Implications of Policy and Structural Change

Future trends in India's production, consumption, and trade in oilseeds and oilseed products are likely to be shaped by changes in domestic and border policies. Current policies appear not to be achieving stated policy goals of benefiting small farmers and reducing import dependence. They are, however, imposing large costs on consumers and creating an inefficient processing sector. Eventually, pressures to improve the performance of the sector, combined with rising demand for animal products and feed protein, are likely to lead to policy reform in the oilseed sector.

Potential changes in domestic and border policies would have differing effects on India's supply, demand, and trade of major oilseeds and products. To help assess how Indian policymakers might view the alternative policy options, we use an economic model of India's oilseed sector that incorporates supply, demand, trade, and processing behavior for major Indian oilseeds and products (see appendix 1 for details). We first generate a 10-year projection, or reference scenario, for India's oilseeds sector beginning in 2001 and ending in 2011. The reference scenario is based on existing policies and assumed changes in key exogenous variables, including income growth, exchange rates, and world prices. Alternative scenarios are then evaluated relative to the reference scenario.

We examine five alternative scenarios:

- Changes in oil tariffs.
- Changes in oilseed price supports.
- Oilseed import liberalization.
- Consolidation in oilseed processing.
- Two composite scenarios, favoring producers and consumers alternately.

Reference Scenario

The reference scenario provides projections for India's oilseeds sector through 2011 based on data available and policies in place as of June 2005. Assumptions for all other variables exogenous to the model (table 4) are consistent with the most recent USDA baseline projections (USDA, 2005c).[2]

In the reference scenario, supply, demand, and price variables track actual historical developments through 2004, and are determined by model assumptions and results for 2005 through 2011. Real world prices of oilseeds and meals rise during 2001-04, decline during 2005-06, and remain roughly constant thereafter (fig. 12). World oil prices follow a slightly different path, peaking in 2003 and declining during 2004-06 before leveling off. Domestic prices of oils and meals follow world prices, adjusted for tariffs and estimated transport and marketing costs. Although Indian oilseeds are not traded, domestic oilseed prices track world prices because they are determined primarily by the prices of their derived products—oil and

[2] Although reference scenario assumptions are consistent with current USDA baseline projections, the reference scenario projections differ in some respects from the USDA baseline because of the availability of more recent data and differences in model base periods, specifications, and elasticities.

Table 4

Summary of reference scenario assumptions

Variable	1991-2001	Assumption 2001-05	Assumption 2005-11
	Annual percent change		
Income/capita, real	4.0	5.8	4.6
Exchange rate, real[1]	2.5	0.4	1.5
Yield trends:[2]			
Soybeans	0.5	1.2	1.2
Peanuts	-1.3	1.0	1.0
Rapeseed	-0.5	1.0	1.0
Sunflower	0.6	1.5	1.5
World prices, real:			
Soybeans	-3.7	14.5	-8.0
Soybean meal	-3.1	-2.3	0.1
Soybean oil	-3.8	7.0	-3.4
Tariffs:			
Oilseeds	NA	30	30
Oil meals	NA	30	30
Oils, crude:			
Soybean	NA	45	45
Palm	NA	80	80
Rapeseed	NA	75	75
Sunflower	NA	50	50

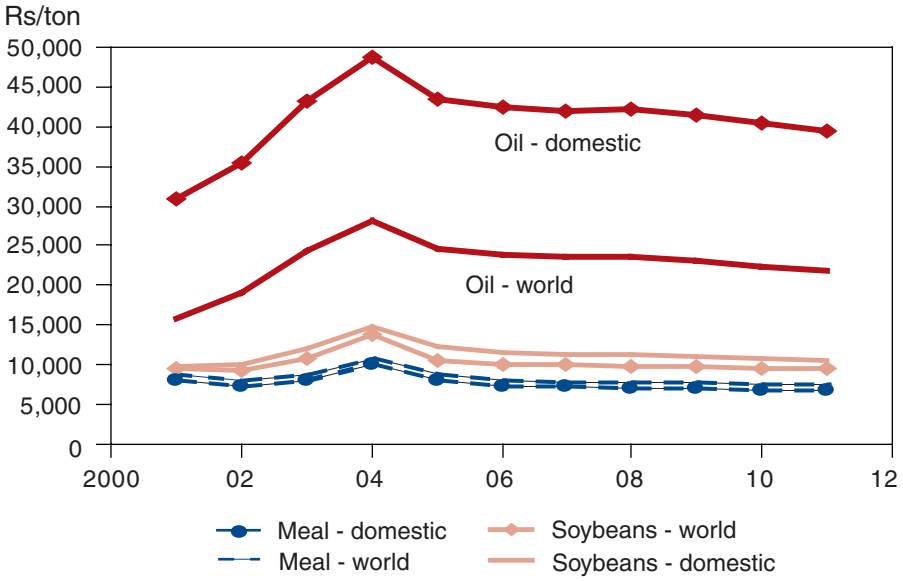
NA = Not available.

[1] Positive numbers indicate real depreciation against the U.S. dollar.

[2] Assumptions are for technical yield trends. Model yields also respond to oilseed prices.

