Overview of the 2007 U.S. and World Outlook

The Macroeconomic Environment

Macroeconomic projections used in the 2007 FAPRI baseline were obtained from Global Insight. The macro projections for the coming decade call for continued solid global economic growth above 3.3% per annum despite crude-oil prices remaining much above $50 per barrel.

Real GDP growth in NAFTA countries is projected to continue in the coming decade, with average annual growth rates of 2.6%, 3.7%, and 2.8%, in Canada, Mexico, and the United States, respectively. Price inflation in these countries is expected to remain moderate during the outlook period.

The outlook for the Asian economies is extremely solid, with a projected average annual real growth rate of 4.2%, and with highest growth rates (6.9% to 7.8%) predicted for China, Vietnam, and India for the decade. East Asia is growing strongly. Japan’s outlook continues to be positive, with 2% growth in 2006 and projected real growth of 1.5% annually for the outlook period. Inflation remains low in most of Asia.

Latin America is projected to grow 4.2% annually on average over the decade. Argentina’s real GDP grew by 8.4% in 2006 and is expected to grow at 5.5% annually for the next 10 years. Brazil’s economy grew by 2.8% in 2006; in the coming decade, annual growth is projected to average 3.6% per year. Price inflation is expected to be significant in Argentina and Venezuela. Elsewhere it hovers between 3% and 5%.

The economic growth convergence between old Europe and the EU-10 continues but at a slower projected pace in the coming decade. Bulgaria and Romania grew strongly in 2006; their growth slows in the coming decade. Most EU members experience real currency appreciation against the U.S. dollar, reducing their competitiveness by 1% to 2.8% annually on average in the coming decade.

Most Latin American currencies appreciated in real terms against the dollar in 2006, with the largest appreciations occurring in Brazil, Chile, and Venezuela. In the coming decade, Argentina’s currency keeps appreciating in real terms and so does Uruguay’s currency, but more moderately. Most other currencies depreciate in real terms against the U.S. dollar on average in the coming decade. All currencies are expected to depreciate in nominal terms.

In the coming decade, the U.S. dollar resumes its real depreciation against currencies of Australia, the EU, Japan, and New Zealand. Most Asian currencies appreciate in real terms against the U.S. dollar, except that of South Korea. China’s currency experiences especially large real appreciations.

Agricultural and Trade Policy Assumptions

Regarding U.S. farm policy, the baseline incorporates provisions of the Deficit Reduction Act of 2005. The share of direct payments available before planting is reduced from 50% to 22%; total payments are unaffected. The Deficit Reduction Act extends the MILC program for another year, eliminates the Cotton Step 2 program, and limits conservation spending. Provisions of the Farm Security and Rural Investment Act (the 2002 farm bill) and the Deficit Reduction Act are assumed to continue throughout the baseline, even though a new farm bill is likely to be put in place in 2007. Loan rates, target prices, and direct payment rates are all held constant between 2006/07 and 2016/17.

In 2006, the international policy environment included the continuing implementation of the 2003 CAP reforms. Decoupling will be completed this year and will take the form of a Single Farm Payment. The accession of Bulgaria and Romania to the European Union is included in the 2007 outlook. With accession, Bulgaria and Romania align external import tariff levels with those of the European Union. Farmers in Bulgaria and Romania will start receiving direct payments equivalent to 25% of EU levels in 2007, increasing gradually each year so that direct payments will finally reach the same level as in the European Union in 2016. Milk marketing quotas are set at 979 tmt for Bulgaria and 3.57 mmt for Romania. The farmer price for milk is assumed to have a three-year phase-in period and will be the same as the EU price in 2009.

The sugar reforms of the EU Common Market Organization were adopted in 2006. The reforms cover a transitional period from 2006/07 to 2009/10. To ease the possible oversupply of sugar in the market in the first year of the reform, the European Commission
implemented a 2.5 mmt one-year cut in the quota in 2006/07. A sufficient amount of quota sugar (1.5 mmt) was surrendered in 2006/07 at a one-time payment of €730/ton. However, the second year of the sugar reform saw only about 0.7 mmt of quota renounced, much less than the 5 mmt anticipated by the Commission. Consequently, in February 2007, the Commission introduced another compulsory but temporary market withdrawal of about 2 mmt of sugar for the 2007/08 year. The first quota withdrawal has been accounted for in the baseline but, given the timing of the announcement of the second withdrawal, the 2007/08 cut was not incorporated into the baseline.

SPS shocks and trade restrictions in meat markets associated with BSE in North America, FMD in Latin America, especially Argentina, and AI in Europe and Asia continued in 2006. The FAPRI baseline incorporates all shocks and resulting trade bans that occurred up to January 20, 2007. These SPS shocks will remain a factor in the short-run outlook as the market recovers from them.

Energy policies, such as the proposed U.S. expanded renewable fuel standard, will continue to be prominent. Recent policies include the 2005 U.S. Energy Policy Act (see Box 1 on U.S. ethanol demand), the 2003 Renewable Fuels Directive of the European Union, and new mandates in Brazil to increase fuel blends of biodiesel by 2008 and 2013.

The 2007 outlook includes policy tables covering border tariffs and TRQs, export subsidies, and domestic policy interventions used in the FAPRI model. An extended policy database is available on our Web site and is updated once a year in the spring (www.fapri.iastate.edu/tools/).

The Outlook for U.S. Agriculture

The growing biofuel industry has transformed the U.S. agricultural sector. Ethanol production has expanded rapidly, and new plants under construction could double production capacity in the next two years. The resulting increase in corn demand and prices is expected to lead to a large increase in U.S. corn acreage at the expense of soybeans, cotton, and other crops. Higher feed costs negatively impact meat, poultry, and dairy producers, resulting in slower rates of production growth and higher prices. Higher commodity prices translate into lower farm program payments, with important implications for the 2007 farm bill debate.

Crops

The use of corn to produce ethanol is projected to double between the 2005/06 and 2007/08 marketing years and to exceed 4 billion bushels by 2009/10. Corn prices have increased sharply since the fall of 2006, and season-average corn farm prices exceed $3.00 per bushel in all but the final year of the 10-year baseline. Higher prices result in the highest U.S. corn acreage since the 1940s and contribute to reductions in U.S. corn exports over the next two years.

The pace of growth in ethanol production eventually slows. After peaking in 2006, ethanol prices fall as supplies increase and prices for petroleum and gasoline decline slightly (see Box 1). Profit margins for ethanol producers are squeezed by both lower ethanol prices and higher corn prices, discouraging additional investment in production capacity. Corn-based ethanol production levels off after 2010, resulting in some moderation in corn prices, which in turn allows U.S. corn exports to recover.

