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# Doha Development Agenda in the European Union
# Impacts on the agricultural sector

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**ABSTRACT**

This paper aims to analyse the impacts of a possible conclusion of the Doha Development Agenda (Falconer proposal) on the European Union economy with the emphasis on the agricultural sectors. The analytical tool employed to analyse the consequences of DDA agreement is the global Computable General Equilibrium model GLOBE. It consists of a set of 113 single country SAM-based CGE models (linked by their trading relationships) that are aggregated into 14 trading blocks. The model distinguishes 23 product categories of which 18 product categories are agricultural or food-related and five represent the non-agricultural sectors: i.e. primary products, manufacturing, services, 'trade' and fuel. The model incorporates various important developments in CGE trade modelling occurred during the last 15 years (e.g. inclusion of preferential agreements, bilateral and multilateral TRQ, split of quota rents, flexible closure rules, etc.), and is calibrated with data from the Global Trade Analysis Project's (GTAP) database version 7.1. Analysis of the impact of Doha Round agreements is performed on a basis of simulation of the reduction of *ad valorem equivalents (AVE)* of bound tariffs on various groups of agricultural products (e.g. sensitive products, special products, tropical products, etc.) and non-agricultural products (NAMA rules) for various countries depending on their status at the WTO (e.g. developed, developing, developing non-LDC, recently acceded member states, very recently acceded member states, least developed countries, small and vulnerable economies, NAMA flexibility rules – group 1, NAMA flexibility rules – Group 2, etc.). The AVE computed for both agricultural and non-agricultural products at HS-6 digit level for all 153 WTO members and several non-WTO countries using information from MAcMap-HS6, ver.2 were used *inter alia* to define a) sensitive products, b) special products, c) to establish a list of products exempted from 97% initiative for LDCs, d) to select products falling under flexibility rules, etc. Reduction of AVEs tariffs for aggregated groups of product categories distinguished in GLOBE was performed using the software TASTE. Our results confirm that, although the overall impact of a possible DDA agreement on EU welfare and GDP is positive, agriculture will suffer the biggest losses. Among especially affected agricultural sectors in the EU the most affected are: sugar, meat beef, vegetable and fruits. On the other hand, performed analysis visualises benefits of DDA agreement on the EU non-agricultural sectors as well as factor income in the food industries. Furthermore, considerable changes in trade flows among various trading blocks will occur. Our analysis shows that the chosen modality of treatment of sensitive products (i.e. tariff cuts 1/3, ½, 2/3 and expansion of multilateral TRQ) matters, and the highest tariff cuts for sensitive products may not necessary lead to the highest decrease in agricultural production.

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# 1. Introduction

The Agreement on Agriculture that formed part of the WTO's Uruguay Round Agreement (1994) contained a commitment to initiate new negotiations for continuing the reform of agricultural trade rules one year before the end of the implementation period of the Uruguay Round. Thus, the assumption that agriculture would be one of the prominent items in the next round of multilateral trade talks were built into expectations from the outset. The new round of multilateral trade negotiations was officially launched in November 2001 at the Fourth Ministerial Conference in Doha, Qatar, and was thereafter known as the Doha Round. Among the headings other than agriculture to be treated in the negotiations (21 in all) are services, market access for non-agricultural products (NAMA), trade-related aspects of intellectual property rights (TRIPS), trade and investment, and trade facilitation.

Multilateral negotiations on Agriculture remain a difficult issue when it comes to market access. One important outcome from the 1994 Uruguay Round Agreement on Agriculture (URAA) was the set up of a new market access scheme for trade in agricultural commodities based on tariffication and market access. Since July 2004 the negotiations have continued at an uneven pace, punctuated by key documents from the chairman of the Agriculture Committee confirming the common ground reached up to that point and containing proposals for moving forward to consensus on outstanding issues. The scenario assuming a Doha Round agreement that is simulated in this study is based on the latest of these documents containing proposals, or "modalities"[1], for concluding the negotiations and reaching agreement on those issues related to agriculture.

The current outstanding issues concerning agriculture in the multilateral context include those related to provisions for developed countries to retain higher rates of protection for 'sensitive products', details of the tariff-reduction formula to be used, preference erosion, tariff escalation and a number of smaller issues of special importance to various WTO members.

Concerning agricultural market access, sensitive products are increasingly considered as one of the focal points of the Doha Round negotiations (Jean, et. al. 2009). The category of sensitive products has been included in the WTO negotiations as a response to the demands of some developing countries in 2002 (Mamaty, 2007). The original plan of this group was to bring certain flexibility to excepted products by introducing lower cuts to products included in the 'black list[2]'. The main idea of introducing sensitive products to foster development was not kept in the final Doha Declaration. However, the approach to introduce flexibility for the so-called 'sensitive' products in each of the pillars constituting the Agreement on Agriculture was approved. Instead, the Doha declaration underlines the importance of sensitive products for market access, domestic support and export competitiveness.

Sensitive products will be selected by each country (developed and developing) and will be subject to smaller tariff reductions than those required by the general formula for remaining products. Nevertheless, this smaller tariff reduction has to be compensated by an expansion of the multilateral TRQ for the addressed product lines. Important points to be determined in the framework of the WTO negotiations are: the number of products that can be selected as sensitive products and the treatment that will receive, with the corresponding expansion in TRQ.

As mentioned before, in the Agricultural Draft Modalities (paragraph 73), three options of deviation are contemplated: one third, one half and two thirds. Respectively, for each deviation, a specific tariff rate quota expansion is required (paragraph 74). The modalities are structured so that the smaller the deviation, the higher the tariff cut and the smaller the compensation. In contrast, the higher the deviation, the lower the tariff cut and the higher the compensation[3]

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[1] WTO (2008). Revised Draft Modalities for Agriculture, TN/AG/W/4/Rev.4, 6 December 2008.
[2] The Black list refers to products excepted of the tariff reductions of the general formula
[3] For further details on the tariff cuts proposed in the Agricultural modalities see: Table 2.

A large number of agricultural product lines in developed countries are protected by TRQs, thus worldwide awareness is focused on the potential effects of different possibilities to bring flexibility to TRQs in the framework of the WTO Doha negotiations (DDA agreement). Surprisingly only few studies have studied the effects of multilateral TRQs base on historical data. According to de Gorter and Kliauga (2006), who studied the extent of TRQ underfill and the potential influence of quota administration methods on imports, the effects of possible expansion of TRQ or reduction of tariffs in the WTO negotiations on agriculture depend on several aspect: the instrument that is binding initially (tariffs or quantities), how soon a regime change can occur as a result of trade liberalization and the extent -if any- of quota underfill (de Gorter and Kliauga, 2006). According to de Gorter and Kliauga, the largest impact is caused by the reduction of out-of quota tariffs followed by the quota expansion. The final outcome also depends on the level of water in the tariff. The relative values of tariff reduction versus quota expansion (in percentage terms) and the level of under and over fill rates for each product (de Gorter and Kliauga, 2006).

For the case of the EU, several studies have focused on the effects sensitive products of tariff reductions. Huan-Niemi (2008) estimated the effects of WTO finalisation on EU's sensitive agricultural products such as the dairy, meat, cereals and sugar sector due to further tariff reductions and erosion of border protection. Her results demonstrate that cereals such as wheat, barley, and maize are the most resilient to the erosion of border protection due to further reduction in tariffs in the projected Doha Round. In contrast, poultry meat has the weakest border protection in the projected Doha Round (Huan-Niemi, 2008).

In recent years, a large number of studies, in particular using a CGE model, have appeared simulating the global impacts of a Doha Round agreement. The multiple studies of the World Bank[4] have mainly used the LINKAGE model and those of IFPRI the MIRAGE model[5], whilst the GTAP model has been a popular choice among other researchers[6]. A major aim of these studies has been to quantify the impact of a Doha Round agreement on global income or welfare. The published estimates of this impact vary widely, not least because different 'versions' of a possible Doha Round agreement are simulated, but also because of technical differences in model specification and implementation. There is, therefore, little to be said in trying to make a brief summary of this literature here. In fact, in a meta-analysis covering 110 studies (468 different simulations with around 5800 individual measures of welfare gains at country or region level), Hess et al. (2010) were able to explain (after removing three outliers) 56% of the variation in income or welfare gain in terms of specific technical features of the models or their implementation[7,8.]

Applying a CGE model, Gouel, et al., (2010) assess the effects of defining sensitive products by the EU and Japan on international trade in the framework of the Doha Round ambitions. Furthermore, they evaluate the trade-off between TRQ and tariffs in relation to improving market access. Results obtained by Gouel, et al., (2010) suggest that consideration of sensitive products limits the potential gains from a possible agriculture agreement at Doha. Gouel, et al., (2010) found a decrease in welfare gains by half. When considering a full liberalization of European and Japanese agricultural imports, Gouel, et al., (2010) find that 30 products represent 69% and 88% of a potential import increase in the EU and in Japan (Gouel et al, 2010).

Another recurrent issue in this vast literature is the distribution of a Doha-induced welfare gain, between poor and rich countries[9] and in some cases between different socio-economic strata within particular countries. Here also, there is little

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[4] See, for example, Anderson et al. (2006).
[5] For example, Bouët et al. (2007), Bouët and Laborde (2009).
[6] Such as Hertel et al. (2006, 2008) or Matthews and Walsh (2006).
[7] Surprisingly, when dummies were added in the meta-regression to account for the involvement of the most prolific or most experienced researchers as (lead) authors, an even higher level of explanation is achieved, suggesting that "individual leading authors in the field engage in model pre-selection that incorporates their individual beliefs about how economies function and how this should be modelled into their simulations, and that this model pre-selection systematically influences the estimates of global welfare gains that they report" (p.16).
[8] The data base used by Hess et al. shows the global gain (for studies that report gains in US dollars) as ranging between *minus* USD 98 billion (that is, a fall in welfare) and USD 2.59 trillion (Hess et al., 2010, Table 1).
[9] For example, Hertel et al. (2006, 2008), Polaski et al. (2006).

agreement. On the one hand, World Bank results showing that "developing countries (which) as a whole account for a quarter of global production at present… would be able to enjoy a third of the global gains in real income" (much of which comes from agricultural trade liberalization by developed countries) (quoted from Dhar, 2007, p. 165) are often claimed to demonstrate the development-friendly potential of a Doha Round agreement. However, this view is challenged by authors like Polaski (2006) who underlined the wide variation in impacts across developing countries. Based on what is claimed to be more realistic modelling of developing country labour markets (such as allowing for unemployment and not treating rural and urban labour as homogeneous), she concluded that, although some developing countries may gain, "more suffer small losses from agricultural liberalization. The losers include many of the poorest countries in the world, including Bangladesh and the countries of East Africa and the rest of Sub-Saharan Africa. Middle Eastern and North African countries, Vietnam, Mexico, and China also experience losses".

The WTO negotiations under the development round started in November 2001 almost 10 years ago. The negotiations have been moving slowly, especially on complex chapter such as the one of agricultural commodities. First studies assessing the WTO negotiations impacts tackled tariff cuts with different formulas (Hertel and Winters 2006; Giordano et al, 2007, etc). The last modality released in 2008, in contrast to previous modalities, contains concrete numbers on different possible tariff cuts to agricultural products (e.g., for sensible, tropical and non-sensible). However, the effects of sensitive products are gaining importance in the framework of bilateral negotiations (Gouel et al 2010). The effect of designating sensitive products on international trade is still vague and not completely analysed yet. Due to tool limitations, most of the studies have focused on the effects of tariff cuts of sensible products, without linking these to multilateral TRQ expansions for developed countries[10] as stated in the modalities. Therefore, there is still a need of evaluating the effects of sensitive products with their consequent multilateral TRQ expansions on international trade, and this is the main focus of this paper.