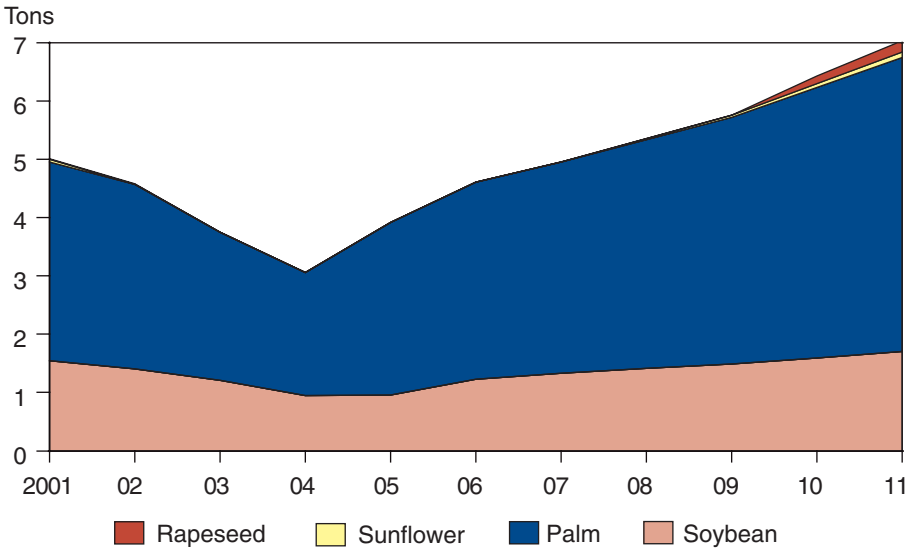
Figure 12

Reference scenario price trends for soybeans and products, India



Source: ERS, India oilseed sector model.

Figure 13
Reference scenario trends in vegetable oil imports, India



Source: ERS, India oilseed sector model.

meal—which are traded. The exception is the peanut market. Since Indian peanuts and peanut oil are usually not traded in significant volumes, their prices are determined by domestic supply and demand conditions rather than world prices.

Supply and demand projections in the reference scenario broadly reflect underlying price movements (table 5). Higher world prices, coupled with higher Indian oil tariffs, boost domestic oilseed prices and output during 2001-05, before leveling off during 2006-11. Consistent with the recent pattern, soybean and rapeseed continue to show the strongest production growth, while peanuts grow the slowest.

Both imports and consumption of total oils initially decline in the reference scenario, reflecting the drought-induced decline in domestic supplies in 2002/03, as well as higher world prices and oil tariffs (fig. 13). Oil consumption and imports resume growth after 2003, the result of steady growth in domestic supplies, lower world and domestic prices, and the assumption of constant oil tariffs. As has been the case since the early 1990s, palm and soybean oils account for most of the projected growth in oil imports and consumption. Rapeseed and sunflower oil consumption also exhibit stronger growth, reflecting gains in domestic supplies and—given projected world prices—rising imports. Peanut oil, which again is not imported based on projected world prices, continues to show the highest domestic price and slowest consumption growth of the major oils.

In the reference scenario, demand for oil meal continues to be led by growth in soybean meal for feed, which expands about 8 percent annually, consistent with recent trends. Other meals grow more slowly, reflecting the weaker preference for these meals by the poultry and egg industries. Growth in soybean meal demand continues to outstrip production, leading to a steady decline in exports of soybean meal and total meal.

Table 5
Summary of reference scenario results

Variable	1990-92 average	2001 base	2011	Growth rates 1991-01	Growth rates 2001-11
	Million tons			*Percent*	
Oilseeds:					
Area (Mil. ha)	19.7	21.9	24.6	1.0	1.2
Soybean	3.1	6.0	6.5	6.7	0.8
Yield (Kgs/ha.)	0.86	0.9	1.0	0.2	1.4
Soybean	0.88	0.9	1.1	0.2	2.3
Production	17.0	19.0	24.4	1.1	2.6
Soybean	2.7	5.4	7.4	7.0	3.2
Crush	14.6	15.7	20.3	0.7	2.6
Soybean	2.5	4.6	6.2	6.5	3.0
Imports	0	0.0	0.0	--	--
Soybean	0	0.0	0.0	--	--
Domestic price (Rs/ton)	NA	12,239	15,569	NA	2.4
Soybean	NA	9,545	10,266	NA	0.7
Oils:					
Production	4.2	4.8	6.2	1.4	2.6
Soybean	0.4	0.9	1.1	6.8	3.0
Consumption	4.4	9.8	13.3	8.3	3.0
Soybean	0.5	2.4	2.9	17.6	1.7
Imports	.20	5.0	7.0	38.3	3.5
Soybean	0.0	1.5	1.7	43.3	1.0
Domestic price (Rs/ton)	NA	32,453	41,671	NA	2.5
Soybean	NA	30,818	39,450	NA	2.5
Meals:					
Production	8.3	8.9	11.6	0.7	2.7
Soybean	2.0	3.7	5.0	6.5	3.0
Consumption	5.7	6.0	8.6	0.5	3.6
Soybean	0.4	1.3	2.8	11.0	8.3
Exports	2.6	2.9	3.0	1.1	0.3
Soybean	1.5	2.4	2.2	4.8	-1.1
Domestic price (Rs/ton)	NA	7,136	5,997	NA	-1.7
Soybean	NA	8,118	6,856	NA	-1.7
Processing:					
Capacity (Mil. tons)	NA	52.3	52.3	NA	0.0
Capacity use (percent)	NA	30.0	39.1	NA	2.7
Soybean	NA	30.0	40.3	NA	3.0
Avg. cost (Rs/ton)	NA	1,017	887	NA	-1.4
Soybean	NA	800	665	NA	-1.8
Quasi-profit (Rs/ton)	NA	1,466	1,571	NA	7.2
Soybean	NA	1,457	1,457	NA	0.0
Quasi-profit (Rs mil.)	NA	22,994	31,840	NA	3.3
Soybean	NA	6,744	9,067	NA	3.0
Net imports (Rs bil.)	NA	-53.6	-119.1	NA	8.3

NA = Not available.
-- = Cannot be calculated.
Source: ERS-India oilseed sector model.

The reference scenario assumes that processing capacity remains fixed at current levels, and that real prices for processing inputs, other than raw material, remain constant.[3] With these assumptions, rising oilseed production leads to modest gains in capacity use in the processing industry, but rates remain low and unit processing costs high by world standards. Increased capacity use generates modest declines in unit processing costs, but processor "quasi-profits"[4] per unit of production remain constant in real terms because the benefits of cost reductions are passed on to oilseed producers in the form of higher oilseed prices.[5] Domestic oilseed producer prices, which are linked to changes in world oil and meal prices, tariffs, and processing costs, are thus able to grow somewhat faster than world prices. Although processors do not realize higher quasi-profits per unit, they benefit from higher total profits because of increased volumes processed and marketed. Total processor profits expand more than 3 percent annually.