U.S. soybean markets are also driven by biofuel developments. The expected shift in 2007 acreage away from soybeans and into corn has contributed to an increase in soybean prices, even though 2006/07 soybean supplies are at record levels. Projected growth in biodiesel production in the United States and other countries contributes to a significant increase in prices for soybean oil and other vegetable oils.

Wheat prices increase in 2006/07, in part because of reduced yields in the United States and other exporting countries/regions. With an assumed return to more normal yields, projected wheat prices decline slightly in 2007/08 but continue to be supported by high prices for corn and other grains.

After five years of solid growth, U.S. exports of cotton have declined in 2006/07. In spite of a smaller 2006 cotton crop, weak cotton prices continue and an increase in U.S. cotton stocks is projected. The result is expected to be a significant reduction in U.S. cotton plantings in 2007, but prices may not improve until exports recover and reduce inventories.

Livestock, Poultry, and Dairy

Higher prices for corn and other feedstuffs mean increased costs to meat, poultry, and dairy produc-
ers. Costs increase most for producers who use a lot of corn and other grains in their feed rations. Protein meal prices are likely to be more moderate. Increased production of ethanol will put more distillers grains and other coproduct feeds on the market. Many livestock producers will find it profitable to include these coproducts in their feed rations, but the magnitude and duration of any cost savings may be limited.

In spite of higher feed costs, the U.S. cattle industry is in an expansion phase. Projected U.S. beef production expands through 2011. Increasing production and high feed costs put downward pressure on feeder cattle prices. Declining net returns to cow-calf operators eventually halt the expansion and cause cattle inventories to decline after 2010. On the demand side, U.S. beef exports are projected to continue their slow recovery but to remain below the 2003 level even in 2016. Fed cattle prices decline slightly between 2008 and 2011 but remain over $80 per cwt throughout the baseline.

Higher corn prices contribute to a $6 per cwt increase in feed costs for pork producers in 2007. Negative farrow-to-finish net returns in 2007 and 2008 lead to a reduction in U.S. pork production in 2009 and 2010. Barrow and gilt prices average $50 per cwt between 2010 and 2016 once the sector adjusts to higher feed costs.

U.S. chicken production actually declined in the last two quarters of 2006, and slow growth is expected in 2007. After dipping in 2006 in the face of weak domestic demand, wholesale chicken prices recover in 2007 but remain below the 2004 and 2005 levels. As with beef and pork, higher feed costs result in slower growth in poultry production and higher output prices than would have occurred otherwise.

Dairy producers are paying higher prices for corn, alfalfa, and other inputs, and milk prices declined sharply in 2006. The result is likely to be a significantly slower rate of growth in U.S. milk production in 2007 that should allow a recovery in milk prices. Projected all-milk prices exceed $14 per cwt for the next 10 years.

**Farm Income and Other Aggregate Indicators**

Net farm income declined for the second straight year in 2006 because of another large increase in production costs. In 2007, sharply higher crop receipts lead to a $6 billion increase in net farm income, in spite of reduced government payments and higher costs for feed and other inputs. In nominal terms, net farm income remains relatively stable after 2007, as costs and receipts grow at a similar pace.

Government farm program outlays by the CCC are expected to decline sharply in FY 2007, as higher prices for corn and other commodities translate into reduced expenditures under the marketing loan and CCP programs. The budgetary impact of farm bill options will be assessed relative to baseline projections with low levels of budgetary costs. Congressional budgetary rules create hurdles for legislation that would increase government spending relative to an extension of current law, so low levels of baseline spending may influence the 2007 farm bill debate.

Food price inflation increases slightly in 2007, to 2.9%, but drops back to about 2% per year over the rest of the baseline period, near the general rate of inflation in the U.S. economy. Higher producer prices for grain, vegetable oil, meat, and dairy products all put upward pressure on consumer food prices, but farm-level prices account for a decreasing share of consumer food expenditures.

**Alternative Baseline Projections**

The figures reported in this publication are based on a single set of assumptions about the weather, the economy, and other factors that affect commodity supply and demand. FAPRI has also developed a stochastic baseline of U.S. agricultural markets that estimates market outcomes under a wider range of assumptions. In essence, FAPRI develops 500 related baselines that share some assumptions, such as a continuation of current government policies, but that differ in their assumptions about crop yields, production costs, petroleum prices, export demand conditions, and other factors.

Results of the stochastic baseline analysis are summarized in the *FAPRI U.S. Baseline Briefing Book* for 2007, available at www.fapri.missouri.edu. That publication provides average results from the 500 related baselines. For most variables, those average results from the stochastic analysis are very similar to the estimates reported in this publication. There are exceptions to this general rule, however. For example, average ethanol production is slightly greater in the
The FAPRI modeling system breaks down U.S. ethanol consumption into three components based on a segmentation of U.S. gasoline/fuel consumption. First, FAPRI separates the E-85 gasoline market used by flex-fuel vehicles (FFVs) from the aggregate gasoline use by “regular” cars. Aggregate gasoline use by regular cars is further separated into two types of markets. There is a market in which ethanol-blended gasoline (E-10) and regular gasoline compete on price for the consumer’s dollar at the pump on a voluntary basis—a voluntary E-10 market. In addition, there is another market component based on an oxygenation requirement and blend mandates, for which consumers do not have a choice, as there is no gasoline that is not ethanol-blended. We call this third market the additive market. These three markets/uses have been evolving rapidly. The additive use of ethanol is currently the larger market but is expected to be overtaken by the voluntary ethanol market, as increasing supplies over the next few years will have to compete for the consumer’s willingness to buy gasoline. The smallest market is the E-85 market, which is also changing rapidly but is starting from a nearly negligible base. We review these three components (additive, voluntary, E-85) of demand and their determinants.

1. Policy incentives and use of additive ethanol

The recent expansion of the use of ethanol has been driven by regulations and various federal and state policies, such as the federal oxygenate requirement and reformulated gasoline program. Although the 2005 Energy Policy Act removed the oxygenate requirement of the 1990 Clean Air Act, the use of reformulated gasoline based on ethanol remains predominant in the United States, at about 37% of gasoline use, mainly because of state mandates to use reformulated gasoline or E-10 blends (for example, in California, Minnesota, Montana, and Hawaii).

