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## **Non-Tariff Measures as an Environmental Governance Mechanism in International Trade**

**Scarlett Queen Almeida Bispo, Frédéric Mertens, and Michelle Martins**

*Selected presentation for the International Agricultural Trade Research Consortium's (IATRC's) 2023 Annual Meeting: The Future of (Ag-) Trade and Trade Governance in Times of Economic Sanctions and Declining Multilateralism, December 10-12, 2023, Clearwater Beach, FL.*

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# Non-Tariff Measures as an environmental governance mechanism in international trade

Scarlett Queen; Frédéric Mertens; Michelle Martins  
Working in progress  
Master's Degree in Sustainable Development





# PROBLEM

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STATEMENT

**International trade    *versus*    environment**

The synergy between international trade and environmental preservation is a complex and relevant topic for global development oriented toward sustainability





# Globalization

Social interactions

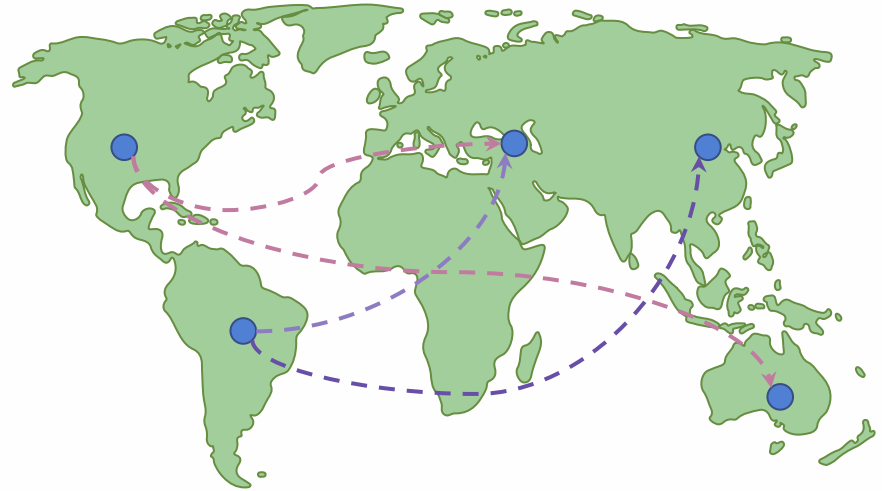


# Teleconnexions

Ecological interactions



Nations can **preserve their natural resources** and ecosystems services increasing the **import of products** that cause environmental damage in exporting countries



Decline of multilateralism


Limitations of multilateral actors

The problem's cause is beyond the  
local jurisdiction

The role of the State gains prominence in implementing responses aimed at environmental issues resulting from its commercial demand, through **trade regulation** - Non-Tariff Measures.







**NTMs can be part of the environmental governance solution for global trade**, if it is adopted by importing nations considering their **share of responsibility** for the **environmental impacts** generated in the country of origin and world.

To the extent that a country commits, through trade regulations, to **import products that are environmentally sustainable or whose production practices reduce environmental damage**, it assumes **responsibility for their demand** and does not just transfer the environmental burden to countries with more lenient environmental regulations.

# Case study

NTMs related to SDG:

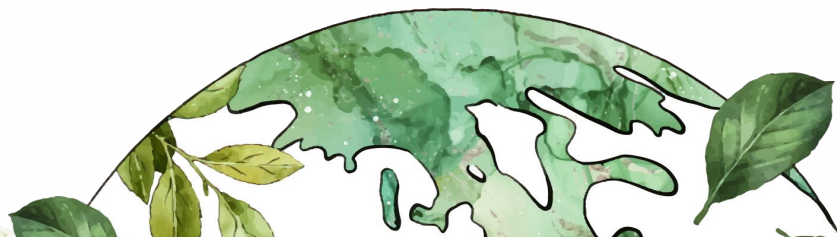


The dynamics of the fisheries sector can illustrate the socio-ecological impacts worsened by trade.

The existence of Multilateral Environment Agreements (MEAs) related to the protection of the marine ecosystem makes it easier to find NTMs linked to this environmental problem.

