

THINK PIECE
Bill Hudson • June 25, 2007

The Americas and Asia: Grain and Oilseed Supply, Demand and Trade (with a Brief Note on Implications for Corn Ethanol and Soybean Biodiesel)

For my purposes in this essay, “The Americas” will mean both North and South America taken together, but mainly the United States, Brazil, and Argentina. And by “Asia” I will mean North Asia (mainly China) and Southeast Asia (mainly Indonesia and Malaysia), and only secondarily South Asia (India and Pakistan).

My first thesis here is that this portion of world geography, “The Americas and Asia,” holds the main growth elements of world grain and oilseed trade for the next decade and beyond. (For the time being, I am excluding wheat from this discussion, which would involve broadening the geography to Australia, Russia, Europe and Canada.)

My second thesis is that substantial growth in corn trade is likely between the Americas and Asia, in the next decade and beyond, and that in our exclusive focus today on the US corn ethanol expansion, we have underestimated the strength of the forces coming together to drive this trade.

Let’s begin on the demand side of the equation, with China. It is old news, of course, but it bears repeating here that China’s economic growth of the past ten years, averaging between 8 and 10 percent per year (double the world annual growth rate for all nations together!), is truly remarkable. China’s economic growth has been a principal driver in the expanded trade and higher prices of almost all world commodities—from crude oil to iron ore and other minerals such as copper, zinc, and lead, and of ocean freight rates themselves. We might well observe that without China’s economic growth and the associated increased demand for crude oil (and to be fair, without the geopolitical tensions in the Middle East and the US war on terrorism), there might not have been a tripling of the world price of oil in the past four years, and along with it the boom in US corn ethanol.

Likewise, China’s economic growth, together with the demand for fast foods (meat) in its cities, drove the growth in trade of oilseeds, especially of soybeans. China’s imports of soybeans were zero in the mid-1990s, while this year they will reach nearly 35 million tonnes—a volume requiring the production from over 25 million hectares (60 million acres) of cropland. It was fortunate, if that is the proper word, for China that Brazil was ready at the very same time to expand soybean plantings into its previously unused Cerrado, so that the recent symbiotic arrangement of soybean demand and supply could proceed without undue impact on the oilseed’s world price.

Let me expand these thoughts a bit further. As mentioned, China’s economic growth is commonly credited with driving up the prices of a wide range of world commodities—including crude oil, iron ore, copper, shipping, etc.—but not of soybeans and corn. In the case of soybeans, the world price did not rise as China became the leading importer, because of the “relief valve” of Brazil’s new and vast acreage of soybeans. In the case of corn, however, what happened? Why hasn’t China driven up the trade and price of corn in the same way?

Before I answer that question directly, let me stay with soybeans a moment and call your attention to the chart on page 7, which shows China’s dependency on imports of vegetable oil. The data shows that China imports some 60 percent of its total vegetable oil consumption from foreign sources. Think about this fact carefully: *Nearly two-thirds of the cooking oil in every wok in China comes from imports!* Surely we cannot continue to view China as so hyper-conscious of food security that it will not ever permit itself to become dependent on other countries for imported products. What could be more strategically vital than cooking oil? —Now admittedly, half of the imports are of palm oil from nearby Southeast Asian neighbors, and only about 10 percent is derived from soybeans imported from the

United States and crushed in China. So we might well want to conclude that if China is still “food security conscious,” it’s an attitude focused mainly on avoiding dependency on the United States, as opposed to the rest of Asia, or to South America.

Back to the question about corn. Why hasn’t China become just as major an importer of corn as it has of soybeans? Is it because there is no major source of corn supply (no “relief valve”) except the United States, which China regards as an unacceptable political risk? Perhaps so, but I think there are a couple of other reasons, both fairly slow moving but nonetheless powerful—and soon, I think, ready to disappear.

I first became aware of the “China Grain Stocks Issue” in 1993, when I came across a USDA-ERS publication by Dr. Frederick Crook on the likelihood that China at that time might have grain stocks in the neighborhood of 500 million tonnes. I mailed Fred’s report to PRX clients, most of whom were just as baffled as I was by the colossal number, 500 million tonnes—a figure some 125 percent of China’s annual production of all grains, oilseeds, and tubers. In the United States, a stocks-to-use ratio of 10 to 20 percent has been common, and a ratio of 50 percent or higher, as in the 1980s, has led to government action to “get rid of the stocks” in order to prop up the market price.

