Assessment of non-tariff measures for selected agri-food exports from Africa to the European Union

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Contributed Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa, September 19-23, 2010.

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Abstract

Non-tariff measures (NTMs) gain in importance in view of tariff reductions, by multilateral and bilateral agreements. African agri-food exports have benefited from considerable tariff reduction by the European Union (EU), but the share in EU imports has not risen. This paper describes possible methodologies to assess NTMs and an exporter survey conducted in 2009 in five African countries: Côte d'Ivoire, Kenya, Morocco, South Africa and Uganda. 95 respondents graded 35 NTMs in five categories. The results have been rather positive in general terms but specific issues like transportation, EU procedures and SPS measures have been regarded as considerably hampering trade. On the other hand, there has been also the mentioning of the positive effect of SPS standards. The country specific assessment of the answers showed that exporters in South Africa and Morocco are more concerned by NTMs.

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The European Union (EU) is the largest export market for most African countries, with African products account for almost 9% of EU imports. Important instruments to lower the entry barriers for African products to the EU are included in the African, Caribbean and Pacific countries (ACP) regimes, the Everything but Arms (EBA) agreement, the Euro-Med Association Agreements, the Trade and Development Cooperation Agreement (TDCA) with South Africa and the Economic Partnership Agreements (EPA).

As a result of these agreements, both agricultural goods and food imports from most African countries face no or reduced import tariffs in the EU. It is widely expected that agri-food imports from developing countries will increase, once free trade is established. However, trade flows have not reflected the favourable development of tariff reductions, yet the overall trade share of Africa with the EU is declining over the years. Several reasons for this development can be identified in Africa, such as growing domestic demand, decreasing production or productivity, infrastructure, quality requirements etc. However, other limiting trade factors can be Non Tariff Measures (NTMs). The aim of this paper is to assess NTMs for selected African products entering into the EU. Following the broad definition by Mahé (1997), NTMs include:

- Technical Barrier to Trade (TBT) as defined by the World Trade Organisation (WTO);
- Sanitary and Phytosanitary Measures (SPS) as defined by the WTO;
- Transport infrastructure and costs;
- Telecommunications, comprising telephone, fax and internet connections;
- Private product standards;
- Technical handling and red tape.

The remainder of this paper is structured as follows. Chapter 1 presents a literature overview of methodologies to evaluate NTMs. In chapter 2 an exporter survey conducted in 2009 in selected countries is introduced. Following, the grading of NTMs is described for the full sample of questionnaires (chapter 3). A more detailed assessment of the specificity of single countries is added (chapter 4), and the final chapter concludes.

1. Literature review on methodologies to evaluate NTMs

Given the vast variety of existing NTMs, there is no single analytical procedure or methodology capable of dealing completely with the entire spectrum of NTMs and their diverse manifestations on trade (Deardorff and Stern, 1998). Thus, there are different fashions to measure or quantify NTMs; these methods can be classified according to the nature of the

identification. A first classification known as frequency or coverage type contains all those NTMs which have been identified. This classification consists of a listing of observed NTMs for specific countries and products or categories of trade at a disaggregated level. A second approach, price wedge, calculates NTM effects as those compared to a tariff equivalent. A similar classification examines a quantity wedge through an econometric model (Deardorff and Stern, 1998). Another exploratory approach is via a survey of market participants or other stakeholders.

1.1 Incidence of NTMs

Several international institutions have developed consistent and accurate databases detecting the presence of NTMs. The most extensive effort has been made by the UNCTAD to create the Trade Analysis and Information System (TRAINS) database, which is accessible online and contains indicators of trade control measures (including NTMs). The data is displayed at the Harmonised System 6-digit (HS-6) level for over 150 countries. A data in time series from the TRAINS has been extended in collaboration with the World Bank to create the World Integrated Trade Solution (WITS) software. Both databases are compounded by trade coverage and frequency ratios.

The percentage of trade subject to NTMs for an exporting country *j* at a desired level of product aggregation is given by the trade coverage ratio C (Bora et al., 2002):

$$C_{jt} = \left[\frac{\sum (D_{it} V_{iT})}{(\sum V_{iT})} \right] * 100$$

In the case of the existence of an NTM to a tariff line item *i*, the dummy variable D_i takes the value of one and zero if there is no NTM; V_i is the value of imports in item *i*, *t* is the year of the import weights.

