

WTO and Food Security: Strategies for Developing Countries

Sabine Daude

University of Hohenheim, Institute of Agricultural Economics and Social Sciences in the Tropics and Subtropics, Department of Agricultural Development Theory and Policy (490a), 70593 Stuttgart, Germany

Abstract

Within a general equilibrium modeling framework two different negotiation strategies of developing countries for the WTO negotiations are simulated. The first simulation is a more “defensive” strategy where developing countries put their negotiation efforts into obtaining further special and differential treatment (SDT) provisions and strengthening the existing ones that were stipulated in the last Uruguay Round Agreement. In the second, more “offensive”, strategy developing countries put emphasis on obtaining better market access for their export products and on reducing export subsidies of developed countries.

The results show that a stronger liberalization results in increased global production output and shifts in trading patterns. Individual net food-importing developing countries may stay with lower food availability. From a welfare point of view, all countries gain, but developing countries gain most from a correction of their own distorted domestic markets and less from that in other countries. These results lead to the suggestion that the use of SDT for food security should be restrained to fields that individual countries can not influence on their own, e.g. world market price fluctuations, but should be excluded from fields that countries can influence through a change in their domestic policies. Developing countries should be assisted to develop alternative public budget sources and to build up capacities to design and implement allowed support policies in order to enhance production for own food consumption and for exports to obtain foreign exchange earnings.

1 Introduction

During the Uruguay Round, which founded the World Trade Organization (WTO), developing countries raised their concerns that liberalization of agricultural markets, especially staple food markets, could have negative implications for their food security. This fear was nourished by the idea that trade liberalization could raise food prices and that net food-importing developing countries could no longer afford to buy sufficient quantities of food on the world market with their limited amount of foreign exchange. Another concern was that the agreement could diminish the possibilities for political maneuver in the field of food policies in developing countries. This led to the commitment to integrate special provisions for developing countries into the framework of the Uruguay Round Agreements.

The most important special provisions under a food security perspective can be found in the Agreement on Agriculture (AoA) and in complementary Ministerial Decisions added to the Uruguay Round (UR) Agreement, namely the “Decision on Measures in Favour of Least-Developed Countries” and the “Decision on Measures Concerning the Possible Negative Effects of the Reform Program on Least-Developed and Net Food-Importing Developing Countries”. Looking at these provisions it can be seen that policy makers in developing countries pursuing food security policies remain with a variety of policy options and sufficient scope for maneuver while still complying with all WTO obligations. Probably more constraints arise out of budget limitations (Ingco and Townsend 1998, p. 11). Nevertheless the main concern is that even if the present options are not cut the framework created by the agricultural agreement may constrain policies in the future. As the last negotiations were dominated by the developed countries, the result is an architecture of the UR Agreement that is biased in favor of developed countries (Stevens et al. 1999, p. 42). So far, this has no direct negative impact on developing countries but in further negotiation rounds this may change.

Since 2000, the WTO negotiations are again in process dealing with an increased complexity of issues and with more member states than ever. This involves the danger of overstressing the capacities of developing countries because budget and human resources are needed to conduct the negotiations (Tangermann and Josling 1999, p. 4). Therefore a first precondition for many developing countries is to acquire support in capacity and institution building in order to be in a position to participate in the negotiations. Besides the ongoing negotiations the next 4th WTO Ministerial Conference is scheduled to take place in Doha, Qatar in November 2001.

Negotiations in the multilateral trading system (MTS) have a mercantilist tradition taking the form of requests and offers (Anderson 1999, p. 14). This means, each country has a kind of „negotiating capital“ and the strategic question is how to invest it in order to maximize own gains. The more negotiating capital the more powerful is the negotiation position. Compared to the UR the position of developing countries in this round is strengthened because the danger of bilateral trading pressure is reduced through the WTO and the number of developing member countries further increased. In order to develop a negotiation strategy, developing countries have to answer two questions: what is our objective and with whom can we reach it? Looking for allies has the purpose of strengthening the own position against other powerful parties. Therefore it is not useful that developing countries split up into too many groups. Although a common position in every detail seems to be unrealistic, developing countries should try to find a common strategy approach where they agree in strategic points.