The objective of this study is to contribute to current ongoing debate on the impact and importance of sensitive products in the framework of the WTO negotiations on agricultural commodities. This study particularly evaluates the trade competitiveness of European agriculture in an international context as well as possibilities for combining tariff cuts in sensitive products linked to multilateral TRQ expansion for four developed countries and their effects on production, international trade and some macroeconomic indicators in developing and developed countries.

## 2. Methodology

### 2.1. The GLOBE model

GLOBE is a Social Accounting Matrix (SAM)-based global Computable General Equilibrium (CGE) model that is calibrated with data from the Global Trade Analysis Project's (GTAP) database version 7.1[11]. It incorporates various developments in CGE modelling over the last 15 years, and owes a particular debt to the IFPRI standard model (Lofgren *et al*., 2002) and the PROVIDE Project model (McDonald, 2003), as well as to the GTAP model (Hertel, 1997). The model is written and solved using General Algebraic Modeling System (GAMS ®) software.

GLOBE consists of a set of single country CGE models linked by their trading relationships. As in all current CGE models, price systems are linearly homogeneous and thus only changes in relative prices matter. Consequently each region in the model has its own numéraire price, typically the consumer price index (CPI) and a nominal exchange rate, while the model as

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[10] To the best of our knowledge, only the study of Gouel et al (2010) includes multilateral TRQ expansions for the EU and Japan.

[11] For the underlying principles of GLOBE, see de Melo and Robinson (1989) and Devarajan *et al*. (1990); for earlier models that can be described as its antecedents, see Robinson *et al*. (1990, 1993).

a whole requires a numéraire, which is an exchange rate index for certain reference regions[12]. In this implementation of GLOBE, the reference regions are the member countries of the OECD.

The SAM on which GLOBE is based disaggregates each region's economy according to eight 'accounts'[13]. The behavioural relationships are quite standard (see Table A3): activities maximise profits using technology characterised by Constant Elasticity of Substitution (CES) production functions over primary inputs and Leontief production functions across intermediate inputs. The household maximises a Stone-Geary utility function (which assumes a linear expenditure system after payment of income tax and after saving a share of post-tax income). The Armington assumption is used for trade. Domestic output is distributed between the domestic market and exports according to a two-stage Constant Elasticity of Transformation (CET) function. In the first stage, a domestic producer allocates output between the domestic and export markets according to the relative prices for the commodity on the domestic market and the composite export commodity (which is a CET aggregate of the exports to different regions) whereas the distribution of the exports between regions is determined by the relative export prices to those regions. Hence domestic producers respond to prices in all markets for the product. The elasticities of transformation are commodity- and region-specific[14]. Domestic demand is satisfied by composite commodities that are constructed by means of a three-stage CES function from domestic production sold domestically and composite imports. All commodity and activity taxes are expressed as *ad valorem* tax rates, while income taxes depend on household incomes.

GLOBE distinguishes 23 product categories across the whole economy (see Appendix , Table A1). All product categories are agricultural or food-related except five: primary products[15], manufacturing, services, 'trade' and fuel[16]. Biofuels are not modelled separately[17].

The EU is treated as one region (EU27). In addition, 12 other regions are separately identified (see Appendix, Table A2). GLOBE also contains an artificial 'dummy' area (Globe) that absorbs inter-regional trade flows where either the source or destination are not identified (for example, some trade and transportation margins and data on remittances). This construct provides a general method for dealing with any transactions data where full bilateral information is missing (see McDonald *et al*., undated). All tax rates, including import tariffs, are modelled as *ad valorem* rates. This means that specific tariffs have to be converted to their *ad valorem* equivalent.

CGE model simulations typically adopt the so-called standard neo-classical assumptions closure rules, namely: (1) trade balance fixed and exchange rate variable, (2) savings fixed and investment variable (´savings-driven´), (3) government budget deficit/surplus variable and household income tax rate fixed, (4) total factor productivity growth variable, (5) labour fully mobile and (6) full employment of factors.

GLOBE allows for user-defined closure rules (which determine how the macro economy behaves, factor market conditions and so on). The closure rules chosen for this study, plus other external assumptions, are shown in Table 1.

Our main criterion when specifying the closure rules given in Table 1 was that assumptions should be reasonable and realistic, given recent trends and cross-country differences in macro-management policies. For example, regarding closure rule 1, developed country exchange rates depend not only on the trade balance but also on foreign capital movements; when significant exchange rate adjustments take place, it is more likely to be the result of several endogenous and exogenous

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[12] This represents a fundamentally different philosophical approach to global modelling from that of the GTAP model, which does not contain nominal exchange rates and has a single global *numéraire*.

[13] Outputs, intermediate inputs, factors, households, government, capital, margins (trade costs and transport) and rest-of-the-world.

[14] In GTAP, the elasticities are commodity-specific only. When the CET functions across exports are switched off so that export supplies are determined by import demands, the model functions similarly to the GTAP model.

[15] Which includes forest and mining products, but also fish.

[16] The product category 'trade' includes transport costs and other trade services, and margins.

[17] Ethanol is included under HS code 2207 ('spirits') in 'processed food' and biodiesel under HS code 3824 ('miscellaneous chemical products') in 'manufactured products'.

(policy) factors rather than an automatic adjustment to changes in the trade balance. Moreover, specific assumptions are made about exchange rate changes up to 2020 incorporating exogenous assumptions about exchange rate appreciation and depreciation between currencies. However, for the least developed countries, this assumption was felt to be unrealistic. Hence, a different decision regarding closure rule 1 was made for these countries.

**Table 1: Assumptions underlying the specification used in GLOBE**

| | Developed countries (including EU) | Middle-income developing countries | Low-income developing countries |
|---|---|---|---|
| **GDP and population growth** | Exogenous projections | Exogenous projections | Exogenous projections |
| **Closure rule 1: Foreign exchange account** | Exchange rate exogenous (fixed projection), trade balance variable | As for developed countries[18] | Exchange rate variable, trade balance fixed |
| **Closure rule 2: Capital account** | Volume of investment fixed, savings variable ('investment driven') | As for developed countries | Investment not fixed, savings rate fixed (savings driven) |
| **Closure rule 3: Government account** | Budget surplus/deficit fixed, household income tax rate variable | Budget surplus/deficit variable, household income tax rate fixed | As for middle-income countries |
| **Closure rule 4: Technology and efficiency** | Rate of total factor productivity growth fixed so as to achieve GDP projection for 2020 in reference scenario; GDP variable in policy scenarios | As for developed countries | As for developed and middle-income countries |
| **Closure rules 5: factor markets: mobility (between agriculture and non-agriculture sectors)** | *Unskilled labour*: mobile<br>*Skilled labour*: mobile<br>*Capital*: mobile<br>*Land*: mobile between different uses within agriculture, does not 'exist' in no-agricultural sector | As for developed countries | As for developed and middle-income countries |
| **Closure rule 6: Factor capacity use** | *Unskilled labour*: full employment not assumed<br>*Skilled labour*: full employment not assumed<br>*Capital and Land*: full capacity use not assumed | As for developed countries, except that full capacity use of capital assumed | As for middle-income countries |

For this study, GLOBE had to be extended so as to include multilateral TRQs, adapting the approach of van der Mensbrugghe (2005: pp. 26-27) for the bilateral case to the multilateral one.

Multilateral TRQs are modelled as a mixed complementarity problem (in this case, different solutions depending on the size of imports of a good relative to its TRQ). Three possibilities can occur:

- imports are below the quota limit: imports enter at the in-quota tariff rate (which in case of multilateral TRQs is zero),

- imports are equal to the quota limit (the quota is just binding): the domestic price of imported good is equal to the world price plus a premium, which is determined endogenously by the model, depending on the supply and demand

- imports exceed the quota limit; the out-of-quota (MFN) tariff is applied to the quantity in excess of the quota limit. In this case the domestic price of import is equal to the world market price times the in-quota-tariff rate plus the premium The premium is equal to the difference between in- and out-of-quota tariffs (= the quota rent). In other words the domestic price will be equal to the world market price plus the out-of-quota tariff rate.

Following the standard assumption in the literature on multilateral TRQs (Gouel et al. 2010)[19], the whole quota rent is assigned to importers. The importer's share is treated as part of government income. In a one-household model like GLOBE,

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[18] The set of developed countries consists of 37 members: EU27, Canada, Iceland, Israel, Japan, Norway, Switzerland, USA, Australia, Chile, and New Zealand.

this has no implications for consumer welfare[20]. More information about modelling of multilateral TRQ in GLOBE can be found under Section 3.2. .

## 2.2. Construction of the baseline (i.e. no DDA agreement)

To construct a baseline 2020, once exogenous projections of inflation rates, exchange rates, trends in the availability of the five fixed factors, population and GDP are available, the model solves for all other relevant variables. Moreover, tariff concessions agreed for all Free Trade Areas currently in force with the EU and a custom union among the 27 EU Member States are recognized in the model.

In order to use an exogenous projection of GDP in the reference scenario, the model was solved assuming the level of technological progress achieved by 2020 to be exogenous. This value was then taken as given in the policy scenarios, allowing GDP to be endogenously determined and hence different from the initial assumption in the presence of a DDA Agreement. However, this means that technological progress itself was assumed to be independent of a freer trading environment. Assumptions about exogenous trends are presented in Table A4.

## 3. Modelling of DDA agreement in GLOBE

### 3.1. Calculation of ad valorem equivalents (AVE)

The Doha Round negotiations focus on the reduction of all *ad valorem equivalents* (AVE) of final bound tariffs (i.e. all out-of-quota tariffs specified in section I-A of Members' Schedules of Concessions)[21]. In order to simulate a possible Doha Round agreement in this study, we calculated product-specific AVEs for all 153 WTO members and several non-WTO countries using information about *ad valorem* and *specific* tariffs available in the Market Access Maps (MAcMap-HS6, ver.2 – Bouet et al., 2004) database.

Calculation of product- and country-specific AVEs was performed according to formula (1):

AVE = ad valorem tariff + [specific tariff/unit value], (1)

where the ad valorem tariff is specified in relation to unity (=no tariff) rather than as a percentage.

This calculation required a choice among four options available in MAcMap for unit values (UV = ratio of import value to import quantity)[22]. The options are: bilateral UV, exporter/importer UV, reference-group-specific UV, and world market average UV. Given the objectives of our study, two criteria guided our choice: a) need to reflect adequately the restrictive impact of a specific tariff; and b) avoidance of excessive volatility. On this basis, world unit values were chosen.

*Agricultural products*

AVEs were computed for agricultural products (as defined according to the WTO nomenclature[23]) at product (HS-6) and individual country level on the basis of data extracted from MAcMap-HS6v2 using the STATA ® program. The computed AVE values of bound tariffs were used thereafter *inter alia*: a) to define "special" agricultural products for the relevant groups of countries (see below); and b) to establish a list of products exempted from 97% initiative for LDCs (see below).

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[19] This is not true for the bilateral TRQs where the majority of authors divide the rent in equal share between importes and exportes, for example, Elbehri and Pearson (2000), Berrettoni and Cicowiez (2002). The simulated trade flows may be affected by this assumption, because the rent is aggregated with price. Certainly, aggregate welfare impacts may not be neutral with respect to the proportions assumed.

[20] In case of exporter's share, this would be modelled as an addition to export price, which increases the value of in-quota exports and accrues to 'producers' in the exporting country.