The frequency index F shows the percentage of import transactions covered by a selected group of NTMs for an exporting country. It is calculated as (Bora et al, 2002):

$$F_{jt} = \left[\frac{\sum (D_{it} M_{iT})}{(\sum M_{iT})} \right] * 100$$

Where variable D_i reflects the presence of an NTM on the tariff line item *i*, M_i indicates whether there are imports from the exporting country *j* of good *i* (also a dummy variable) and *t* is the year of measurement of the NTM. The frequency ratio, unlike the coverage ratio, does not reflect the relative value of the affected products and thus cannot give any indication of the overall importance of the NTMs to an exporter, or, relatively, among export items (Bora et al, 2002).

The availability of coverage and frequency ratios is rather limited and not always continuous over the years. The last updated information is as of 2001. TRAINS-WITS data has information for 165 countries, however not all agricultural products and not all years are covered. This database can be used in econometric studies as explanatory variables when analysing factor trends in bilateral trade flows. The use of coverage and frequency ratios has also been applied in gravity models with promising results (Kee et al, 2008; Andriamananjara et al, 2004).

1.2 Price comparison and quantity impact NTMs

This approach, also known as the price or quantities wedge method, is based on the estimation of the difference caused by the NTM between import and domestic prices (or quantities). From the difference the import tariff is deducted. The price (quantity) wedge between domestic and import is considered as the NTM. The calculation is straight forward when both prices (quantities) for the same commodity are available. However, the method has several limitations. First, the effect of several NTMs affecting a specific product is calculated jointly, but nothing can be said of the specific effect of each NTM or the identification of single NTMs. Second, it is difficult to have domestic and import prices for the same product, therefore in most cases domestic produced and imported products are considered perfect substitutes. In order to overcome this caveat, some researchers such as Griliches (1970) apply hedonic prices either for domestic or for import prices (quantities). One of the important limitations is to be operational for large scale industries or product aggregations, as the data is too aggregated to identify specific differences (Deardorff and Stern, 1997).

1.3 Tariff equivalent

A tariff equivalent is estimated by calculating first the price wedge and then comparing the tariff that would have the same effect on prices or quantities flows as those caused by the NTMs. This method is applied to simulate the effects of NTMs in market models. It is also

possible to apply an econometric method to determine the price wedge by analysing changes in prices (quantities) of produced and traded products over a period of time. Therefore, supply and demand elasticities are a necessary requirement (Bora et al., 2002).

1.4 Econometric methods

Gravity models are often used to relate the trade flows with country characteristics and coverage or frequency ratios. This approach includes in any case the distance between trading partners as a representation for transport costs. A basic gravity model representing trade flows is written as:

$$\log(trade\_flow_{ij}) = \alpha_0 + \sum \beta_n \log(C_i) + \sum \chi_n \log(C_j) + distance_{ij} + \sum \delta_{ij} \log(NTM_{ij}) + \varepsilon_{ij}$$

Where: $trade\_flow_{ij}$ represents the absolute values of the trade flow between country i and j; C_i, C_j and NTM_{ij} are the characteristics considered in the study for country i, j, as well as the NTM faced in trade of commodities between i and j respectively; α_0 is the specific intercept; β_n, χ_n and δ_{ij} are the parameters specific for characteristics of country i, j, and NTMs respectively; $distance_{ij}$ represents the distance between country i and j; finally ε_{ij} is the error term in the econometric regression. Gravity-based techniques address NTMs' impacts on trade rather than their welfare impact (CGE modelling approach), and may therefore neglect the current effect that regulations have on correcting market failures with restrictive trade flows (Beghin and Bureau, 2001).

1.5 Survey-based methods

A survey is conducted among exporters of certain products and regions. This method has several advantages, such as the identification of particular NTMs which would be difficult to identify (through other methods), e.g. administrative entry procedures, pre-shipment inspections, customs classifications, etc.

Surveys also allow for the possibility of prioritizing different types of mechanisms. Surveys can be used to determine which specific NTMs are important to exporters (Mattson, et al., 2004). The main disadvantage of surveys is the high cost of conduction. Additionally, given the specificity of commodity trade across countries, it is difficult to reach a certain comparability level between surveys on different products (countries) (Carrère and de Melo,

2009). Depending on the survey structure, the further use of the results can vary depending on different econometric analyses.