Impacts of Changes in Oil Tariffs

To evaluate the impacts of oil tariffs, we analyze the impacts of increasing them by 10 percentage points. Because India's current soybean oil tariff (45 percent) and in-quota tariffs on crude sunflower oil (50 percent) and refined rapeseed oil (45 percent) are already set at their bound maximums, actual increases in these tariffs would be violations of WTO disciplines. Increases in these tariffs are analyzed only to demonstrate the impacts relative to other policies. Actual hikes in these bound rates would entail negotiated compensation to trading partners involving costs not accounted for in this analysis. All other assumptions remain as they are in the reference scenario.[6]

The increase of 10 percentage points in oil tariffs leads to smaller percentage increases in average domestic wholesale prices of oil (4.5 percent) and farm prices of oilseeds (2.9 percent) (table 6). World and domestic meal prices are unchanged. Oilseed production and crush increase, but the gains are small—averaging about 2.0 percent—relative to the increase in oil tariffs. Higher prices reduce oil consumption. Oil imports fall due to larger domestic supplies and reduced consumption, while larger supplies allow meal exports to rise. Impacts for peanuts are small compared with other oilseeds because of weak price response among peanut producers, and because prices for peanut oil are linked to domestic supply and demand rather than world prices. Even with the benefit of lower unit processing costs (resulting from higher capacity use) passed on to oilseed producers, the quasi-profits of oilseed processors increase relative to the reference scenario, mostly because larger quantities are processed and marketed.

The impacts of a 10-percent decrease in oil tariffs would be symmetrical with the tariff increase scenario (see appendix 4 for complete results). With lower oil tariffs, lower domestic oil and oilseed prices would result in much smaller percentage declines in oilseed production and crush, and in lower meal exports. Processor quasi-profits would shrink due to higher unit costs associated with lower capacity use, as well as smaller quantities processed and marketed, but would remain substantially positive. Consumers, by contrast, would receive significant benefits as the average domestic price of oil would fall 4.5 percent, consumption would rise 2.5 percent, and imports would rise 6.7 percent over the reference scenario.

[3] Recent data suggest that solvent extraction capacity may be declining, in part because recent poor harvests led to closure of some units. Constant crush capacity is assumed in the reference scenario, with the effects of reduced processing capacity analyzed in the consolidation scenario.

[4] Quasi-profits, as used here, account for the major costs and revenues associated with processing, including the cost of raw materials, labor, interest, power, steam, and hexane, and revenues from sale of oil and meal. Excluded items include such costs as bags and brokerage for de-oiled cake, local and central taxes, and revenues from the sale of processing wastes such as sunflowerseed hulls and peanut pods.

[5] The extent to which changes in crush costs are transmitted to producer prices of oilseeds and consumer prices of products is determined in the model by (1) the price responsiveness of oilseed supply (own- and cross-price elasticities) and (2) the oilseed trade regime in the scenario being analyzed. When oilseeds cannot be imported, the impact of gains in processing efficiency tends to be bid into the price of oilseeds, which are in relatively fixed (inelastic) supply. When oilseeds can be imported, domestic oilseed prices are determined primarily by world market prices, and domestic crush costs have little bearing on domestic prices.

[6] World reference prices for oilseeds and products are maintained at reference scenario levels (consistent with 2005 USDA baseline projections) in all scenarios analyzed. Although India is a large trader in global oil and meal markets, the changes in trade in the scenarios analyzed are small compared with the volume of global trade and unlikely to have significant long-term impacts on world prices. The oilseed import liberalization scenario alters the composition of India's oilseed and

Table 6
Scenario results: 10-percentage-point increase in oil tariffs

Variable	2011 result	Scenario/reference
	Million tons	*Percent change*
Oilseeds:		
Production	24.9	2.0
Soybean	7.6	2.8
Crush	20.7	2.2
Soybean	6.4	3.0
Imports	0.0	[1]
Soybean	0.0	[1]
Domestic price (Rs/ton)	16,022	2.9
Soybean	10,682	4.1
Oils:		
Production	6.4	2.2
Soybean	1.2	3.0
Consumption	12.9	-2.5
Soybean	2.8	-2.1
Imports	6.6	-6.7
Soybean	1.6	-5.6
Domestic price (Rs/ton)	43,556	4.5
Soybean	41,626	5.5
Meals:		
Production	11.9	2.6
Soybean	5.1	3.0
Consumption	8.6	0.0
Soybean	2.8	0.0
Exports	3.3	10.2
Soybean	2.3	6.7
Domestic price (Rs/ton)	5,993	-0.1
Soybean	6,856	0.0
Processing:		
Capacity (Mil. tons)	52.3	0.0
Capacity use (%)	40.0	2.4
Soybean	41.5	3.0
Avg. cost (Rs/ton)	874	-1.5
Soybean	651	-2.1
Quasi-profit (Rs/ton)	1,584	0.8
Soybean	1,457	0.0
Quasi-profit (Rs mil.)	32,820	3.1
Soybean	9,337	3.0
Net imports (Rs bil.)	107.0	-10.2

[1] Imports are zero in the reference scenario.
Source: ERS-India oilseed sector model.

The analysis of tariff impacts highlights several important issues. First, as expected, the impacts on oilseed producers and processors are opposite the impacts on consumers. The size of the producer and consumer impacts are determined by several factors:

- Oil accounts for a small physical fraction of the oilseed, so changes in oil prices tend to yield proportionally small changes in oilseed prices.

