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## COMMITTEE ON COMMODITY PROBLEMS

### INTERGOVERNMENTAL GROUP ON TEA

#### Seventeenth Session

Nairobi, Kenya, 29 November – 1 December 2006

### POLICY DEVELOPMENTS IN THE WORLD TEA MARKET: ECONOMIC IMPACT OF MAXIMUM RESIDUE LEVELS AND ISO 3720 QUALITY STANDARD

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## I. INTRODUCTION

1. The recent imposition of maximum residue levels (MRLs) permissible for the importation of tea by several major importing countries is expected to have a significant impact on the international trade of this commodity. The Intergovernmental Group (IGG) on Tea, in recognizing that the absence of global harmonization in fixing the MRLs for tea could constitute a barrier to trade and impose significant costs of compliance on exporters, decided on a series of actions, including the collection of more data on MRLs for all commonly used plant protection products based on Good Agricultural Practices (GAP) and Hazard Analysis and Critical Control Point (HACCP) principles by tea producing countries, and the creation of a Working Group on MRLs. At its 16th Session, India and the United Kingdom were asked to co-lead the Working Group to coordinate, prioritize and accelerate the submission on behalf of the industry for pesticide MRLs for tea. A technical report of the Working Group will be presented at this session.

2. Another initiative of the IGG, in its bid to improve prices, is directed at quality improvement. At its 16<sup>th</sup> Session, the Group highlighted the persistent problems of oversupply in the world tea market and the consequent downward pressure on world prices, and noted that responses to this must involve either an expansion in demand or a reduction in supply to achieve market balance. With respect to the latter, the Group suggested that members consider imposing a minimum quality standard for tea entering international trade. Specifically, that ISO 3720 be adopted as the minimum quality standard<sup>1</sup>. Although some countries already had mechanisms in place for the elimination of low quality teas from their exports, others did not, and a method to implement the resolution in all producing countries would need to be devised.

3. In support of these two initiatives, this document examines the possible economic impact of the imposition of MRLs and of ISO 3720 standards on the world tea market through changes in supply and demand. A partial equilibrium model of the world tea market (the FAO Tea Model) was constructed to aid in the analysis. Delegates are invited to review the study, discuss the possible implications and recommend intergovernmental actions required for moving forward.

## II. METHODOLOGY

4. The FAO Tea Model covers more than 60 countries in various regions, including the major tea exporters and importers. Production, consumption and trade values were obtained from the world tea database available with the Secretariat. Data on population, exchange rates, gross domestic product (GDP) and consumer price index were sourced from the International Monetary Fund. Applied tariffs were sourced from the World Bank and the International Tea Committee. The model is dynamic and includes specific behavioural equations for production and consumption, while export and import equations were treated as residuals. Demand and supply elasticities as well as cross elasticities were either estimated or derived from the available literature. It was assumed that all countries were affected by the changes in international tea prices, and their market structure was modelled as an open economy, which implied that the internal price was driven by the world price and by the exchange rate (plus border measures for importers), through a price transmission equation. The model was calibrated on year 2004, and provided recursive dynamic solutions up to 2015.

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<sup>1</sup> Any product from the leaves of *Camellia sinensis* (L) O Kuntze, commercially known as tea, in bulk form and value added products, namely packet tea, tea bags and flavoured tea produced for sale within the country or exported to other countries or imported from other countries should conform to the minimum specifications as laid down under the International Standard ISO 3720 for black tea and parallel standards under development for green tea as modified from time to time.

5. The two basic assumptions made in the modelling were that:
- a) Teas of different origins and types, such as crush, tear and curl (CTC) or orthodox, were perfectly substitutable in the world market, because data reflecting the differences in consumer preferences were not available; and
  - b) All countries responded to world tea prices, which is a composite of average prices realized at major tea auctions.
6. In order to model the impact of the adoption of the MRLs and the ISO 3720 as standards in international trade, four scenarios were built based on the feedback from member countries indicating the portion of their domestic production that would not meet current MRLs or ISO 3720 standards and would have to be removed from the market. The effects of implementing the two standards were simulated separately and the impact projected over 10 years to 2015. Scenarios 1 and 2 simulated the effects of the adoption of the MRLs only, and scenarios 3 and 4 simulated the effects of the adoption of the ISO 3720 only.
7. Although the adoption of the standards in question (MRLs and ISO 3720) would most likely be gradual, the analysis was based on the assumption that the standards were fully adopted in the first year of the simulation period. It was also assumed that affected producers would gradually adjust to the new standard so that by the end of the analysis period, at 2015, a 50 percent recovery in quantities of the affected production would be restored in the market.
8. The adjustment in supply to the MRLs imposed by importing countries was assumed to imply a percentage reduction in supply ranging from 2.5 percent (scenario 1) to 5 percent (scenario 2) in countries that would be most affected. The adoption of ISO 3720 was assumed to imply a percentage reduction in supply ranging from 2.5 percent (scenario 3) to 5 percent (scenario 4) in the countries that currently do not follow these standards. For China, the impact of introducing ISO 3720 would only affect 18 percent of its production, i.e. the black tea portion, as the equivalent standard for green tea does not exist.