But in the China of the 1980s and early 1990s, “food security” was indeed a key policy, and the large stocks of grain had built up from the fear of mass starvations like those during the Great Leap Forward (1960s) and other periods of political uncertainty, and because of the feature of Chinese Communism which made a family’s household storage of physical grain supplies its main (if not only) avenue of “saving ahead.” Needless to say, the Communist system did not rely on local banks with savings accounts or on “checks in the mail” from the Social Security Administration.

So as the new market-oriented China emerged, as its economic growth rates increased and demand skyrocketed for materiel of all kinds to build the new cities, the “relief valve” for feedgrain supply to produce meat has been the gradual bleeding off of the enormous grain stocks from the older structure of life. As shown in the table on page 5, the USDA presently puts stocks of the major grains at just below 100 million

tonnes, which would be about 23 percent of total annual use for all grains, and about 17 percent for corn.

A second reason for China’s not importing corn, and in fact for its *exporting* of corn, was China’s internal geography and lack of transportation infrastructure. China’s main corn producing region (its “cornbelt”) is in the extreme northeast portion of the country, centered on Jilin Province, and until the last few years, the surplus of corn production over local use was difficult to physically move from the Jilin area to other parts of the country, such as to the south central Yangtze River area, which needed the corn to feed hogs. In the fall of 2000, the PRX China Grain Workshop featured a representative from the World Bank, who explained the Bank’s billion-dollar project to build a modern railroad from the Jilin area to the port of Dalian, along with the world’s largest elevator (the Beiliang grain elevator with 40 million bushels of storage and two loading docks for panamax vessels). That project is now long complete, and China’s cash grain marketing system readily moves the northeastern corn all over the country to domestic livestock feeders, and of course also to foreign buyers in nearby South Korea.

At this point, the reader might want to pause and examine the table on page 5 of China Supply-Demand of Major Crops. Take note especially of the various annual growth rates. For instance, the area planted of the main four crops is virtually unchanging, none of the crop yields are growing fast, but the consumption and imports are indeed increasing rapidly, except as noted for corn. Note too that corn feed use is increasing much, much less rapidly (1.8%) than total meat production (4.3%). How can this be, we logically ask, if the data from USDA are correct? Well, the data are *not* correct, as USDA will confirm: the Department has adjusted ending stocks twice in the last five years, by many tens of millions of tons, because otherwise the calculated ending stocks would have become negative. There is no credible source of public data on China grain stocks (the information is still classified), and there is no credible survey of how much grain is fed.

The most trustworthy data for China are trade data. We know in certain terms that China is importing over 30 million tonnes of soybeans, that China is exporting (mainly from Dalian) several million tonnes of corn, and that the corn export number each year is waning

from a peak of 15 million tones in 2002 to about 3 million this year.

So if the reader is wondering ahead about my conclusion, yes, I am arguing that China is “about to become an importer of corn,” as so many other forecasters have argued for so long. In the same sense that new Brazilian cropland provided a “relief valve” for China’s growth in soybean demand, I think that the previously accumulated grain stocks have been used in place of greater corn production or imports to satisfy livestock demand. I think that the excess stocks are gone, that exports are nearly over, and that China is not in a position to grow enough corn on its own to permit meat production to continue its annual growth of 4.3 percent.

Note the last chart in this piece, on page 8. I fully recognize my own warning about the credibility of China’s grain data, but I think that the change in the yield of corn recently, from its long term trend, is indeed credible—maybe the exact number of bushels per acre is not correct, but the change in *the structure of yield growth* is I believe real. For the past 7 to 8 years, corn yields in China have fallen well below the 30-year trend. The main reason is two-fold: (1) Smog, which I first heard of a few years ago from a friend at Harvard, who has a team of engineers in the country (but go to Google and search “China grain yield, ozone,” and you will find a huge body of research reporting the same conclusion, namely the deleterious effect of ozone on crop yields); and (2) the lack of Intellectual Property Rights, as the major American corn seed companies are not in vigorous operation in China, because the legal structure does not permit them the same profit opportunities as in the US. In other words, a Catch-22 to the otherwise miraculous economic growth of China is smog (low crop yields) and a helter-skelter patent and copyright system, which leaves them out of the loop for the world’s best seed technology.

My argument about the likelihood of corn imports by China can be simplified as follows: It is inconsistent for China’s economic growth to continue at breathtaking pace, as well as its urbanization and the accompanying demand for meat to feed the urban workers, unless corn feed use begins to grow at similar rates—which because of limited land and yields within China im-

plies imports, the only substantial source of which would be the Americas.