A basic choice for developing countries concerning their negotiation strategy is whether to continue seeking special and differential treatment including tariff preferences or to exchange market access commitments with the developed countries on a most favoured nations (MFN) basis (Anderson 1999, p. 15). The first choice is a more „traditional way“ being more defensive whereas the second would be more offensive.

Going for a defensive strategy would mean to put negotiation efforts into obtaining further special and differential treatment and strengthening the existing ones. Arguing for further commitments for the sake of food security could be done under the name of non-trade concerns (NTCs). Under the heading of NTCs, food security is always related to other NTCs like those prevalent in developed countries. Therefore developing countries should pay attention if they gain more by arguing for more domestic support flexibility for their NTCs than they can lose if developed countries argue in the same way for theirs.

The traditional defensive strategy of pursuing SDT has the costs that developing countries have less influence over the agenda because they „opt out“, thus allowing others to take the lead in the negotiations. Furthermore, the overuse of SDTs tends to marginalize developing countries and this could foster a second-class membership within the WTO (Tangermann and Josling 1999, p. 71). A similar view was already brought forward by Knudsen at the beginning of the 1990s who saw the danger that such special provisions could encourage developing countries „to take a back seat“ in the multilateral trading system (Knudsen 1990, p. 36).

The alternative choice for developing countries would be to opt for an offensive negotiation strategy. Developing countries should formulate their positions in accordance with the three areas of market access, domestic support and export subsidies. Within an offensive strategy, developing countries could focus on further market access for their export products. This would include clearer rules for the quota system, especially their allocation, which is in its present form characterized by non-transparency and rent-seeking (Ingo and Townsend 1998, p. 25f).

The outcome of the two presented basic strategy approaches for developing countries in the ongoing WTO agricultural negotiations is open to speculations and it is difficult to predict which strategy would be the better one for developing countries, especially from the viewpoint of food security. The strategy to pursue special and differential treatment is more directed towards increasing domestic food production for food security. In contrast to this, the offensive strategy would enhance the production of export products, thus leading to food security via an increase in income. A good way to get an idea of the complex implications that different policy options in the WTO may have is to simulate these strategies within a model and to analyze the quantitative results.

2 Methods

2.1 The GTAP-model

The model chosen for the simulation of the different negotiation strategies is the GTAP-model. It is a static, general equilibrium model which is particularly suited for the analysis of international trade relations. For an extensive introduction into the model the reader is referred to the GTAP book (Hertel, 1997) and the web page (www.agecon.purdue.edu/gtap).

The theory behind the model is similar to other multi-regional applied general equilibrium models and the underlying equation system can be divided into two categories: one category comprises the accounting relationships which ensure that the receipts and the expenditures of every agent are equalized in the equilibrium. The other category includes the behavioral equations which define the behavior of the agents in the economy. Based on microeconomic theory, agents are supposed to be rational and utility optimizing (Brockmeier 1996, p. 4).

The database used is the Version 4 of the GTAP data base with the base year of 1995. As the idea is to simulate negotiation strategies for the next WTO negotiation round, this necessitates a data base which includes all the liberalization commitments of the UR and which reflects the situation at the end of the implementation period. As the GTAP Version 4 has the base

year 1995 this means that some of the liberalization commitments of the UR from 1994 are already considered within the data, but others are not. Therefore it is necessary to modify the data base such that it includes all the liberalization commitments.