- Based on the elasticities of oilseed supply and oil demand used in the model, consumers are more responsive to changes in oil prices than are farmers to changes in oilseed prices.
- Changes in processing costs associated with different levels of capacity use can affect oilseed prices and oilseed production.

Second, oilseed processors are clear gainers from higher oil tariffs but, even with lower tariffs, would continue to earn significant unit profits. With higher oil tariffs, processors gain from higher returns to oil, as well as increased quantities processed when domestic raw material supplies respond to higher oil prices.

Third, higher oil tariffs tend to reduce foreign exchange costs (the cost of oil imports less earnings from meal exports), while lower oil tariffs would tend to raise foreign exchange costs. However, the net foreign exchange impacts of the scenarios analyzed are small in the context of India's overall balance of payments.

Impacts of Oilseed Price Supports

A major justification for maintaining high oil tariffs is to provide support to oilseed producers. However, oil tariffs may be a relatively inefficient means of supporting farmers. Another approach would be to make the existing system of minimum support prices (MSPs) more effective in supporting oilseed prices. This would provide direct support to oilseed producers and help diversify production away from food grains and toward crops in short supply (such as oilseeds), another stated policy goal.

The scope for using the MSP program to provide direct support to oilseed producers may, however, be restricted by multilateral commitments and budgetary costs. Oilseed MSPs set above import parity (the international reference price for the commodity plus transport and handling costs) would constitute "domestic support" under current World Trade Organization rules. To the extent that support exceeded WTO permitted levels, an oilseed MSP program could be subject to WTO discipline. Such a program would also imply some government budgetary costs for procurement, handling, and storage of oilseeds purchased to defend the MSP. These costs must be weighed against any estimated benefits of such a policy.

Two scenarios analyze the potential impacts of supporting oilseed prices with the MSP program. Both scenarios raise producer prices for each oilseed by an amount equal to the impact of a 10-percent increase in oil tariffs. This permits comparison of the impacts of providing the same amount of producer support via the MSP (directly) versus the oil tariff (indirectly). The difference between the two MSP scenarios is in the mechanism for supporting higher oilseed prices. In the first scenario, the Government pays the difference between the market price and the MSP, while processors continue to operate based on market prices of raw materials and products. In the second scenario, processors pay for the program by paying the MSP for oilseeds and absorbing the costs by reducing their margins.

These two mechanisms essentially bracket the available options for operating an oilseed MSP. When the Government pays the full cost of supporting

oilseed prices above market prices, processor returns are not directly affected. Government costs would include the difference between the MSP and the market price for all of the oilseeds procured in price support operations, as well as any storage and handling costs. Storage periods and costs may be small for oilseeds because of excess demand in the form of idle processing capacity. At the other extreme, when processors are required to pay the new MSP for raw materials, government costs are limited to handling and (likely short-term) storage for oilseeds procured in price support operations. But, with this option, processors will likely cease operations if the oilseed MSP becomes too high relative to market prices of oil and meal and processing margins become negative. Intermediate scenarios would involve some sharing of program costs, with the Government selling procured oilseeds to processors at a price between the market price and the MSP.

With a government-financed MSP, oilseed producer prices rise an average of 2.9 percent (table 7). Prices for traded oils and meals—which remain linked to world prices—are mostly unchanged from the reference scenario. In contrast to the higher oil tariff scenario—which afforded little benefit to peanut producers—peanut prices and production rise, leading to lower prices for peanut oil and higher consumption. Overall, gains in oilseed production and crush, as well as oil and meal production, average about 2 percent, the same as when oil tariffs were increased 10 percent. However, with oil prices mostly unchanged, oil consumption is also unchanged and oil imports fall. Meal exports rise due to higher production and unchanged consumption.

Although the benefits of lower unit processing costs accrue to producers, the quasi-profits of oilseed processors rise because of increased capacity use and sales. Budgetary costs associated with the government-financed MSP are difficult to estimate. Assuming that just 220,000-290,000 tons of oilseeds would have to be removed from the market for an average of 3 months to support a 2.9-percent average price increase, the cost would be about Rs123-164 million ($2.7-$3.6 million).[7] These costs are balanced by producer and processor gains from higher prices and output.

When processors pay the new higher MSP, impacts on production, consumption, and trade are identical to the "government pays" scenario. But processor quasi-profits, while remaining positive, fall about 30 percent compared with the reference scenario. Average returns to processors of peanuts turned negative for some years, meaning that at least some processors would cease operations rather than incur losses.

The MSP scenarios indicate that, by supporting oilseed prices directly rather than indirectly through the oil tariff, producer support is achieved with less adverse impact on oil consumers and with a net savings of foreign exchange. The MSP approach, unlike oil tariffs, also supports peanut producers. But such a policy would entail costs to the Government and/or processors, and may also be subject to WTO disciplines regarding domestic support. A "processor pays" approach is likely to reduce government costs, but may result in private financial losses and supply disruptions. Intermediate solutions that share costs between the government and processors may mitigate private losses, but would add regulatory complexity and, possibly, create processor dependence on government outlays.

[7] The calculation assumes an average oilseed price elasticity of demand in the range of -0.30 to -0.40, implying that 0.87-1.16 percent of total supplies (220,000-290,000 tons) would have to be removed from the market to raise the average reference scenario price by 2.9 percent (Rs456/ton), yielding a cost of Rs99.0-132 million. Adding handling and administrative costs of Rs100/ton and storage costs, computed assuming 10-percent interest for an average storage period of 3 months, results in a budgetary cost estimate of Rs123-164 million ($2.7-3.6 million).

