from 3.9 mmt in 2002/03 to 4.7 mmt by the end of the decade.

Cuba suffered a decline of 0.4 mmt in sugar production in 2002/03 because of Hurricane Michelle. Although sugar production increases in 2003/04, the country is undergoing a massive restructuring of the sugar industry, which may result in significantly lower levels of production and exports in the future. After experiencing lower yields and a decline in sugar beet production in 2001/02, the EU’s sugar beet production increases about 8% in 2002/03. Sugar production increases 9.8%, from 16.2 mmt in 2001/02 to 17.8 mmt in 2002/03. The EU’s per capita sugar consumption increases merely 2% between 2002/03 and 2012/13, as the region has a saturated domestic sugar market. Exports in the EU are projected to increase from a level of 3.8 mmt in 2002/03 to 5.1 mmt by 2012/13. Thailand’s sugarcane production also recovered in 2001/02, increasing 22.3% after an 8.4% decline in 2000/01 due to disease and pest infestation. Sugar production and exports in Thailand increase by 2.9 mmt and 1.6 mmt respectively between 2002/03 and 2012/13.

China, Indonesia, Japan, Malaysia, and South Korea account for about 23% of world trade by 2012/13, allowing Asia to retain its status as the largest importing region. China increases sugar production in 2002/03 and throughout the projection period, thus lowering initial projections of higher Chinese sugar imports because of the country’s entry into the WTO. India’s extraordinarily high sugar stocks will maintain that country’s rank as a net exporter of sugar until excess stocks are depleted. Although the FSU will remain a large importer of sugar, accounting for about 18% of world trade by 2012/13, imports decline from current levels as Russia and the Ukraine move toward increasing domestic beet production and reducing their market share of imports. Imports in the U.S. increase 16% between 2002/03 and 2012/13. Because the current HFCS-sugar dispute between the U.S. and Mexico remains unresolved, projections indicate much lower Mexican sugar exports than previously expected. Projections of sugar consumption in Mexico have been revised upward, in part because Mexican bottling companies have switched from HFCS to cane sugar in response to the imposition of a 20% duty on HFCS-containing soft drinks beginning in January 2002. The strong devaluation of the peso in Argentina has resulted in profitable sugar exports, and hence exports are expected to increase by about 9% during the projection period.

Cotton

After a 3.1-mha contraction in worldwide cotton area in 2002/03, with 2.3 mha of the contraction coming from Asia, area is expected to rebound to 32.9
mha of total cotton area in 2003/04. North America shows less of a rebound in area in 2003/04, growing by 0.04 mha or a diminutive 0.76%.

The recovery in area brings a recovery in production, with total worldwide cotton production reaching 20.3 mmt in 2003/04. World production continues to expand, reaching just over 23.3 mmt by the end of the forecast period.

**Livestock and Poultry**

Recovery from the 2001 economic slowdown is quite gradual in 2002, with the general economic condition still soft in many regions of the world. Recovery was further dampened with adverse developments in major markets. The BSE scare and mislabeling scandal in Japan and the poultry import ban in Russia adversely affected the markets. However, the outlook for the world meat sector in the next decade shows increases in consumption, production, and trade, and strengthening of world meat prices. The main driver on the demand side is economic recovery in many regions, with average growth rates ranging from 2.62% to 4.38%. Most countries achieve full economic recovery in 2003/04, with many continuing to show increasing growth rates thereafter. As a result, per capita consumption of beef, pork, and poultry increases 0.38% to 2.18% annually, or 5.70 kg, between 2002 and 2012. On the other hand, meat production capacity continues to expand. Structural transformation into larger-sized operations leads to the adoption of technological improvements and advanced management practices that continue to raise breeding herd productivity and feed efficiency. Moreover, several policy and institutional changes around the globe are improving the functioning of world markets. These include market-oriented domestic policy reforms, such as the Agenda-2000 reforms in the EU; trade liberalization in South Korea and Mexico; the zero-for-zero agreements between the EU and CEECs; accession of China and Taiwan to the WTO; and favorable institutional arrangements, such as the bilateral veterinary agreements between several countries (the EU and the U.S., Russia and the U.S., Brazil and Canada).