The Clean Air Act also removed the liability exemption shielding the use of methyl tertiary butyl ether (MTBE), another important additive, in gasoline starting in May 2006. Several states had already banned MTBE use because of health concerns. These policy changes induced a radical shift away from MTBE to ethanol in 2005 and 2006 and contributed to the ethanol price spike observed in 2006. The replacement of 3.3 billion gallons of MTBE represents about 3 billion gallons of ethanol use per year.

The use of ethanol as an additive in gasoline was the largest component of U.S. ethanol consumption in 2006. Additive ethanol demand responds moderately to changes in the ethanol price net of tax incentives—the blenders’ response to a change in price of one of the inputs going into producing gasoline. Additive ethanol demand is directly linked to the volume of gasoline consumed in the United States. It eventually responds to gasoline prices, as higher gasoline prices reduce the aggregate gasoline use and hence the additive ethanol included in gasoline, other things being equal. As the U.S. ethanol market expands, this important component of ethanol demand will become relatively less important, as its growth will eventually taper and be linked to the growth of aggregate gasoline consumption. FAPRI projects that the additive segment of the ethanol market will exceed 5 billion gallons by 2016.

2. Federal tax credit and voluntary use of E-10 gasoline

Various exemptions have been in place since 1978 to favor ethanol use in gasoline. In 2004, the exemption was replaced by a blender tax credit (volumetric ethanol excise tax credit) of 51¢ per gallon for blending or using ethanol in gasoline. The current federal blender’s tax credit provides incentives to blenders to use ethanol in gasoline and pass on some of the credit to consumers to entice them to purchase blended gasoline at the pump. The penetration of E-10 has been rapid, as ethanol production is spreading beyond the Midwest. Some distribution impediments remain, as dedicated infrastructure has to be used to transport ethanol to avoid water contamination. The tax credit is set to expire in 2010. FAPRI assumes that the tax credit will remain in place throughout the entire baseline. The United States also maintains a tariff on imported ethanol (2.5% of unit value plus 54¢ per gallon) to discourage imports, beyond the limited imports allowed free of border tariffs under the Caribbean Basin Initiative. The tariff increases the price of U.S. ethanol above its level in the world market and discourages consumption of ethanol. The tariff was put in place to preclude imported ethanol
from receiving the benefits of the federal tax credit. The ethanol tariff is set to expire in 2008, but the FAPRI outlook assumes that the tariff will remain in place indefinitely.1

The voluntary demand for E-10 is sensitive to the change in relative prices of regular unleaded and E-10 gasoline, as they are very close substitutes. Consumers often do not perceive the 3% loss of energy content of the E-10 blend relative to regular gasoline. Hence, the E-10/regular choice is strongly driven by the relative price. The FAPRI outlook projects that voluntary E-10 demand will exceed 7 billion gallons by 2016.

3. Ethanol use linked to the E-85 market

Consumers who own FFVs can substitute more ethanol for gasoline by using E-85 gasoline (a blend of 85% ethanol and 15% gasoline). This substitution is not feasible for drivers of regular vehicles who are limited to E-10 blends or less. In Brazil, this combination of FFVs and ethanol use as a substitute for gasoline is widespread because FFVs are a significant share of the vehicle fleet and because consumers can obtain any blend at the pump. In contrast, the U.S. demand for E-85 and its future are constrained by the small share of FFVs in the U.S. car fleet and by the limited availability of E-85 pumps. In 2006, there were about 6 million FFVs in a total of about 243 million vehicles. The U.S. auto industry announced that it can produce 2 million FFVs a year and will be able to produce about half of the new vehicles as FFVs, or 8 million FFVs, by 2012. Currently, new FFV offerings in the U.S. market tend to be large, heavy vehicles with low gas mileage. Compounding this slow market penetration of FFVs is the lack of E-85 gasoline stations. In 2006, about 1,100 gas stations out of 170,000 offered E-85. Because of the lack of E-85 availability, at most a third of existing FFVs are used as such. Many drivers do not even know they own an FFV.

Given these important constraints, the FAPRI outlook assumes that the use of ethanol in the E-85 market will be limited for the next 10 years, reaching roughly 500 million gallons in 2016, or less than 5% of the projected U.S. ethanol consumption. If new policies are put in place to induce the acquisition of FFVs and the consumption of E-85, this market could grow faster. Ethanol marketed as E-85 gasoline has to compete with regular gasoline on energy content (66% to 70% of the energy content of unblended gasoline). In the long term, one would expect to see E-85 prices at levels consistent with its energy content relative to gasoline. In the baseline, the implied retail price of ethanol eventually falls to about 71% of the retail price of gasoline on a per gallon basis. The ethanol price would have to fall further to induce significant consumption in the E-85 market.

The 2005 Energy Policy Act also called for a renewable fuel standard of 7.5 billion gallons by 2012, which should be easily met ahead of schedule, given the rapid expansion of the ethanol market. President Bush proposed an alternative fuel standard during his 2007 State of the Union Address that would require the eventual use of 35 billion gallons of alternative fuels, which would include both biofuels and other fuels not derived from petroleum. This proposal has not been enacted and so is not included in the 2007 outlook. If put into law, it will provide a greater demand floor for U.S. ethanol demand.

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stochastic analysis than it is in the figures reported here. Ethanol production capacity can grow more rapidly when ethanol producer returns are above average, but capacity only dissipates slowly if returns are below normal. Because of the safety net aspects of current U.S. farm programs, government payments and net farm income are also higher on average in the stochastic baseline than reported here.

**The Outlook for World Agriculture**

**Wheat**

The world wheat price is projected to decrease to $200.80 per mt in 2007/08 with the recovery in area and yields of major exporters. The Gulf FOB wheat price increases to $204.38 per mt by 2016/17 as growth in world demand puts pressure on world markets. In 2006/07, world wheat area is lower because of declines in Australian, Russian, Ukrainian, and U.S. wheat areas. Wheat area is projected to increase in 2007/08 by 8 mha, with the main sources of this increase coming from recoveries in these countries. In the later years, production increases come from yield growth.

Per capita consumption of wheat continues to decline but population growth offsets this trend. Food and industrial use reaches 562.2 mmt in 2016/17 while feed use reaches 114.5 mmt in 2016/17. Consumption grows 0.94% annually on average, with the main source of the demand increase coming from Asian, African, and Middle Eastern countries. In 2007/08, world wheat net trade increases to 90.4 mmt because of the lower price, which increases demand. Trade grows 2.29% annually on average, reaching 108.8 mmt in 2016/17. U.S. market share decreases in 2006/07 with the decline in U.S. production. It increases slightly in 2007/08, to 24.6%, and stays relatively stable after that.