When trade barriers vary considerably across countries, sectors and trading partners, surveys offer a good method to observe these differences. Many obstacles to trade are concentrated in specific sectors and are more prevalent in intraregional trade. Moreover, most of the goods affected are often under a preferential tariff treatment by the destination country. At the same time, obstacles to trade can be associated with a lack of infrastructure and efficient procedures in the country of origin as shown by the case of Uganda (Mimouni et al., 2009).

2. Exporter survey

For the purpose of this paper we have chosen a survey-based method to obtain a first overview of the impact of NTMs on agri-food exports from African countries to the European Union. The survey has been conducted during 2009 and in order to select the countries to be included in the analysis, trade relations have been analysed. The analysis focused on export volumes from different African regions to the EU, some very competitive and others with low trade flows with the EU. The likely African countries to be included were Cameroon, Côte d'Ivoire, Ghana, Senegal, Ethiopia, Kenya, Malawi, Uganda and South Africa. After conducting a preliminary analysis, Côte d'Ivoire, Kenya, Uganda, South Africa and Morocco were selected as the target countries. Uganda, representing the smallest country in the sample, is also the only landlocked country and beneficiary of the EBA agreement. Morocco is the only North African country in this sample and is also included in the Neighbourhood policy of the EU. Côte d'Ivoire and Kenya are important regional players in West and East Africa, respectively. South Africa has a specific bilateral trade agreement with the EU and is the most important single economy in Africa. The selected countries' diverse geographies, stages of economic development and institutional, political and economic relations with the EU permit a reasonable degree of variation within the African continent. Export of agricultural and food products are diverse, for some countries they are concentrated on a few main products; others supply a wide range of products to the EU. Generally, the selected countries are the most important African exporters of agricultural and food products, with the exception of Uganda.

The survey of selected exporters in 2009 resulted in 95 questionnaire replies, with 20 each from Uganda, South Africa, Morocco and Kenya, and 15 from Côte d'Ivoire. The original intention was to collect answers from at least 100 individuals, evenly distributed among the five participating countries. The exporters were carefully selected by the team's local experts

taking into account two conditions: (i) the questionnaires had been completed by the respondent in due time and with enough detail to allow for a quality analysis; and (ii) the group of exporters selected had to represent the largest possible array of main commodities exported by the respective country. Thus, the survey outcome is not representative but provides an in-depth insight into the opinion and perceptions of agricultural commodity and food exporters.

Many of the respondents currently export a wide variety of agri-food products to the EU, but were selected due to their importance as an exporter of one or two particular products, which represents a main export of a given country (e.g. coffee in Kenya and Uganda, citrus fruits in Morocco and South Africa).

The questionnaire contained in the section on assessment of NTMs two separate approaches, firstly the closed grading of specific questions regarding the impact of NTMs, and secondly, specific questions including the quantification of NTMs. The answers to the specific questions will only be used to illustrate the grading differences between the selected countries in chapter 4.

3. Grading of Non-Tariff Measures by exporters

In the questionnaire five particular categories of NTMs have been addressed and are described in Table 1. All the categories in the questionnaire followed the same structure. The respondent was asked to grade the influence that a listed NTM, under each specific category, had on his/her trade volume. The grading included a positive impact (graded as 1 or 2) and a negative impact (graded as -1 or -2).

Table 1: NTM categories used in the survey

Category	Description
Taxes and Subsidies	European and African Government Participation in Trade and Restrictive Practices (subsidies, tax benefits, and government monopoly practices)
Customs Procedures	Customs and Administrative Entry Procedures (sampling, import licensing, pre-shipment inspection, customs classification, and anti-dumping duties)
Standards and Regulations	Technical Barriers to Trade (specific labelling requirements related to non safety issues, packaging requirements, and quality requirements for fresh food) Sanitary and Phytosanitary Measures (chemical residue limits, testing, certification of food safety, labelling requirements related to food safety)
Specific Limits	Specific Limits (embargoes, tariff quotas, export taxes, trade agreements, export restraints, and export/import quantity restrictions)
Distribution Chain and Infrastructure	Others

Source: Own design

In the following, an inside on the cross country trends is presented according to the answers collected for the five NTM categories. The results displayed are the average of the answers of all selected countries.