[21] In-quota tariffs are subject to commitments described under other paragraphs.

[22] They are calculated in MAcMap using data for 2000-2004.

[23] The GLOBE composite category 'food, beverages and tobacco' is classified wholly within agriculture.

*Industrial goods* (NAMA)

For industrial (non-agricultural) goods, AVEs were computed at product (HS-6) level for all individual countries (WTO and non-WTO) on the basis of data extracted from MAcMap-HS6v2 using STATA. The computed AVE values of bound tariffs for non-agricultural products were used thereafter to select products falling under flexibility rules (see below).

For all products, calculated AVEs were then aggregated, using average import shares for the period 2004-2009 as weights, in order to fit the 23 GLOBE composite commodity categories.

All tariff cuts were implemented using the TASTE program (Horridge and Laborde, 2010) on the basis of information about ad valorem and specific tariffs available from MAcMap (HS6 ver.2 data base 2004).

In the simulations, if the reduction in tariff bindings brings the bound tariff below the level of the existing applied tariff, the latter is adjusted downwards to the maximum allowed under the new binding; alternatively, if the reduced tariff binding is still above the level of the applied tariff, the latter remains unchanged.

**3.2. Agricultural tariffs**

In Table 2 are presented the tariff cut schemes applied:

**Table 2: Tariff reduction to improve agricultural market access (general scheme)**

| Instrument<br><br>Group of countries | Initial bound tariff (ad valorem, %) | Average reduction rate (%) | Exceptions |
|---|---|---|---|
| **Agricultural Market Access** | | | |
| **Developed countries** | >75 | 70.0 | Tropical products (see below)<br><br>Duty-free and quota-free access for at least 97% of products originating from LDCs |
| | 50-75 | 64.0 | |
| | 20-50 | 57.0 | |
| | 0<20 | 50.0 | |
| **Developing countries (non-LDC)** | >130 | 46.7 | 12% of tariff lines designated as special products (5% exempt from tariff cuts and 7% subject to a smaller reduction) |
| | 80-130 | 42.7 | |
| | 30-80 | 38.0 | |
| | 0<30 | 33.3 | |
| **Small and vulnerable economies** | >130 | 41.0 | 12% of tariff lines designated as special products (5% exempt from tariff cuts and 7% subject to a smaller reduction) |
| | 80-130 | 32.0 | |
| | 30-80 | 18.0 | |
| | 0<30 | 0.0 | |
| **RAMs (List 2[24])** | >130 | 42.0 | |
| | 80-130 | 34.0 | |
| | 30-80 | 22.0 | |
| | 0<30 | 0.0 | |
| **Least Developed Countries (LDCs)** | all | 0.0 | |
| **RAMs (List 1[25])** | all | 0.0 | |

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[24] Recently Acceded Members List 2: China Taiwan, Ecuador, Jordan, Oman, Panama, Croatia. The eighth recognised member on this list – Cap Verde – is not represented in the MAcMap data base.
[25] Recently Acceded Members List 1: Albania, Armenia, Macedonia, Georgia, Kyrgyz Republic, Moldova, Mongolia, Saudi Arabia, Ukraine, Viet Nam and Tonga.

### 3.3. Special and differential treatment

#### 3.3.1. Sensitive products

Sensitive products were defined only for a group of developed countries. Countries in this category are those that designate themselves as 'developed' to the WTO. For the purpose of this study, the set of developed countries consists of 37 members (EU27, Canada, Iceland, Israel, Japan, Norway, Switzerland, USA, Australia, Chile, and New Zealand).

It has been assumed that developing countries and RAMs (List 2) instead of defining sensitive products will select the option of designating *special* products (see: below), as in this case they will maximise the number of tariff lines exempt from cuts.

According to the Revised Draft Modalities For Agriculture (WTO, TN/AG/W/4/Rev.4, 6 December 2008) developed countries may designate up to 4% of their tariff lines as sensitive products, or up to 6% if more than 30% of their tariff lines are greater than 75%). The reduction of tariffs for these products may be 1/3, ½, or 2/3 of the average reduction as specified in Table 3, compensated by the creation or expansion of *erga omnes* market access quotas (multilateral TRQs) for those products (i.e. 4%, 3.5% and 3% of domestic consumption, respectively). In-quota tariffs of multilateral TRQ of developed countries are assumed to be equal to zero.

For the majority of developed countries (incl. Japan, Canada, US, Switzerland, Island, Israel, Norway) the list of sensitive tariff lines (HS-8 level) was obtained on the basis of countries' notification to WTO (stand 2008). For others, i.e. EU, Australia and New Zealand sensitive products were defined on the basis of ad valorem equivalents (AVE) of applied/bound tariffs. It was assumed that in the EU sensitive products consist of 28 product lines (at HS-6 level) with the highest AVEs of applied tariffs (an HS-6 level equivalent to 4% or 88 tariff lines of 2204 HS-8 tariff lines). In the case of sensitive products, all tariff cuts were implemented according to a reduction scheme presented in Table 4 (below).

#### 3.3.2. Multilateral Tariff Rate Quotas (TRQ)

If a country opts to declare a tariff line as sensitive, it has to open a multilateral TRQ based on domestic consumption in the base period (average of 2003-2005) as compensation. The TRQs shall result in new access opportunities equivalent to no less than 4% of domestic consumption expressed in terms of physical units where the two-thirds deviation is used (1/3 of due cut). Where the one-third deviation is used (2/3 effective cut), the new access opportunities shall be no less than 3% of domestic consumption. Finally, when the one-half deviation is used, the new access opportunities shall be no less than 3.5% of domestic consumption. For Canada, Japan and USA, the respective multilateral TRQs were calculated on the basis of domestic consumption figures available in balance sheet notifications to WTO. For the EU, the domestic consumption was calculated from the balance sheets provided by DG-AGRI. In the present version of the model multilateral TRQ were modelled only for those four countries (country blocks). The multilateral quotas calculated for each GLOBE commodity and specific country were thereafter allocated to the country's trading partners according to their share in total country's imports in the simulated reference scenario 2020.

#### 3.3.3. Special products

It was assumed that developing countries and RAMs (List 2) will select the option of designating special products, as in this case they can maximise the number of tariff lines exempt from cuts (5% for both developing countries and RAMs), plus 7% (8% for RAMs) subject to moderate cuts. It was assumed that 12% of agricultural tariff lines (at HS-6 level) with the highest bound AVEs will be declared as special products, of which the first 5% will be completely exempt from tariff cuts) while the remaining 7% (8% for RAMs) will be subject to tariff cuts of 19% and 16.1% respectively (an average tariff cut for special products for developing countries was 11%, and for RAMs List 2 10%) (see Table 3).

**Table 3: Special and Differential Treatment**

| Instrument / Group of countries | Initial bound tariff (ad valorem, %) | Average reduction rate (%) | "Sensitive products" 2/3 reduction rate (%) | 1/2 reduction rate (%) | 1/3 reduction rate (%) |
|---|---|---|---|---|---|
| **Developed countries** | >75 | 70 | 47 | 35 | 23 |
| | 50-75 | 64 | 43 | 32 | 21 |
| | 20-50 | 57 | 38 | 29 | 19 |
| | 0<20 | 50 | 33 | 25 | 17 |
| | | | Multilateral TRQ (% of domestic consumption) | | |
| | | | 3 | 3.5 | 4 |
| **Developing countries and SVEs** | 5% with the highest tariffs | 0 | Not modelled in this study | Not modelled in this study | Not modelled in this study |
| | 7% with next-highest tariffs | 19 | | | |
| **RAM countries (List 2)** | 5% with the highest tariffs | 0 | Not modelled in this study | Not modelled in this study | Not modelled in this study |
| | 7% with next-highest tariffs | 16 | | | |

### 3.3.4. Tropical products

Based on the list of tropical products at HS-6 level in the latest revised modalities[26], a selection of tropical products subject to tariff cuts was made in each *developed* country according to whether the AVE of each product is below or above 20%. In the first group (AVE< 20%), the tariff is reduced to zero, while in the second group (AVE>20%) the tariff is reduced by 85%.

### 3.3.5. Differential treatment for some country groups

#### 3.3.5.1. LDCs

The group of the least developed countries (LDCs) consisting of 31 countries (UN definition). These countries are not required to cut tariffs for any of their tariff lines.

#### 3.3.5.2. Developed countries: 97% Initiative for LDCs

In all developed countries, tariffs for all other agricultural products (except 3%) are reduced to zero for agricultural imports from LDCs. The selection of the 3% of tariff lines (22 agricultural products) was carried out on the basis of previously computed AVEs (3% of the HS-6 agricultural tariff lines with the highest AVEs). In the case of some groups of countries with 3% of product exclusion, some of these tariffs were already liberalized under specific FTAs.

#### 3.3.5.3. Small vulnerable economies (SVEs)

The group of SVEs consists of 15 countries (Barbados, Bolivia, Cuba, Dominican Republic, El Salvador, Fiji, Guatemala, Honduras, Maldives, Mauritius, Mongolia, Nicaragua, Papua New Guinea, Paraguay, Trinidad and Tobago). General tariff cuts for these countries are implemented according to the tiered schedule in Table 3. For "special" products, it is assumed that

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[26] See WTO, TN/AG/W/4/Rev.4, Annex G.

12% of agricultural tariff lines (at HS-6 level) with the highest bound AVEs are declared as special products, of which first 5% will be completely exempted from tariff cuts) and remaining 7% will be subject to tariff cuts by 19% (an average tariff cut for special products was 11%). This matches the case of other developing countries (see Table 4).

### 3.4. Non-agricultural tariffs (NAMA - Non-Agricultural Market Access)

#### 3.4.1. NAMA General rules

According to the *Fourth Revision of Draft Modalities for Non-Agricultural Market Access* (WTO, TN/MA/W/103/Rev.3, 6 December 2008), industrialised countries reduce their tariffs for non-agricultural products linearly over a given number of years by applying the Swiss formula (2) with coefficient 8, while developing countries do the same but with a coefficient of 20. The formula applied is:

$$t_f = \frac{At_0}{(A + t_0)},$$  (2)

where $t_0$ = initial tariff rate, $t_f$ = (end-of-period) reduced tariff rate, and A is the (negotiable) country-specific coefficient. The overall tariff reduction is presented in Table 4.

**Table 4: NAMA Tariff reduction**

|  | Non Agricultural Market Access | |
|---|---|---|
|  | Coefficient A | Implementation period (years) |
| **Developed countries** | 8 | 5 |
| **Developing countries** | 20 | 9 |
| **Small Vulnerable Economies** | 30 | - |

#### 3.4.2. NAMA flexibility rules

The revised modalities for NAMA refer in various places to additional flexibility options for certain categories of product or country. In these simulations of a Doha Round agreement, we have adopted the following flexibility provisions:

▪ Less severe tariff cuts for Argentina, Brazil, Columbia, Mexico and South Africa involving 10% of NAMA tariff lines. For these designated tariff lines, the actual tariff cuts were half the reduction required by applying the Swiss formula.

▪ Less severe tariff cuts for China, Egypt, Indonesia, Morocco, Malaysia, Philippines and Thailand involving 6.5% of NAMA tariff lines. The designated lines are exempt from any tariff cut.

In the two cases above, the country-specific tariff lines selected for more 'flexible' treatment were those with the highest AVEs computed for industrial products within each country.

▪ Less severe tariff cuts for India. Here, the flexibility rules translate into total exemption from cuts for 5% of the tariff lines. Selection of these lines was carried out on the basis of AVEs computed for industrial products in India.