Wheat area in Australia is projected to recover in 2007/08, increasing production to 23.4 mmt and net exports to 13.7 mmt. As production grows more than consumption, net exports increase to 20.6 mmt in 2016/17. Canadian wheat area declines over the next 10 years, so yield growth is the driver of the production increase. Domestic consumption reaches 10.7 mmt in 2016/17, primarily driven by the growth in feed use and industrial use for ethanol. Canada’s net exports decrease to 17.6 mmt in 2007/08, as other major exporters’ productions recover and thus regain some of their market shares. In 2006/07, EU-25 production decreased because of adverse weather conditions. In 2007/08, production increases to 125.9 mmt because of recovery in yield and area. Food and industrial use reaches 64.5 mmt in 2016/17, reflecting demand growth from the ethanol industry. Net exports reach 10 mmt by the end of the projection period.

In Argentina, wheat area is projected to increase, responding to higher world prices, which raises production to 14.8 mmt in 2007/08 and net exports to 9.8 mmt. Consumption grows 0.74% on average annually, reaching 5.3 mmt in 2016/17. Aided by the production growth and a modest consumption increase, Argentine net exports reach 11.5 mmt in 2016/17.

Net imports of Asian countries increase by 5.4 mmt over the next 10 years, owing to the increase in food use that comes from population growth. African and Middle Eastern countries increase their net imports by 14.2 mmt over the next 10 years. Latin American countries’ net imports reach 11.6 mmt by 2016/17, a 1.8 mmt increase.

**Coarse Grains**

The world coarse grain area is projected to increase further in 2007/08, to total 252.3 mha, responding to higher ethanol demand, particularly in the United States. Although all three crops have area increases, corn area increases the most, especially in the United States and Latin American countries, followed by sorghum and barley areas. Coarse grain production reaches 1,066.7 mmt in 2016/17. Net trade in coarse grains grows 2% annually on average, reaching 120.5 mmt in 2016/17.

In 2006/07, corn demand increases in the world, particularly in the United States, pushing the world price to $159.44 per mt. This price increase continues until 2009/10, after which the corn price starts to decrease, as production growth catches up with consumption growth. In 2006/07, world corn area increased to 146.1 mha. It continues to increase in the projection period, reaching 156.6 mha by 2016/17 because of demand growth. Production reaches 850 mmt in 2016/17 because of growth in area and yields. Consumption increases in the projection period mainly because of the increase in food and industrial use; it reaches 847.7 mmt in 2016/17.
In 2006/07, corn net trade increases with the increase in demand. In 2007/08, corn net trade decreases as U.S. net exports decline and the increase in net exports of other countries cannot meet the continuing increase in demand. Over the next 10 years, corn net trade is projected to increase, reaching 97 mmt in 2016/17 because of demand growth in major importing regions such as Asia and Latin America. The United States recaptures its market, and its share recovers to 70.2% in 2016/17. In the next decade, the main U.S. competitors in the corn market increase their production to meet the rising world demand. Argentina increases its production by 7.2 mmt over the next 10 years. Brazilian production increases by 10.9 mmt in the projection period. South African production increases by 1.3 mmt by 2016/17.

The largest demand increase for corn comes from Asian countries because of growth in their feed demand. Asian net imports increase by 10 mmt over the next decade. China becomes a net importer of corn in 2012/13, with imports reaching 1.9 mmt in 2016/17. African net imports increase by 2.9 mmt. Among Latin American countries, Mexico maintains its role as a major importer, with imports reaching 9.6 mmt in 2016/17. Middle Eastern corn net imports reach 9.1 mmt in 2016/17.

The world sorghum price decreases in 2007/08 to $159.35 per mt as production increases. The price is quite stable over the next 10 years. World sorghum net trade decreases slightly in 2007/08. It increases after that, reaching 6 mmt by 2016/17. Japanese net imports of sorghum are stable; they reach 1.4 mmt in 2016/17. Mexico’s sorghum net imports decrease until 2009/10 and then increase, following the pattern of feed use and livestock numbers. Mexican net imports reach 3.2 mmt by 2016/17.

Higher world demand in 2006/07 increases the world barley price to $128.04 per mt. Despite higher production in 2007/08, lower stock levels decrease the world barley supply, thus increasing the price to $130.66 per mt. World net trade reaches 17.5 mmt in 2016/17, fueled by growth in demand. EU-25 net exports of barley reach 3.5 mmt in 2016/17. Australian net exports recover in 2007/08 and reach 5.9 mmt by 2016/17. Canadian net exports are 1.1 mmt in 2016/17. Ukrainian and Russian net exports reach only 4 mmt and 2 mmt, respectively, by 2016/17.

Rice

Tight exportable supplies across Asia and record low world rice stocks have resulted in sharply higher Thai export prices over the last three years. The Thai 100% B price rose nearly 7%, to $321 per mt, in 2006/07 but is expected to weaken to $287 per mt in 2007/08 as world rice supplies expand. Global rice area is expected to increase by 869 tha, to 152.9 mha, in 2007/08, while production is projected to increase by 5.2 mmt, to 420.2 mmt, during the same period. Yield recovery in Australia and yield improvements in the United States, European Union, Taiwan, and Mexico more than offset yield declines in Argentina, Uruguay, Brazil, and Turkey. Strong consumption demand, coupled with low stocks, keeps the world stocks-to-use ratio at around 19% over the 10-year baseline.

While the world average per capita use of rice declines slightly, total world rice consumption increases by 1.1%, to 416.2 mmt, in 2006/07, as world population grows by 1.19%. The downturn in per capita use is expected to continue, driven by demographic factors such as urbanization, income growth, aging population, and increasing preference toward more protein-based diets in a number of Asian countries.

Total world rice trade in 2006/07 is 28.1 mmt, up 0.9% from a year earlier. Export expansion from Thailand, Vietnam, Argentina, and Myanmar more than offsets the contraction of export shipments from the United States, Uruguay, Australia, and China during the period. Total global rice trade is expected to continue to grow by 1.8% annually over the baseline period, as demand remains strong. Total world rice trade relative to total world rice consumption remains low relative to other grains at 7.0%.

India and Thailand are projected to account for 98% of the net volume growth in world rice exports over the next decade. Rice exports from the United States are expected to decline, as growth in consumption outpaces growth in output, which comes mainly from yield improvements. Over the same period, 70% of the projected net growth in rice import volume is expected to come from the Middle East, Africa, the European Union, Mexico, South Korea, and the Philippines.