3.1 Taxes and Subsidies

Monetary restrictions other than tariffs are regarded in the category 'Taxes and Subsidies' (TaxSub). These NTMs can take many forms such as port taxes or surcharges, as specified in Table 2. Taking the combined results of all respondents regarding taxes and subsidies, some general statements can be made concerning their impact on exports. In almost all cases, the general outlook towards the application of taxes and surcharges, countervailing duties, EU procurement policies and insurance costs was negative with respect to their effect on the capacity to export.

Table 2: Grading NTMs related to Taxes and Subsidies (in percent of answers)

Impact	**-2**	**-1**	**0**	**1**	**2**
1) African Government assistance to African exporters/producers, including subsidies and tax benefits	12	6	53	12	17
2) Countervailing duties (additional import duty imposed to offset Government subsidies in the exporting country, when the subsidized imports cause material injury to domestic industry in the importing country)	16	4	70	8	2
3) European Union procurement (policies that favour domestic suppliers when imported goods are price-competitive and are of comparable quality)	31	15	48	1	5
4) African State trading, government monopoly practices, etc.	14	7	77	1	1
5) European Union surcharges, port taxes, etc.	28	25	45	1	1
6) African Government surcharges, port taxes, export taxes, etc.	22	27	44	3	3
7) Insurance charges/premiums	4	34	53	3	6

Note: -2 = major negative impact; -1 = minor negative impact; 0 = no impact; 1 = minor positive impact; 2 = major positive impact

3.2 Customs and Procedures

The category 'Customs and Procedures' (Custom) include bureaucratic aspects, processes and other types of obstacles associated to international trade activities that may be used, intentionally or not, to protect domestic markets from imported goods. As presented in Table 3, this includes government implemented measures such as inspections, licences and duties, as well as gratuities illicitly solicited by customs officials and representatives. The survey results show that within the topic of customs and procedures, respondents were especially sensitive to three particular obstacles: rules of origin, customs formalities and pre-shipment

procedures. Even though all three obstacles received mixed opinions on whether their impact on exports is negative or positive, the balance is predominantly negative.

Table 3: Grading NTMs related to Customs and Procedures (in percent of answers)

Impact	**-2**	**-1**	**0**	**1**	**2**
1) Anti-dumping duties (penalties imposed upon suspiciously low-priced imports)	15	5	73	1	5
2) Rules of origin (laws, regulations and administrative practices applied to ascribe a country of origin)	11	24	48	3	14
3) Customs formalities (Customs valuation, Customs classification Consular formalities, required declaration of goods by the shipper and examination of declarations by the customs authorities)	15	31	45	4	5
4) Export licensing (procedures requiring submission of an application or other documentation to an administrative body for approval as a prior condition for importation)	9	18	58	8	7
5) Pre-shipment inspection (formalities before sending the goods, process of selecting a representative group of products from a larger group)	7	22	43	11	17
6) Prior import deposits (requirement to place a deposit in advance with the central bank as the condition for obtaining foreign currency to pay for imports, discriminatory credit restrictions, credit restrictions that apply only to imports)	7	11	80	1	1
7) Bribes solicited by customs officials	21	12	63	4	0
8) Entry price system and standard import values	19	14	59	5	3
9) Other: Method of duty calculation[2]	1	0	99	0	0

Note: -2 = major negative impact; -1 = minor negative impact; 0 = no impact; 1 = minor positive impact; 2 = major positive impact

3.3 Standards and Regulations

The category 'Standards and Regulations' (StaReg) deals with food safety issues and technical standards. The regulations addressed in this category are presented in Table 4. They represent the common, albeit diminishing, notion of what NTMs are and are consistently indicated as one of the main causes behind the difficulties of African agro-food exporters in exporting to the EU. Concerning standards and regulations, respondents were very opinionated and results showed that they perceive related obstacles and supports as having an overall positive effect on their activity, even if it is by a somewhat marginal difference. The main findings that can be drawn from the grading results are that labelling and packaging requirements are viewed in a very positive light, whereas EU and private SPS standards are not.