▪ Least Developed Countries, RAMs (List 1) and developing countries with low tariff bindings are exempt from all NAMA tariff reductions.

### 3.5. Export subsidies

We assume that the export subsidy ceilings approved by the WTO in the country schedules of the Uruguay Round Agreement on Agriculture are reduced to zero.

**4. Policy scenarios**

The main policy scenarios considered are as follows:

1.  Implementation of DDA without sensitive products and multilateral TRQ => Scenario (DDA - no sensitive)

2.  Implementation of DDA with sensitive products and multilateral TRQs, and **1/3** tariff cuts for sensitive products in all blocks, except of EU  (DDA_1/3) with:

    a.   1/3 tariff cuts for sensitive products in EU

    b.   ½ tariff cuts for sensitive products in EU

    c.   2/3 tariff cuts for sensitive products in EU

    d.   No sensitive products in EU

3.  Implementation of DDA with sensitive products and multilateral TRQs, and **1/2** tariff cuts for sensitive products in all blocks, except of EU (DDA_1/2) with:

    a.   1/3 tariff cuts for sensitive products in EU

    b.   ½ tariff cuts for sensitive products in EU

    c.   2/3 tariff cuts for sensitive products in EU

    d.   No sensitive products in EU

4.  Implementation of DDA with sensitive products and multilateral TRQs, and **2/3** tariff cuts for sensitive products in all blocks, except of EU (DDA_2/3) with:

    a.   1/3 tariff cuts for sensitive products in EU

    b.   ½ tariff cuts for sensitive products in EU

    c.   2/3 tariff cuts for sensitive products in EU

    d.   No sensitive products in EU

It is assumed that the Doha Round agreement is fully phased in by 2020.

**5. Main Results**

**5.1. Effects of DDA (including sensitive products + multilateral TRQ)**

*5.1.1. Impact on Trade*

The effects of the DDA agreement (with sensitive products and expansion of multilateral TRQs) on the EU imports are considerable. The imports of agricultural and agri-food commodities in the EU are substantially increasing when moving from scenarios: DDA_1/3, DDA_½, DDA_2/3 tariff cuts to scenario "DDA no sensitive products"' (see: Table A5). In the first scenario (DDA_1/3) imports of agro-food grow by 15% (22% for agricultural commodities) compared to the reference scenario while in the last scenario (no sensitive products) the final increase is of 24 % for agro-food (and 36% for agricultural commodities). On the other hand, imports of non agricultural commodities increase by approximately 1.2% under all scenarios. The effect on the total EU imports is growing through the scenarios (1/3, ½ and 2/3), with an average around 2.2%. Yet, different modalities of tariff cuts (1/3, ½, 2/3) and the respective expansion of TRQs for sensitive products chosen by the EU have mixed effects on imports of different commodities. Of particular interest are the sensitive products. Rice, vegetable and fruits, sugar and processed food behave as expected, i.e. the imports increase when the tariff cuts are bigger even if the

TRQs are smaller. In the case of rice and sugar, the possibility for the EU to select them as sensitive products limits drastically the increase of imports compared with the scenario without sensitive products. The same holds for beef meat, even if in this case the combination of tariff cut and TRQs indicates that the most protective situation for the EU is the ½ cut choice. Finally, the dairy sector shows a complete different behaviour given that the introduced protection causes a decrease of imports when moving from the 1/3 modality to the one without sensitive products. In this case, a simple tariff cut, without opening a zero tariff multilateral TRQs represent the most protective solution for the EU. Obviously, the market access allowed by the EU with the TRQs is much more important than the simple tariff cut.

On the export side, results are provided in Table A6, the EU registers a small improvement of agricultural and agri-food exports. According to the different modalities on sensitive products (including no sensitive products), the EU exports of agri-food commodities (agricultural) increase between 1.57% (0.9%) and 5.09% (6.78%), while the total exports increase between 1.49% and 1.70%, showing that the exports of non agricultural commodities remain stable through the different scenarios. In terms of single agricultural commodities, the EU registers a significant increase of exports of wheat, beef and other meat and processed food. For all these commodities, exports increase as the tariffs decrease. In the case of meats, the export towards Japan and countries with FTA in force with the EU drives the final export expansion. On the other hand, export of rice, sugar and dairy products face a considerable fall. EU exports of rice and sugar towards all the trade partners are decreasing while for the dairy products, the increase of EU exports to developed countries (USA, Japan and Canada) does not compensate the fall of exports to all the other countries where EU is loosing competitiveness, particularly compared with MERCOSUR countries.

### 5.1.2. Impact on Production
#### 5.1.2.1. EU

Our results show that conclusion of Doha negotiations has a substantial impact on agricultural and food production in the EU. Implementation of tariff cuts for majority of agricultural products combined with an extension of tariff rate quotas for sensitive products (the latter are subject to lower tariff cuts) leads to a decrease of production for all the major agricultural commodities. This drop applies to both "normal" as well as sensitive products. For example, compared with the reference scenario (2020 - no DDA) and in dependence on a chosen modality of tariff cuts and TRQ expansion, the implementation of DDA leads to a decrease of production of sugar (sensitive product) between -7% to -13%, rice (-7% to -12%), meat beef, sheep and goat (sensitive product) (approximate -8%), sugar beet (-2% to -4%) as well as non-sensitive products, e.g. vegetable oils and fats (-2.4% to -2.5%), or milk (-0.1% to -0.2%). On the other hand, DDA agreement has a positive effect EU production of wool, silk cocoons (+11%), oilseeds (+0.6%), plant based fibres (+0.5%), food beverages and tobacco (0.2%) – see: Table A7.

Implementation of DDA agreement together with inclusion of sensitive products and expansion of multilateral TRQs in all regions affect the level of agricultural production compared with a scenario "DDA without sensitive products ", irrespectively of the modality of sensitive products treatment chosen by the EU and other developed countries. For example, inclusion of sensitive products in the EU leads to positive effects on production (= lower drop of production) for sugar (+8 percentage points difference), meat beef sheep goat (+8 percentage points difference), rice (+8 percentage points difference), sugar beet (+3 percentage points difference). While protective policies bring expected results in the case of TRQ commodities such as sugar, meat beef, sheep goat; they also have some positive indirect impacts on production of other (non-TRQ) commodities, e.g. wool and cocoons, other crops, live pigs, poultry or plant-based fibres.

Our results show however that a seemingly higher protection of sensitive products (i.e. a lower tariff cut compared with an average) linked with a commitment of providing a better market access in the form of expansion of multilateral TRQ may result in a drop of production both for some of sensitive as well as other products. For example, in the EU, irrespective of the modality of sensitive products treatment chosen by the EU and other developed countries, the DDA agreement was found to

have a direct negative impact on production of two important sensitive products, i.e. dairy (-0.6 to -0.9 percentage point difference) and fruits and vegetables (-0.2 percentage point difference); and also an indirect negative effect on oilseeds (-0.3 percentage point difference). Clearly, depending on the current share of imports in the overall domestic consumption, an increase of multilateral TRQs for some sensitive products may over-compensate expected "savings" (lower tariff cuts) leading to higher imports and a relative decrease of domestic production. In order to verify the extent to which a decrease of production of sensitive products was indeed caused by (lower) tariff cuts compared to the extension of multilateral TRQ, a separate (yet not realistic from a policy point of view ) policy scenario (i.e. DDA with sensitive products without TRQ expansion) was run. The results show that for a number of agricultural products, e.g. dairy, an expansion of TRQ (and not tariff cuts), was merely responsible for a drop of production

Concerning other sectors, the implementation of DDA agreement leads to an increase of production in the EU non-agricultural sectors, e.g. services (+16 bill EUR), trade services and communication (+9 bill EUR), manufacturing (+3 bill EUR) in prices 2004.

### 5.1.2.2 Other countries/regions

The implementation of the DDA agreement also substantially affects agricultural production of all EU trade partners, irrespectively on the modality of tariff cuts (1/3, ½, 2/3) and the respective expansion of TRQs for sensitive products chosen by these countries as presented in Table A8. The highest negative changes in agricultural production occur in countries with the currently highest protection rate, e.g. Japan (sugar = - 41%, sugar cane = - 39%, meat pork poultry = -33%, meat beef sheep goat = -10%, live cattle sheep goats = -9%, other cereals = -8%), and FTA countries (incl. Norway, Switzerland, South Korea) (rice = - 6%, wheat = - 5%, other cereals = -5%). On the other hand, an increase of production takes place in regions with the highest competitive production potential, e.g. other ACPs countries (sugar = + 23%), USA (rice = +24%), India (meat beef sheep goat = +19%), Australia and New Zealand (dairy = +16%, meat beef sheep goat = +15%, raw milk = +13%, sugar = +12%). Given growing consumer demand for agricultural and food products, it can be therefore expected that an implementation of the DDA agreement will result in a better adjustment of trade flows to reflect regions' relative competitiveness.

Also the non-agricultural sector, especially manufactures, in many EU trade partners are positively affected, e.g. Russia (+0.8%), Japan (+0.5%) and FTA (+0.4%). This occurs mainly due to tariff reduction in NAMA relevant sectors and an increase of exports in more competitive countries.

### 5.1.3. Impact on GDP

Dependent on the position of the agricultural and non-agricultural sectors in the overall economy, the implementation of DDA agreement will have an impact on production, consumption, investments and trade flows and therefore the GDP in a particular region. Indeed, our results show that a pattern of GDP's change caused by the implementation of DDA is quite different across countries and regions (see: Table A9). In the case of the EU and Canada an increase of GDP is steered mainly by a growth of domestic consumption, while in the case of developing countries as China and India it is the growth of exports that leads to an increase of the GDP.

Japan represents the case of a very much protected country where after the multilateral liberalization the exports growth is not able to keep the pace of imports growth, causing a negative impact on the GDP. Furthermore, countries which are not WTO members, e.g. Russia are not able to enjoy the positive impacts of DDA on the GDP (although in Russia agricultural and non-agricultural exports and production increase, a growth of domestic prices leads to a decrease of domestic consumption (by approximately 5%) and to a drop of the GDP (by -0.02%).

The assessment of the impact of the introduction of sensitive products and expansion of multilateral TRQ on GDP was carried out by comparing the simulation results (% changes of GDP) in the scenario, i.e. "DDA with sensitive products" with a scenario "DDA without sensitive products". The results are presented in Table 8 (last column). Our results show that

introduction of sensitive products and expansion of TRQs in four developed countries (EU, US, Canada and Japan) has negative impact on GDP in Australia and New Zealand (-0.0107 percentage points), the EU (a difference equals to -0.006 percentage points), and countries with FTA in force with EU (-0.0011). The main reason for diminution of GDP in Australia and New Zealand in scenario "DDA with sensitive products" compared with a scenario (DDA without sensitive products" is a decrease of exports of agricultural commodities to the main trading partners. In the case of EU, the lower tariff cuts and expansion of multilateral TRQs linked to the introduction of sensitive products lead to the maintaining of a high price level, and thus a decrease of domestic consumption compared with a situation "DDA without sensitive products. Also in FTA countries a drop of GDP is mainly linked to a drop in consumption caused by higher export prices.