Oilseeds

World oilseed prices increase in 2006/07 as a
result of stagnating supply and strong world demand. Oilseed prices continue to rise for the next two years because demand growth outpaces an increase in supply. Area expansion and yield improvements soften prices for the remainder of the projection period. In the long run, all oilseed prices remain within their established relationships.

World oilseed area expanded 1% in 2006/07 and is projected to increase 11% through the end of the outlook period. This increase is primarily due to soybean area expansion, mostly concentrated in South America. Rapeseed area grows 11% over the next 10 years as the EU-25 expands harvested area to meet its biodiesel demand. An additional 1.4 mha is added for sunflower seed area by 2016/17, mainly concentrated in the CIS and Argentina. The expansion of oilseed area is driven by increased worldwide demand for protein meals and vegetable oils.

The record U.S. soybean production in 2006/07 pushed the world soybean output up by 4%. World production is expected to decline by 2% in 2007/08 as U.S. soybean acreage shifts to corn because of the ethanol boom. Brazil’s production expansion slowed down during 2005/06 and 2006/07 because of its strong currency, compounding debt, and lack of financial support for farmers. However, encouraged by expected price increases, Brazil resumes area expansion in 2007/08 and outpaces the United States to become the leading producer in 2014/15. World production reaches 280 mmt at the end of the outlook period and is concentrated in Argentina, Brazil, and the United States. By 2016/17, Brazil holds a 33% share while the United States contributes 30% of production.

The majority of the increase in soybean net imports occurs in China. Policies favoring oilseed imports and domestic crush, combined with growing demand for protein and fats, make China the world’s leading soybean importer. Chinese soybean net imports rise to 50 mmt in 2016/17, accounting for 59% of world net imports. The European Union’s net import share decreases from 23% to 15% during the outlook period, as it imports processed products rather than beans. Brazil’s export share reaches 59% by the end of the outlook period while the U.S. share of world soybean net exports is projected to decline to 29%. World rapeseed consumption increases 21% by 2016/17, primarily driven by the biodiesel demand in the European Union. Net exports of rapeseed increase to 7.8 mmt over the baseline, with Canada positioned as the dominant net exporter.

Oilseed meal consumption increases 25%, reaching 252 mmt by the end of the projection period. Almost 80% of this increase results from soybean meal consumption growth. China increases its consumption by 3.7% annually because of strong expansion in its livestock sector. U.S. domestic consumption expands by 15% over the next decade whereas the U.S. share of world consumption falls slightly. Soybean meal also accounts for the majority of the growth in oilseed meal trade. The volume of net trade in the soybean meal market increases by 30% throughout the baseline. Argentina, the leading soybean meal net exporter, ships 97% of its production to the world market because of its differential export tax. Argentina’s market share grows to 52% while Brazil accounts for 28% by 2016/17. The EU-25 is the dominant net importer, with a 39% share of world net imports.

Increasing incomes and population in developing countries encourage an additional 36 mmt of vegetable oil consumption in the world by 2016/17. On a per capita basis, world vegetable oil consumption is expected to increase to 20 kg per person annually over the baseline. Annual average world soybean oil consumption grows by 1.8%, followed by palm and sunflower oil consumption with an annual growth of 1.3% and 0.3%, respectively. Rapeseed oil consumption per capita shrinks by 0.70% during the baseline because this oil is mostly used for biodiesel production. Palm oil becomes a preferred substitute for other vegetable oils whose prices soar while palm oil remains the relative economical oil. China is expected to increase vegetable oil net imports by 93% because of strong per capita consumption growth over the baseline. China’s soybean oil net imports reach 3.4 mmt while India’s net imports increase to 2.9 mmt by 2016/17. China also dominates in palm oil net imports in the world market. Chinese palm oil net imports expand to 10.0 mmt in 2016/17, accounting for a quarter of world net imports.

Cotton

Gains in cotton yield since 2004/05 have been substantial worldwide. U.S. yields have “stair-stepped” to over 900 kg/ha and, with stacked genetically modi-
fied traits, yields are expected to increase to over 1,000 kg/ha by the end of the projection period. With the introduction of Bt cotton into India, yields are increasing at a rapid pace; they reach 464 kg/ha in 2004/05, are expected to exceed 500 kg/ha in 2007/08, and continue to grow for the rest of the decade, as Bt cotton currently represents only 50% of Indian planted acreage.

Recent growth in world cotton production has been driven by strong yields and above-average cotton acreage, with production averaging over 25 mmt a year over the last three seasons. Higher prices for grains and oilseeds due to biofuels production are expected to constrain acreage growth in some locations over the next few years. Biofuels-driven acreage competition is expected to reduce U.S. planted cotton acreage by 0.6 mha and reduce acreage in other course-grain-producing countries such as Argentina and China. Other regions, with fewer alternative crops or a comparative advantage in cotton production, are likely to hold or increase acreage to take advantage of improved prices.

Prices, as measured by the Cotlook A-Index, are expected to jump to $1,455 per mt next year and reach $1,645 per mt by the end of the projection period. Supply issues contribute to the improved outlook for prices, but continued strong world demand plays a supportive role as well. World cotton consumption is expected to reach a record 26.9 mmt in 2007/08 and to grow modestly above population growth, reaching 30.8 mmt by 2016/17. World cotton spinning continues to concentrate in a small number of countries. China, India, Pakistan, and Turkey account for 72% of world mill use in 2006/07 and expand to 79% of world mill use by 2016/17. While some of this gain in mill use has come from declines in the United States and Europe, developing countries are expected to continue to see their growth in mill use slow or even decline. The United States continues to rely on export markets for the majority of demand.

Sugar

World sugar production, consumption, and net trade in raw sugar equivalence increase by 13.9%, 20.9%, and 14.6%, respectively, between 2006/07 and 2016/17. World sugar stocks declined for three consecutive years before increasing by 13.6% in 2006/07. After two years of tight markets, the sugar price finally declines in 2006/07 by 24.7%, to 11.9¢ per pound, as supply exceeds demand. By 2016/17, the price increases to 13.3¢ per pound, an increase of 11.7%, as demand increases, production declines in the European Union, and more sugarcane is diverted to ethanol production, particularly in Brazil.