Table 7

Scenario results: Raising oilseed minimum support prices (MSPs)

Variable	2011 result		Scenario/reference	
	Government pays	Processor pays	Government pays	Processor pays
	--------*Million tons*-------		-----*Percent change*-----	
Oilseeds:				
Production	24.9	24.9	2.0	2.1
Soybean	7.6	7.6	2.9	2.9
Crush	20.7	20.7	2.3	2.3
Soybean	6.4	6.4	3.1	3.1
Imports	0.0	0.0	[1]	[1]
Soybean	0.0	0.0	[1]	[1]1
Domestic price (Rs/ton)	16,025	16,024	2.9	2.9
Soybean	10,697	10,697	4.2	4.2
Oils:				
Production	6.4	6.4	2.3	2.3
Soybean	1.2	1.2	3.1	3.1
Consumption	13.3	13.3	0.0	0.0
Soybean	2.9	2.9	0.0	0.0
Imports	6.9	6.9	-2.0	-2.0
Soybean	1.7	1.7	-2.1	-2.1
Domestic price (Rs/ton)	41,663	41,663	0.0	0.0
Soybean	39,450	39,450	0.0	0.0
Meals:				
Production	11.9	11.9	2.7	2.7
Soybean	5.1	5.1	3.1	3.1
Consumption	8.6	8.6	0.0	0.0
Soybean	2.8	2.8	0.0	0.0
Exports	3.3	3.3	10.4	10.5
Soybean	2.4	2.3	7.0	7.0
Domestic price (Rs/ton)	5,993	5,993	-0.1	-0.1
Soybean	6,856	6,856	0.0	0.0
Processing:				
Capacity (Mil. tons)	52.3	52.3	0.0	0.0
Capacity use (percent)	40.0	40.0	2.4	2.4
Soybean	41.6	41.6	3.1	3.1
Avg. cost (Rs/ton)	873	873	-1.5	-1.5
Soybean	650	650	-2.2	-2.2
Quasi-profit (Rs/ton)	1,584	1,076	0.8	-31.5
Soybean	1,457	1,040	0.0	-28.6
Quasi-profit (Rs mil.)	32,831	22,310	3.1	-29.9
Soybean	9,347	6,673	3.1	-26.4
Net imports (Rs bil.)	113.7	113.7	-4.5	-4.6’

[1] Imports are zero in the reference scenario.

Source: ERS-India oilseed sector model.

Table 8
Domestic and import parity prices for major oilseeds, India

Oilseed	Unit	2000	2001	2002	2003
Soybeans:					
World price	$/ton	208	200	203	240
Freight/ins.	$/ton	30	25	36	61
Border price	$/ton	238	225	239	301
Border price	Rs/ton	10,738	10,605	11,336	14,016
Domestic trans.	Rs/ton	783	800	821	849
Import parity price	Rs/ton	11,521	11,405	12,157	14,866
Domestic price[1]	Rs/ton	9,497	10,318	12,268	14,040
Rapeseed:					
World price	$/ton	190	202	220	284
Freight/ins.	$/ton	30	25	36	61
Border price	$/ton	220	227	256	345
Border price	Rs/ton	9,926	10,683	12,142	16,064
Domestic trans.	Rs/ton	783	800	821	849
Import parity price	Rs/ton	10,709	11,483	12,963	16,913
Domestic price[2]	Rs/ton	12,134	13,046	15,265	18,121
Sunflower:					
World price	$/ton	214	219	287	289
Freight/ins.	$/ton	30	25	36	61
Border price	$/ton	244	244	323	350
Border price	Rs/ton	11,008	11,483	15,320	16,297
Domestic trans.	Rs/ton	783	800	821	849
Import parity price	Rs/ton	11,791	12,283	16,141	17,146
Domestic price[3]	Rs/ton	10,225	12,622	14,508	15,573

[1] Soybean: Indore; Source: Solvent Extractors' Association of India.
[2] Rapeseed: Jaipur; Source: Solvent Extractors' Association of India.
[3] Sunflowerseed: Average of Khamgaon (Maharashtra), Jalna (Maharashtra), and Gulbargo (Karnataka); Source Government of India, Ministry of Agricuture.

Impacts of Oilseed Import Liberalization

Liberalization of oilseed imports, which are now effectively prohibited by tariff and sanitary/phytosanitary (SPS) restrictions, is an additional policy option open to the Indian Government. The oilseed tariffs are intended to protect oilseed producers but, in fact, domestic oilseed prices are determined more by the economics of processing, including oil and meal prices, oil and meal extraction rates, and unit processing costs. Generally, domestic oilseed prices are not afforded protection equivalent to the 30-percent import tariff. Domestic oilseed prices—except in the case of rapeseed—are typically below import parity prices (world reference prices adjusted for transport and handling costs to the farm gate), and well below import parity prices plus the tariff (table 8).

The oilseed import liberalization scenario assumes reduced oilseed tariffs and the removal of—or zero-cost solutions to—existing SPS barriers.[8] All other assumptions on exogenous variables, including oil tariffs and the fixed availability of processing capacity, remain the same as in the reference scenario. To implement this scenario, three important changes are introduced into the analytical framework:

[8] Assessing the feasibility of removing existing SPS barriers to oilseed imports is beyond the scope of this study. For this analysis, it is assumed that the barriers can be reduced or complied with without creating unacceptable pest or disease risks, or unacceptable costs to oilseed processors.

- The scenario is conducted in a way that prevents oilseed imports from leading to losses for oilseed producers. Producer prices are not allowed to fall below reference scenario prices. This is a realistic approach because of the priority that policymakers place on producer welfare. When necessary, producer prices are maintained at the reference scenario level by allowing non-zero tariffs sufficient to maintain reference scenario producer prices. Based on market price conditions during the period analyzed, non-zero tariffs are required for rapeseed only.
- With import liberalization, domestic oilseed prices become linked directly to world oilseed prices rather than domestic oil and meal prices. The only remaining protection of domestic oilseeds and products arises from oil tariffs, plus the "natural" protection afforded by international and domestic transport and handling costs. A key implication of oilseed import liberalization is that India's high oil tariffs would have little or no impact on the oilseed prices received by Indian producers or paid by processors. Processors would, however, continue to benefit from high domestic oil prices and crush margins resulting from oil tariffs. Oilseed producers may also receive less price benefit than they would in a protected market, as increased use of processing capacity reduces processing costs. Any portion of this benefit that would raise oilseed producer prices above import parity would be retained by processors, unless redirected by other policies.
- With no prohibitive restrictions on imports of raw material, processors would likely behave as profit maximizers, importing and processing raw material until marginal revenue equals marginal cost. Additional cost factors include the costs of transporting imported oilseeds to processing plants and, as long as India has a meal surplus, transporting surplus meal back to ports for export.

