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## International Trade Department

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Trade Note 27

## WTO's DOHA COTTON INITIATIVE: HOW WILL IT AFFECT DEVELOPING COUNTRIES?

For many developing countries, especially in Africa and Central Asia, cotton is an important cash crop (Figure 1). It is receiving attention of late because four poor cotton-exporting West African countries (Benin, Burkina Faso, Chad and Mali) have demanded that cotton subsidy and import tariff removal be part of the World Trade Organization's Doha Development Agenda (DDA). Cotton subsidies are mostly provided by governments in high-income countries, and part of the US cotton subsidy program has been ruled illegal following a WTO dispute settlement case brought by Brazil. Hence some reform can be expected soon, especially if the DDA is to live up to its name of being a development round.

How much would Sub-Saharan Africa and Central Africa gain from removal of all cotton subsidies and tariffs? How would the welfare of those cotton-importing developing countries with export interests in textiles and clothing be affected by such reform? What would be the relative contributions of domestic supports, export subsidies and import tariffs to the global gains from removal of those measures? And how would the gains from full reform compare with the gains that could be expected if and when (a) the US complies with its WTO obligations as laid out in the WTO's dispute settlement Panel and Appellate Body reports (WTO 2004b, 2005a) and (b) the partial reforms proposed in the Hong Kong

Trade Ministerial meeting in December 2005 are implemented as part of the DDA?

The Cotton Initiative under the WTO's DDA has not only the trade policy reform component, but also a development component aimed at boosting the international competitiveness of cotton producers in low-income (especially West African) countries. One prospective way to do that is for governments of those countries to encourage adaptation and allow adoption of new varieties of cotton emerging from the biotechnology revolution, the affordability of which will be greater in the absence of cotton market distortions. How do the estimated gains from cotton subsidy and tariff reform compare with the prospective gain from wider adoption by developing countries of genetically modified (GM) cotton? And how much greater would be the gains to cotton-producing developing countries from GM cotton adoption if global cotton markets were not distorted by subsidies and tariffs?

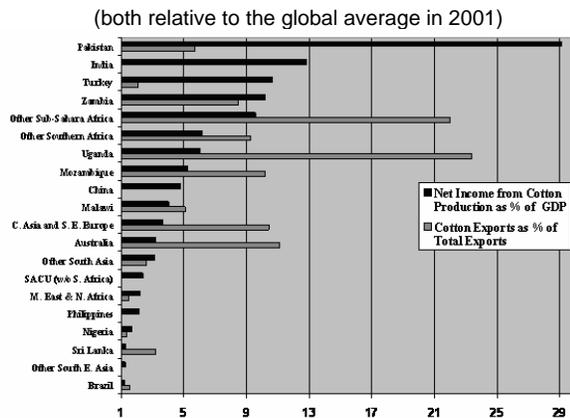
### Background: The Global Cotton Market

Cotton production is highly concentrated in a few countries: as of 2005/06, nearly half is produced by just China and the United States, and that rises to more than two-thirds when India and Pakistan are added and to more than three-quarters when Brazil and Uzbekistan are included. Also highly concentrated are exports of cotton lint, with the US, Australia, Uzbekistan and Brazil accounting for



almost two-thirds of the world's exports, while the cotton-four in West Africa and the other four countries in Central Asia bring that total to almost four-fifths. Cotton production is also concentrated in the sense that a number of low-income countries depend heavily on cotton for earning foreign exchange (Figure 1). Cotton usage, on the other

Figure 1: Net income from cotton production as % of GDP, and cotton exports as % of total exports



Source: GTAP database (www.gtap.org)