To establish a data base that reflects the post-UR levels, a post UR tariff vector is used which has been developed by Francois and Strutt (1999). Starting point is the initial Version 4 of the GTAP data base from 1995. As at that point of time many UR commitments were already implemented, the tariff vector starting from this departure point does not simulate the UR tariff reductions, but moves closer to the situation at the end of the implementation period (Francois and Strutt 1999, p. 3). The output is a data base with protection levels moved to post-UR rates. This updated data base is appropriate for post-UR scenarios starting from the end of the implementation period (Francois and Strutt 1999, p. 1) and this is the starting point for the simulation of the two different negotiation strategies.

2.2 Aggregation of the GTAP data base

Version 4 of the data base contains 45 country/regional economic data bases and 50 disaggregated economic sectors. The regional data are derived from individual social accounting matrices (SAMs) and the data are then linked by matrices of bilateral trade flows and protection data. For a more extensive introduction see Gehlhar et al. (1997, p. 74ff.) who give an overview of the data base as well as a description of how the data were derived. The number of countries and commodities necessitates an aggregation according to the focus of the question that should be answered by the model simulations. Aggregation means that countries and commodities that are separate in the GTAP database are put together, forming groups of countries and commodities specific for the envisaged simulations. This allows to focus on the most important relationships following the purpose of the simulations and not to get lost within an analysis of too many relationships between regions and commodities.

The objective of the planned simulations is to examine production, price and trade changes which influence food security under different negotiation strategies of developing countries within the WTO negotiations. A special focus is on the food security situation of net food-importing developing countries. Bearing this in mind the following aggregation of regions and commodities is used:

Aggregation of the European Countries, the US and Japan is a group who highly protects their agricultural producers. Another important group within the WTO negotiations is the Cairns Group. Its own protection of agricultural sectors is relatively small or nearly not present compared to the first group - therefore they are the main force to negotiate for further

liberalization because they have strong export interests. The idea to choose one individual net-food importing developing country aims at looking at the effects of WTO scenarios specific for one country. This allows more in depth analysis because the specific features of the country can be taken into consideration. For this purpose Morocco is chosen.

Another important group aggregation for the question in mind is a group of least developed countries (LDCs)/net food-importing developing countries (NFIDCs). Identifying such a group is not straightforward within the GTAP data base because the countries are not all specified individually, but in different groups of regions. Therefore an analysis is made, how many countries are classified in which GTAP region and how many are given individually. The choice is made to define a group of LDCs/NFIDCs and countries with annual income below 760\$ per capita including GTAP regions where the percentage share of the countries meeting these criteria is more than 50% (Daude 2000, p. 53). This results in an aggregation of the following GTAP regions and countries¹: RSA, RAS, RSS, RNF, Sri Lanka, Venezuela, Vietnam, India and China. Indonesia is left out because it is already part of the Cairns Group and Morocco is not included because it was already defined as being treated individually. The remaining aggregation, which will be simply named NFIDCs, includes 83 countries of which 52 meet the criteria of LDC/NFIDC and annual income below 760\$ per capita. This corresponds to 63%, which seems to be acceptable for defining a group. The remaining countries are put together in an aggregation called Rest of the World (RoWo). Table 1 gives an overview of the chosen aggregation:

Table 1: Selected aggregation of GTAP regions for the simulations

<i>Aggregate groups</i>	<i>Original GTAP regions</i>
1. EU_JP_US	Denmark; Finland; Germany; Sweden; United Kingdom; Rest of EU; Japan; United States of America
2. Cairns	Argentina; Australia; Brazil; Canada; Chile; Colombia; Indonesia; Malaysia; New Zealand; Philippines; Thailand; Uruguay
3. Morocco	Morocco
4. NFIDCs	RSA, RAS, RSS, RNF, Sri Lanka, Venezuela, Vietnam, India, China
5. RoWo	CAM; CEA; EFT; FSU; RAP; RME; ROW; RSM; SAF; Hong Kong; Korea; Mexico; Singapore; Taiwan, Turkey

Notes: RSA =Rest of Southern Africa, RAS =Rest of South Asia; RSS =Rest of Saharan Africa, RNF =Rest of North Africa; CAM =Central America and Caribbean, CEA =Central European Associates, FSU =Former Soviet Union, RAP =Rest of Andean Pact, RME =Rest of Middle East, ROW =Rest of the World, RSM =Rest of South America; SAF= South African Customs Union

¹ For abbreviations see notes under table 1.