The beef price increases 5.36% over the next three years. Pork prices cycle throughout the baseline. The second peak price in 2011 is 4.61% higher than the peak price in 2005. The poultry price has an average annual increase of 0.89% throughout the decade.

Responding to the higher meat prices, world meat production rises 18.37% during the projection period, reaching 214.50 mmt in 2012 or an increase of 33.29 mmt. Broiler production shows the fastest growth at 22.21%, followed by a 17.95% increase in pork production, and a 15.45% increase in beef production. With meat consumption growing in many meat-deficit countries, demand increases by 3.69 mmt, or 36.44%, over the next decade. Meat trade satisfies some of the rising demand. Pork trade dominates the increase in meat trade, followed by beef and then poultry.

Low-cost producers in the Americas who have managed SPS challenges capture a growing share of international meat trade throughout the baseline. With abundant feed supplies, advanced production technologies, adequate transport and storage infrastructure, and exceptional sanitary and food safety controls, the U.S. and Canada increase their shares of the international meat market. The U.S. captures 36% of the growth in meat trade during the decade. The devaluation of its currency by 6.5% coupled with strategic investment in infrastructure in the grain-rich Center-West regions improves Brazil’s competitive edge relative to other meat exporting countries. On the other hand, animal disease problems in the EU and Argentina compromise these countries’ export potential.

Disruptions in world meat markets caused by sanitary issues continued in 2002. The BSE crisis in Europe was more widespread, affecting all member states except Finland and Sweden. As a result, Europe’s share of international meat trade has declined, as major importers have imposed restrictions or total bans on importation of EU beef products. Also, FMD cases in Europe prompted Japan and the U.S. to impose a complete but temporary ban on meat imports from the entire EU. The FMD outbreak in the early part of 2000 in South Korea continues to close the Japanese pork import market to pork imports from South Korea, as did the FMD outbreak in Taiwan in 1997. Similarly, cases of FMD reported in Argentina were a setback to the anticipated entry of meat products from South America into lucrative markets in North America, Europe, and Asia. Recent cases of BSE reported in Japan are the first reported outside of Europe and the
first in Asia. The full effects of these cases on meat import markets in Asia are still unknown. Recurring outbreaks of avian flu in Hong Kong have affected both the domestic poultry sector as well as the flow of live poultry imports from mainland China.

**Beef**

With its economy in recession, depreciating currency, and BSE and mislabeling scares, Japan saw its import of beef decline by 254 tmt in 2002. This drop was more than compensated for by an expansion in the imports of Russia, Mexico, South Korea, Taiwan, and other countries. As a result, there is an upward pressure on the beef price over the next three years, prompting it to rise by 5.36% annually. The U.S. price for fed steers peaks at $78.23 per cwt in 2005.

Income and population growth and various production constraints enable consumption to rise faster than production in many countries, prompting these countries to satisfy their excess demand with low-cost imports. For example, both the beef and dairy sectors in Japan have declined, by 2.25% and 5.64%, respectively. BSE and the mislabeling scandal drastically affected consumer confidence in food safety. Per capita beef consumption for imported beef was affected the most, declining 15.35% in 2002. Beef consumption recovered in 2003 and is expected to grow the rest of the decade, inducing beef imports to increase by 1.85% annually, reaching 1.09 mmt in 2012. South Korea’s beef imports are expected to expand because of a recent WTO ruling against its discriminatory beef retail distribution system. Over the baseline period, beef production in South Korea increases only 1.42% annually while consumption rises 2.81% each year, causing beef imports to balloon to 453 tmt (64% of consumption) in 2011. Taiwan’s beef consumption always had been met primarily with imports; they supply 95% of consumption demand. After two successive years of declines, beef consumption recovers in 2002 by 20.48% and continues to grow for the rest of the decade at a rate of 3.08%. Taiwan’s imports increase 5% annually over the baseline period.

China traditionally has been a net exporter of beef, with declining exports but small imports. With demand increasing at a rate of 4.72% compared to a 4.22% increase in production, China becomes a net importer of beef, at 252 tmt in 2012. Poor animal genetics and lack of improved pasture constrain rapid expansion of beef production in China.