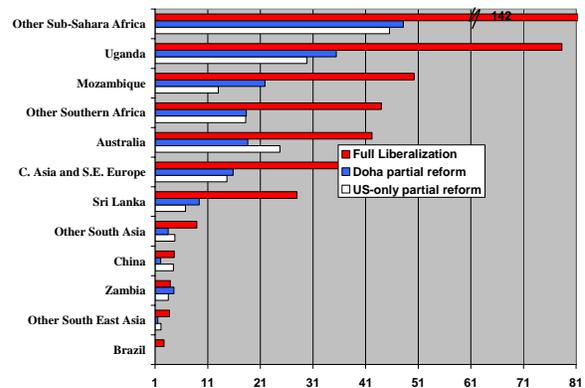
hand, is distributed across countries roughly in proportion to their volumes of textile production. Because of high domestic usage by exporters of textiles and clothing in developing Asian countries (and Mexico because of its preferential access to the US and Canadian markets under NAFTA), even relatively large cotton producers such as China, Pakistan and India export only a small fraction of their crop, in contrast to Sub-Saharan Africa where textile production is relatively minor (columns 2 and 3 of Table 1).

### The Global Cost of Cotton Subsidies and Tariffs

Using the GTAP database and model of the global economy, Anderson and Valenzuela (2006) estimate that the removal of all cotton subsidies and import tariffs would boost global economic welfare by \$283 million per year, and would raise the price of cotton in international markets by an average of 13 percent. (These estimates do not take into account gains from productivity that the ending of subsidies might stimulate). The price rise ensures that all cotton-exporting countries would benefit, while net importers of cotton would be worse off, as shown in the right-hand columns of Table 1.

What is striking about the welfare effects is their distribution among developing countries (Table 1 and Figure 2). Especially noteworthy is the relatively large benefit bestowed on Sub-Saharan Africa, of \$147 million per year. About two-fifths of that would go to the Cotton-4 and another one-fifth to other West African countries. This is driven by an estimated increase in Sub-Saharan African cotton output and net farm income of nearly one-third, and in the real value of the region's cotton exports of more than 50 percent. By contrast, cotton output and exports would fall by one-quarter in the United States and would halve in the EU (middle columns of Table 1). That would raise Sub-Saharan Africa's share of global cotton exports from 12 to 17 percent, and the share of all developing countries from 52 to 72 percent. The region's welfare gain of \$147 million per year is no less than one-fifth of the estimated gain for the region from the freeing of all goods markets globally, according to our GTAP model results. It is therefore not surprising that some African trade negotiators have threatened to walk out of the WTO's Doha round of talks if substantial reforms to cotton policies are not included in the final Doha agreement – in which case the global cost of not reforming cotton would be many times greater than implied in Table 1.

Figure 2: Welfare gain from cotton tariff and subsidy reform as a percent of GDP, as a multiple of the share for the world as a whole



Source: Authors' GTAP model simulation results

Export subsidy removal would contribute almost none of the global benefits from reform, and cotton tariff removal would account for only one-ninth of the global gain, with the other eight-ninths due to cutting domestic support programs. This latter result contrasts markedly with that for the removal of all agricultural subsidies and tariffs (to

**Table 1: Cotton net farm income and net export positions in 2001, and impact of removing cotton subsidies and tariffs<sup>a</sup> on cotton output, exports, net farm income and economic welfare**

(percent and 2001 US\$m)

