Feedstuffs
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Feedstuffs Play Key role in China's Food Needs
(Third Segment of a Three-part Series)

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Results from the energy and protein requirements in Table 2 are converted into trade related data in Table 13, with the additional requirements over the base year of 2007 serving as the basis. Negative numbers indicate a surplus and positive numbers a deficit. Maize equivalents are used for energy and soybeans for protein. Maize is essentially the only net import grain feedstuff, and soybeans account for 98 percent of net oilseed imports.

The additional metabolizable energy requirement for 2015 is minus 101,014 million Mcal, indicating a surplus will be available. China produced 156.7 million tons of maize in 2007, had 843 tons of net imports, and consumption of 157.6 million tons. It is projected that production will be 187.3 million tons in 2015, and that imports will be a net 1.0 million tons. For trade purposes, 101,014 million Mcal is equivalent to 30.1 million tons of maize (shown as -30,064 in Table 13).

Something has to happen to that surplus, but what? Most of it will be in the form of crop residues so market forces are one likely mitigating factor. Unneeded stover can be burned, used as fuel and, as increasingly researched in pilot projects, converted into biofuels. Government policy making is also critical since the maize equivalent surplus is projected to double five years later in 2020, to 62 million tons, and to reach 98 million tons in 2030.

Protein is an entirely different story. China produced 14.6 million tons of soybeans in 2007 and had net imports of 31.5 million tons resulting in total consumption of 46 million tons. Production in 2015 is projected to be 16.4 million tons, net imports in the model were specified at 39.6 million tons, from which the additional soybean equivalents are calculated to be 8.7 million tons. The potential total soybean equivalent imports are 48.3 million tons and total consumption 64.7 million tons. Soybean equivalent imports are calculated to be 57.8 million tons in 2020, and 55.4 million tons in 2030.

The growth in potential soybean equivalent imports is 53 percent during the 8 years 2007-2015. A 20 percent growth rate in the five years to 2015-2020 is projected. However, a slight decline (7 percent) is projected for the ten years 2020-2030. One factor leading to the decline is that the growth rate in total food consumption is projected to decline due to population demographics. For example, population only increases 40 million in the 10 years from 2020 to 2030. In addition, a larger portion of the population is aged mitigating dietary changes. Most significantly, there is remarkable increased productivity in livestock production (see Table 5 in the previous article), and from structural changes such as increased commercialization of pigs and poultry. Efficiencies in production are also taking place. In pig production, for example, 11.55 Mcal of ME was required per kg of pork produced in 2007 (data not shown). It is projected that by 2030 that will fall to 9.64 Mcal. On the other hand protein requirements will increase in many species. For example, 0.50 kg of CP will be required per kg of poultry meat in 2030 compared with 0.27 kg in 2006. The net result is that, as shown in Table 6, inventories of all species will register a decline from 2020 to 2030.

The trade data presented in Table 13 is what might be termed the most likely scenario. But, a natural question is: What would the impact be if a few key parameters were different? Three

scenarios are presented in Table 14. The first line in it contains current model results from Table 13. If beef consumption were to increase to 12.0 kg in 2030 from the from the projected 7.5 kg, a 60 percent increase, soybean equivalent imports would increase dramatically, from 55 million tons to 98 million tons, well above total world soybean imports of 67 million tons in 2006-2007.

As explained, crop residues are a very significant part of China's livestock production. If the proportion of all maize stover produced in 2030 that is treated (to enhance palatability and nutritional content) were to increase from 35 percent (leaving 5 percent that is fed being untreated and 60 percent for other uses) soybean equivalent imports would only amount to 40 million tons, not much more than the actual imports of 31 million tons in 2006-2007. On the other hand, if the projected treatment level of 35 percent in 2030 were to decline to 20 percent (leaving 5 percent of availabilities to be fed untreated and 75 percent for other uses), potential soybean imports would be 65 million tons, 10 million tons more than projected in the base model.

The bottom line of these few scenarios is that while the basic projections are reasonable and likely, there is considerable latitude for variations. Much of that depends on government policies. For example, in the past two years there have been conflicting reports by officials about disposition of maize residues. In addition government policymaking regarding the amount of emphasis to place on agricultural research and development is a key point to what will actually transpire in China's feedstuff and food trade. That is an important decision since rapid increases in yields can depress prices leading to reduced farm family incomes. In effect, a key point is that social aspects in many cases are as important as technical ones.

Other Key Points

- China will be long on energy feedstuffs and short on protein feedstuffs.
- On the energy side in the base projections, maize equivalent surpluses (essentially from non maize grain sources) will grow to 30 million tons in 2015, 62 million tons in 2020 and 100 million tons in 2030. The big question is, what will happen to those surpluses?
- On the protein side in the base projections soybean equivalent deficits will grow to 48 million tons in 2015, 58 million tons in 2020 and decrease slightly to 55 million tons in 2030. Government policy is the key determinant about actual results.
- Crop residues and silage do not convey the aura of excitement associated with biotechnology and other high-tech solutions associated with principal crop outputs, yet they are a prime determinant in trade projections.
- Overall, a major key to projections is to understand that China's yields and productivity are still quite low and, given its structure, have great leeway for significant improvement.