The aggregation of commodities has also to follow the research question in mind. This paper analyses food security in view of increasing trade liberalization. The main staple food in many countries – also in Morocco following the food balance sheet - is wheat. Therefore, it is useful to define ‘wheat’ as one category. Another category of basic staple foods is defined as ‘other grains’ including paddy rice and other cereals. The next group consists of vegetables, fruits and nuts which are important for food security in many developing countries through domestic consumption. Moreover, vegetables and fruits are used for exports and in that way contribute to foreign exchange earnings. This is particularly true for the Moroccan market. The fourth group contains all the rest of agricultural non-processed commodities including fishing and forestry. Finally, all the remaining commodities are put together in one group named services and industries. The following Table 2 gives an overview of these groups:

Table 2: Selected aggregation of GTAP commodities for the simulations

<i>Aggregate groups (abbreviations)</i>	<i>Original GTAP commodities</i>
1. Wheat	Wheat
2. Other grains (othgr)	Paddy rice; cereal grains
3. Vegetables and fruits (v_f)	Vegetables, fruits, nuts
4. Other agricultural commodities including fish and forestry (oap)	Oil seeds; sugar cane, sugar beet; plant-based fibers; crops; bovine cattle, sheep and goats, horses; animal products; raw milk; wool, silk-worm cocoons; forestry; fishing
5. Processed agricultural products (pap)	Bovine meat products; meat products; vegetable oils and fats; dairy products; processed rice; sugar; food products; beverages and tobacco products
6. Services and industries (svi)	Coal; oil; gas; minerals; textiles; wearing apparel; leather products; wood products; paper products, publishing; petroleum, coal products; chemical, rubber, plastic products; mineral products; ferrous metals; metals; metal products; motor vehicles and parts; transport equipment; electronic equipment; machinery and equipment; manufactures; electricity; gas manufacture, distribution; water; construction; trade, transport; other private services; public services; dwellings

2.3 Implementation of the scenarios

In a defensive negotiation strategy developing countries prefer not to participate actively in trade liberalization but to protect their markets. Nevertheless, due to other negotiation powers in the WTO process, namely the Cairns Group, a further substantial liberalization is assumed to take place. As liberalization within the manufactures and industry sector is already quite advanced after the UR and as the focus of this paper shall be on the agricultural sector, only a liberalization in the agricultural sector is simulated. The scenario assumes an unilateral import

tariff and export subsidy reduction of 30% by the group of the US_JP_EU, Cairns and RoWo for the agricultural sector mainly as a result of the pressure of the Cairns Group on US_JP_EU. Reduction commitments are not assumed for the processing sector of agricultural products. In this scenario developing countries (i.e. NFIDCs and Morocco) benefit from a special and differential treatment in so far as they do not have to liberalize their own agricultural markets.

In an offensive negotiation strategy, developing countries exchange access to their own markets with further liberalization of the markets in the “developed” countries. Developing countries are assumed to substantially liberalize their agricultural markets by 30% in exchange for developed countries increasing their liberalization from 30% to 50%. It is assumed that developing countries due to their weaker negotiation position and their lower level of market distortions have to exchange a higher own liberalization against a lower liberalization in developed countries. Thus, in comparison to the defensive strategy scenario I, 30% domestic trade liberalization is exchanged against 20% more liberalization of the developed countries. The products covered by the liberalization are again all agricultural products except the processed agricultural ones. In this scenario developing countries would not benefit from special and differential treatment but would have “sold” their SDTs within the bargaining process.