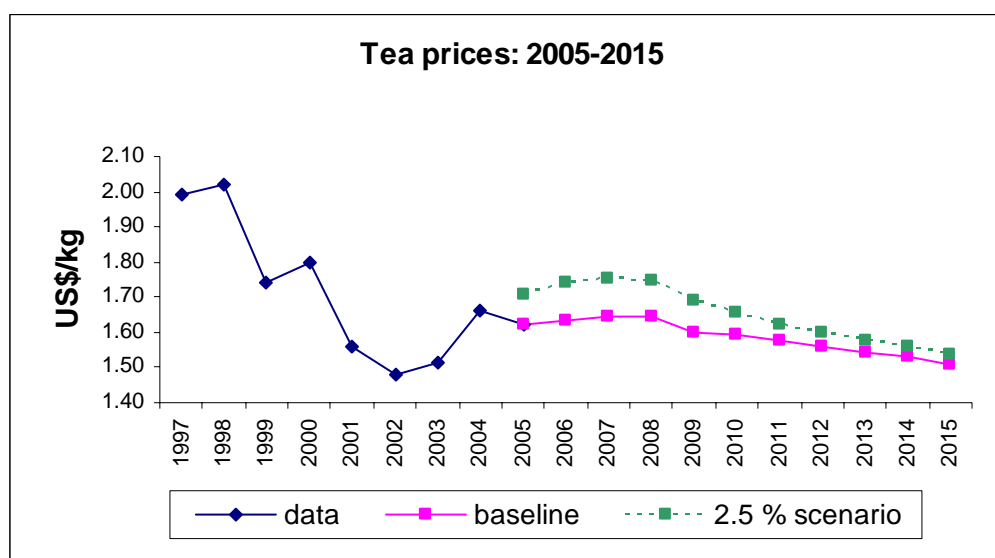
### **III. RESULTS OF THE ANALYSIS**

#### **A. BASELINE**

9. The baseline projections, which serves as a comparative reference for analysing the different scenarios are included in Figures 1 to 4 and are presented in detail in document CCP:TE 06/2. These projections indicate that world black tea consumption is expected to grow at an average annual rate of 1.3 percent between 2005 and 2015 and the growth in production would average 1.7 percent over the same period. Given these market fundamentals, the price of tea in the world market is expected to remain around the current level until 2009, before declining and following the downward trend of the past decade.

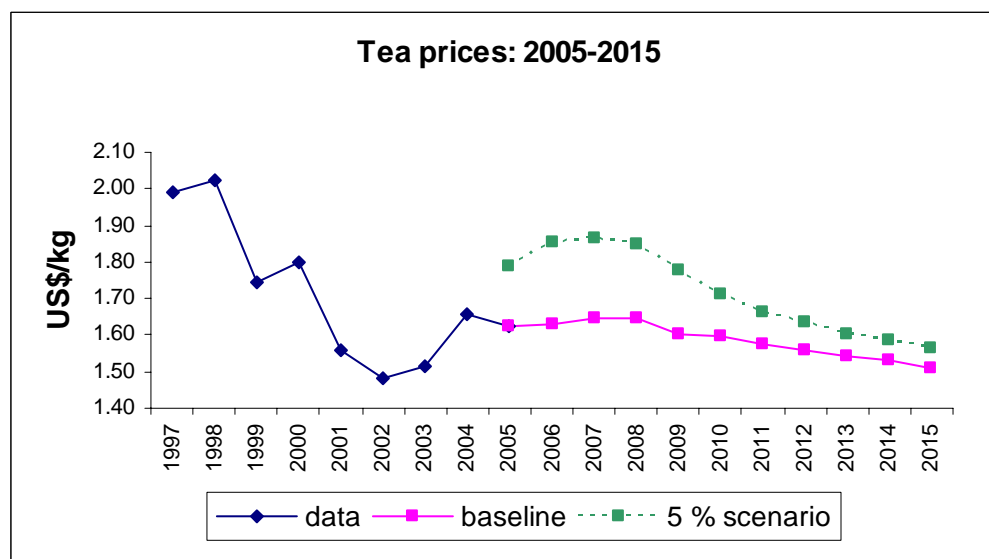
#### **B. POSSIBLE IMPACT OF MRL STANDARDS ON INTERNATIONAL TEA TRADE**