Mexico’s cattle inventory has been shrinking at an annual rate of 4.29% since 1993. Growth in disposable income and population drive an expansion of beef demand. But it takes several years for the cattle sector to recover, causing beef net imports to increase 46.7% over the next two years. As the cattle sector recovers, net imports at the end of the decade approach the 2002 level. Strong demand for feeder cattle in the U.S. prompts Mexico’s live cattle exports to expand 3.70% annually, which is lower than rates observed in the late 1990s.

In the next decade, Russia’s beef imports increase 30.14%, from 695 tmt in 2002 to 904 tmt in 2009. In the first half of the baseline, cattle stock and production in Russia continue to decline 2.19% annually, while consumption recovers and grows. A slight recovery in production at the end of the decade, driven by recovery in the dairy sector, dampens imports to 854 tmt in 2012. The evolution of the CEECs’ cattle sector follows the pattern in Russia.

Canada is increasing its exports of both beef products and live cattle. Live cattle export to the U.S. reached a new peak in 2002 at 1.6 million head with the drought conditions during 2002 in Alberta and Saskatchewan, and to meet increasing American supply requirements. However, during the 2003 herd-rebuilding phase, Canada’s exports of live cattle and beef decline 14.87% and 14.42%, respectively, before they recover and continue to grow the rest of the decade by 2.38% and 4.93%. Canada’s share of world beef trade increases only slightly, from 8.08% to 8.36%.

Australia exports of both live cattle and beef increased in the first half of the decade. Beef exports increase 1.48% annually, peaking at 1.58 mmt in 2010 and slightly declining thereafter. But live cattle exports continue to grow 3.24% annually, reaching 1.16 million head in 2012. The Philippines and Indonesia are the primary destinations for Australian live cattle exports. Australia’s beef export market share declines from 42.73% to 38.34% as South American beef exporters recover some market shares.

New Zealand ranchers are able to retain more dairy calves to rebuild beef herds early in the baseline
with the 1.1% increase in dairy cow numbers. Production grows by 1.83% and exceeds the stable consumption. As a result, beef exports increase by 18.52% over the next decade, and New Zealand loses only a small percentage of export share.

Even though FMD outbreaks were controlled in 2002, delayed entry into its traditional markets such as Chile, the U.S., and Canada slowed Argentina’s recovery in beef exports. Export gains in the next decade are due to the country’s depreciating currency, with exports reaching 480 tmt in 2012, an annual growth rate of 12.84%. Argentina’s share of beef trade increases from 8.74% to 11.61%. Brazil, on the other hand, gains a competitive edge with its currency depreciation of 6.5% per year as well as improvement in its production technology, while maintaining FMD-free status in some of its states. Export growth in the next decade is 3.75% annually, reaching 1.02 mmt in 2012. As a result, Brazil’s export market share increases from 15.90% to 27.86%.

In the more recent BSE case, per capita beef consumption in the EU declined 5.22% in 2000 and another 7.98% in 2001. Stocks built up through the Special Purchase Scheme are fully released to the market by 2004. Per capita consumption is assumed to recover in three to four years before it reverts to its long-term downward trend in 2005. The OTMS is terminated in March 2004. After 2005, both consumption and production decline, with the latter due to the decrease in dairy cattle numbers.

**Pork**

The transformation of the pork sector in many countries has expanded productive capacity and improved productivity. However, rising incomes in countries that are not major pork-producing regions increase the demand for pork imports and boost world trade by 41.45 tmt, an increase of 1.10 tmt, by 2012. After two years of good prices, a healthy supply response puts downward pressure on price, causing it to decline to $34.92 per cwt in 2002. It returns to an upward trend in 2003, reaching another peak of $44.86 in 2005. The next peak price of $46.93 in 2011 is 4.61% higher than that in 2005.

Consumers in Japan substituted beef with pork because of food safety concerns in 2002, raising per capita pork consumption and imports by 2.77% and 5.34%. As a result, the pork safeguard was triggered in August 2002. Production declines 0.13% annually, while consumption increases 0.97% annually, prompting pork imports to increase 15.55% over the baseline, reaching 1.3 mmt in 2012.