The percentage liberalization efforts are implemented in GTAP via the policy variables for import and export taxes and subsidies TMS (i,r,s) and TXS (i,r,s) which are defined as follows (Hertel 1997, p. 374ff):

TMS (i,r,s) power of the tax on imports of tradable commodity i from source r to destination s (levied in region s)

TXS (i,r,s) power of the tax on exports of tradable commodity i from source r to destination s (levied in region r)

These variables are influenced by the different prices within the model, namely:

PMS (i,r,s) market price by source of tradable commodity i imported from source r to destination s

PCIF (i,r,s) world (c.i.f.) price of tradable commodity i imported from source r to destination s

PM (i,r) market price of tradable commodity i in region r

PFOB (i,r,s) world (fob) price of tradable commodity i exported from source r to destination s

through the formulas²:

$$TMS(i, r, s) = \frac{PMS(i, r, s) * QXS(i, r, s)}{PCIF(i, r, s) * QXS(i, r, s)} = \frac{VIMS(i, r, s)}{VIWS(i, r, s)}$$

and

$$TXS(i, r, s) = \frac{PM(i, r) * QXS(i, r, s)}{PFOB(i, r, s) * QXS(i, r, s)} = \frac{VXMD(i, r, s)}{VXWD(i, r, s)}$$

A tax or a subsidy is implemented by driving a wedge between the two prices concerned and thereby influencing the corresponding power of the tax on imports or exports. The relationship between prices, values and actual policy can be summarized as follows (Table 3):

Table 3: Relationship of domestic and world market price ratios and tax policies

	Prices	Values	Power of GTAP variable	Actual policy
Power of the tax on imports TMS	PMS > PCIF	VIMS > VIWS	TMS > 1	Import tax
	PMS < PCIF	VIMS < VIWS	TMS < 1	Import subsidy
Power of the tax on exports TXS	PM > PFOB	VXMD > VXWD	TXS > 1	Export subsidy
	PM < PFOB	VXMD < VXWD	TXS < 1	Export tax

When implementing the scenarios, the different protection and taxation rates across different commodities and countries are taken into account and the necessary tax reductions to achieve the 30% or 50% trade liberalization are calculated. The effects of a liberalization are the greater the higher the initial protection or taxation, i.e. the wedge between prices.

3 Results and their Discussion

Focusing on food security implications of different negotiation strategies for net food-importing developing countries only selective variables like quantity and price changes of staple food shall be analyzed.

3.1 Changes in quantities

In scenario I, the strongest output effects arise in the two country groups EU_JP_US and Cairns Group in the wheat sector, however, in opposite directions. Whereas the EU_JP_US reduce their wheat output, the Cairns Group increases it. NFIDCs and RoWo increase their wheat output slightly and Morocco stays nearly unchanged. In the product group of other

² QXS = export or import quantities, VIMS = value of imports evaluated at (importer's) market price, VIWS = value of imports evaluated at world (cif) prices, VXMD = value of exports at (exporter's) market price, VXWD = value of exports evaluated at world (fob) prices

grains, the developments go in the opposite directions, however very modestly. The EU_JP_US increase output whereas the Cairns Group decreases it. The decrease is stronger for RoWo and close to zero for the NFIDCs.

In scenario II, the quantity changes as compared to the first scenario get more pronounced. Looking at the 30% liberalization of the developing countries alone, it can be seen that their influence on quantity changes is only minor. However, using this liberalization within the bargaining process for a further liberalization of the developed countries leads to substantial quantity changes worldwide. Table 4 shows this development:

Table 4: Output quantity changes for wheat and other grains moving from scenario I to II (mt)

	EU_JP_US	Cairns	Morocco	NFIDCs	RoWo	total (rounded)
Change in wheat (mt)	-1200	1400	-8	180	90	470
Change in othgr (mt)	2500	-300	-2	230	860	3300

As the right-hand column shows, total staple food production increases under an offensive negotiation strategy compared to a defensive one which is better in the sense of global food availability. Any production decline in one region is more than off-set by increased production in other regions. However, as can be seen in the case of Morocco this does not automatically mean a production increase of a net food-importing country’s own production. The group of NFIDCs increases their staple food production. However, due to the number of countries combined in this group, interpretation of this figures should be treated with caution because possibly countries within the group produce less staple food like in the case of Morocco. The effects within the developing countries are mainly due to their own liberalization effort.