	<i>Index of cotton production specialization<sup>c</sup></i>	<i>Net exports<sup>b</sup> (\$b) of:</i>		<i>Change in cotton output volume (%)</i>	<i>Change in cotton net farm income (%)</i>	<i>Change in value of cotton exports (%)</i>	<i>Welfare change (\$m):</i>	
		<i>cotton</i>	<i>textiles and clothing</i>				<i>TOTAL</i>	<i>that are due to terms of trade change</i>
<b>High-income countries</b>	<b>0.3</b>	<b>1.0</b>	<b>-92.0</b>	<b>-20</b>	<b>-15</b>	<b>-18</b>	<b>465</b>	<b>275</b>
Australia	3.8	1.1	-2.6	25	22	38	137	125
United States	0.6	2.2	-60.7	-25	-18	-29	429	443
EU25	0.1	-1.0	-28.8	-54	-53	-49	14	-109
Japan	0.0	-0.4	-14.1	1	2	62	-24	-49
Korea-Taiwan	0.1	-0.7	22.5	12	7	34	-61	-84
<b>Developing countries</b>	<b>3.8</b>	<b>-1.0</b>	<b>92.0</b>	<b>6</b>	<b>4</b>	<b>46</b>	<b>-182</b>	<b>-275</b>
<i>E. Europe &amp; C. Asia</i>	<i>4.3</i>	<i>0.3</i>	<i>7.4</i>	<i>7</i>	<i>3</i>	<i>36</i>	<i>-14</i>	<i>-36</i>
Turkey	11.6	-0.4	8.7	2	2	37	-86	-80
Other ECA	2.1	0.7	-1.3	10	9	35	72	44
<i>East Asia</i>	<i>3.0</i>	<i>-1.4</i>	<i>60.4</i>	<i>2</i>	<i>2</i>	<i>72</i>	<i>-83</i>	<i>-127</i>
China	4.0	-0.1	41.9	2	2	76	50	45
<i>South Asia</i>	<i>14.5</i>	<i>-1.0</i>	<i>24.5</i>	<i>2</i>	<i>1</i>	<i>55</i>	<i>-96</i>	<i>-99</i>
Bangladesh	14.2	-0.3	3.8	8	5	68	-11	-21
India	13.7	-0.6	11.9	-1	0	31	-85	-79
Pakistan	29.9	-0.1	6.8	5	3	61	-7	-5
<i>M. East &amp; North Africa</i>	<i>2.5</i>	<i>0.4</i>	<i>-3.3</i>	<i>6</i>	<i>6</i>	<i>37</i>	<i>19</i>	<i>26</i>
<i>Sub-Saharan Africa</i>	<i>5.8</i>	<i>1.1</i>	<i>-1.8</i>	<i>32</i>	<i>31</i>	<i>55</i>	<i>147</i>	<i>113</i>
South Africa	0.3	-0.0	-0.2	19	21	47	-1	-2
Mozambique	6.1	0.0	-0.0	19	18	29	2	1
Zambia	11.6	0.0	0.0	4	4	11	0	0
Uganda	6.8	0.0	-0.0	27	26	45	4	3
Other Sthn & E. Africa	7.5	0.2	0.7	21	20	46	17	14
Nigeria	2.2	0.0	-0.7	23	21	47	-1	0
Other Sub-Sah. Africa	12.6	0.8	-1.6	39	37	60	126	97
<i>Latin America &amp; Car.</i>	<i>1.1</i>	<i>-0.4</i>	<i>4.8</i>	<i>11</i>	<i>9</i>	<i>54</i>	<i>-155</i>	<i>-152</i>
Argentina	1.1	0.1	-0.4	14	11	66	7	6
Brazil	1.5	0.1	-0.0	10	10	58	13	12
Mexico	0.8	-0.5	4.0	13	11	42	-128	-136
<b>World</b>	<b>1.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-1</b>	<b>-2</b>	<b>8</b>	<b>283</b>	<b>0</b>

<sup>a</sup>Removal of those distortions left after the phase-out of the quotas at the end of 2004<sup>b</sup>Exports minus imports, both valued at f.o.b. prices as in the GTAP database 6.05<sup>c</sup>Cotton's national share in GDP relative to the global share. In the GTAP database the sector is 'plant-based fibers' and so includes such products as flax (important only for Bangladesh in the above countries)

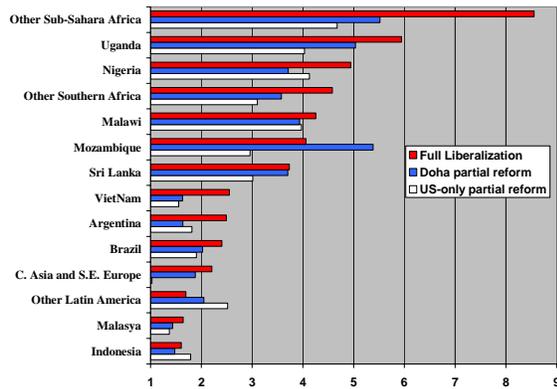
Source: Authors' GTAP model simulation results



which cotton is a tiny contributor), whereby tariff removal accounts for a huge 93 percent of the global benefits and domestic support programs only 5 percent (Anderson, Martin and Valenzuela 2005).