Taiwan’s pork in 2002 was 28% lower than its pre-FMD level in 1996. With its accession to the WTO in 2001, production is expected to increase only slightly, by 0.54% annually. On the other hand, domestic pork consumption increases 0.91% annually, raising Taiwan’s pork imports 14.87% annually. Total imports reach 58 tmt in 2012.

Since 1995, China’s net export of pork has declined steadily. China is a potentially large market, but realistic market penetration is projected to be modest because a large portion of China’s pork supply still is produced cheaply by backyard producers. The share of commercial farms is increasing over time. They mostly supply the coastal cities and export to Hong Kong. The cost structure of these farms is comparable to producers in the West. With the reduction of duties from 20% to 12% and with the opening of distribution businesses to foreign firms, the slight differential in the growth of consumption at 2.25% and production at 2.20% is met by more imports, which are expected to reach 210 tmt in 2012. China’s export potential is constrained by SPS issues. Pork consumption in Hong Kong grows 1.74% annually. With production, mostly from imported live swine, declining by 1.85%, pork imports increase by 3.52% annually, reaching 379 tmt in 2012.

South Korea gained significant share of the Japanese pork import market after the 1997 ban on imports from Taiwan. However, FMD cases in pork-producing regions have restricted South Korea’s exports to Japan. Similar to the case of Japan, a weak economy and depreciating currency reduced South Korea’s 2001 pork imports by 29.31%. Imports remain in the range of 130 to 145 tmt. With the high cost of production and continuing SPS concerns, South Korea’s exports recover, but they reach only slightly below half of what their peak level was before the FMD cases.

Improved consumer purchasing power and population growth caused pork consumption in Mexico to increase by 2.69%. Despite some industry integration, limited supply of cheap feeds and credit problems keep
growth in domestic production lagging behind at 1.08%. As a result, pork imports increase by 8.05%, reaching 539 tmt in 2012.

Faster capital turnover and better feed supplies attract more investments in swine production in Russia and cause pork production to expand by 2.17% annually. With weaker recovery of consumption, pork imports decline slightly, from 699 tmt in 2002 to 546 tmt in 2012.

Owing to an abundant supply of cheap feeds, continuing improvement in productivity, adequate processing, storage, and transport infrastructure, and fewer SPS cases, low-cost producers in North America continue to capture the growth in the international pork market. By keeping a tight reign on production costs and improving productivity, efficient producers are able to weather the cyclical downturn in prices. With annual production growth of 1.19% exceeding consumption growth of 1.03%, net exports from the U.S. increase 5.82% annually, allowing the U.S. to increase its market share from 9.38% to 13.40% over the projection period.

Abundant feed resources, improved production technology, and additional investments in hog production facilities and meat processing plants allow Canada to expand production and exports of pork and live swine. Pork production growth of 3.06% exceeds consumption growth of only 1.20%, causing exports to grow at 5.77% and reach 1.16 mm in 2012. Exports of live swine to the U.S. also continue to grow at 0.91%, reaching 5.84 million head in 2012. Canada matched the growing demand for feeder pigs by midwestern producers with increased investment in weaner pig operation. Canada’s share of the world pork export market expands from 22.86% to 28.97%.

The BSE scare in 2001 in the EU raised domestic consumption and closed some traditional export markets, resulting in low net exports of only 1.047 mm. The EU was able to increase its net exports to 1.15 mm despite Japan’s triggered safeguard in 2002. Environmental regulations and animal welfare requirements limit the EU’s long-term capacity. Production grows at a rate of only 0.63%. For the rest of the decade, net exports average around 1.18 mm and only approach the 1998 peak level at the end of the decade at 1.24 mm. The EU’s export market share declines from 48.97% to 32.93%.

Brazil’s swine-pork sector grows 2.85% annually, driven by strong exports and domestic demand. With pork consumption growing by only 2.20%, Brazil is able to expand its exports by 5.50%, reaching 599 tmt in 2012. Also, market promotion by the government and devaluation of its currency allow Brazil to expand its traditional markets and penetrate emerging markets (for example, Russia), raising its share of the pork export market from 8.96% to 16.45% by the end of the period.