Could Brazil do part of the job again, in a corn version of my so-called “relief valve”? Maybe, but look again at the acreage chart on page 6. The increase in Brazilian acreage planted has unquestionably plateaued in the past four years—as if the easy part had been done. A corn import boom from China would need to be matched by a fertilizer import and distribution boom in Brazil, and it is this infrastructure problem that is adding cost to Brazil’s exportable supplies and slowing it down. I have no doubt that, ultimately, every square inch of arable land in Brazil will come to bear on humanity’s needs, but it is a question of the potential pace at which this may happen. When the internal price of corn in China rises sharply, and the price of pork climbs as well, it seems to me that economics will send Chinese feed grain buyers to US corn markets—especially in years with big Midwestern crops and reduced prices.

When will my forecast come true? “Within five years is as close as I can come,” said two of the presenters summer before last at an Illinois Corn Growers meeting in Bloomington, Illinois. Both the Beijing office of the US Grain Council and a China representative of Cargill made the same forecast as I have in this essay, based mainly on the same analysis—with one exception. The Grain Council, in its private survey of two dozen large livestock feeders said that corn feed use was *already* growing at 5 percent a year or so, and just was not reflected in official figures. When the price differentials are right, corn will come into the country—and the differentials can be affected at will by political agencies who can reduce artificial port fees and other charges used to control the feed economy and food inflation. (Large corn imports might already have happened, of course, but for expensive ocean freight, another Catch-22 of China’s economic growth.)

Note on Corn Ethanol and Biodiesel. Press reports abound regarding China’s own interest in milling corn for fuel ethanol. My most trustworthy sources on this issue are the US Grains Council in Beijing, which does not believe China will use much corn for ethanol, and our colleague Fred Crook who travels the Jilin area every year. Twice in two years Fred has attempted to tour the large corn dry mill near Jilin, and he has not

had complete success—but both times he has come away with growing evidence that the facility converts corn to *drinking* alcohol, not fuel!

With respect to US corn ethanol, its expansion, and the world price of corn, what would it mean for China to become a large importer of US corn? Well, let's say that China did 10 million tonnes in a year, or about 400 million bushels, which would be in turn about 1,000 million gallons of ethanol. One would have to think it's quite bullish for the price of corn—and ethanol advocates would probably scoff. "How could China *pay* for US corn? How can exports to China compete with the US Renewable Fuels Standard?"

Instead of saying that it all depends on the price of crude oil and gasoline, and whether the federal excise tax credit and the US import tariff are still in place, let's close with another look at China's vegetable oil import chart on page 7. China's imports of food oils are about 14 million tonnes, which would be about 30 billion pounds, which at 40 cents a pound would be a total annual expense of about \$12 billion. A five cent a pound increase in the price of soybean oil would represent another \$1.5 billion to be paid by the state agency in charge of China's food oil purchases. Let me just ask you whether you think this agency, of a country with several hundred billions in foreign currency reserves, would pay \$1.5 billion (or even another \$10 billion!) to keep food oil in all the woks in China? And what about India, the other principal buyer of world food oils—can American trucks buy biodiesel fuel away from the food oil supply of these people as well?

This, in my view, is the problem with biodiesel expansion—the food oil needed to make the fuel really is food, and the main food buyers will outbid the fuel use. Why won't the same be true, when the test comes, of feed grains for meat?

Longer Term. In the Americas, about 15 percent of the world's people live on almost 30 percent of the world's cropland—a large relative surplus of land to people, and the soils are young. In all of Asia, however, about 55 percent (nearly 4 billion) of the world's people live on about 30 percent of the world's cropland—a large relative deficit, and the soils are old. The dramatic but continuing economic growth of Asia, first with the "Tigers," then with China, but now too with India, means that the trade flow of grains and oilseeds from the Americas to Asia is destined to increase significantly.

Quarterly Data Tables. A new section of the PRX grain database, Section C-2, "World Oilseeds, Meal, and Oil—Supply, Demand, and Trade" has been e-mailed with this Think Piece. This new section contains the complete fabric of world oilseed data from which the tables and charts in this piece have been taken. As commodity data goes, the oilseed complex is difficult, because the user must attend to seeds as well as the component meal and oil. But the message of the tables across the board is important: The world oilseed complex is where we see the fastest annual growth in feed and food, with many aspects growing at 4 to 5 percent per year and higher.