This scenario includes assumptions on transportation and handling costs for imported oilseeds and exported meal. These costs vary by unit according to distance from ports, access to rail transport, the quality of roads, and other factors. Some processing units may be too remote and inaccessible for imports to be feasible. Based on available information on transport and handling costs and the location of processing capacity, it is assumed that about 76 percent of India's processing capacity could process imported oilseeds, with an average transport and handling cost of Rs800 ($17.78) per ton.[9]

With liberalization of oilseed imports, producer prices rise an average of 1.6 percent (table 9). Soybean and sunflowerseed prices rise 7.5 percent and 6.4 percent because import parity prices are above initial domestic prices. Despite the higher price of imported raw materials, lower average processing costs and increased volumes make soybean and sunflowerseed imports profitable for processors. However, a 34-percent tariff is needed to maintain rapeseed prices at reference scenario levels, and peanuts continue to be untraded with no change in price relative to the reference scenario.[10] Domestic prices of oils and meals remain linked to world prices and are unchanged from the reference scenario.

Soybean and sunflowerseed production increase 4.1 percent and 1.3 percent, while oilseed crush and production of meal and oil rise sharply due to imports of about 8.7 million tons of oilseeds. Soybeans (8.0 million tons in

[9] Oilseed transport and handling costs are accounted for in a way that avoids the detail of plant- or region-specific transport and handling cost data. It is assumed that all processing capacity within about 800 km of major ports could process imported oilseeds. This is reasonable because soybean processors in Madhya Pradesh-roughly 800 km from major ports-now pay the transport costs and earn profits from meal exports. Based on state data, about 76 percent of existing processing capacity meets this criterion (Solvent Extractors' Association of India, 2003). Processors farther from the port are assumed to rely on domestically produced oilseeds. The average costs of transporting oilseeds and meals from and to ports are based on data provided by processors in Madhya Pradesh (Rs850/ton by road, Rs750/ton by rail, Rs800/ton average). Oilseed imports might, in the short run, bid up the transport costs. But since many plants are located closer to ports than 800 km and large-scale imports could lead to investment in more efficient transport, current costs may also overestimate longrun costs.

[10] The 34-percent average tariff needed to maintain rapeseed producer prices is above the current 30-percent tariff, implying that the current tariff would not prevent rapeseed imports in the absence of nontariff barriers.

Table 9
Scenario results: Liberalizing oilseed imports[1]

Variable	2011	Scenario/reference
	Million tons	*Percent change*
Oilseeds:		
Production	24.8	1.4
Soybean	7.7	4.1
Crush	29.3	44.5
Soybean	14.5	133.1
Imports	8.7	[2]
Soybean	8.0	[2]
Domestic price (Rs/ton)	15,816	1.6
Soybean	11,039	7.5
Oils:		
Production	8.1	29.2
Soybean	2.7	133.1
Consumption	13.3	0.0
Soybean	2.9	0.0
Imports	5.2	-25.9
Soybean	0.2	-89.7
Domestic price (Rs/ton)	41,673	0.0
Soybean	39,450	0.0
Meals:		
Production	18.6	60.6
Soybean	11.6	133.1
Consumption	8.6	0.0
Soybean	2.8	0.0
Exports	10.0	237.5
Soybean	8.8	301.4
Domestic price (Rs/ton)	6,273	4.6
Soybean	6,856	0.0
Processing:		
Capacity (Mil. tons)	52.3	0.0
Capacity use (percent)	67.6	72.9
Soybean	94.0	133.1
Avg. cost (Rs/ton)	637	-28.2
Soybean	367	-44.9
Quasi-profit (Rs/ton)	1,320	-16.0
Soybean	982	-32.6
Quasi-profit (Rs mil.)	38,679	21.5
Soybean	14,250	57.2
Net imports (Rs bil.)	118.2	-1.0

[1] The removal of SPS barriers on all oilseeds with zero tariffs on soybeans, rapeseed, sunflowerseed, and peanuts. Rapeseed tariff is maintained to prevent a decline in domestic prices.
[2] Imports are zero in the reference scenario.
Source: ERS-India oilseed sector model.

2011) are the major oilseed imported, followed by rapeseed (0.5 million) and sunflowerseed (0.2 million). Domestic oil and meal consumption are mostly unchanged so, with the large gains in oil and meal production, oil imports fall 26 percent and meal exports more than triple relative to the reference scenario. Soybean processors reap windfall gains in quasi-profits, with smaller gains for processors of other oilseeds. Although the cost of soybeans and sunflowerseed rises, processors benefit from high oil tariffs,

the retained benefits of lower unit processing costs, and large increases in volumes processed and marketed.

Under oilseed import liberalization, soybeans, rather than sunflowerseed and rapeseed, account for the bulk of imports. This occurs despite the fact that both rapeseed and sunflowerseed contain a larger oil fraction and are currently protected by higher oil tariffs than soybeans. The reason for this outcome is that India imports only small amounts of rapeseed and sunflower oils. With oilseed import liberalization, these oilseeds are imported only until the derived oil output replaces imports of the oils; larger imports of the oilseeds would drive down domestic prices of the oils and reduce processor profits.