10. A 2.5 percent reduction in supply from countries affected by the imposition of MRLs (scenario 1) would lead to a 4 percent increase in world tea prices between 2005 and 2015. The FAO composite price would average US\$1.65/kg compared to the baseline of US\$1.59/kg (Figure 1). The impact of the imposition of the MRLs would be greatest in the first 3 years, as a progressive rise in import demand occurs against the background of lower export availability, with prices rising from US\$1.71/kg in 2005 to US\$1.75/kg in 2007. It also reflects the relatively inelastic demand for tea in major markets. As adjustments occur, the price would decline reaching US\$1.54/g by 2015, which would still be 1.8 percent higher than the baseline.

**Figure 1. Simulation results of scenario 1**

Source: FAO World Tea Model.

11. If the reduction in supplies were greater, at 5 percent (scenario 2), the model indicates a steeper climb in the world tea price relative to the baseline, averaging about 8 percent higher over the projection period to 2015 (Figure 2). This translates into a world tea composite price of US\$1.72/kg compared to a baseline of US\$1.59/kg. Similar to scenario 1, the greatest impact would be in the first 3 years, with the projected price increasing from US\$1.79/kg in 2005 to US\$1.86/kg in 2007, before declining to US\$1.56/kg in 2015.

**Figure 2. Simulation results of scenario 2**

Source: FAO World Tea Model.

12. Under scenario 1, the value of exports from Kenya and Sri Lanka would increase by 4.4 percent and 5.8 percent, respectively, compared to the baseline. Exports are also expected to be higher for other exporters in Africa in terms of value, with the growth ranging from 4.4 percent to 6.1 percent, while a decline of 0.5 percent would occur in India. At the world level, the value of tea trade is expected to increase by 4.1 percent between 2005 and 2015. Under scenario 2, the value of world exports is estimated to rise by 8.1 percent compared to the baseline. At the country level, a nearly 10 percent increase in the value of exports from Kenya, Indonesia and Viet Nam is

expected, compared to a 10 to 12.5 percent increase in Sri Lanka, Malawi and Tanzania. The magnitude of the changes in this analysis does not account for the different market conditions and preferences for teas of particular origins, since all teas are treated as a homogenous product.

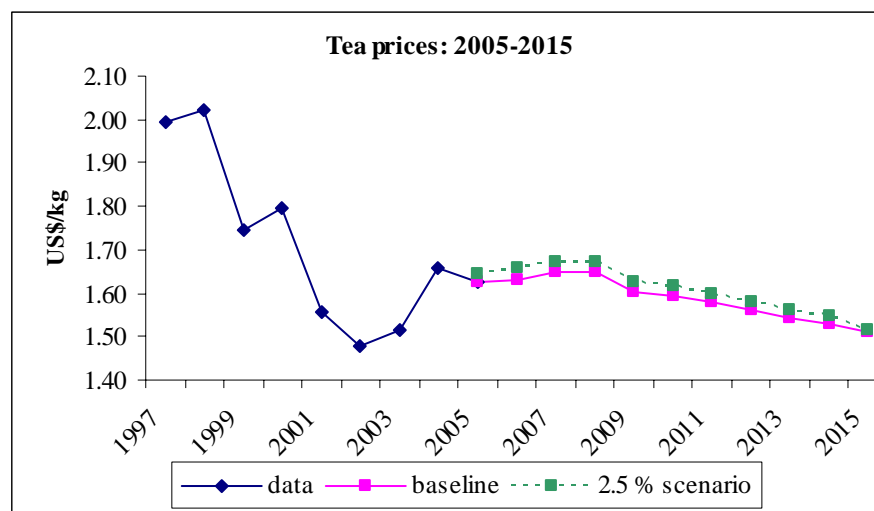
13. According to the simulation, a 2.5 percent cut in production in India relative to the baseline would result in a 4.4 percent average decline in export volumes between 2005 and 2015, while a similar cut in production for China would induce a 2.9 percent decrease in export volume. On the other hand, a 5 percent cut in production yields a decrease in export volume of 9.6 percent and 6.2 percent in India and China, respectively.