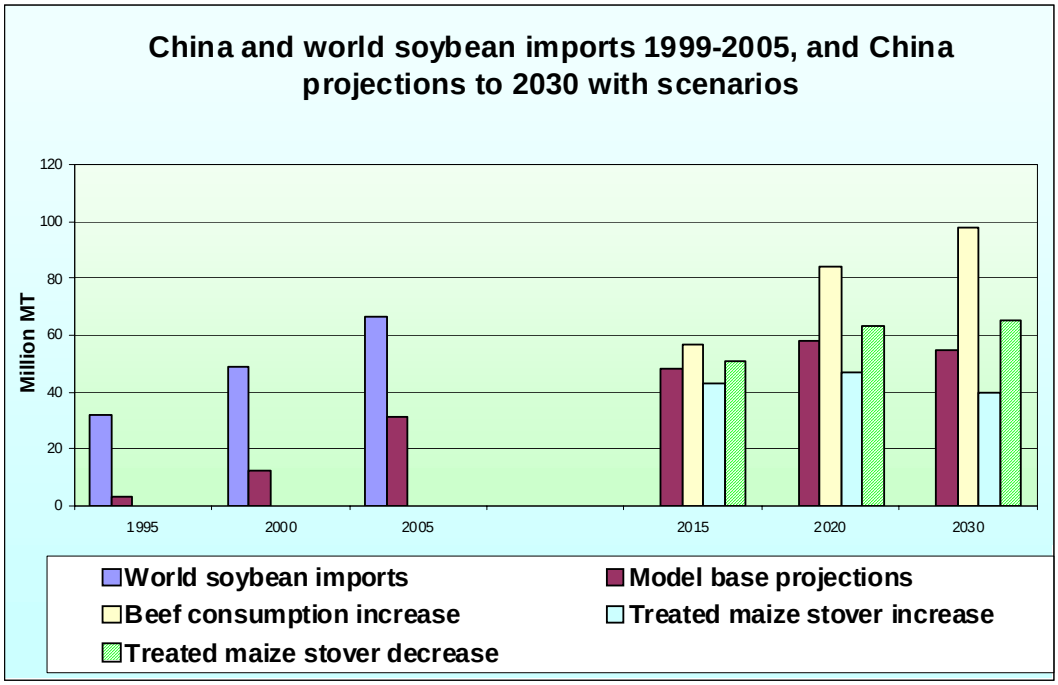
Table 13. Maize and soybean trade 1994-1996 to 2006-2007, and maize and soybean equivalent imports 2015 to 2030, China economy robust

Item	1994-1996	1999-2001	2006-2007	2015	2020	2030
Maize						
Imports (1,000 MT)	7,911	5,024	4,836			
Exports (1,000MT)	3,004	6,923	3,994			
Net imports (1,000 MT)	4,907	-1,899	843	1,000	1,000	1,000
Additional ME requirement over (million Mcal) (1)				-101,014	-208,851	-329,246
			(Negative numbers indicate surplus)			
Maize equivalent (proxy for energy sources)						
Mcal per kg		3.36				
Mcal per 1,000 MT		3,360,000				
Total amount of maize production (1,000 MT)			156,728	187,281	207,280	258,935
Maize net imports in in basic (with net trade) model (1,000MT)			843	1,000	1,000	1,000
Additional maize equivalents need to meet shortfall (1,000 MT)				-30,064	-62,158	-97,990
(Negative numbers indicate amount available to export or reduce energy crops)						
Total consumption of maize (1,000MT)			157,571	188,281	208,280	259,935
Soybeans						
Imports (1,000 MT)	3,039	11,925	31,903			
Exports (1,000MT)	466	221	418			
Net imports (1,000 MT)	2,573	11,704	31,485	48,274	57,808	55,414
Additional protein requirement over base (1,000 MT) (1)				2,951	2,793	277
Soybean equivalent (principal protein source)						
Protein content of meal (percent)		43.00				
Crush to meal (percent)		79.13				
Domestic soybean production (1,000 MT)			14,590	16,413	18,933	25,338
Soybean net imports in basic (with trade) model (1,000 MT)			31,485	39,600	49,600	54,600
Additional soybean equivalents needed to meet protein shortfall (1,000 MT)				8,674	8,208	814
Potential total soybean equivalent imports (inc trade in model) (1,000 MT)			31,485	48,274	57,808	55,414
(Positive numbers are amount needed to import or expand protein crops)						
Total consumption of soybeans (or equivalents) (1,000 MT)			46,075	64,687	76,741	80,753

(1) See Table 2

Table 14. Soybean trade 1996 to 2006-2007, and scenarios about soybean equivalent imports 2015 to 2030, China economy robust

Item	Net soybean imports			Projected soybean equivalent imports		
	1994-1996	1999-2001	2006-2007	2015	2020	2030
	---1,000 Mt---					
Current model base projections	2,573	11,704	31,485	48,274	57,808	55,414
Beef consumption projected increases to 6.6, 9.1 and 12.0 kg in 2015, 2020 and 2030 rather than 5.5, 6.5 and 7.5 kg				57,275	83,542	98,312
Maize stover treated projected increases to 35, 50 and 60 percent in 2015, 2020 and 2030 rather than 25, 30 and 35 percent				43,105	47,248	40,194
Maize stover treated projected decreases to 20, 20, and 20 percent in 2015, 2020 and 2030 rather than 25, 30 and 35 percent				50,858	63,087	64,546



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