The oilseed import liberalization scenario demonstrates the potential for efficiency gains from using idle processing capacity. Oilseed producers gain on average, consumers are largely unaffected and, with high oil tariffs in place, processors reap large windfall gains. This result may not be optimal for the economy as a whole but, as later scenarios indicate, there is scope to reallocate processor gains so that consumers and/or producers receive more of the benefits.

While gains for processors are large, producer and processor impacts would likely vary by plant and region, and over time. Larger plants with greater scale economies are likely to have an advantage over smaller units. As a result, peanut and rapeseed processors, who are restricted to small-scale units, may receive smaller gains than sunflower and soybean processors. Processors located near ports would have cost advantages over inland units for imports of raw material and exports of meal. While the scenario assumes that processing capacity remains fixed at the 2001 level, larger and more technically efficient units may eventually be built near ports and have a competitive advantage over most existing units. In this event, the least competitive existing units would likely close, and the remaining inland units would tend to process domestic raw materials, selling both oil and meal in the domestic market.

Impacts of Consolidation in Oilseed Processing

The recent trend in oilseed processing toward consolidation of ownership by larger domestic and multinational firms, though not driven by policy change, is a potentially significant development. With the formation of larger consolidated firms, smaller, less efficient firms are likely to be pressured to exit the industry. As firms exit, average capacity use will rise and average costs of processing will fall. While there would be local employment losses associated with firm exits, benefits would accrue to producers and consumers due to lower average processing costs. Economywide employment effects may be minimal if the overall volume processed by the industry does not change.

Some of the impacts of industry consolidation are analyzed with a scenario that reduces processing capacity at a constant rate during the projection period. By 2011, capacity is reduced to the point where overall capacity use reaches about 94 percent, roughly the rate maintained in other major oilseed

Table 10
Scenario results: Consolidation of oilseed processing[1]

Variable	2011	Scenario/reference
	Million tons	*Percent change*
Oilseeds:		
Production	24.7	1.1
Soybean	7.5	1.9
Crush	20.5	1.2
Soybean	6.3	2.0
Imports	0.0	[2]
Soybean	0.0	[2]
Domestic price (Rs/ton)	15,860	1.9
Soybean	10,564	2.9
Oils:		
Production	6.3	1.1
Soybean	1.2	2.0
Consumption	13.3	0.0
Soybean	2.9	0.0
Imports	7.0	-0.9
Soybean	1.7	-1.4
Domestic price (Rs/ton)	41,647	-0.1
Soybean	39,450	0.0
Meals:		
Production	11.8	1.4
Soybean	5.1	2.0
Consumption	8.6	0.0
Soybean	2.8	0.0
Exports	3.1	5.7
Soybean	2.3	4.5
Domestic price (Rs/ton)	5,999	0.0
Soybean	6,856	0.0
Processing:		
Capacity (Mil. tons)	21.8	-58.2
Capacity use (percent)	93.9	140.3
Soybean	94.0	133.1
Avg. cost (Rs/ton)	549	-38.1
Soybean	367	-44.9
Quasi-profit (Rs/ton)	1,573	0.2
Soybean	1,457	0.0
Quasi-profit (Rs mil.)	32,281	1.4
Soybean	9,248	2.0
Net imports (Rs bil.)	116.5	-2.3

[1] Linear reduction of processing capacity so that processing capacity utilization rate is 94 percent by 2011.
[2] Imports are zero in the reference scenario.
Source: ERS-India oilseed sector model.

processing countries such as the United States, Argentina, and Brazil.[11] All other assumptions remain the same as the reference scenario.

With this consolidation scenario, oilseed producer prices rise modestly when—as in the reference, tariff change, and MSP scenarios—the benefits of higher capacity use and lower processing costs are passed to producers, but domestic oil and meal prices are unchanged (table 10). Increased oilseed production and crush raise oil and meal output, but oil and meal consumption are

[11] In oilseed processing, the convention is to measure capacity based on 24-hour days and 300 days of operation, which builds in 65 days of closure for holidays and plant maintenance.

unchanged. As a result, oil imports drop slightly and meal exports rise. Processor quasi-profits rise as the gains associated with increased volumes more than offset the modest increase in raw material prices.

Under this scenario, even with plants moving out of production, both the processing industry and oilseed producers benefit. Although there would be local employment losses associated with plant closures—and smaller, more labor-intensive firms may exit first—the increase in volume processed makes the change in total employment uncertain.

The recent consolidation trend, because of excess capacity and limited raw material supplies, threatens the least efficient oilseed processors under existing domestic and trade policies. Increased Government support, perhaps through higher oil tariffs, may continue to protect less efficient processors, but would result in additional costs to consumers and, in the case of soybean oil, require renegotiation of the WTO bound tariff. Liberalizing oilseed imports would, however, provide an opportunity for more processors to stay in business if they are sufficiently competitive with other firms.

Composite Scenarios: Distributing Benefits to Producers and Consumers

The analysis so far has shown that each of the policy options available to the Government—adjusting oil tariffs, providing price supports to oilseed producers, and liberalizing oilseed imports—has differing implications for producers, consumers, processors, government outlays and, in some cases, WTO disciplines. The results for individual policy changes suggest that some composite scenarios—scenarios that combine changes in multiple policies—may meet the goals of supporting oilseed producers and processors at a smaller cost to consumers.

Two such scenarios involve tapping the large potential for efficiency gains in processing associated with liberalizing oilseed imports, but then reallocating the gains to producers or consumers. The first scenario includes the same liberalization of oilseed imports analyzed previously (see table 9), but investigates whether it is possible to transfer the gains in processor quasi-profits to consumers by reducing oil tariffs. The second scenario also includes oilseed import liberalization, but investigates whether it is possible to transfer gains in processor quasi-profits to oilseed producers using oilseed tariffs.