Brazil remains the dominant world supplier, given continued record sugar production and the country’s potential for expansion. Brazilian net exports reach 22.0 mmt by 2016/17. Because of adverse weather, and declining area and yields, Australian sugar production continues to decline in 2006/07, by 6.6%. With government financial support and favorable sugar prices, sugar production and net exports in Australia are projected to increase by 18.7% and 18.8%, respectively, between 2006/07 and 2016/17. After declining for three years because of weather conditions, Thailand’s sugar production recovers and increases by 29.3% in 2006/07. Thai sugar production and net exports are projected to increase by 25.7% and 20.8%, respectively, between 2006/07 and 2016/17. The implementation of the EU sugar reforms results in a significant reduction in EU sugar beet production and a trade reversal in the European Union from a major sugar exporter to a net importer; imports total 3.3 mmt by the end of the projection period.

Russia and Ukraine are projected to lower their combined sugar imports in the coming decade, as domestic production increases by 18.7% while consumption increases by 3.6% by 2016/17. In India, sugar production recovers in 2005/06, increasing by 48.7%. Sugar production increases by 19.1% in 2006/07 and is projected to increase by 14.3% by 2016/17. India is expected to continue to export sugar during the projection period, with net exports reaching 2.4 mmt.

Ethanol and Biodiesel

Given the growing interest in biofuels as an alternative fuel source, many countries are promoting ethanol use through mandates and/or directives. In the world ethanol market, the current major players are Brazil and the United States, with China and India emerging as significant producers. With the decline in U.S. net imports in 2007, the world ethanol price declines 16.2%, to $1.51 per gallon. As countries continue to increase their production of ethanol, the ethanol price continues its downward trend over the decade.
and reaches $1.35 per gallon by 2016. As demand for ethanol increases over the projection period, net trade is expected to increase 26.4% and reach nearly 1.3 billion gallons by 2016.

Brazilian production of ethanol increases 4.5% in 2007 and 58.0% by the end of the projection period while ethanol consumption is projected to increase 62.9%, to 6.3 billion gallons, as a result of the dramatic rise in the use of FFVs. By 2016, Brazil’s net exports reach 1.3 billion gallons, a 35.3% increase. In the EU-25, ethanol production increases 68.7%, reaching 1.5 billion gallons in 2016. Consumption reaches 1.7 billion gallons, an increase of 81.8%, by 2016. Despite the significant increase in ethanol use, total biofuels consumption remains well below the 5.75% target indicated in the 2003 Biofuels Directive. EU-25 net imports more than triple by 2016, as consumption grows faster than production.

Ethanol production in China is projected to increase 12.2%, to reach 1.2 billion gallons, while ethanol disappearance increases 29.5%, to 1.4 billion gallons, by 2016. As China moves toward implementation of alternative fuel sources, it becomes a net importer of fuel ethanol by 2009. China’s net imports are expected to reach 133.5 million gallons in 2016, since production potential is limited because of the growing livestock industry, which competes with ethanol for feedstock. Indian ethanol production increases 17.1% and consumption is projected to increase 26.4% by 2016. Consequently, net imports increase 64.6%, reaching 194.6 million gallons. As support for the use of ethanol in fuel continues in Japan and South Korea, their net imports are expected to increase 76.4% and 89.9%, respectively, by the end of the projection period.

Biodiesel is another emerging renewable energy source adopted in a growing number of countries. The EU-25 has an ambitious target for biodiesel use in its transportation sector, while Brazil and Argentina have also set up biodiesel mandates. The biodiesel industries in Malaysia and Indonesia are also under fast development. Currently, the EU-25 is the leading biodiesel producer and consumer in the world market. Its biodiesel industry has made a significant expansion over the past five years. Biodiesel production increased 30% in 2006 and it is expected to reach 7.3 mmt by 2016. The principal feedstock for biodiesel in the EU-25 is rapeseed oil, whose output has been pushed up by 13% in 2006/07 because of the climbing biodiesel demand.

Livestock and Poultry

SPS issues continued to affect the world meat market, depressing trade by 2.0% in 2006. Although some recovery is assumed, opening of some markets has been interrupted by suspected violations of new strict export standards. In the longer run, however, with sustained income and population growth, per capita meat consumption rises by 4.8 kg. Meat production capacity also continues to expand. Structural transformation has raised productivity and efficiency, and several policy and institutional changes around the globe have improved the functioning of world markets.

Rising meat demand fuels a 17.1% growth in total meat production over the next decade. 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. Total meat trade increases by 27.8% in the next decade, reaching 22.8 mmt at the end of the decade.

Demand recovery coupled with strong grain prices pushes all meat prices to high levels. Low-cost producers in the Americas capture a growing share of international meat trade throughout the baseline. From its lowest share in 2004, the United States regains 6.8 percentage points in market share by 2016. The devaluation of its currency by 3.2%, coupled with strategic investment in infrastructure in the grain-rich Center-West regions, improves Brazil’s competitive edge relative to other meat-exporting countries, allowing it to garner around 0.3 to 11.0 additional percentage points of export market share.

Beef

This outlook assumes that there is some recovery from BSE in the short run. The weak meat trade in 2006 was partly due to the 1.4% decline in beef trade. Over the rest of the decade, beef trade recovers and grows by an average rate of 3.5%, ending at 8.8 mmt in 2016. Beef production grows by 1.5%, reaching 62.7 mmt in 2016.

The excess beef demand in the outlook comes from three sources. First is the demand recovery from BSE in the short run, such as in Japan and South Korea. Second is the income- and population-driven de-
mand expansion in countries such as Egypt, Indonesia, Mexico, the Philippines, and Russia. Third is demand from trade reversals—changing from an exporter to an importer—such as happened in China and the European Union.

After Japan agreed to resume beef trade with the United States, several countries followed in opening their markets. However, strict implementation of new stringent import rules has interrupted regular flow of products on some occasions. Japan’s continuing decline in production and growth in consumption fuel a net import expansion of 6.3%. With the opening of its market, South Korea’s net imports grow by 10.9%.

China traditionally has been a net exporter of beef, with declining exports but small imports. Facing limited availability of improved grazing area and poor animal genetics, production growth falls behind consumption. As a result, China becomes a net importer of beef, at 225 tmt, in 2016.

Growth in disposable income and population continues to drive an expansion of beef demand in Mexico. After the pre-BSE net import level is exceeded in 2010, net imports continue to grow at 8.2%. Mexico’s feeder cattle export to the United States grows by 2.4%, reaching 1.6 million head in 2016.

Despite its TRQ with an in-quota rate of 15% and an out-quota rate of 60%, Russia sees its net imports peak in 2009 at more than 1.0 mmt to meet a shortfall in production. A slower decline and eventual turnaround in the cattle numbers slightly lowers imports to 887 tmt in 2016.