Looking at the output change of fruits and vegetables in Morocco, an increase can be observed. The country benefits from liberalization by increased market access for one of its main agricultural export products. Most of the change is attributable to the liberalization in the developed countries and only little to the liberalization of the developing countries. The main market (over 80%) for exported fruits and vegetables from Morocco is the EU_JP_US market where Morocco benefits from the simulated liberalization. Also for Moroccan exports to RoWo a tax reduction becomes effective. Consequently, Morocco increases its exports. For exports to the countries of the Cairns Group no tax reduction becomes effective and Morocco’s exports are reduced. This shows that Morocco reacts to further market access

opportunities by increasing production of its export products at the expense of all other sectors, especially staple food production.

The changes in output show that production is shifted between regions and sectors. Greenfield et al. (1996) relate the changes in production location to the issue of market stabilization and via this to price stability, which is important within the food security discussion. If production shifts from a high cost but stable producing area to a low cost but unstable area, the instability may increase and vice versa (Greenfield et al. 1996, p. 367). Assuming production in EU_JP_US and the Cairns Group as relatively stable because they are less prone to climatic catastrophes that are destroying the whole harvest, the observed production shifts do not seem to have a major negative influence on price stability.

3.2 Changes in prices

The most interesting price under food security aspects is the import price of staple food for net food-importing developing countries. The price changes from different countries of origin for scenario I and II are depicted in the following two figures (Figure 1 and 2):

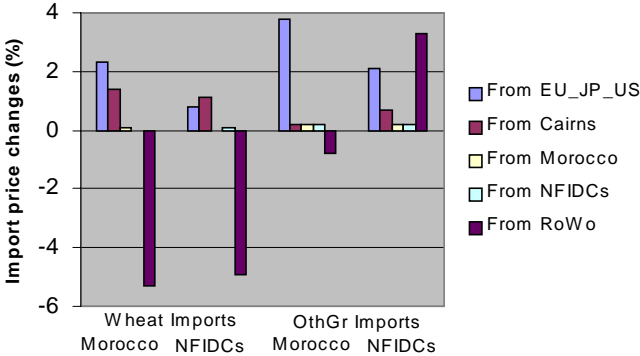


Figure 1: Scenario I - Import price changes of staple food for Morocco and NFIDCs from different sources (%)

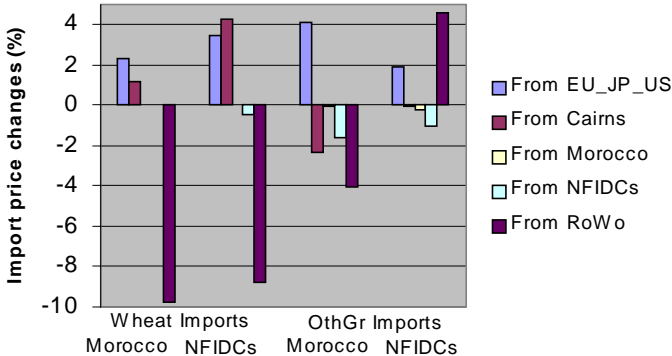


Figure 2: Scenario II - Import price changes of staple food for Morocco and NFIDCs from different sources (%)

Comparing the import price developments depicted in Figure 1 and Figure 2, it can be said that for Morocco wheat prices from all sources are more favorable in scenario II than in scenario I. Price increases stay at the same level than in scenario I whereas price declines from some sources get more pronounced. For the group of NFIDCs the picture is not so clear. Imports from EU_JP_US and the Cairns Group get substantially more expensive and only imports from RoWo get cheaper. As imports from RoWo have only a small share compared to imports from the other two regions scenario II is less favourable for the group of NFIDCs as a whole concerning wheat import prices. This shows that not only the price developments matter but also the import market shares from different sources.