CHINA SUPPLY-DEMAND OF MAJOR CROPS

Source: USDA WASDE, Jun-07

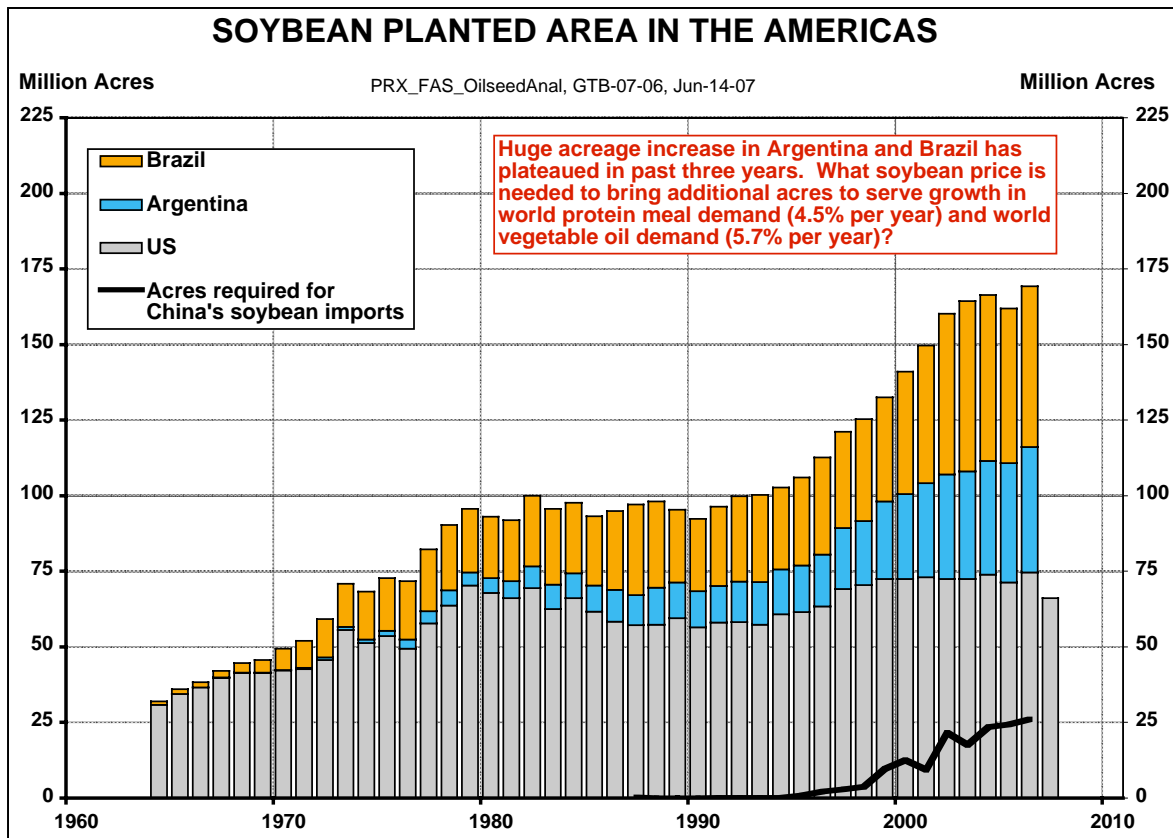
PRX_ChinaGrains, GTB-07-06, Jun-20-07

Country	Crop year	Area Harvested mil ha	Yield mt/ha	Carry In mmt	Produc- tion mmt	Imports mmt	Feed Use mmt	Domestic Use mmt	Exports mmt	Carry Out mmt
Wheat	02-03	23.9	3.80	76.6	90.3	0.4	6.5	105.2	1.7	60.4
	03-04	22.0	3.90	60.4	86.5	3.8	6.0	104.5	2.8	43.3
	04-05	21.6	4.30	43.3	92.0	6.8	4.0	102.0	1.2	38.8
	05-06	22.8	4.30	38.8	97.5	1.0	3.5	101.0	1.4	34.9
	06-07	23.4	4.40	34.9	103.5	0.6	4.0	101.0	2.5	35.4
	07-08	23.0	4.30	35.4	100.0	0.5	3.5	99.5	2.5	33.9
	<i>Annual Growth</i>			<i>2.5%</i>						
Corn	02-03	24.6	4.90	84.8	121.3	0.0	96.0	125.9	15.2	65.0
	03-04	24.1	4.80	65.0	115.8	0.0	97.0	128.4	7.6	44.9
	04-05	25.4	5.10	44.9	130.3	0.0	98.0	131.0	7.6	36.6
	05-06	26.4	5.30	36.6	139.4	0.1	101.0	137.0	3.7	35.3
	06-07	27.0	5.30	35.3	143.0	0.1	103.0	143.0	4.5	30.9
	07-08	27.6	5.30	30.9	146.0	0.1	105.0	148.0	3.0	26.0
	<i>Annual Growth</i>			<i>1.6%</i>			<i>1.8%</i>			
Soybeans	02-03	8.7	1.89	2.1	16.5	21.4	26.5	35.3	0.3	4.5
	03-04	9.3	1.65	4.5	15.4	16.9	25.4	34.4	0.3	2.1
	04-05	9.6	1.81	2.1	17.4	25.8	30.4	40.2	0.4	4.7
	05-06	9.6	1.81	4.7	16.4	28.3	34.5	44.5	0.4	4.5
	06-07	9.6	1.70	4.5	16.2	30.0	36.7	46.9	0.4	3.4
	07-08	9.3	1.74	3.4	15.6	34.5	39.7	50.0	0.5	3.1
	<i>Annual Growth</i>			<i>-1.7%</i>						
Soybean Meal	02-03			0.0	21.0	0.0		20.2	0.8	0.0
	03-04			0.0	20.2	0.0		19.5	0.7	0.0
	04-05			0.0	24.0	0.1		23.4	0.7	0.0
	05-06			0.0	27.3	0.8		27.8	0.4	0.0
	06-07			0.0	29.1	0.4		29.0	0.5	0.0
	07-08			0.0	31.5	0.5		31.4	0.6	0.0