### C. POSSIBLE IMPACT OF ADOPTING ISO 3720 AS THE MINIMUM QUALITY STANDARD IN INTERNATIONAL TEA TRADE

14. The effect of imposing ISO 3720 as a minimum quality standard on global demand and supply is smaller than that projected for the imposition of MRLs. Under scenario 3, a 1.25 average percent increase in the world composite price is expected over the analysis period to 2015 (Figure 3), while under scenario 4, the increase in the world composite price would be about 2.4 percent (Figure 4). The price response was similar to that of the modelling of the MRLs, whereby the FAO composite tea price was higher at the beginning of the period, then progressively reduced towards 2015, as affected exporters are assumed to adjust to the quality standard.

15. At the world level, the adoption of ISO 3720 is expected to reduce the volume of tea traded internationally, by about 200 tonnes under scenario 3 to 350 tonnes under scenario 4 and the value of trade to increase by US\$35 million in scenario 3 and US\$66 million in scenario 4 as a consequence of increases in price (Tables 3 and 4).

**Figure 3. Simulation results for scenario 3**



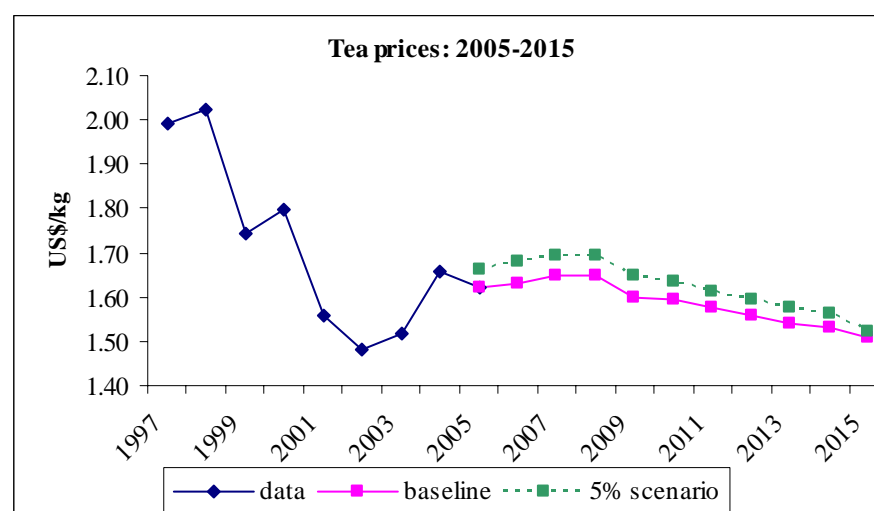
Source: FAO World Tea Model.

16. On a country basis, the most affected exporting country would be Turkey, where exports could be reduced by an average of 3 200 tonnes under scenario 3 (Table 3). The least affected countries would be India, Kenya and Sri Lanka, the current major exporting countries, while exports from Malawi and Tanzania could decline by up to 1.5 percent.

17. The response under scenario 4 is higher, but qualitatively similar. The composite world price is expected to be 2.4 percent higher than the baseline between 2005 and 2009, falling back to about 2 percent above the baseline by 2015, as the affected countries adjust to the imposition of the standard (Table 4). The reduction in supplies from the affected countries is expected to be offset by the increase in major exporting countries. A projected increase in exports of about 13 000 tonnes or 7 percent, is expected from India in the first year of implementation, and an

average of 9 percent over the entire projection period. Exports from Kenya and Sri Lanka would increase by about 500 and 1 000 tonnes, respectively, as an average over the projection period under scenario 3. The magnitude of the increase is almost doubled under scenario 4.

**Figure 4. Simulation results for scenario 4**



Source: FAO World Tea Model.

## IV. CONCLUSIONS

18. The results of the analysis should be treated with caution as they depend on the above mentioned assumptions of the model, and on the definition of the scenarios. Given current world market conditions, the adoption of MRLs could lead to loss of market shares, particularly in Asia, while African exporters might benefit. Where exports are expected to be reduced, smaller entrepreneurs are likely to be more affected, and even to be forced to exit the tea trade. The cost of compliance, of which the cost of certification is a major component, is a major concern, particularly for small traders. Larger and often more integrated tea traders have a bigger capacity to absorb, this cost.