AI in the European Union increased per capita beef consumption by 1% in 2006; consumption increases by another 0.9% in 2007 and then returns to the long-term downward trend, declining 0.5% annually. Termination of the OTMS in 2006 brings 400 to 500 thousand head of cattle into the food chain, increasing production over two years. Driven by lower dairy cattle production, EU beef production declines 0.6% over the rest of the projection period. The European Union, which became a net importer in 2003, continues in this position, ending the period with 573 tmt in net imports.

With restoration of live cattle trade with the United States, Canada’s cattle exports grow by 2.5%, reaching 1.2 million head in 2016. As a result, beef trade declines in the next two years. Thereafter, net trade expands by 6.8% annually, reaching 450 tmt in 2016.

Producers in Oceania and South America benefited from the ban of North American beef in many importing countries. Australia exploits markets closed to U.S. beef and increases its beef exports at 2.3% annually for the rest of the decade. Driven by the growing Asian demand for quality beef, Australia’s feedlot capacity expanded and reached 1 million head. Exports of live animals grow by 6.1% annually, reaching 0.9 million head in 2016. Australia loses 4.1 points of market share, as North American exporters recover their markets. New Zealand’s timely recovery from droughts when other countries faced SPS challenges in the early 2000s allowed its exports to expand in 2003/04 by 13.0% despite the strengthening of the New Zealand dollar. An expanding dairy sector contributes to the continued growth of New Zealand beef exports over the rest of the decade. Net exports grow at 2.8% annually, reaching 679 tmt in 2016.

After two successive years of strong export growth in Argentina, export controls to rein in domestic inflation reduced exports by 34.5% in 2006. Herd rebuilding thereafter softens short-term exports. But rising cattle numbers coupled with currency devaluation throughout the next decade allow Argentina to expand net exports in the outer years. Net exports reach 726 tmt in 2016.

Pork

Benefiting from trade shocks from BSE and AI, pork trade showed strong growth in the last four years. But with lower exports from Brazil and weak imports in Japan and South Korea, pork trade declined by 0.4% in 2006. Over the rest of the decade, pork trade increases 2.5% annually (1.2 mmt), reaching 6.1 mmt in 2016. Pork production increases at a rate of 1.6% (15.9 mmt), reaching 116.4 mmt in 2016. The pork price cycles throughout the decade, ending at $50.26/cwt.

Stricter enforcement of tariff rules and recovery in beef and poultry sectors from BSE and AI reduced Japan’s pork imports in 2006. It recovers in the next two years and its imports are determined by movements in the world price over the rest of the decade.

Taiwan’s WTO accession dampens production growth while net imports expand by 15.6%. For China,
with the reduction of duties from 20% to 12% and with the opening of distribution businesses to foreign firms, the slight edge in the growth of consumption over production is met by more imports, which reach 117 tmt in 2016. South Korea’s consumption growth is supplied by more net imports, which grow at 3.9%.

Improved consumer purchasing power and population growth caused pork consumption in Mexico to increase by 2.8%. Despite some industry integration, a limited supply of cheap feeds and credit problems keep growth in domestic production lagging behind consumption, increasing pork imports by 4.1% annually.

Russia’s pork quota has an in-quota rate of 15% and an out-quota rate of 80%. Russia attracts more investments in swine production, causing pork production to expand by 2.7% annually. With a weak recovery in consumption, pork net imports decline by 1.8%.

The hog inventory in Canada has been declining since 2003. It will turn around beginning in 2011. As a result, pork production declines 1.5% in the next two years. Over the rest of the decade, production grows 2.9%. Canada’s export of live hogs to the United States continues to grow at 1.5%, reaching 9.9 million head in 2016. Canada’s pork exports decline in the short run but grow by 4.8% over the rest of the decade.

Strict environmental regulations and animal welfare requirements limit the European Union’s (especially the EU-15’s) long-term capacity, and production grows with consumption, by only 0.5% annually. As a result, with a stable export level, the European Union’s market share drops by 8.1 percentage points.

Strong domestic and export demand fuels a 3.7% annual expansion in Brazil’s pork sector. Improvement in productivity (breeding and feeding programs), favorable domestic policies (credit, infrastructure, fiscal), and a weakening currency improve Brazil’s competitiveness, increasing its net exports by 9.5% annually, which translates into an additional 1.7 percentage points of market share for Brazil.

Poultry

A spreading AI outbreak, particularly in Europe, caused the poultry market to post a 3.7% decline in trade in 2006. Recovery from AI allows poultry trade to grow at a rate of 3.3% over the rest of the decade.

As growth in production falls short of consumption, China’s net imports reach 555 tmt in 2016. Thailand’s broiler sector takes several years to recover from the AI crisis. Recovery is helped by a new TRQ from the European Union, expansion of integrated producers, productivity improvement (lower feed conversion ratios), reduced processing costs, investment in product innovation, and a shift to higher-valued products. Thailand’s net exports increase by 7.8%, reaching 497 tmt in 2016. However, with small- and medium-sized operations exiting the industry and the continuing threat of AI, Thailand falls short of its long-term trend. Thailand regains 1.1 percentage points of market share, mostly in the first part of the decade, aided by a shift to cooked and higher-valued products in its export mix and its allocation in the new EU poultry TRQ regime.

Continuing recovery from AI allows Japan’s net imports to grow by 2.2% for the rest of the decade. Also, modest economic growth raises total broiler net imports in South Korea, Indonesia, and the Philippines from 91 tmt to 245 tmt. Despite production subsidies for domestic production, Saudi Arabia’s net imports grow by 4.1%, reaching 595 tmt by the end of the period.

With WTO accession, Taiwan removed its quota and replaced it with a “tariff-only regime” in 2005. As a result, imports are projected to increase 11.0% annually, reaching 177 tmt in 2016, as production growth of 0.9% is unable to meet the 2.2% consumption growth. A shift to differentiated local breeds sustains domestic production.

Russia’s net imports dropped by 10.5% in 2003 and by another 6.0% in 2004 as new import rules were clarified. Imports recovered by 20.0% in 2005 and continue to remain above the 1.13 mmt TRQ for the rest of the decade. Imports decline slightly, because domestic production is encouraged and grows by 3.8%, exceeding the 1.4% growth in consumption.