For import prices of other grains it is not straightforward to say which negotiation strategy is more favorable for developing countries. Morocco experiences import price declines in scenario I only from RoWo, whereas in scenario II from all regions except from EU_JP_US, where import prices even increase. Unfortunately, EU_JP_US is by far the most important import source for Morocco and therefore Morocco suffers from the price increase from this important source. For NFIDCs with the offensive negotiation strategy some import sources get less expensive including the most important import source, EU_JP_US. Prices only increase for imports from RoWo, but this is only a minor source. Therefore it seems that for imports of other grains for NFIDCs the offensive strategy is more favorable.

The picture of price changes is quite diversified and depends strongly on the import sources of the countries, the respective import shares and on the countries' possibilities to change their import sources.

3.3 Changes in trade

Changes in quantities and prices have a direct influence on trade flows. To secure food availability staple food import flows into developing countries are the determining factors. They are influenced by the corresponding export flows of developed countries. NFIDCs and Morocco being confronted with declining imports from EU_JP_US and the Cairns Group substitute these imports by imports from RoWo. Although the percentage increase from RoWo to these countries looks impressive, the absolute numbers reveal that wheat imports for NFIDCs and Morocco are actually declining. Morocco is not increasing its own wheat production in order to close the gap, whereas the group of NFIDCs increases their wheat output, thereby mitigating the effect of less imports. Nevertheless, the whole group of developing countries stays with less wheat than prior to the liberalization.

Figure 3 illustrates the wheat gap for developing countries in the first scenario, although the drawing is not true to scale:

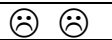
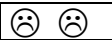


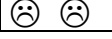

	Morocco	NFIDCs
Change in wheat imports	 -10mt	 -70mt
Change in domestic wheat output		 +30mt
Change in wheat availability	 -10mt	 -40mt

Figure 3: Scenario I - Change in wheat availability in Morocco and NFIDCs (mt)

For the other grains, Morocco and the group of NFIDCs are confronted with declining imports from EU_JP_US which can not be off-set by increased imports from the Cairns Group in the first scenario. Morocco is not able to compensate the reduced imports by domestic production, whereas the group of NFIDCs is more successful as the following Figure 4 shows:







	Morocco	NFIDCs
Change in othgr imports	 -8mt	 -80mt
Change in domestic othgr output	 +4mt	 +260mt
Change in othgr availability	 -4mt	 +180mt

Figure 4: Scenario I - Change in other grains availability in Morocco and NFIDCs (mt)

For the second scenario where the net food-importing countries assume an offensive strategy and push for further liberalization, the situation of wheat availability can be shown in Figure 5. Figure 6 depicts the other grains availability.







	Morocco	NFIDCs
Change in wheat imports	 -4mt	 -300mt
Change in domestic wheat output	 -8mt	 +200mt
Change in wheat availability	 -12mt	 -100mt

Figure 5: Scenario II - Change in wheat availability in Morocco and NFIDCs (mt)

	Morocco	NFIDCs
Change in othgr imports	☹☹ -6mt	☹☹ -75mt
Change in domestic othgr output	☺ +2m	☺☺☺☺ +490mt
Change in othgr availability	☹ -4mt	☺☺ +415mt

Figure 6: Scenario II - Change in other grains availability in Morocco and NFIDCs (mt)

The patterns seen in both scenarios are nearly similar, however more pronounced in scenario II. The changes in other grains imports are only minor whereas wheat imports into NFIDCs decline drastically with the offensive negotiation strategy. However, with the offensive approach, domestic production within the net food-importing developing countries experiences a huge increase. Unfortunately, the increase in wheat is not enough to leave the countries with more wheat available. In the case of other grains, the domestic production increase can off-set the decline in imports. The changes in imports together with the changes in domestic production show some possible effects of trade liberalization on net food-importing countries. Not only do the import sources shift, but also the products. It seems that NFIDCs shift towards imports and production of other grains rather than wheat. Less imports as in the case of other grains into NFIDCs does not automatically mean less availability within the countries. As could be seen, the total availability of other grains rose due to the substantially increased production which more than off-sets the import decline.