Turning to the impacts on cotton farmers' incomes of such reform (Figure 3), we estimate they would decline by one-sixth in the United States and by just over half in the EU. In virtually all other regions, however, they are estimated to rise. Crucially, they would rise by a huge 30 percent in Sub-Saharan Africa and around 40 percent in West Africa in particular – more than three-quarters of which is due to cuts to domestic support programs.

**Figure 3: Percentage change in cotton farm income from reform of cotton tariffs and subsidies, as a multiple of the percentage change for developing countries as a whole**



Source: Authors' GTAP model simulation results

**Effects of Partial Reform of Cotton Subsidies and Tariffs**

While the full reform results presented above are not likely to materialize in the immediate future, they provide a useful benchmark against which to compare the estimated effects of partial reforms. Consider two partial reform scenarios: liberalization in the United States alone, as a possible response to the outcome of the WTO dispute settlement case brought against it by Brazil; and a broader liberalization consistent with what was agreed at the Hong Kong Trade Ministerial in December 2005 as part of the Doha Development Agenda (DDA).

How much cotton reform can be expected in the United States as a result of the US being found, by the WTO's dispute settlement Panel and Appellate Body, to be not in compliance with its WTO obligations? The WTO ruled that the Step 2

program and the export credit guarantees were prohibited export subsidies and domestic-content subsidies. In response, the US Congress agreed to repeal the two parts of its Step 2 program in 2006. If US expenditure on cotton support is reduced by the full amount of the Step 2 payments, this would be equivalent in 2000-02 to a one-seventh reduction in the aggregate subsidy to US cotton production. The complaining country (Brazil) may expect a reduction also in US cotton producer subsidies, which in 2000-2002 averaged \$3.0 billion while in 1992 (the limit year under the Uruguay Round Agreement on Subsidies and Countervailing Measures) they were just \$2.0 billion. To simulate a US reform that would fully comply with the WTO rulings, we ran a scenario in which not only the Step 2 program is removed but also domestic producer subsidies are cut by one-third, from \$3 billion to \$2 billion.

The WTO's Hong Kong Trade Ministerial meeting of the DDA in December 2005 went further: members agreed that all cotton export subsidies be eliminated during 2006, that least-developed countries get duty free access for their cotton exports to high-income countries by the time implementation of the DDA commences, and that domestic cotton subsidies be reduced faster and more ambitiously than other agricultural domestic support programs during DDA implementation. To see how far that would go towards yielding the potential gains to low-income countries from full reform as reported above, we ran another partial liberalization scenario in which we eliminated those two sets of trade measures and cut domestic cotton supports by one-third in all high-income countries (not just in the US).

Among the impacts of these partial reform simulations are the following:

- The national welfare gains and boost to cotton farmers' incomes from partial reform are still concentrated in Sub-Saharan Africa and Central Asia, although less so than under full reform (Figures 2 and 3)
- Sub-Saharan Africa's cotton output and exports would rise only one-quarter as much (and Central Asia's 40 percent as much) under full reform as under the Doha partial reform scenario.



- Compared with what Sub-Saharan Africa can expect from Doha cotton reform, US-only partial reform would generate only around three-fifths of the estimated net welfare and net cotton income effects, and two-fifths of the export effects.
- The average price of cotton in international markets is estimated to rise by 12.9 percent under full reform, but by just 4.4 and 3.2 percent in the Doha and US-only scenarios, respectively.