[2] Added as an “Other” option by one respondent from South Africa

Table 4: Grading NTMs related to Standards and Regulations (in percent of answers)

Impact	-2	-1	0	1	2
1) Labelling: technical regulations and standards (measures that address labelling issues that include environmental protection, safety, national security and consumer information)	4	16	42	23	15
2) Packaging: technical regulations and standards (measures that address packaging issues that include environmental protection, safety, national security and consumer information)	3	16	45	23	13
3) Critical mass of exportable quality product at producer place	6	11	51	19	13
4) EU SPS measures (chemical residue limits, disease free product, requirements for specific product treatments)	19	19	29	12	21
5) Private SPS measures (e.g. Global GAP, British Retail Consortium, International Food Standards, etc)	14	23	40	7	16
6) Other private measures (related to inorganic farming, fair trade, animal welfare, environmental protection, etc)	8	21	44	14	13
7) Testing and certification arrangements (methods to verify the exported goods meet the prescribed product standards)	11	20	36	15	18

Note: -2 = major negative impact; -1 = minor negative impact; 0 = no impact; 1 = minor positive impact; 2 = major positive impact

3.4 Specific Limitations

The 'Specific Limitations' (Spec) category covers quantitative NTMs and similar restrictions (Table 5). It includes import quotas and their administration methods (licensing, auctions, and other); export limitations and bans; limits on imports; foreign exchange controls often based on licensing; prohibitions such as embargos; domestic content and mixing requirements forcing the use of local components in a final product; and discriminatory preferential trading agreements. The survey looked at a range of specific limitations that have the potential to affect African exports to the EU including quotas, embargoes and discrimination from bilateral agreements. The respondents revealed to be predominantly indifferent to most included NTMs in this category.

Table 5: Grading NTMs related to Specific Limitations (in percent of answers)

Impact	-2	-1	0	1	2
1) Quantitative restrictions/export restraints (explicit limits, usually by volume, on the amount of a specified commodity that may be imported into a country)	18	6	75	1	0
2) European and African Embargoes and other restrictions of similar effect (a ban on African and/or European imports, either with respect to specific products or to specific countries)	17	3	79	1	0
3) Discrimination resulting from bilateral agreements (a treaty or other agreement that is biased towards the participating parties)	21	13	66	0	0
4) Measures to regulate domestic prices (process to control the price at which a commodity trades within a country)	18	9	65	4	4
5) Tariff quotas (higher tariff rate to imported goods after a specified quantity of the item has entered the country at a lower prevailing rate)	21	6	71	2	0
6) Other: Tariff adjustments	2	0	98	0	0

Note: -2 = major negative impact; -1 = minor negative impact; 0 = no impact; 1 = minor positive impact; 2 = major positive impact

3.5 Distribution Chain and Infrastructure

NTMs under the 'Distribution Chain and Infrastructure' (DisInf) category were considered as some of the most important and often overlooked factors impairing African agri-food exporters' performance. It includes all limitations related to transportation, packaging, handling, preserving, etc. The results of the exporters' survey shed light on two key areas (Table 6): transportation and communication. Respondents' views were highly negative towards transportation costs from the production site to the port of export (which are directly related with transportation over land), transportation infrastructure, and transportation from the port of export to the EU port of entry. On the other hand, results showed that communication conditions were acceptable for the majority of the respondents.