Under NAFTA, Mexico removed the global TRQ and its prohibitive out-quota rates. A safeguard agreement was reached with the United States, whereby a TRQ for chicken leg quarters is imposed. The product is duty-free, but out-quota is charged a 98.8% duty. The TRQ grows by 1% annually and is removed in 2008. A shortfall in domestic production is still filled by net imports, which grow by 2.9% annually and reach 515 tmt in 2016.
With the weakness of the world market, Brazil’s net exports declined 8.7% in 2006. Over the rest of the decade, net exports grow by 1.8%, reaching 2.9 mmt in 2016. Large new investments in broiler production in the Center-West region are encouraged through fiscal incentives, subsidies from local government, and lower feed cost with proximity to feed supplies. Brazil gains only 0.3 percentage points of market share.

The United States gains 1.5 percentage points of market share. Faced with strict animal welfare and environmental regulations, the European Union loses 3.5 percentage points.

Dairy

World milk production grows 18.2% over the next decade, with most of the growth generated by gains in productivity per cow. Of the 92.1 mmt increase in milk production, 28.9% occurs in the Americas and 58.9% occurs in Asia, primarily in China and India. Despite rising availability of milk in many importing countries, dairy product trade expands substantially over the next decade.

As leading exporters in world dairy markets, Australia and New Zealand enjoy continued export growth in the long run. Australian milk production begins in 2008 to recover from the country’s drought and grows 2.2% annually. More abundant milk supplies enable butter, cheese, NFD, and WMP production to increase 35.8%, 37.2%, 26.4%, and 56.1%, respectively, over the projection period. With stable domestic consumption, Australian dairy product exports grow significantly. New Zealand milk production increases 1.7% annually in the next decade and, as a result, exports of all four dairy products grow. Australia and New Zealand account for 42.7% of world cheese trade and 55.7% of WMP trade on average over the next decade.

EU milk production is restricted by milk quotas; production averages 130.1 mmt during the baseline. Cow inventories continue to decline while milk yield per cow increases at the same pace. Because of the decrease in intervention prices for butter and NFD, higher returns from cheese production, and restricted milk supply, some milk is diverted from butter and NFD into cheese production. The steady growth in domestic cheese consumption absorbs the bulk of the increase in cheese production, limiting the growth in cheese exports throughout the baseline. Strong world prices facilitate the improvement of EU-25 butter and NFD exports, which are initially negatively affected by the CAP reform. Bulgaria and Romania, with their accession to the European Union, have milk production capped by milk quotas. Their gap between consumption and production is met by more imports of dairy products from trade both inside and outside the European Union.

North American milk production increases 11.4% in the next decade, reaching 111.7 mmt by 2016. About 89.4% of the growth occurs in the United States, and Mexico accounts for the remainder. Canadian milk production is sluggish, and cow numbers continue to fall. While EU NFD exports are affected by the CAP reform, the bulk of the increase in U.S. milk production is processed into NFD, and U.S. NFD exports increase. Growth in Mexico’s dairy product output cannot catch up with domestic demand growth and thus Mexican dairy product imports increase over the baseline.

As Argentina’s economy recovers and world dairy prices hold firm, the Argentine dairy sector expands over the baseline. Argentine milk output increases 3.4% annually throughout the baseline, generated by growth in both dairy herd and productivity. Large growth in milk production boosts output of all four dairy products. Attracted by strong world prices, Argentina steadily increases its dairy exports and compensates partially for the reduction in international supplies, especially of cheese and WMP, from the European Union. Argentine cheese exports increase 73.2% and WMP exports increase 50.7%. Brazilian milk production is stimulated by improved domestic economic conditions and favorable government policies. Milk production increases 3.3% annually, generated entirely by higher productivity per cow, as dairy cow inventories continue to shrink. More abundant milk supplies enable Brazil to generate substantial exportable surpluses of dairy products, causing the country to switch from an importer to a net exporter position. A greater milk supply, along with a modest growth in consumption, enables Uruguay to increase its dairy exports, especially of cheese. Venezuela, a leading WMP importer, increases it WMP imports 14.7% over the next decade.

Russian milk output increases 1.8% annually over the baseline. The additional supply of milk ac-
commodates growth in fluid milk consumption as well as increased output of all four major dairy products. Income growth stimulates growth in dairy consumption. Cheese consumption increases 1.3 kg per person and Russian cheese imports rise 35.3% over the baseline period. The growth in NFD production catches up with the growth in consumption and consequently stabilizes Russia’s NFD imports throughout the baseline. After being affected by the Russian import ban in 2006, exports of butter and cheese in the Ukraine recover gradually, assuming Ukraine producers can improve their sanitary conditions or find alternative markets. Growing domestic demand and weaker Russian import demand for milk powders hamper growth in Ukrainian dairy product exports over the baseline.

With sustained economic growth, population growth, and changing diets in Asia, the region’s dairy consumption expands steadily. To meet strong domestic demands for dairy products, China and India significantly increase milk production. As a result of efforts by the Chinese government to encourage milk production through better genetics and herd management, Chinese cow yields increase 2.8% annually. But limited land, water, feed, and energy sources, starting from the mid term, slow the growth pace of the Chinese cow inventory. Rising yields combined with a steady expansion of China’s dairy herd results in a 5.2% annual increase in Chinese milk production. The expansion of milk production not only facilitates the growth of fluid milk consumption but also helps boost the production of dairy products, especially of milk powder. As domestic WMP becomes more abundant and as consumers substitute fluid milk for milk powder, WMP imports decrease. Strong demand causes Chinese butter, cheese, and NFD imports to increase steadily in the next decade.

India, one of the biggest milk producers in the world, continues to expand its milk production, with a 1.8% annual growth in cow milk production and a 3.6% annual growth in buffalo milk production. Driven by rapidly growing domestic demand and strong world prices, Indian butter production increases 55.1%. As most of the butter is absorbed by the domestic market, India can only export a small amount of butter. After the reduction of NFD exports in 2007 through an export ban meant to mitigate the strong domestic price, Indian NFD exports grow 33.1% over the baseline.

Southeast Asia (Indonesia, Malaysia, Philippines, Thailand, and Vietnam) depends heavily on imports to meet domestic demand. It increases its share of total NFD imports from 40.6% in 2006 to 42.9% in 2016. China and Japan account for about 12.1% of the NFD import market by the end of the baseline. While Chinese WMP imports decline, Southeast Asia increases its imports 4.6% annually, and its imports account for about a quarter of world imports by 2016. Steady growth also occurs in Asian cheese and butter imports. Japan, a leading cheese importing country, increases its cheese imports 1.8% annually, which accounts for roughly 20% of total world imports by 2016. China, Southeast Asia, and South Korea combined increase their cheese imports 2.7% annually. Total butter imports into China, Japan, South Korea, and Southeast Asia increase 47.4% over the baseline.