	<i>Annual Growth</i>				<i>8.4%</i>			<i>9.2%</i>		
Soybean Oil	02-03			0.2	4.7	1.7		6.4	0.0	0.3
	03-04			0.3	4.5	2.8		7.2	0.0	0.3
	04-05			0.3	5.4	1.7		7.2	0.0	0.3
	05-06			0.3	6.2	1.5		7.6	0.1	0.2
	06-07			0.2	6.6	1.7		8.2	0.1	0.2
	07-08			0.2	7.1	1.9		8.9	0.1	0.2
	<i>Annual Growth</i>				<i>8.5%</i>			<i>6.8%</i>		
Rice	02-03	28.2	6.19	82.2	122.2	0.3		134.8	2.6	67.2
	03-04	26.7	6.02	67.2	112.5	1.1		135.0	0.9	44.9
	04-05	28.4	6.31	43.9	125.4	0.6		130.3	0.7	38.9
	05-06	28.9	6.26	38.9	126.4	0.7		128.0	1.2	36.8
	06-07	29.2	6.26	36.8	128.0	0.8		127.9	1.4	36.3
	07-08	29.6	6.26	36.3	129.7	0.9		129.1	1.5	36.3
	<i>Annual Growth</i>			<i>0.2%</i>				<i>-0.9%</i>		
Four Major Crops	02-03	85.4			350.3	22.1	102.5	401.2	19.8	197.0
	03-04	82.1			330.2	21.8	103.0	402.3	11.6	135.2
	04-05	85.0			365.0	33.2	102.0	403.5	9.8	119.0
	05-06	87.6			379.6	30.1	104.5	410.5	6.7	111.4
	06-07	89.2			390.7	31.5	107.0	418.8	8.8	106.0
	07-08	89.5			391.3	36.0	108.5	426.6	7.5	99.3
	<i>Annual Growth</i>	<i>0.9%</i>			<i>2.2%</i>	<i>10.2%</i>	<i>1.1%</i>	<i>1.2%</i>	<i>-17.8%</i>	<i>-12.8%</i>
Meat Production		Beef	Pork	Broilers	Tot Meat					
	02-03	6305	45186	9898	61389					
	03-04	6759	47016	9998	63773					
	04-05	7115	50106	10200	67421					
	05-06	7492	52261	10350	70103					
	06-07	7900	54352	10520	72772					
<i>Annual Growth</i>	<i>5.8%</i>	<i>4.7%</i>	<i>1.5%</i>	<i>4.3%</i>						

WORLD TOTAL OILSEED MEALS Consumption and Trade by Major Regions and Countries

Source: USDA-FAS, PSD Online, Latest month Jun-07 ,PRX_FAS_OilseedAnal, GTB-07-06, Jun-14-07