Surprisingly, for the majority of concerned countries/regions the impact of "DDA with sensitive products" on GDP is slightly positive or almost zero. For example, the highest positive impact was found for India where domestic consumption under "DDA with sensitive products" decreases less than domestic consumption "DDA without sensitive products". Apparently, a situation "DDA without sensitive products" generates in India considerable additional exports and thus an increase of consumer price level. The latter leads to a drop of consumption and thus causes a decrease of GDP. In a situation "DDA with sensitive products" exports grow less, the rise of domestic consumer prices is lower, therefore consumption and GDP grow faster than in "without sensitive" situation. Similar situation occurs also in Mercosur countries, i.e. in "with sensitive" situation exports and domestic consumer prices grow less thus consumption increases leading to the growth of GDP.

## 5.2. Impact of the chosen modality of treatment of sensitive products

### 5.2.1. Impact on trade

Table A5 shows that, irrespectively from the sensitive products modalities chosen by other developed countries (USA, Japan and Canada), the lowest imports increase in the EU within each modality is achieved by choosing the 1/3 scenario, i.e. by limiting the tariff cut on sensitive products but allowing for a bigger tariff rate quotas. Looking at the agricultural and agri-food totals, the combination that allows the lowest increase in agricultural imports for the EU seems to be the 1/3 cut for the EU while 2/3 cut by other EU trade partners. This conclusion holds for all sensitive products except of beef meat and dairy. In the latter case (i.e. dairy), the option "no sensitive products" in all the developed countries, results also in the lowest EU imports. In the case of beef meat, the choice of ½ cut for EU represents the most protective one under all set of scenarios.

Looking at the exports result in the EU, we can deduce that result on protection in the EU could be generalized to the other developed countries. In fact, irrespectively on the EU choice in the set of scenarios where USA, Japan and Canada adopt a 2/3 cut on their sensitive products the EU exports of agricultural and agri-food commodities will be the highest. The maximum of EU agricultural exports will be achieved if all regions (including EU) select a 2/3 option.

### 5.2.2. Impact on Production

The chosen modality by the EU for treatment of sensitive products matters and has an impact on the level of production of the sensitive products. Our results show that depending on the selected policy option by the EU, the percentage change of EU production may greatly differ even for the same products, e.g. sugar (5 percentage points difference), rice (4.8), sugar beet (2.0). Similar differences occur irrespectively on the mode for treatment of sensitive products chosen by other developed countries (1/3, ½ or 2/3).

In all the cases considered (applies for all commodities and regions) the highest drop in agricultural production was not necessary linked to the highest tariff cuts for sensitive products, i.e. 2/3 cut. And vice versa, the lowest drop in production was not necessary linked to a lowest i.e. 1/3 cut of tariffs. Indeed, the dependence between drop of production and the selected level of tariff cuts appears to be highly non-linear (inter alia dependent on the increase of multilateral TRQs, net trade position, filling rate of the quota, etc.)

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Furthermore, irrespectively on the modality of tariff cuts for sensitive products (1/3, ½ or 2/3) chosen by other developed countries, the selection of tariff cuts' modality by the EU affects production of selected commodities in all regions, e.g. sugar in other ACPs (12 percentage points difference), meat beef sheep and goat in India (10 percentage points difference), sugar cane in ACP (5 percentage points difference), meat beef sheep and goat in Mercosur (3.5 percentage points difference), live cattle sheep goats in Mercosur (3 percentage points difference).

The cumulative impact of the modality of tariff cuts (1/3, ½, 2/3) chosen by the EU on production of agricultural commodities in other countries/regions can be assessed by summing up the differences in the change of production for all these three scenarios and all agricultural products. Our results show that the highest impact of the modality of tariff cuts (1/3, ½, 2/3) chosen by the EU can be seen in the following regions/countries: other ACPs countries (cumulative dependence = 21 percentage points), EU itself (cumulative dependence = 15 percentage points), India (cumulative dependence = 12 percentage points), Mercosur (cumulative dependence = 10 percentage points), and Australia and New Zealand (cumulative dependence = 8 percentage points)

### 5.2.3. Impact on GDP

Our results show that a change of the modality chosen by the EU concerning treatment of sensitive products can affect country's GDP. Moving away the scenario with lowest tariff cuts and the highest expansion of multilateral TRQs (DDA_1/3) to the biggest tariff cuts with lower expansion of TRQs (DDA_2/3) will result in a small, yet positive impact on GDP in the EU, Mercosur, Australia and New Zealand  (see: Table 8). On the other hand, the same shift in policies will negatively affect GDP in: Russia, India, other ACP countries, and is expected to have an neutral impact on GDP in US, Japan, China or other WTO developing countries.


## 6. Concluding remarks

This paper evaluates the impact and importance of sensitive products in the framework of the WTO negotiations making use of a CGE model (the GLOBE model). Four hypothetical scenarios are simulated, and are compared with the reference ('no-change') scenario for the year 2020.  The first scenario investigated is based on the hypothetical case in which there is no country defining sensitive products and thus the multilateral TRQ have to be not expanded (scenario DDA –no sensitive). The other three scenarios assume that an agreement has been reached in the Doha round multilateral negotiations, based on the revised draft modalities for an agreement on agriculture presented to the WTO agriculture Committee in December 2008. One novelty of this study is the consideration that the sensitive products of four developed countries/regions (Japan the US, Canada and the EU) retain some extra protection but that they are required to open new multilateral TRQs or extend existing ones in order to grant some additional controlled market access for these products.

In this exercise, we concentrate on the effects of the designation of sensitive products with an expansion of multilateral TRQ for these products based on consumption patterns. Some of the results obtained from the simulations shed light on following issues:

*Trade*

The highest imports increase in the EU within each modality is observed by choosing the 2/3 scenario, i.e. by increasing the tariff cut on sensitive products with a limited extension of tariff rate quotas. These results are independent on the tariff cut schemes chosen by other developed countries. This conclusion holds true for all sensitive products except of beef meat and dairy. In the latter case (i.e. dairy), the option "no sensitive products" in all the developed countries, results also in the lowest EU imports. In the case of beef meat, the choice of ½ cut for EU represents the most protective one under all set of scenarios. EU exports of agricultural and agri-food commodities will be the highest, irrespectively on the EU choice in the set of scenarios, when USA, Japan and Canada adopt a 2/3 cut on their sensitive products. The maximum of EU agricultural exports will be achieved if all regions (including EU) select a 2/3 option (see: Table A10).

*Production*

Our results show however that an outcome with a relatively high protection of sensitive products linked with a commitment of expansion of multilateral TRQ may result in a drop of production of sensitive and non-sensitive products in the EU. For example, in the EU, irrespective of the modality of sensitive products treatment chosen by the EU and other developed countries, the DDA agreement promots the production drop of i.e. fruits and vegetables (-0.2 percentage point difference) and dairy (-0.6 to -0.9 percentage point difference). Furthermore, it shows also a drop in production of oilseeds (-0.3 percentage point difference). These results suggest that depending on the current share of imports in the overall domestic consumption, an expansion of multilateral TRQs for some sensitive products may over-compensate expected 'savings' (lower tariff cuts) leading to higher imports and decrease in domestic production.

In other countries and regions the effects caused by trade liberalization are mostly linked to the initial degree of protection such as the case of Japan for sugar, sugar cane, meat and cereals.

Concerning non-agricultural sectors, the implementation of DDA agreement leads to an increase of production in the EU non-agricultural sectors, e.g. services, manufacturing, trade services and communication,. On the other hand, an increase of production takes place in regions with high competitive production potential such as USA, Australia and New Zealand, India and other developing countries.

*GDP*

Dependent on the position of the agricultural and non-agricultural sectors in the overall economy, the implementation of the different options of possible outcomes of the DDA agreement will have an impact on production, consumption, investments and trade flows and therefore on the GDP of each included region. Indeed, our results show that a pattern of GDP's change caused by the implementation of DDA is quite different across countries and regions. The model results show that in the case of the EU and Canada, an increase of GDP is steered mainly by a growth of domestic consumption, while in the case of developing countries as China and India it is the growth of exports that leads to an increase of the GDP.

In summary, the model results indicate that the economic changes and the adjustment requirements arising from a conclusion of the WTO negotiations would, as far as the EU is concerned, fall very heavily on the agricultural sector and thus the importance of studying in detail the effects of sensitive products linked to multilateral TRQ expansions on international trade flows and welfare.

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**APPENDIX**

**Table A1: Sector aggregation in GLOBE**

| No | Code | Description of product category | HS code |
|---|---|---|---|
| 1 | rice | Rice | 1006 rice<br>Processed rice |
| 2 | wht | Wheat | 1001 Wheat and meslin |
| 3 | ocer | Other cereals | 1002 rye in the grain<br>1003 barley<br>1004 oats<br>1005 corn (maize)<br>1007 grain sorghum<br>1008 buckwheat. millet & canary seed. cereals nesoi |
| 4 | v_f | Vegetables. fruit & nuts | 07 edible vegetables<br>08 ed. fruits & nuts. peel of citrus/melons |
| 5 | osd | Oilseeds | 1201 Soybeans. whether or not broken<br>1202 peanuts (ground-nuts). raw<br>1203 copra<br>1204 flaxseed (linseed). whether or not broken<br>1205 rape or colza seeds. whether or not broken<br>1206 sunflower seeds. whether or not broken<br>1207 oil seeds & oleaginous fruits nesoi. broken or not<br>1208 flour & meal of oil seed & olea fruit (no mustard) |
| 6 | c_b | Sugar cane & sugar beet | 121291 Sugar Beet<br>121292 Sugar Cane |
| 7 | pfb | Plant-based fibres | 13 lac. natural gums. resins. etc.<br>14 vegetable plaiting materials |
| 8 | ocr | Other crops | 0199 Other raw vegetable materials<br>06 Live trees. other plants. cut flowers<br>1209 seeds. fruit and spores. for sowing<br>1210 hop cones. fresh or dried. lupulin<br>1211 plants etc for pharmacy. perfume. insecticides etc<br>121210 Locust Beans (Including Locust Bean Seeds)<br>121220 Seaweeds and Other Algae<br>121230 Apricot. Peach or Plum Stones and Kernels<br>121299 Other Vegetable Prods (chicory roots etc)<br>1213 Cereal straw & husks unprep w/n chop etc or pellet<br>1214 rutabagas. hay. clover & other forage products |
| 9 | Ctl | Live cattle. sheep. goats. horses | 0101 horses. asses. mules and hinnies. live<br>0102 bovine animals. live<br>0104 sheep and goats. live |
| 10 | oap | Live pigs. poultry. other unprocessed or preserved animal products | 0103 swine. live<br>0105 chickens. ducks. geese. turkeys. and guineas. live<br>0106 animals. live. nesoi - not elsewhere specified of indicated.<br>0407 birds' eggs. in the shell. fresh. preserved or cooked<br>0408 birds' eggs. not in shell & yolks. fresh. dry. etc<br>0409 honey. natural<br>0410 edible products of animal origin. nesoi<br>05 products of animal origin |
| 11 | rmlk | Raw milk | 0401 milk and cream. not concentrated or sweetened |
| 12 | wol | Wool. silk cocoons | 0296 raw animal materials used in textiles<br>50 silk. inc. yarns & woven fabrics thereof<br>51 wool & fine or coarse animal hair. inc. yarns & woven fabrics thereof |