**What Impact Would GM Cotton Adoption Have on the Gains from Trade Reform?**

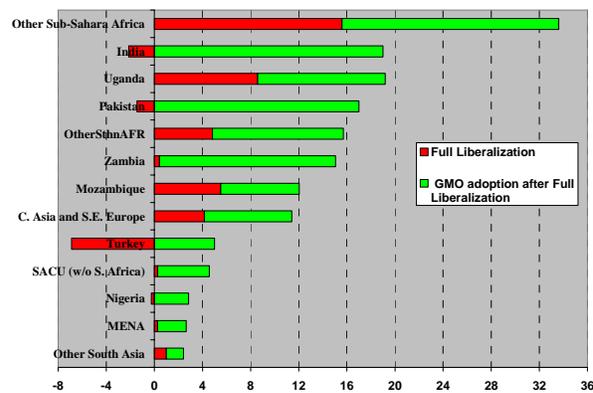
The Cotton Initiative involves two parts: in addition to trade and subsidy reform, importance has been attached to boosting the international competitiveness of cotton production in low-income countries. One prospective way to do that is for governments of those countries to allow the adoption of new varieties of cotton emerging from the biotechnology revolution, following the example of the early adopting countries (the United States, Australia, China and South Africa). To simulate the economic effect of global adoption of GM cotton varieties, Anderson, Valenzuela and Jackson (2006) assume total factor productivity in cotton production, net of any higher cost of GM seed, would rise by 5 percent in all adopting countries except India and Sub-Saharan Africa other than South Africa (who's yields are well below half the global average) where 15 percent is assumed.

If all other countries adopt GM cotton, the value of cotton output in the four early-adopting countries would fall in response to the output expansion in newly adopting regions, but global welfare would jump \$2.3 billion. Asia's developing countries that are net importers of cotton would gain even if they grow little or no cotton, because the international price of that crucial input into their textile industry would be lower by an average of 4.1 percent in this scenario. The gains to Central Asia, Sub-Saharan Africa and South Asia are estimated to be ten, thirteen and twenty-three times greater than the global gains when expressed as a percentage of regional GDP. South Asia's are especially large because it is a large producer *and* user of cotton.

The estimate of the global benefits from full GM cotton adoption by developing countries is eight times larger than the above estimate of the global gain from complete removal of all cotton subsidies and tariffs, and twelve times larger than the global gain from the Doha partial cotton reform simulation. The differences are less marked for Sub-Saharan Africa, but even so its estimated gain from adopting GM cotton varieties is well above that from full removal of all trade-distorting cotton policies and around six times that from the Doha partial reform simulation considered above.

If all distortions to cotton markets were removed, the gains to developing countries in the absence of distortionary cotton policies would be slightly greater (12 percent so in the case of Sub-Saharan Africa). Were these two reforms (GM catch-up and subsidy removal) to occur simultaneously, they would reinforce each other in Sub-Saharan Africa as each expands the region's cotton production and exports and so makes the gain from the other change larger: the gain to Sub-Saharan Africa would then be \$370 million. Also, by comparing Figures 2 and 4 it is clear that, while some cotton-importing developing countries lose from subsidy reform on its own, they gain when it is combined with the spread of the productivity enhancing GM cotton varieties. This is a clear example of complementarity between the trade and development components of the Doha Cotton Initiative.

**Figure 4: Welfare change from the combination of cotton tariff and subsidy reform and post-2001 GM cotton adoption, as a percent of GDP, as a multiple of the percentage change for the world as a whole**



Source: Authors' GTAP model simulation results



### Conclusions

How far the DDA will go towards generating the benefits of full liberalization will hinge very heavily on the extent to which the US and to a lesser extent EU governments are willing to cut their applied domestic subsidies to cotton production. But potentially Doha partial reform could deliver roughly twice the gains to cotton-exporting developing countries as the reform that – in the absence of the DDA – the US might be expected to do anyway to bring its cotton support programs into conformity with its WTO obligations. Meanwhile, there are other ways in which incomes of cotton farmers in developing countries can be enhanced. Adaptation and

adoption of new genetically modified (GM) cotton varieties are one obvious way of contributing – and that is within the powers of developing countries themselves and so does not need to wait until that Doha round concludes. While the above results suggest that developing country welfare would be enhanced by far more from allowing GM cotton adoption than by the removal of all cotton subsidies and tariffs, cotton subsidy reductions would enhance the capacity of poor farmers in low-income countries to purchase the more-expensive GM cotton seeds and make the necessary adjustments to their farming practices, thereby increase the prospects of realizing the potential gains from GM adoption.

### Further Reading

- Anderson, K., W. Martin and E. Valenzuela (2005), “Why Market Access is the Most Important of Agriculture’s ‘Three Pillars’ in the Doha Negotiations”, *Trade Note* No. 26, World Bank, Washington DC, Dec. See [www.worldbank.org/trade/wto](http://www.worldbank.org/trade/wto)
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