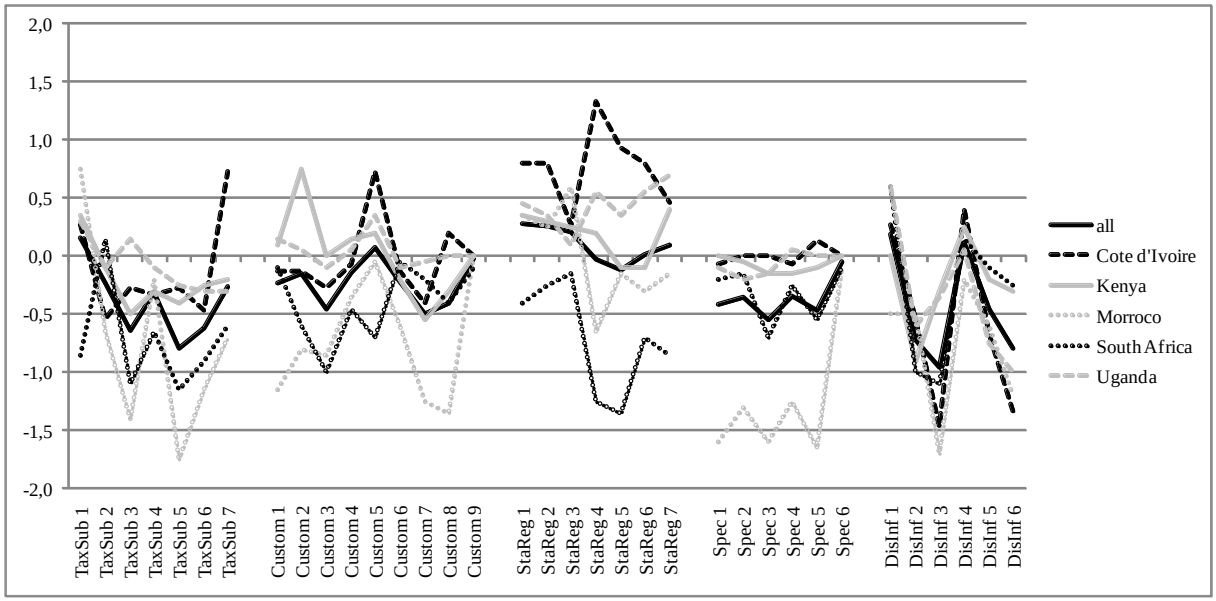
Table 6: Grading NTMs related to Distribution Chain and Infrastructure (in percent of answers)

Impact	-2	-1	0	1	2
1) Connections and telecommunications	14	3	54	9	20
2) Transportation costs from production location to port, airports and other shipping places	29	25	36	6	4
3) Transportation from ports of export to EU ports of entry	49	14	27	2	8
4) Access to labelling, packaging, refrigeration structures	2	11	71	7	9
5) Infrastructures access for transportation from the production place to ports of export (road, railways, etc)	27	9	52	4	8
6) Transportation over land	25	39	28	4	4

Note: -2 = major negative impact; -1 = minor negative impact; 0 = no impact; 1 = minor positive impact; 2 = major positive impact

4. Discussion of country specific assessment of NTMs

Chapter 3 has looked at the responds to all questionnaires, but it is important to have a look whether in the selected countries there are structural differences in the answers. The assessment by specific countries provides a further insight into the issue of NTMs. Figure 1 shows the simple averages of answers to each of the grading question by selected country.



Note: abbreviation and the number of the question refer to chapter 3.

Figure 1: Average answer to NTM grading questions by selected country

In the category 'Taxes and Subsidies' (TaxSub) as for most other categories the perception of Moroccan and South African exporters have the perception of facing stronger restrictions than the average of the selected countries. Especially the EU procurement and EU surcharges are seen more restrictive. In the case of EU port taxes and other surcharges the answers in these two countries also indicated that two-thirds of the respondents paid those, whereas in the other three countries the majority of exports did not indicate this.

In the category 'Customs and Procedures' (Custom), the rather negative perception of 'Rules of origin' (Customs2) in the case of South Africa is also supported by the fact that a quarter of the exporters have experienced problems in this regard. 'Pre-shipment inspections' (Customs5) are positively seen in most of the countries with the exception of South Africa.

In the category 'Standards and Regulations' (StaReg) the largest fluctuation between the answers from the different countries can be observed. Cote d'Ivoire has generally a considerable more positive perception than the average, whereas South Africa is at the other

end of the spectrum. This is highlighted with the answers regarding sanitary and phytosanitary (SPS) measures (StaReg4, 5). In the case of South Africa 60% of the respondents reported that they have had a shipment barred from entering the EU, which was almost entirely due to incompliance with SPS standards. In Morocco and South Africa more than 80% of the exporters indicated that they have made specific investments in the last three years to acquire certifications for food and agricultural products. In the other three countries this percentage is closer to 50%. About 50% of Kenyan, Moroccan and Ugandan exporters indicated that the compliance with EU standards has assisted them to export to other destinations. This might provide an answer for the more positive perception of SPS standards in these countries.