Oilseed imports with benefits shifted to consumers. In this scenario, the bulk of any gains in processor quasi-profits (between the reference scenario and the oilseed import liberalization scenario) are shifted to consumers by reducing oil tariffs. This type of transfer appears possible for the soybean sector and, to a lesser extent, for rapeseed, but not for the sunflower or peanut sectors (table 11). The overall decline in domestic oil prices is relatively small—about 1 percent—as the significant consumer gains are confined to soybean oil.

In this scenario, impacts on producers are the same as in the oilseed import liberalization scenario; soybean and sunflower prices and production rise, while peanut and rapeseed production and prices are almost unchanged.

Table 11
Scenario results: Composite scenarios

Variable	2011 result		Scenario/reference	
	Oilseed import liberalization with benefits to:			
	Consumers	Producers	Consumers	Producers
	--------Million tons---------		*------Percent change------*	
Oilseeds:				
Production	24.8	25.0	1.4	2.5
Soybean	7.7	7.9	4.1	7.2
Crush	29.3	29.3	44.6	44.5
Soybean	14.5	14.5	133.1	133.1
Imports	8.7	8.5	[1]	[1]
Soybean	8.0	7.8	[1]	[1]
Dom. price (Rs/ton)	15,845	15,945	1.8	2.4
Soybean	11,039	11,388	7.5	10.9
Oils:				
Production	8.1	8.1	29.3	29.2
Soybean	2.7	2.7	133.1	133.1
Consumption	13.3	13.3	0.4	0.0
Soybean	2.9	2.9	2.1	0.0
Imports	5.3	5.2	-25.1	-25.9
Soybean	0.2	0.2	-86.2	-89.7
Dom. price (Rs/ton)	41,228	41,674	-1.1	0.0
Soybean	37,709	39,450	-4.4	0.0
Meals:				
Production	18.6	18.6	60.7	60.6
Soybean	11.6	11.6	133.1	133.1
Consumption	8.6	8.6	0.0	0.0
Soybean	2.8	2.8	0.0	0.0
Exports	10.0	10.0	237.7	237.5
Soybean	8.8	8.8	301.4	301.4
Dom. price (Rs/ton)	6,273	6,273	4.6	4.6
Soybean	6,856	6,856	0.0	0.0
Processing:				
Capacity (Mil. tons)	52.3	52.3	0.0	0.0
Capacity use (percent)	67.6	67.6	72.9	72.9
Soybean	94.0	94.0	133.1	133.1
Avg. cost (Rs/ton)	637	637	-28.2	-28.2
Soybean	367	367	-44.9	-44.9
Quasi-profit (Rs/ton)	1,111	1,099	-29.3	-30.0
Soybean	661	633	-54.6	-56.6
Quasi-profit (Rs mil.)	32,564	32,197	2.3	1.1
Soybean	9,586	9,182	5.7	1.3
Net imports (Rs bil.)	119.4	115.5	0.2	-3.1

[1] Imports are zero in the reference scenario.
Source: ERS-India oilseed sector model.

Consumer prices fall for soybean and rapeseed oils, and consumption rises, as processor gains from oilseed imports are transferred to consumers by reducing oil tariffs. Tariffs on soybean oil are reduced from 45 percent to 37 percent, and for rapeseed oil from 75 percent to 74 percent, leading to declines in consumer prices for soybean and rapeseed oils of about 4 percent and 1 percent, respectively. (The relatively small tariff reduction for rapeseed oil is linked to the relatively small impacts on rapeseed imports

and processing costs in the oilseed import liberalization scenario.) Soybean oil tariffs and prices fall the most because soybean processors benefit the most from oilseed import liberalization, thus generating more efficiency gains to transfer to consumers.

It was not possible to lower the sunflower oil tariff because any downward adjustment would reduce processor quasi-profits below the reference scenario. However, sunflower processors, on average, appear to earn significantly higher unit surpluses than other processors, both in the base period and the reference scenario. As a result, there may be more scope for transferring sunflower processor quasi-profits to oil consumers than accounted for in this analysis. Transferring benefits to peanut oil consumers by this approach is not possible because these products continue to be untraded under oilseed import liberalization.

Oilseed imports with benefits shifted to farmers. In this scenario, the bulk of any gains in processor quasi-profits are shifted to producers by upward adjustments to oilseed tariffs. This policy approach is feasible for all oilseeds except peanuts.

With processor quasi-profits transferred to producers, oilseed producer prices and oilseed production rise relative to both the reference scenario and the oilseed import liberalization scenario (table 11). Oilseed producer prices rise an average of 2.4 percent. The largest price and output gains are for soybeans, again because soybean processors experience the largest efficiency gains from liberalization of oilseed imports. The soybean tariff rises from zero to 4 percent and the rapeseed tariff rises from 34 percent to 37 percent. Producer prices rise 10.9 percent for soybeans and 1.5 percent for rapeseed.

Sunflowerseed prices, while higher than in the reference scenario, are consistent with the oilseed import liberalization scenario because higher farm prices would reduce processor quasi-profits below the reference scenario. However, the high level of quasi-profits (per unit) apparently earned from sunflowerseed processing may suggest more scope to transfer gains to producers than shown in this analysis. Since peanuts used for processing are not traded, there is no scope to raise producer prices by this mechanism.

Impacts on oil consumers are unchanged from the reference scenario and the oilseed import liberalization scenario. Oilseed processor quasi-profits match those of the reference scenario. Oil and meal trade implications remain the same as under the oilseed import liberalization scenario, but increased oilseed production leads to smaller oilseed imports.

This analysis demonstrates how oilseed import liberalization—with oilseed tariffs set in a way that enables higher processing efficiency while protecting producers—could benefit most oilseed producers with no loss to consumers or processors. In the longer term, if processors respond to oilseed import liberalization by building larger, more efficient plants, even larger efficiency gains may be shared among producers, consumers, and processors than estimated in this analysis. These larger efficiency gains could be channeled to consumers (through reductions in oil tariffs) or to producers (through WTO-legal adjustments in oilseed tariffs) without making other players worse off.