19. Three major insights have emerged from the analysis of the effects of the ISO 3720. Firstly, although the adoption of the quality standard would result in a marginal reduction in the volume of tea traded at the world level, the impact at the country level could be severe. Secondly, although the reduction in volume at the world level is small, the subsequent rise in export values could be as much as US\$66 million. Hence, in a number of countries, such as Vietnam, Malawi and Tanzania, the value of trade would be higher despite the contraction in volumes, which could lead to poorer quality, less efficient producers exiting the industry. Thirdly, countries that have already adopted the ISO 3720 as a minimum quality standard have a clear advantage over those that have not, and stand to gain the most. Therefore, the ability of the countries that currently do not follow this standard to adjust, would determine their competitiveness and continued presence in the world market.

## V. RECOMMENDATIONS

20. Based on the results and conclusions of the analysis, the following can be put forward:

- i) Any adoption of a minimum quality standard, whether it be ISO 3720 or some other, should be done gradually in order to allow producers sufficient time to adjust, and not to prejudice poorer producers with limited resources. Governments may also wish to consider appropriate actions to support farmers who may be negatively affected.

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- ii) Although the analysis is a useful first step, more detailed information should be provided by member countries, particularly on the quantities that do comply with the standard as well as the cost of compliance, so as to enable the Secretariat to conduct a more in-depth analysis.
  - iii) A more detailed desegregation of data according to the type of tea and associated price levels would have to be put in place to enhance the analysis.
21. Beyond the scope of the study, the Group may also wish to consider the following:
- i) Global harmonization of MRLs should be a major and urgent objective of the tea trade. The MRL regimes differ in the various import markets and need to be harmonized to reduce the cost of compliance for the exporter shipping to more than one market. Where there is no field trial data available, the general practice is to fix the MRL at the minimum level of detection. In cases where the chemical in question is not registered, the minimum detection level was extremely low and generally led to the rejection of the consignment. Therefore, the effort of the Working Group in generating data for chemicals that are currently not listed in the MRL regimes should be supported.
  - ii) Information on the cost of compliance with MRLs and the overall cost to the tea value chain should be compiled and a compliance “tool kit” for producers created to facilitate the adjustment process. The “tool kit” should include all the important aspects of MRL compliance, from costs to the rules and regulations of importing countries.



**TABLE 1 – Model results: Impact of pesticide residues limits – scenario 1 – 2.5 percent initial reduction in supply**

	Baseline						2.5 percent scenario					
	Export (Mt)			Export (000 \$US)			Export (Mt)			Export (000 \$US)		
	2004	2015	avg 2005-15	2004	2015	avg 2005-15	2015	avg 2005-15	% change avg on baseline	2015	avg 2005-15	% change avg on baseline
India	179,000	160,302	176,185	297,140	241,875	279,664	152,244	168,358	-4.4	279,664	278,313	-0.5
China	289,334	344,305	330,441	480,294	519,510	524,520	336,949	320,696	-2.9	524,520	530,144	1.1
Sri Lanka	290,614	340,321	315,135	482,419	513,499	500,226	344,002	320,079	1.6	500,226	529,124	5.8
Indonesia	97,691	107,506	101,207	162,167	162,212	160,649	106,707	100,064	-1.1	160,649	165,417	3.0
Bangladesh	12,173	11,882	11,989	20,207	17,929	19,031	12,449	12,618	5.2	19,031	20,860	9.6
Vietnam	51,837	52,851	53,778	86,049	79,745	85,364	52,851	53,778	0.0	85,364	88,901	4.1
Japan	1,500	6,659	3,748	2,490	10,048	5,950	6,659	3,748	0.0	5,950	6,196	4.1
Turkey	5,910	14,276	11,911	9,811	21,541	18,906	16,402	14,021	17.7	18,906	23,179	22.6
Kenya	330,398	353,315	341,997	548,461	533,106	542,864	353,835	342,817	0.2	542,864	566,713	4.4
Malawi	48,237	50,942	49,415	80,073	76,865	78,438	51,433	50,128	1.4	78,438	82,866	5.6
Tanzania	24,170	30,453	27,101	40,122	45,949	43,018	30,868	27,629	2.0	43,018	45,674	6.2
Uganda	34,069	39,449	36,966	56,555	59,523	58,678	39,651	37,367	1.1	58,678	61,772	5.3
Zimbabwe	14,912	16,448	15,087	24,754	24,818	23,948	16,663	15,375	1.9	23,948	25,417	6.1
Argentina	59,671	66,158	65,006	99,054	99,824	103,186	66,735	65,842	1.3	103,186	108,843	5.5
Brazil	3,593	6,250	3,893	5,964	9,430	6,180	6,298	3,946	1.3	6,180	6,523	5.5
World	1,619,492	1,810,886	1,758,611	2,688,356	2,732,386	2,791,506	1,810,181	1,757,876	-0.04	2,791,506	2,905,952	4.1