| 13 | prim | Primary Sectors | 03 fish & crustaceans<br>25 salt. sulphur. earth & stone. lime & cement<br>26 ores slag & ash<br>2702 lignite. agglomerated or not. excluding jet<br>2703 peat (including peat litter). incl agglomrtd<br>2706 mineral tars. including reconstituted tars<br>2707 oils etc from high temp coal tar. sim aromatic etc<br>44 wood & articles of wood. wood charcoal<br>45 cork & articles of cork<br>46 manu. Of straw. esparto. or other plaiting materials. basketware and wickerwork<br>47 pulp of wood. waste & scrap of paper |
|----|------|-----------------|-------------|
| 14 | cmt | Meat cattle. sheep. goat. horse | 0201 meat of bovine animals. fresh or chilled<br>0202 meat of bovine animals. frozen<br>0204 meat of sheep or goats. fresh. chilled or frozen<br>0205 meat of horses. asses. mules. hinnies fr. chld. fz<br>0206 edible offal. bovine. swine. sheep. goat. horse. etc. |
| 15 | omt | Meat pork. poultry. other | 0203 meat of swine (pork). fresh. chilled or frozen<br>0207 meat & ed offal of poultry. fresh. chill or frozen<br>0208 meat & edible offal nesoi. fresh. chilled or frozen<br>0209 pig & poultry fat fresh chld frzn salted dried smkd<br>0210 meat & ed offal salted. dried etc. & flour & meal |
| 16 | vol | Vegetable oils and fats | 15 animal or vegetable fats. oils & waxes |
| 17 | dair | Dairy products | 0402 milk and cream. concentrated or sweetened<br>0403 buttermilk. yogurt. kephir etc. flavored etc or not<br>0404 whey & milk products nesoi. flavored etc. or not<br>0405 butter and other fats and oils derived from milk<br>0406 cheese and curd |
| 18 | sgr | Sugar | 17 sugar (raw. refined. confectionery) |
| 19 | f_b_t | Food.<br>Beverages and tobacco | 09 coffee. tea. mate & spices<br>11 milling industry products<br>16 ed. prep. of meat. fish. crustaceans. etc<br>18 cocoa & cocoa preparations<br>19 preps. of cereals. flour. starch or milk<br>20 preps of vegs. fruits. nuts. etc.<br>21 misc. edible preparations<br>22 beverages. spirits & vinegar<br>23 residues from food industries. animal feed<br>24 tobacco & manuf. Tobacco substitutes |
| 20 | fuel | Fuel | 2701 coal. briquettes. ovoids etc. mfr from coal<br>2704 coke etc of coal. lignite or peat. retort carbon<br>2705 coal gas. water gas. prdcr gas etc. ex pet gs & othgs<br>2708 pitch & pitch coke from coal tar or other min tars<br>2709 crude oil from petroleum and bituminous minerals<br>2710 oil (not crude) from petrol & bitum mineral etc.<br>2711 petroleum gases & other gaseous hydrocarbons<br>2712 petroleum jelly. mineral waxes & similar products<br>2713 petroleum coke. petroleum bitumen & other residues<br>9856 electric services<br>9857 natural gas transmission<br>9858 natural gas distribution<br>9859 gas production and/or distribution |
| 21 | manufs | Manufactures and machinery | Chapters 28-43 48-49 52-87 88-97 |
| 22 | trade | Trade and transportation | Chapters: 9832-9835 9841-9853 |
| 23 | serv | Services | Chapters: 9801-9831 9854-9855 9860-9884<br>Public services |

**Table A2: Regional aggregation in GLOBE**

| No. | Code | Country | Economic Agreement |
|-----|------|---------|--------------------|
| 1. | EU27 | Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom, Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia | EU27 (Customs union) |
| 2. | USA | USA | No FTA. Main trading partner |
| 3. | JPN | Japan | No FTA. Main trading partner |
| 4. | CHI | China. Hong Kong | No FTA. Main trading partner |
| 5. | RUS | Russian Federation | GSP. Main trading partner |
| 6. | CAN | Canada | |
| 7. | IND | India | |
| 8. | MERC | Argentina. Brazil. Uruguay. Paraguay | No FTA. Main trading partner |
| 9. | OCE | Oceania | Australia. New Zealand |
| 10. | Other ACP countries | Nigeria, Senegal, Rest of West Africa, rest of Central Africa, rest of South Central Africa, Ethiopia, Madagascar, Malawi, Mauritius, Mozambique, Tanzania, Uganda, Zambia, Zimbabwe, Rest of Eastern Africa, Botswana, Rest of South African Customs, Caribbean Countries, Rest of Oceania | |
| 11. | FTAs and Customs Unions in force | Chile, South Africa, Mexico, Switzerland, Norway, Rest of Europe, Rest of EFTA, South Korea, Peru, Ecuador, Panama, Colombia, Costa Rica, Guatemala, Nicaragua, Rest of Central America | |
| 12. | Other WTO developing country status | Taiwan, Indonesia, Malaysia, Philippines, Singapore, Thailand, Pakistan, Sri Lanka, Bolivia, Venezuela, Turkey, Egypt, Morocco, Tunisia | |
| 13. | Rest of the World | Rest of East Asia, Cambodia, Laos, Myanmar, Vietnam, Bangladesh, Rest of South America Albania,, Belarus, Ukraine, Rest of Eastern Europe, Kazakhstan, Kyrgyzstan, Rest of Former Soviet Union, Armenia, Azerbaijan, Georgia, Islamic Republic of Iran Rest of Western Asia, Croatia, Rest of North Africa. | |

**Table A3: Summary of the behavioural relationships in each segment of GLOBE, broken down by 'account'**

| | Commodities | Activities | Factors | Households | Government | Capital | Margins | Rest of World | Prices |
|---|---|---|---|---|---|---|---|---|---|
| **Commodities** | 0 | Leontief input-output coefficients | 0 | Stone-Geary utility functions | Varies with region (see closure rules) | Fixed shares of savings | 3-stage CET functions | 3-stage CET functions | Consumer commodity price |
| **Activities** | Total supply from domestic production | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Activity prices |
| **Factors** | 0 | 2-stage CES production functions | 0 | 0 | 0 | 0 | 0 | 0 | Factor prices |
| **Households** | 0 | 0 | Fixed shares of factor income | 0 | 0 | 0 | 0 | 0 | |
| **Government** | *Ad valorem* tax rates | *Ad valorem* tax rates on output and factor use | Average tax rates | Average tax rates | 0 | 0 | 0 | 0 | |
| **Capital** | 0 | 0 | Shares of factor income | 0 | Varies with region (see closure rules) | 0 | Current account 'deficit' on margins trade | Current account 'deficit' | |
| **Margins** | Fixed technical coefficients | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **Rest of World** | 3-stage CES functions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **Prices** | Producer prices  Domestic & world prices for imports | Value-added Prices | | | | | | | |

Source: McDonald *et al.* (undated, Table 3).

**Table A4: Assumptions about exogenous trends in GLOBE, 2004-2020**

| | GDP | Population | Capital | Land | Exchange rate | GDP | Population | Capital | Land |
|---|---|---|---|---|---|---|---|---|---|
| | Total change, 2004-2020, % | | | | | Average annual change, % | | | |
| **EU27** | 28.25 | 4.03 | 28.26 | -4,41 | -15.66 | | | 1.57 | -0,28 |
| **Mercosur** | 116.45 | 14.58 | 207.77 | 14,99 | -21.83 | 4.94 | 0.85 | 7.28 | 0,88 |
| **USA** | 42.17 | 16.39 | 43.1 | 1,23 | 20.50 | 2.22 | 0.95 | 2.27 | 0,08 |
| **Canada** | 39.61 | 18.45 | 46.01 | 12,58 | -14.11 | 2.11 | 1.06 | 2.39 | 0,74 |
| **Japan** | 16.01 | -2.71 | 3.59 | -13,62 | -28.89 | 0.93 | -0.17 | 0.22 | -0,91 |
| **China** | 312.37 | 9.2 | 350.19 | 2,80 | -38.39 | 9.26 | 0.55 | 9.86 | 0,17 |
| **India** | 264.32 | 22.81 | 411.89 | 9,97 | -5.80 | 8.42 | 1.29 | 10.74 | 0,60 |
| **Russia** | 75.18 | -5.64 | 152.97 | 10,54 | 21.14 | 3.57 | -0.36 | 5.97 | 0,63 |
| **Oceania** | 35.06 | 8.95 | 32.21 | 1,60 | -11.72 | 1.9 | 0.54 | 1.76 | 0,10 |
| **Other ACP countries** | 105.17 | 35.23 | 88.49 | 9,76 | * | 4.59 | 1.9 | 4.04 | 0,58 |
| **Other (WTO developing)** | 105.17 | 35.23 | 88.49 | 9,76 | * | 4.59 | 1.9 | 4.04 | 0,58 |
| **Rest of the World** | 105.17 | 35.23 | 88.49 | 9,76 | * | 4.59 | 1.9 | 4.04 | 0,58 |
| **Countries having FTAs with EU** | 35.06 | 8.95 | 32.21 | 9,76 | -11.72 | 1.9 | 0.54 | 1.76 | 0,58 |

**Note to Table A4**

The GDP, population and exchange rate assumptions come from Global Insight, and/or the OECD AGLINK/COSIMO database. For regions with * in the exchange rate column, the closure rules specified balanced trade and endogenous exchange rates. The endogenous exchange rate depreciation for these three regions was: -12.51,-23.59 and -14.57, respectively.

There are five factors in GLOBE, unskilled and skilled labour, capital, land and natural resources. In the model simulations, it is assumed that the availability of unskilled and skilled labour grow at the same rate as population (see table) and that natural resources are constant. The trends in capital and land availability are shown in the table.