Primarily led by Poland, recovery in production allows Eastern Europe to expand exports toward the end of the decade. As CEECs with zero-for-zero agreements with the EU increasingly comply with the EU’s stricter sanitary requirements, their exports are expected to expand.

**Poultry**

Driven by its competitive price compared with that of other meats and by the perception that it is a healthier meat choice, poultry consumption in many countries grows faster than consumption of other meats over the next decade. On the production side, the ready availability of advanced production technology enables many producers to respond to the growing demand by increasing production by 22.11%. Where production is limited, increased consumption is met mostly through trade, which increases by 40.28%. The world poultry price shows a sustained annual increase of 0.89% throughout the next decade.

China becomes a net importer of broilers beginning in 2004, with imports reaching 311 tmt in 2012. China also exports poultry, mostly products with high labor processing requirements, to the EU and Japan. Because of SPS concerns, the EU and Japan require strict inspection. The flow of live chicken exports to Hong Kong from the mainland has been interrupted by cases of avian flu.

Despite high production costs (reportedly as much as double U.S. costs), Taiwan’s import of poultry products has been very low, at around 12 tmt, because imports outside the 19-tmt quota have not been permitted. WTO accession eliminates the quota and reduces duties from 40% to 25%. As a result, poultry imports increase 32.22%, as consumption growth of 2.17% outpaces the 0.73% growth in production.
Since the collapse of poultry production in the early 1990s, Russia has depended on imports to meet domestic demand. With production increases of 5.02% more than compensating consumption increases of 2.60%, imports rise by only 0.56%. Russia’s net imports of broiler meat reach 1.35 mmt in 2012. After imposing a temporary ban on poultry imports from the U.S. in 2002, allegedly due to food safety questions, Russia is considering the adoption of a TRQ that would limit broiler imports. The details of this new quota are still developing.

Japan’s poultry consumption and imports declined in 2001 because of the weak economy and depreciating currency. However, even with a recession in 2002, imports grew, and over the rest of the decade, consumption recovers and grows at 0.74%, while production declines steadily at 0.21%, leading to an annual increase in poultry imports of 1.84%. Hong Kong’s demand for chicken meat is met largely by imports, which account for 81% of the country’s total supply. Domestic production grows at 2.83%, including slaughter of live poultry imports. With a 1.47% increase in consumption, poultry meat imports increase by 1.10%. The combined net imports of Indonesia, the Philippines, and South Korea increase from 92 mmt in 2001 to 217 mmt in 2012, an annual growth of 8.44%.

Eastern Europe has been an importer of poultry products in the past. A 2.46% growth in consumption, driven by income growth and increasing demand from HRI after privatization, causes imports to grow by 6.96%, reaching 227 mmt in 2012. Production growth lags behind at 2.04%.

Per capita poultry consumption in Mexico in 2002 overtakes beef consumption, the leading meat in the Mexican meat consumption basket. The NAFTA poultry quota has prohibitive out-quota duties. However, in many instances the Mexican government revised the quota upwards when the NAFTA quota was exceeded, to avoid the high duties. The termination of the quota in 2003 may boost imports, which are already growing 5.99% per year, more than meeting the 3.14% yearly growth in consumption. Domestic production grows 2.79% annually, with 80% of integrated farms mostly using genetics from the U.S.

Poultry consumption in Saudi Arabia increases by 3.12%. Despite the higher cost of production, the government of Saudi Arabia supports domestic production. Production is expected to grow by 3.35%, leaving more than half of the total demand to be met by imports, which grow by 7.89%, reaching 517 mmt in 2012.

Strong exports and domestic demand drive the growth in Brazil’s poultry sector. Large investments in broiler production in the grain-rich Center-West region have been encouraged by fiscal incentives and subsidies from local governments. The use of high-performance breeding stock has improved productivity. As a result, production increases by 2.98%. In comparison, domestic consumption increases by 2.24%, leaving a large amount of exportable surplus. Devaluation of the Brazilian currency and market promotion in the export market enable Brazil to increase its poultry exports by 5.69%, which go mostly to Russia, China, and the EU. Brazil increases its share of the export market by 10% in the first half of the decade, and by another 3.52% in the second half.