Source: calculation with the FAO tea market model

**TABLE 2 – Model results: Impact of pesticide residues limits – scenario 2 – 5 percent initial reduction in supply**

	Baseline						5 percent scenario					
	Export (Mt)			Export (000 \$US)			Export (Mt)			Export (000 \$US)		
	2004	2015	avg 2005-15	2004	2015	avg 2005-15	2015	avg 2005-15	% change avg on baseline	2015	avg 2005-15	% change avg on baseline
India	179,000	160,302	176,185	297,140	241,875	279,664	143,320	159,313	-9.6	224,048	273,561	-2.2
China	289,334	344,305	330,441	480,294	519,510	524,520	328,843	310,015	-6.2	514,071	532,336	1.5
Sri Lanka	290,614	340,321	315,135	482,419	513,499	500,226	347,431	324,734	3.0	543,128	557,610	11.5
Indonesia	97,691	107,506	101,207	162,167	162,212	160,649	108,464	102,526	1.3	169,558	176,051	9.6
Bangladesh	12,173	11,882	11,989	20,207	17,929	19,031	13,243	13,618	13.6	20,703	23,384	22.9
Vietnam	51,837	52,851	53,778	86,049	79,745	85,364	52,851	53,778	0.0	82,621	92,344	8.2
Japan	1,500	6,659	3,748	2,490	10,048	5,950	6,659	3,748	0.0	10,411	6,436	8.2
Turkey	5,910	14,276	11,911	9,811	21,541	18,906	18,384	15,402	29.3	28,739	26,446	39.9
Kenya	330,398	353,315	341,997	548,461	533,106	542,864	354,316	343,582	0.5	553,893	589,974	8.7
Malawi	48,237	50,942	49,415	80,073	76,865	78,438	51,891	50,799	2.8	81,119	87,228	11.2
Tanzania	24,170	30,453	27,101	40,122	45,949	43,018	31,255	28,126	3.8	48,861	48,296	12.3
Uganda	34,069	39,449	36,966	56,555	59,523	58,678	39,840	37,744	2.1	62,281	64,812	10.5
Zimbabwe	14,912	16,448	15,087	24,754	24,818	23,948	16,863	15,646	3.7	26,362	26,867	12.2
Argentina	59,671	66,158	65,006	99,054	99,824	103,186	67,272	66,628	2.5	105,164	114,409	10.9
Brazil	3,593	6,250	3,893	5,964	9,430	6,180	6,342	3,994	2.6	9,914	6,859	11.0
World	1,619,492	1,810,886	1,758,611	2,688,356	2,732,386	2,791,506	1,809,533	1,757,202	-0.08	2,828,789	3,017,341	8.1