Line	Region	Country	Crop Year					Growth Rate	
			02-03	03-04	04-05	05-06	06-07		07-08
			mmt	mmt	mmt	mmt	mmt	mmt	pct
Consumption of Oilseed Meals									
1	North Asia	China	33.7	34.4	40.3	44.5	46.6	48.9	7.7%
2		Japan	6.4	6.2	6.0	5.9	5.9	6.0	-1.3%
3	South Asia	India	7.4	8.4	9.7	10.1	10.3	10.6	7.7%
4	SE Asia	SE Asia	10.6	9.9	10.8	12.1	13.1	13.9	5.6%
5	Europe	EU-27	44.8	44.4	44.7	45.5	46.9	48.3	1.5%
6	Americas	Mex, US, Brzl, Arg	45.8	46.5	50.6	51.7	52.9	54.7	3.6%
7	Others	Others	<u>37.3</u>	<u>39.5</u>	<u>42.2</u>	<u>44.9</u>	<u>47.7</u>	<u>49.8</u>	6.0%
8	World	World	185.9	189.3	204.4	214.7	223.3	232.1	4.5%
Imports of Oilseed Meals as Meal and as Whole Oilseeds for Crush to Meal									
9	North Asia	China	15.0	12.8	19.0	21.4	22.7	26.3	11.9%
10		Japan	5.2	4.9	4.6	4.4	4.4	4.4	-3.3%
11	South Asia	India							
12	SE Asia	SE Asia	7.2	6.6	7.4	8.5	9.7	10.4	7.8%
13	Europe	EU-27	38.9	38.8	38.1	38.9	39.1	40.1	0.6%
14	Americas	Mexico only	4.5	4.6	5.0	5.7	5.8	6.1	6.2%
15	Others	Others	<u>31.9</u>	<u>33.7</u>	<u>35.0</u>	<u>36.1</u>	<u>39.1</u>	<u>41.6</u>	5.4%
16	World	World	102.7	101.5	109.1	115.0	120.7	128.9	4.6%
Exports of Oilseed Meals as Meal and as Whole Oilseeds for Crush to Meal									
17	Americas	USA	28.6	24.4	31.0	28.3	31.5	31.4	1.9%
18		Brazil	28.9	30.1	29.5	32.5	31.3	34.5	3.6%
19		Argentina	26.4	25.4	29.2	31.1	33.2	37.4	7.2%
20	Others	Others (mainly EU-27)	<u>17.9</u>	<u>24.2</u>	<u>20.8</u>	<u>25.1</u>	<u>28.2</u>	<u>28.6</u>	9.9%
21	World	World	101.7	104.1	110.6	117.0	124.1	131.8	5.3%



WORLD TRADE OF ALL OILSEED OILS

Source: USDA-FAS, PSD Online, Latest month Jun-07 ,PRX_FAS_OilseedAnal, GTB-07-06, Jun-14-07

Line	Oilseed	Crop Year						Growth Rate
		02-03	03-04	04-05	05-06	06-07	07-08	
		mmt	mmt	mmt	mmt	mmt	mmt	
Total Oil Imported as Oil and Imported as Whole Oilseeds for Crushing to Oil								
1	Olive	0.4	0.6	0.6	0.6	0.6	0.6	6.8%
2	Palm	19.7	21.4	24.1	25.7	26.9	27.6	7.0%
3	Rapeseed	2.4	3.3	3.0	3.9	4.5	4.9	15.8%
4	Soybeans	19.9	18.2	20.7	21.1	22.6	23.8	3.6%
5	Sunflowerseeds	2.5	2.7	2.5	3.5	3.9	3.9	9.7%
6	Others	2.8	2.8	2.9	3.1	2.8	2.5	-2.0%
7	Total	47.7	48.9	53.9	57.9	61.2	63.5	5.9%

Palm oil and soybean oil (as oil and as seeds for crushing to oil) make up 81 percent of world vegetable oil trade.

Note on Estimated Biodiesel Use

8	Palm, mmt	4.8	5.8	7.1	7.8	8.8	9.7	15.2%
9	Palm biodiesel, bil gals	1.4	1.8	2.1	2.3	2.7	2.9	15.2%
10	All other, mmt	43.0	46.8	51.9	58.2	62.0	63.9	8.3%
11	All other biodiesel, bil gals	13.0	14.1	15.7	17.6	18.7	19.3	8.3%
12	Total biodiesel, bil gals	14.4	15.9	17.8	19.9	21.4	22.2	9.0%

CHINA IMPORTED VEGETABLE OILS SHARE OF TOTAL USE