4 Conclusions

The ongoing WTO negotiations require developing countries to adopt a negotiation strategy to pursue their objectives. One option is to play a more defensive card by putting most of their negotiation capital into the strengthening of special and differential treatment provisions. The other option is more offensive, namely negotiating for stronger liberalization in order to have better market access for their export products. From a food security point of view, it is difficult to predict which strategy produces a more secure situation. With the help of a general equilibrium model this paper tries to assess these two basic negotiation approaches quantitatively.

The results show that a stronger liberalization results in increased global production output and shifts in trading patterns. Total staple food production is higher under the offensive scenario, but individual net food-importing developing countries may stay with lower food availability. This shows that the concerns of some developing countries they may face

increasing food insecurity with increasing trade liberalization has to be taken very seriously. In the modeling results, Morocco (as a NFIDC) often showed different results than the whole group of NFIDCs. This implies that the issue of food security is very country-specific. Without knowing the import and export structure of a country, it is not possible to predict if a country will benefit from trade liberalization. From a welfare point of view, all countries gain, but developing countries gain most from a correction of their own distorted domestic markets as foreseen in the multilateral liberalization agreements and less from a correction in other countries. In order to put developing countries in the position to close food import gaps through domestic production, research for appropriate technologies and health care to maintain the labour force remains crucial.

Developing countries should get support in human and administrative capacity building to be in a position to analyze their country-specific trade structure and to conduct the agricultural negotiations effectively. This also means that developed countries exercise 'due restraint' to register concerns of developing countries and not to squeeze them out (Stevens et al. 1999, p. 56). The use of SDT for food security should be restrained to fields that individual countries can not influence on their own, e.g. world market price fluctuations, but should be excluded from fields that countries can influence through a change in their domestic policies. Instead of investing bargaining power into further SDT provisions, developing countries should be assisted to develop alternative public budget sources. They should get the resources and the time to build up capacities to design and implement support policies which are allowed by the WTO agreements in order to enhance production for own food consumption and for exports to obtain foreign exchange earnings.

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Abbreviations

AoA	Agreement on Agriculture
CAM	Central America and Caribbean (GTAP region)
CEA	Central European Associates (GTAP region)
EU	European Union
FSU	Former Soviet Union (GTAP region)
GTAP	Global Trade Analysis Project
JP	Japan
LDC	Least-developed country
MFN	Most favored nation
mt	Million tonnes
MTS	Multilateral trading system
NFIDC	Net food-importing developing country
NTC	Non-trade concern
oap	Other agric. products including fish and forestry (simulation sector)
othgr	Other grains (simulation sector)
pap	Processed agricultural products (simulation sector)
RAP	Rest of Andean Pact (GTAP region)
RAS	Rest of South Asia (GTAP region)
REU	Rest of European Union (GTAP region)
RME	Rest of Middle East (GTAP region)
RNF	Rest of North Africa (GTAP region)
ROW	Rest of the world (GTAP region)
RoWo	Rest of the world (simulation region)
RSA	Rest of Southern Africa (GTAP region)
RSM	Rest of South America (GTAP region)
RSS	Rest of Saharan Africa (GTAP region)
SAF	South African Customs Union (GTAP region)
SDT	Special and differential treatment
svi	Services and industries (simulation sector)
UR	Uruguay Round
US	United States
v_f	Vegetables and fruits (simulation sector)
WTO	World Trade Organization