Source: calculation with the FAO tea market model

**TABLE 3 – Model results: Impact of ISO 3720 – scenario 3 –2.5 percent initial reduction in supply**

	Baseline						2.5 percent scenario					
	Export (Mt)			Export (000 \$US)			Export (Mt)			Export (000 \$US)		
	2004	2015	avg 2005-15	2004	2015	avg 2005-15	2015	avg 2005-15	% change avg on baseline	2015	avg 2005-15	% change avg on baseline
India	179,000	160,302	176,185	297,140	241,875	279,664	163,488	182,198	3.4	247,820	292,853	4.7
China	289,334	344,305	330,441	480,294	519,510	524,520	344,529	330,403	0.0	522,245	531,067	1.2
Sri Lanka	290,614	340,321	315,135	482,419	513,499	500,226	341,431	316,599	0.5	517,548	508,880	1.7
Indonesia	97,691	107,506	101,207	162,167	162,212	160,649	105,531	97,616	-3.5	159,967	156,902	-2.3
Bangladesh	12,173	11,882	11,989	20,207	17,929	19,031	12,088	12,286	2.5	18,323	19,748	3.8
Vietnam	51,837	52,851	53,778	86,049	79,745	85,364	51,938	52,108	-3.1	78,730	83,754	-1.9
Japan	1,500	6,659	3,748	2,490	10,048	5,950	6,659	3,748	0.0	10,095	6,025	1.3
Turkey	5,910	14,276	11,911	9,811	21,541	18,906	11,209	8,696	-27.0	16,991	13,977	-26.1
Kenya	330,398	353,315	341,997	548,461	533,106	542,864	353,476	342,245	0.1	535,807	550,102	1.3
Malawi	48,237	50,942	49,415	80,073	76,865	78,438	50,350	48,344	-2.2	76,322	77,705	-0.9
Tanzania	24,170	30,453	27,101	40,122	45,949	43,018	29,983	26,360	-2.7	45,449	42,370	-1.5
Uganda	34,069	39,449	36,966	56,555	59,523	58,678	39,502	37,093	0.3	59,879	59,620	1.6
Zimbabwe	14,912	16,448	15,087	24,754	24,818	23,948	16,512	15,171	0.6	25,030	24,385	1.8
Argentina	59,671	66,158	65,006	99,054	99,824	103,186	66,331	65,253	0.4	100,546	104,884	1.6
Brazil	3,593	6,250	3,893	5,964	9,430	6,180	6,264	3,910	0.4	9,496	6,284	1.7
World	1,619,492	1,810,886	1,758,611	2,688,356	2,732,386	2,791,506	1,810,729	1,758,446	-0.01	2,744,745	2,826,408	1.3

Source: calculation with the FAO tea market model

**TABLE 4 – Model results: Impact of ISO 3720 – scenario 4 –5 percent initial reduction in supply**

	Baseline						5 percent scenario					
	Export (Mt)			Export (000 \$US)			Export (Mt)			Export (000 \$US)		
	2004	2015	avg 2005-15	2004	2015	avg 2005-15	2015	avg 2005-15	<i>% change avg on baseline</i>	2015	avg 2005-15	<i>% change avg on baseline</i>
India	179,000	160,302	176,185	297,140	241,875	279,664	166,207	187,711	6.5	252,858	305,145	9.1
China	289,334	344,305	330,441	480,294	519,510	524,520	344,392	330,033	-0.1	523,938	536,504	2.3
Sri Lanka	290,614	340,321	315,135	482,419	513,499	500,226	342,376	317,932	0.9	520,872	516,832	3.3
Indonesia	97,691	107,506	101,207	162,167	162,212	160,649	103,478	93,957	-7.2	157,425	152,737	-4.9
Bangladesh	12,173	11,882	11,989	20,207	17,929	19,031	12,273	12,560	4.8	18,671	20,418	7.3
Vietnam	51,837	52,851	53,778	86,049	79,745	85,364	50,990	50,403	-6.3	77,573	81,935	-4.0
Japan	1,500	6,659	3,748	2,490	10,048	5,950	6,659	3,748	0.0	10,131	6,093	2.4
Turkey	5,910	14,276	11,911	9,811	21,541	18,906	9,524	6,773	-43.1	14,489	11,010	-41.8
Kenya	330,398	353,315	341,997	548,461	533,106	542,864	353,611	342,470	0.1	537,964	556,722	2.6
Malawi	48,237	50,942	49,415	80,073	76,865	78,438	49,735	47,253	-4.4	75,663	76,814	-2.1
Tanzania	24,170	30,453	27,101	40,122	45,949	43,018	29,493	25,604	-5.5	44,869	41,622	-3.2
Uganda	34,069	39,449	36,966	56,555	59,523	58,678	39,544	37,207	0.7	60,161	60,483	3.1
Zimbabwe	14,912	16,448	15,087	24,754	24,818	23,948	16,567	15,248	1.1	25,204	24,787	3.5
Argentina	59,671	66,158	65,006	99,054	99,824	103,186	66,478	65,478	0.7	101,136	106,442	3.2
Brazil	3,593	6,250	3,893	5,964	9,430	6,180	6,277	3,924	0.8	9,549	6,379	3.2
World	1,619,492	1,810,886	1,758,611	2,688,356	2,732,386	2,790,052	1,810,576	1,758,288	-0.02	2,754,509	2,856,608	2.4

Source: calculation with the FAO tea market model