**Table A5. EU Imports**

| | Reference scenario 2020 | DDA no sensitive products | Other Developed Countries 1/3 | | | | Other Developed Countries 1/2 | | | | Other Developed Countries 2/3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products |
| Units | US$ bn. 2004 | % change | % change | | | | % change | | | | % change | | | |
| Rice | 1.42 | 116.27 | 43.71 | 58.67 | 75.66 | 115.56 | 43.48 | 58.43 | 75.4 | 115.29 | 43.34 | 58.28 | 75.25 | 115.13 |
| Wheat | 3.24 | 12.98 | 14.37 | 14.22 | 14.04 | 13.53 | 14.24 | 14.09 | 13.91 | 13.4 | 14.07 | 13.92 | 13.74 | 13.23 |
| Other cereals | 2.26 | 3.61 | 4.30 | 4.25 | 4.17 | 3.86 | 4.24 | 4.19 | 4.11 | 3.8 | 4.18 | 4.12 | 4.04 | 3.73 |
| Vegetables, fruits | 28.57 | 14.28 | 13.55 | 13.73 | 13.92 | 14.28 | 13.54 | 13.71 | 13.90 | 14.27 | 13.52 | 13.70 | 13.89 | 14.25 |
| Oilseeds | 8.91 | -3.07 | -2.38 | -2.41 | -2.45 | -3.00 | -2.38 | -2.41 | -2.45 | -3 | -2.39 | -2.41 | -2.46 | -3.01 |
| Sugar cane & beet | 0.03 | -1.99 | -0.81 | -1.05 | -1.39 | -2.17 | -0.79 | -1.03 | -1.37 | -2.15 | -0.76 | -1.00 | -1.34 | -2.12 |
| Plant-based fibres | 1.71 | -1.80 | -1.33 | -1.40 | -1.49 | -1.79 | -1.32 | -1.39 | -1.48 | -1.79 | -1.32 | -1.39 | -1.48 | -1.79 |
| Other crops | 15.49 | 10.32 | 3.81 | 5.41 | 7.11 | 10.29 | 3.81 | 5.41 | 7.12 | 10.29 | 3.81 | 5.42 | 7.12 | 10.29 |
| Live cattle, sheep, goats, horses | 0.69 | -6.92 | -5.40 | -5.32 | -5.55 | -7.34 | -5.30 | -5.22 | -5.45 | -7.24 | -5.20 | -5.12 | -5.34 | -7.14 |
| Live pigs, poultry, other animals | 3.52 | 0.68 | 0.52 | 0.48 | 0.44 | 0.27 | 0.6 | 0.56 | 0.52 | 0.35 | 0.69 | 0.65 | 0.60 | 0.44 |
| Raw milk | 0.09 | -2.73 | -2.42 | -2.52 | -2.63 | -2.97 | -2.38 | -2.48 | -2.59 | -2.93 | -2.34 | -2.44 | -2.55 | -2.89 |
| Wool, silk cocoons | 0.66 | -6.77 | -5.87 | -6.00 | -5.99 | -5.35 | -6.12 | -6.25 | -6.24 | -5.60 | -6.36 | -6.50 | -6.49 | -5.85 |
| Meat beef, sheep, goat, horse | 6.51 | 241.5 | 120.43 | 108.12 | 116.88 | 241.98 | 120.52 | 108.20 | 116.92 | 241.99 | 120.60 | 108.29 | 116.95 | 242.00 |
| Meat pork, poultry | 3.82 | 43.14 | 45.44 | 45.46 | 45.44 | 44.37 | 45.28 | 45.31 | 45.28 | 44.21 | 45.09 | 45.12 | 45.09 | 44.02 |
| Vegetable oils/ fats | 10.06 | 16.17 | 16.10 | 16.27 | 16.42 | 16.27 | 16.11 | 16.27 | 16.43 | 16.27 | 16.1 | 16.26 | 16.42 | 16.26 |
| Dairy products | 3.80 | 35.99 | 89.71 | 86.78 | 78.51 | 36.36 | 89.55 | 86.74 | 78.48 | 36.26 | 89.41 | 86.75 | 78.48 | 36.24 |
| Sugar | 6.62 | 121.73 | 23.46 | 39.53 | 61.78 | 122.02 | 23.44 | 39.5 | 61.74 | 121.97 | 23.40 | 39.46 | 61.70 | 121.92 |
| AGRICULTURE | 97.40 | 36.82 | 22.08 | 22.75 | 25.12 | 36.96 | 22.06 | 22.76 | 25.09 | 36.94 | 22.04 | 22.74 | 25.08 | 36.91 |
| Food, beverages, tobacco | 60.55 | 5.01 | 4.89 | 4.94 | 5.00 | 5.09 | 4.88 | 4.93 | 4.99 | 5.08 | 4.86 | 4.91 | 4.97 | 5.07 |
| AGRI-FOOD | 157.95 | 24.63 | 15.49 | 15.92 | 17.41 | 24.74 | 15.47 | 15.93 | 17.39 | 24.73 | 15.45 | 15.91 | 17.37 | 24.70 |
| Primary sectors | 61.90 | 0.12 | 0.12 | 0.12 | 0.12 | 0.14 | 0.12 | 0.12 | 0.12 | 0.14 | 0.12 | 0.12 | 0.12 | 0.14 |
| Fuel | 231.43 | -0.20 | -0.23 | -0.22 | -0.20 | -0.11 | -0.24 | -0.22 | -0.20 | -0.12 | -0.25 | -0.24 | -0.22 | -0.13 |
| Manufactures | 1870.72 | 1.96 | 1.93 | 1.94 | 1.96 | 2.04 | 1.93 | 1.94 | 1.95 | 2.03 | 1.92 | 1.92 | 1.94 | 2.02 |
| Trade services & communication | 256.78 | -0.07 | -0.07 | -0.07 | -0.06 | -0.03 | -0.07 | -0.07 | -0.06 | -0.03 | -0.08 | -0.07 | -0.06 | -0.04 |
| Services | 409.35 | 0.06 | 0.05 | 0.06 | 0.07 | 0.12 | 0.05 | 0.05 | 0.07 | 0.12 | 0.04 | 0.04 | 0.06 | 0.11 |
| TOTAL | 2988.13 | 2.52 | 2.02 | 2.05 | 2.14 | 2.59 | 2.01 | 2.04 | 2.13 | 2.58 | 2.00 | 2.03 | 2.12 | 2.57 |

**Table A6. Exports in EU**

| | Reference scenario 2020 | DDA no sensitive products | Other Developed Countries 1/3 | | | | Other Developed Countries 1/2 | | | | Other Developed Countries 2/3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products |
| Units | US$ bn. 2004 | % change | % change | | | | % change | | | | % change | | | |
| **Rice** | **0.41** | **-4.7** | **-6.27** | **-5.93** | **-5.53** | **-4.58** | **-6.23** | **-5.89** | **-5.49** | **-4.54** | **-6.23** | **-5.88** | **-5.49** | **-4.53** |
| **Wheat** | 2.85 | 17.24 | 9.25 | 9.46 | 9.70 | 10.31 | 10.74 | 10.96 | 11.2 | 11.82 | 12.52 | 12.74 | 12.98 | 13.61 |
| **Other cereals** | 0.69 | 7.21 | 1.52 | 1.61 | 1.70 | 1.93 | 2.46 | 2.55 | 2.64 | 2.87 | 3.57 | 3.66 | 3.76 | 3.99 |
| **Vegetables, fruits** | **4.10** | **6.85** | **6.21** | **6.32** | **6.46** | **6.81** | **6.23** | **6.34** | **6.48** | **6.83** | **6.25** | **6.36** | **6.5** | **6.85** |
| **Oilseeds** | 0.64 | 5.05 | 4.04 | 4.14 | 4.26 | 4.87 | 4.06 | 4.16 | 4.28 | 4.89 | 4.09 | 4.19 | 4.31 | 4.93 |
| **Sugar cane & beet** | 0.01 | -0.23 | 1.58 | 1.23 | 0.80 | -0.25 | 1.59 | 1.24 | 0.81 | -0.24 | 1.6 | 1.25 | 0.82 | -0.23 |
| **Plant-based fibres** | 0.85 | 2.63 | 1.99 | 2.09 | 2.21 | 2.56 | 1.99 | 2.09 | 2.22 | 2.56 | 2 | 2.11 | 2.23 | 2.58 |
| **Other crops** | 6.36 | 16.63 | 15.44 | 15.64 | 15.89 | 16.58 | 15.51 | 15.71 | 15.95 | 16.64 | 15.57 | 15.77 | 16.01 | 16.7 |
| **Live cattle, sheep, goats, horses** | 1.49 | 0.13 | 1.19 | 1.36 | 1.30 | 0.37 | 1.12 | 1.28 | 1.22 | 0.29 | 1.06 | 1.23 | 1.17 | 0.23 |
| **Live pigs, poultry, other animals** | **5.82** | **1.13** | **0.89** | **0.95** | **1.02** | **1.23** | **0.86** | **0.92** | **0.99** | **1.19** | **0.82** | **0.88** | **0.95** | **1.16** |
| **Raw milk** | 0.12 | 2.17 | 1.68 | 1.82 | 1.99 | 2.43 | 1.66 | 1.8 | 1.96 | 2.4 | 1.62 | 1.76 | 1.92 | 2.36 |
| **Wool, silk cocoons** | 2.07 | 15.31 | 13.63 | 13.91 | 13.69 | 11.31 | 14.35 | 14.64 | 14.42 | 12.02 | 15.06 | 15.36 | 15.14 | 12.72 |
| **Meat beef, sheep, goat, horse** | **1.94** | **9.12** | **2.91** | **2.79** | **2.45** | **2.02** | **3.47** | **3.36** | **3.01** | **2.59** | **4.39** | **4.27** | **3.93** | **3.51** |
| **Meat pork, poultry, other** | **8.55** | **32.01** | **5.61** | **5.67** | **5.74** | **6.09** | **9.09** | **9.14** | **9.22** | **9.58** | 13.34 | 13.4 | 13.48 | 13.84 |
| **Vegetable oils/ fats** | 4.07 | 5.09 | 3.59 | 3.61 | 3.65 | 3.93 | 3.69 | 3.72 | 3.76 | 4.03 | 4.07 | 4.10 | 4.13 | 4.41 |
| **Dairy products** | **11.84** | **-5.71** | **-8.36** | **-8.31** | **-8.25** | **-8.35** | **-7.73** | **-7.68** | **-7.62** | **-7.72** | **-7.54** | **-7.49** | **-7.43** | **-7.51** |
| **Sugar** | **2.34** | **-46.06** | **-45.51** | **-45.76** | **-46.06** | **-46.85** | **-45.48** | **-45.72** | **-46.03** | **-46.81** | **-45.43** | **-45.67** | **-45.98** | **-46.77** |
| **AGRICULTURE** | **54.15** | **6.78** | **0.90** | **1.03** | **1.05** | **1.16** | **1.79** | **1.87** | **1.88** | **2.01** | **2.71** | **2.77** | **2.83** | **2.95** |
| **Food, beverages, tobacco** | **55.73** | **3.44** | **2.23** | **2.27** | **2.31** | **2.42** | **2.39** | **2.42** | **2.46** | **2.57** | **2.6** | **2.64** | **2.68** | **2.79** |
| **AGRI-FOOD** | **109.88** | **5.09** | **1.57** | **1.66** | **1.68** | **1.80** | **2.09** | **2.15** | **2.18** | **2.29** | **2.66** | **2.70** | **2.75** | **2.87** |
| **Primary sectors** | 38.43 | 1.23 | 1.26 | 1.26 | 1.25 | 1.20 | 1.26 | 1.26 | 1.25 | 1.2 | 1.26 | 1.26 | 1.25 | 1.21 |
| **Fuel** | 51.32 | 0.69 | 0.67 | 0.66 | 0.64 | 0.57 | 0.68 | 0.67 | 0.65 | 0.58 | 0.69 | 0.69 | 0.67 | 0.60 |
| **Manufactures** | 1188.56 | 2.05 | 2.07 | 2.06 | 2.04 | 1.96 | 2.07 | 2.06 | 2.04 | 1.97 | 2.08 | 2.07 | 2.05 | 1.98 |
| **Trade services & communication** | 418.44 | 1.13 | 0.99 | 0.99 | 1.00 | 1.03 | 1.00 | 1.00 | 1.01 | 1.04 | 1.01 | 1.01 | 1.02 | 1.05 |
| **Services** | 305.80 | 0.12 | 0.10 | 0.10 | 0.09 | 0.08 | 0.10 | 0.10 | 0.10 | 0.08 | 0.11 | 0.11 | 0.10 | 0.09 |
| **TOTAL** | **2112.43** | **1.70** | **1.49** | **1.49** | **1.48** | **1.45** | **1.53** | **1.52** | **1.51** | **1.48** | **1.57** | **1.56** | **1.56** | **1.52** |