'Specific Limitations' (Spec) appear to be the most discussed in Morocco, as the other four countries have a rather indifferent perception. With a third of the respondents facing volume restrictions in entering the EU market, Morocco is the only country with a considerable share; mainly tomatoes which enter the EU in the framework of a tariff rate quota.

In the category 'Distribution Chain and Infrastructure' (DisInf), the responds to the different questions fluctuate between questions and not so much between countries. The questions regarding transport and transportation costs (DisInf2, 3, 6) are seen as a major obstacle by all exporters.

5. Conclusion

In the light of further reduction in tariffs of either multilateral or bilateral nature, the focus on the implications of NTMs on trade flows will further gain in importance. Especially, in the trade between developing and developed countries this issue may already overlay the effect of tariffs. This paper provides some insights in the perception of African exporters regarding NTMs in the trade in agri-food products with the EU. The results have been rather positive in general terms but specific issues like transportation, EU procedures and SPS measures have been regarded as considerably hampering trade. On the other hand, there has been also the mentioning of the positive effect of SPS standards. This shows that the issue is not only black and white, and the rich information provided in this survey needs to be further evaluated. The country specific assessment of the answers showed that South Africa and Morocco are more concerned by NTMs. This might be partly due to the high share of perishable agri-food exports (fruits and vegetables). The focus on the major African exporting countries introduced a bias into this survey which limits the possibility to generalise for African agri-food exports

but an overall indication about the effects of NTMs of African agri-food exports has be provided.

Literature:

Andriamananjara, S., Dean, J. M., Feinberg, R., Ferrantino, M. J., Ludema, R., and Tsigas, M. (2004). The effects of non-tariff measures on prices, trade and welfare: CGE implementation of policy-based price comparisons. U.S International Trade Commission, Office of Economics Working Paper No.2004-04.A. Online: http://www.usitc.gov/publications/332/working_papers/ec200404a.pdf

Beghin, G. and J.C. Bureau (2001). Quantification of sanitary, phytosanitary and technical barriers to trade for trade policy analysis. Working Paper 01-WP291, Center for Agricultural and Rural Development, Iowa State University. Online: http://econ2.econ.iastate.edu/research/webpapers/paper_2024.pdf

Bora B., A. Kuwahara and S. Laird (2002). Quantification of non-tariff measures. Policy issues in international trade and commodities study series no. 18, United Nations Conference on Trade and Development (UNCTAD). Online: http://192.91.247.38/tab/pubs/itcdtab19_en.pdf

Carrère, C. and J. De Melo (2009). Non-tariff measures: what do we know, what should be done? Document de travail de la série Etudes et Documents E 2009.33, Centre d'Etudes et de Recheres sur le Développement International (CERDI). Online: http://carrere.cerdi.org/2009.33.pdf

Deardorff, A.V. and R.M. Stern, 1997. Measurement of non-tariff barriers. OECD Economics Department Working Papers, No. 179, OECD Publishing. doi: 10.1787/568705648470.

Griliches, Z. (1970). Hedonic prices for automobiles: an econometric analysis of quality change. In: Zellner, A. (editor), *Economic statistics and econometrics*, North-Holland, Amsterdam.

Kee, H L., A. Nicita and M. Olarreaga (2008). Estimating trade restrictiveness indices. *Economic Journal*, 119 (534): 172-199.

Mahé, L.P. (1997). Environment and quality standards in the WTO: New protectionism in agricultural trade? A European perspective. *European Review of Agricultural Economics* 24, 480-503.

Mattson, J.W., W.W. Koo and R.D. Taylor (2004). Non-tariff trade barriers in agriculture. Agribusiness & Applied Economics Report No. 531, Center for Agricultural Policy and Trade Studies, North Dakota State University. Online: http://ageconsearch.umn.edu/bitstream/23501/1/aer531.pdf

Mimouni, H., C. Averbeck, and O. Skorobogatova (2009). Obstacles to trade from the perspective of the business sector: a cross-country comparison. Chapter 1.6 in: Lawrence, R.Z., M. Drzeniek Hanouz and J. Moavenzadeh (editors), *The global enabling trade report 2009*, World Economic Forum, Geneva.