U.S. broiler production, consumption, and trade continue to grow over the next decade. The Russian ban on U.S. broiler exports partly explains the 12.42% decline in exports in 2002. But with abundant feed grains, efficient production, and adequate transport and storage infrastructure, the U.S. increases its exports 2.87% annually, to reach 2.92 mmt in 2012. However, strong competition from Brazil reduces the U.S. share of broiler trade slightly, from 55.21% to 49.45%.

Over the last three years, EU import of broilers increased 40.80%, allegedly because of the EU’s use of the “salted meat from other animals” category, which carries a lower duty than does frozen unprocessed poultry. Also, net exports of poultry products from the EU declined, as a greater proportion of poultry production was retained for the domestic market to substitute for beef after the BSE scare. With consumption growing 1.06% and production growing 0.74% annually, net exports will continue to decline over the rest of the decade. A ban on MBM affects feed costs, and environmental regulations and welfare requirements may adversely affect long-term prospects.

The Thai poultry sector is expected to recover well. Productivity improves and investment in product innovation continues, with more emphasis on higher-valued products through processing. However, continued appre-
ciation of the baht over the rest of the decade hurts Thailand’s long-term competitive advantage. The slight differential between production growth of 3.25% and consumption growth of 3.37% results in only a 2.66% net growth in exports.

**Dairy**

After stagnating in the 1990s, milk production in modeled countries began to increase in 1998. Over the next decade, milk production increases 11% because of a 1.7% increase in total dairy cattle inventories and a 9.2% increase in milk per cow. Just over 36% of the 49.8-mmt increase in milk production occurs in North and South American countries. U.S. milk production rises 7.1 mmt over the baseline, while cow numbers fall 0.5% annually, implying a 1.5% annual increase in output per cow on average. Productivity in Brazil’s dairy sector rises an average of 1.5% annually, which is coupled with a 8.6% increase in cow numbers over the next decade, producing a 5.6-mmt increase in milk output. Milk production in Mexico increases 2.3 mmt through combined growth in cow inventories and productivity per cow. Argentine yields and cow inventories decline over the short run because of capital constraints and economic uncertainty. However, growth resumes in 2006, with production levels reaching the 1999 peak level by the end of the projection period.

The vast majority of the growth in milk production in the Americas over the next decade remains in domestic markets to satisfy demands for fresh milk and dairy products. In contrast, the bulk of the combined 5.7-mmt increase in milk production in New Zealand and Australia is destined for export markets. New Zealand milk production increases an average of 2.2% annually over the baseline. Australian milk production grows 2.3% annually, as the industry rationalizes current capacity in response to recent deregulation. Substantial growth in milk production also occurs in China, Ukraine, Russia, and India.

Total fluid milk consumption rises 11.2 mmt over the baseline, leaving more than 77.5% of the growth in milk production to be processed into manufactured dairy products. Total butter production increases 14.4% by 2012, with nearly 82% of the growth occurring in India. Butter production remains relatively constant in the EU and Japan, while U.S. butter production decreases about 3.0% over the baseline. Total cheese production grows 13.3% over the baseline, with U.S., Australian, and New Zealand production increasing about 1.8%, 2.3%, and 2.9% annually, respectively. Similarly, total NFD output rises about 7.5% over the baseline. NFD production in the U.S., the EU, and Japan declines substantially, but output in Argentina, Mexico, Poland, Russia, Ukraine, India, Australia, and New Zealand increases considerably. Production of WMP rises 15.2% over the baseline. Brazilian WMP production grows roughly 2.2% annually.

Per capita cheese demand in modeled countries grows an average of 0.4% annually over the next decade. The U.S. and the EU account for 61.6% of the total increase in cheese consumption. U.S. per capita cheese consumption increases 1.1 kg over the baseline. Per capita cheese consumption in Russia and the Czech Republic increases about 3.4% and 1.5% annually, respectively. Growing cheese demand in Russia is met by imports, largely from the EU and Eastern European countries, while growth in U.S. cheese consumption is met by domestic production. Per capita butter consumption decreases in most countries except Poland, Brazil, and Mexico. Butter consumption is relatively high in countries such as New Zealand, Poland, the EU, and the Czech Republic. New Zealand per capita butter consumption decreases about 1% annually, while U.S. butter consumption decreases about 0.5% annually.