**Table A7: Production in EU**

| | Reference scenario 2020 | DDA no sensitive products | Other Developed Countries 1/3 | | | | Other Developed Countries 1/2 | | | | Other Developed Countries 2/3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products | EU1/3 | EU 1/2 | EU2/3 | EU no sensitive products |
| **Units** | US$ bn. 2004 | % change | % change | | | | % change | | | | % change | | | |
| **Rice** | **8.70** | -17.90 | -7.42 | **-9.65** | **-12.14** | **-17.80** | **-7.38** | **-9.65** | **-12.17** | **-17.76** | **-7.36** | **-9.63** | **-12.14** | **-17.74** |
| **Wheat** | 27.94 | 0.66 | -0.53 | -0.27 | 0.03 | -0.24 | -0.34 | -0.27 | -0.20 | -0.05 | -0.11 | -0.04 | 0.03 | 0.18 |
| **Other cereals** | 30.76 | 0.17 | -0.18 | -0.09 | -0.01 | -0.07 | -0.14 | -0.09 | -0.05 | -0.03 | -0.09 | -0.05 | -0.01 | 0.02 |
| **Vegetables, fruits** | **127.12** | -1.36 | -1.52 | **-1.51** | **-1.47** | **-1.27** | **-1.53** | **-1.51** | **-1.46** | **-1.28** | **-1.55** | **-1.52** | **-1.47** | **-1.29** |
| **Oilseeds** | 17.70 | 1.04 | 0.58 | 0.60 | 0.64 | 0.96 | 0.58 | 0.60 | 0.63 | 0.97 | 0.59 | 0.61 | 0.64 | 0.98 |
| **Sugar cane & beet** | 10.38 | -7.00 | -2.46 | -3.29 | -4.38 | -7.05 | -2.45 | -3.29 | -4.38 | -7.04 | -2.44 | -3.28 | -4.38 | -7.04 |
| **Plant-based fibres** | 10.79 | 0.64 | 0.41 | 0.45 | 0.49 | 0.66 | 0.41 | 0.45 | 0.49 | 0.65 | 0.41 | 0.44 | 0.49 | 0.65 |
| **Other crops** | 113.08 | 0.06 | 0.70 | 0.53 | 0.36 | 0.07 | 0.70 | 0.53 | 0.36 | 0.08 | 0.70 | 0.53 | 0.36 | 0.08 |
| **Live cattle, sheep, goats, horses** | 50.21 | -4.56 | -2.37 | -2.07 | -2.21 | -4.69 | -2.36 | -2.07 | -2.23 | -4.68 | -2.35 | -2.06 | -2.21 | -4.66 |
| **Live pigs, poultry, other animals** | 89.94 | 0.79 | 0.06 | 0.16 | **0.29** | 0.27 | 0.13 | 0.16 | 0.20 | 0.33 | **0.21** | **0.24** | **0.29** | **0.42** |
| **Raw milk** | 72.62 | 0.11 | -0.26 | -0.20 | -0.13 | 0.07 | -0.25 | -0.20 | -0.14 | 0.08 | -0.25 | -0.20 | -0.13 | 0.08 |
| **Wool, silk cocoons** | 3.24 | 12.71 | 11.26 | 12.09 | 12.53 | 9.45 | 11.84 | 12.09 | 11.95 | 10.03 | 12.41 | 12.68 | 12.53 | 10.60 |
| **Meat beef, sheep, goat, horse** | **74.97** | -16.84 | -8.85 | **-7.93** | **-8.52** | **-17.07** | **-8.84** | **-7.93** | **-8.55** | **-17.06** | **-8.82** | **-7.91** | **-8.52** | **-17.03** |
| **Meat pork, poultry** | 117.78 | 1.56 | -0.77 | -0.45 | -0.06 | -0.63 | -0.48 | -0.45 | -0.42 | -0.33 | -0.12 | -0.09 | -0.06 | 0.02 |
| **Vegetable oils/ fats** | 50.41 | -2.29 | -2.41 | -2.43 | -2.42 | -2.39 | -2.40 | -2.43 | -2.46 | -2.38 | -2.37 | -2.40 | -2.42 | -2.35 |
| **Dairy products** | **266.12** | -0.49 | -1.46 | **-1.37** | **-1.23** | **-0.60** | **-1.43** | **-1.37** | **-1.23** | **-0.57** | **-1.42** | **-1.37** | **-1.23** | **-0.56** |
| **Sugar** | **34.60** | -20.39 | -7.27 | **-9.66** | **-12.80** | **-20.46** | **-7.26** | **-9.66** | **-12.80** | **-20.46** | **-7.25** | **-9.65** | **-12.80** | **-20.45** |
| **AGRICULTURE** | **1106.36** | **-2.25** | **-1.65** | **-1.66** | **-1.80** | **-2.60** | **-1.60** | **-1.61** | **-1.75** | **-2.55** | **-1.54** | **-1.55** | **-1.69** | **-2.49** |
| **Food, bev & tobacco** | **1291.65** | 0.30 | 0.13 | **0.15** | **0.19** | **0.27** | **0.13** | **0.15** | **0.18** | **0.27** | **0.14** | **0.16** | **0.19** | **0.28** |
| **AGRI-FOOD** | **341.69** | **-0.87** | **-0.69** | **-0.69** | **-0.74** | **-1.06** | **-0.66** | **-0.66** | **-0.71** | **-1.03** | **-0.63** | **-0.63** | **-0.68** | **-1.00** |
| **Primary sectors** | 219.32 | 0.35 | 0.34 | 0.35 | 0.35 | 0.33 | 0.35 | 0.35 | 0.34 | 0.33 | 0.35 | 0.35 | 0.35 | 0.33 |
| **Fuel** | 968.88 | 0.34 | 0.29 | 0.29 | 0.30 | 0.32 | 0.29 | 0.29 | 0.30 | 0.32 | 0.29 | 0.30 | 0.30 | 0.32 |
| **Manufactures** | 10530.16 | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| **Trade services & communication** | 5258.48 | 0.22 | 0.17 | 0.18 | 0.19 | 0.21 | 0.18 | 0.18 | 0.19 | 0.21 | 0.18 | 0.18 | 0.19 | 0.21 |
| **Services** | 11981.51 | 0.17 | 0.13 | 0.13 | 0.14 | 0.20 | 0.13 | 0.13 | 0.14 | 0.2 | 0.12 | 0.13 | 0.14 | 0.19 |
| **TOTAL** | **31356.36** | **0.06** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** |

**Table A8. Total Production by Regions**

| | | Reference scenario 2020 | DDA no sensitive products | Uniform cut (all regions) DDA1-3 | Uniform cut (all regions) DDA1-2 | Uniform cut (all regions) DDA2-3 |
|---|---|---|---|---|---|---|
| | Units | US$ bn. 2004 prices | %Change from 2020 | | | |
| **Mercosur** | Agriculture | 250.11 | 1.63 | 1.44 | 1.26 | 1.10 |
| | Agri-Food | 341.69 | 1.24 | 1.14 | 1.02 | 0.91 |
| | TOTAL | 2908.60 | 0.01 | 0.02 | 0.01 | 0.01 |
| **USA** | Agriculture | 659.22 | 1.54 | 0.51 | 0.70 | 0.95 |
| | Agri-Food | 1147.44 | 1.10 | 0.43 | 0.55 | 0.72 |
| | TOTAL | 30986.73 | 0.12 | 0.10 | 0.10 | 0.11 |
| **Japan** | Agriculture | 202.85 | -7.37 | -2.92 | -3.36 | -4.06 |
| | Agri-Food | 559.67 | -2.23 | -0.95 | -1.10 | -1.32 |
| | TOTAL | 10036.78 | 0.14 | 0.14 | 0.14 | 0.14 |
| **Australia. New Zealand** | Agriculture | 102.86 | 5.12 | 5.68 | 5.90 | 5.76 |
| | Agri-Food | 150.85 | 3.84 | 4.12 | 4.27 | 4.19 |
| | TOTAL | 1821.17 | 0.18 | 0.19 | 0.19 | 0.19 |
| **China** | Agriculture | 796.94 | 0.07 | 0.07 | 0.07 | 0.07 |
| | Agri-Food | 1200.04 | 0.05 | 0.06 | 0.06 | 0.06 |
| | TOTAL | 16569.63 | 0.13 | 0.13 | 0.13 | 0.13 |
| **Russian Federation** | Agriculture | 68.47 | -0.54 | -0.34 | -0.34 | -0.38 |
| | Agri-Food | 95.56 | -0.33 | -0.06 | -0.08 | -0.14 |
| | TOTAL | 1863.33 | 0.08 | 0.08 | 0.08 | 0.08 |
| **Canada** | Agriculture | 90.85 | 0.45 | 0.98 | 1.10 | 1.17 |
| | Agri-Food | 150.75 | 0.66 | 0.85 | 0.96 | 1.03 |
| | TOTAL | 2420.45 | 0.11 | -0.01 | 0.00 | 0.03 |
| **India** | Agriculture | 352.80 | 2.44 | 0.26 | 0.28 | 0.64 |
| | Agri-Food | 430.69 | 1.89 | 0.18 | 0.20 | 0.48 |
| | TOTAL | 4253.75 | 0.25 | 0.22 | 0.22 | 0.22 |
| **Other ACP Countries** | Agriculture | 189.74 | 1.68 | 0.71 | 0.90 | 1.12 |
| | Agri-Food | 274.06 | 1.17 | 0.50 | 0.63 | 0.78 |
| | TOTAL | 1659.06 | 0.10 | 0.05 | 0.06 | 0.07 |
| **Other WTO developing countries** | Agriculture | 491.01 | 0.64 | 0.70 | 0.69 | 0.68 |
| | Agri-Food | 718.14 | 0.67 | 0.71 | 0.70 | 0.70 |
| | TOTAL | 7167.50 | 0.35 | 0.36 | 0.36 | 0.36 |
| **FTAs in force with EU** | Agriculture | 331.40 | -0.27 | 0.47 | 0.45 | 0.42 |
| | Agri-Food | 567.78 | -0.10 | 0.32 | 0.31 | 0.30 |
| | TOTAL | 6900.41 | 0.21 | 0.22 | 0.22 | 0.22 |
| **Rest of the World** | Agriculture | 357.08 | 0.81 | 0.62 | 0.63 | 0.64 |
| | Agri-Food | 461.56 | 0.70 | 0.52 | 0.54 | 0.55 |
| | TOTAL | 4675.78 | 0.12 | 0.11 | 0.11 | 0.12 |

**Table A9. GLOBE simulation results: effect on GDP by regions**

| | DDA no sensitive products (1) | EU_1/3 | EU_1/2 | EU_2/3 | DDA with sensitive products Average EU1/3 EU1/2 EU2/3 (2) | Difference (3) = (2) – (1) |
|---|---|---|---|---|---|---|
| | **% change from reference scenario 2020** | | | | | |
| **EU27** | 0.0228 | 0.0218 | 0.0221 | 0.0226 | 0.0222 | -0.0006 |
| **Mercosur** | -0.0179 | -0.0089 | -0.007 | -0.0057 | -0.0072 | 0.0107 |
| **USA** | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0000 |
| **Japan** | -0.0074 | -0.0072 | -0.0073 | -0.0073 | -0.0073 | 0.0002 |
| **Australia. New Zealand** | 0.0014 | -0.0102 | -0.0099 | -0.0078 | -0.0093 | -0.0107 |
| **China** | 0.0104 | 0.0105 | 0.0105 | 0.0105 | 0.0105 | 0.0001 |
| **Russian Federation** | -0.0204 | -0.0188 | -0.0189 | -0.0191 | -0.0190 | 0.0015 |
| **Canada** | 0.0378 | 0.041 | 0.04056 | 0.0401 | 0.0406 | 0.0028 |
| **India** | 0.0126 | 0.0245 | 0.02433 | 0.0226 | 0.0238 | 0.0112 |
| **Other ACP Countries** | -0.0169 | -0.0044 | -0.0058 | -0.0081 | -0.0061 | 0.0108 |
| **Other WTO developing countries** | 0.0144 | 0.0148 | 0.0147 | 0.0147 | 0.0147 | 0.0003 |
| **FTAs in force with EU** | 0.0310 | 0.0299 | 0.03 | 0.0299 | 0.0299 | -0.0011 |
| **Rest of the World** | 0.0025 | 0.0035 | 0.0035 | 0.0035 | 0.0035 | 0.0010 |