World prices for NFD and WMP decreased by 36.4% and 34.8% respectively in 2002. NFD and WMP prices decline about 3.8% and 3.6% in 2003, as NFD and WMP supplies increase. From 2004 onward, NFD and WMP prices rise an average of 1.9% to 1.6% annually. The strength in powder markets is driven by a recovery in Asian demand for milk proteins coupled with a strong demand for cheese in several countries, which keeps additional milk from flowing to powder plants. An increase in exports from the EU along with weak import demand contributed to a 20.4% decrease in cheese prices in 2002. Similarly, butter prices decreased about 14.9% in 2002. Butter and cheese prices rise steadily after 2004, increasing 2.4% and 2.8% annually, respectively.

New Zealand, Australia, and the EU supplied roughly 86% of butter exports in 2002. Moderate growth in EU and New Zealand exports keeps the share of these major exporters above 85% throughout the
baseline. The EU butter export level increases from 75 tmt in 2002 to 88.5 tmt in 2012, growing 1.8% annually. However, EU butter exports remain below their quantity limits for subsidized exports. With substantial stocks and weak international demand, the EU domestic butter price declines 1.1% annually from 2002 to 2012. Australian butter exports increase about 5.2% annually. China, Egypt, Mexico, and Russia are among the major butter importers. As the Russian economy strengthens, butter imports increase 40.8 tmt by 2012. Mexican butter imports also increase, by 16.5 tmt, over the baseline because of increased demand. Increased butter demand in India, China, and other South Asian countries raises total butter imports by 123.3 tmt over the baseline.

The EU, New Zealand, and Australia contributed about 78% of cheese exports in 2002. The combined share of these major exporters remains above 78% throughout the baseline. Cheese exports from Australia and New Zealand grow an average of 2.7% and 3.6% annually, allowing these countries to capture 73.6% of the total growth in trade. Following implementation of the Berlin Accord reforms, EU unsubsidized cheese exports grow 24 tmt over the baseline, increasing nearly 0.7% annually. Russia, Japan, and the U.S. import about 55% of the total cheese traded. Russian and Japanese cheese imports rise to 215.4 tmt and 239.5 tmt respectively by 2012. Exports from Oceania satisfy the 27.5-tmt increase in Japanese cheese imports and the 22.9-tmt growth in cheese imports by other countries in Asia.

Supplies in international NFD markets remain abundant in the coming decade, keeping prices below $1,550 per mt for the entire projection period. Australia, New Zealand, the EU, and the U.S. supplied about 68% of NFD exports in 2002. Exports from both the EU and the U.S. are limited by WTO export subsidy commitments. Although the EU has a cap on NFD exports, export levels stay well below its quantity limit throughout the baseline. The most important factor in EU NFD exports is increased stocks. Weak demand for NFD increased EU stocks in 2002. With high supplies of NFD and limited export opportunities, the EU NFD prices are close to the intervention levels, increasing the stocks in the first part of the projection period. U.S. NFD prices remain above world prices. Poland seizes the opportunity to recover some of its NFD exports lost following the Russian economic crisis and increases its exports about 6.2% annually. Mexican NFD imports increase about 30% over the baseline. Malaysian NFD imports grow about 4% annually.

New Zealand, Australia, and the EU contributed about 86% of WMP exports in 2002. WMP trade grows a modest 15% over the next decade. Argentina, Australia, and New Zealand are able to supply the increased demand in WMP imports. New Zealand WMP net exports increase 100 tmt by 2012, accounting for more than two-thirds of the total growth in trade. Argentine WMP exports grow an average of 0.6% annually, reaching 123 tmt by 2012. Australian WMP net exports rise 3.1% annually, reaching 215.1 tmt by 2012. Competition for milk supplies and subsidy allocations keeps EU WMP exports stagnant at about 400 tmt. China, Egypt, Malaysia, and the Philippines are the major WMP importers.