# OBJECTIVE

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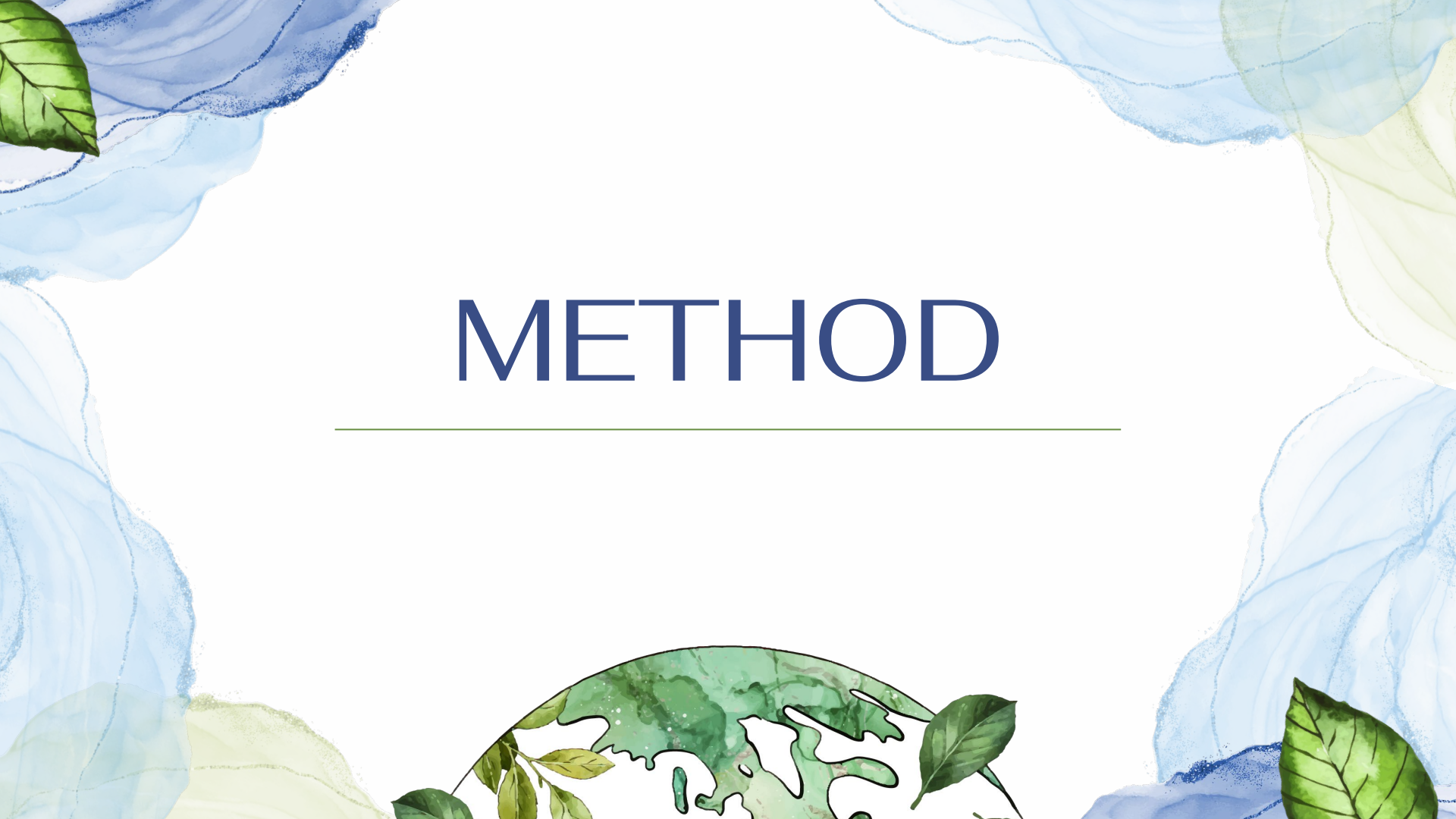
**This study aims to investigate how NTMs are addressed  
in discussions on environmental governance of  
international trade.**

Then to assess the impacts of NTMs linked to Sustainable  
Development Goal (SDG) 14 (Life Below Water) on fisheries trade.



# METHOD

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## Method

1

### Map

Map the NTMs related to SDG 14

2

### NTMs objectives

Identification of keywords

3

### Model

Gravity Model to identify the effect on trade

# Step 1: MAP

SDG-HS-NTM concordance matrix (KRAVTCHENKO et al. 2019 and UNCTAD)



Identify product groups relevant to individual SDGs at 6-digit level of HS



What NTMs affecting trade in the examined product groups have public policy objectives embedded in SDGs



Use keywords to ensure higher accuracy of the results of the matching process



Use R software to evaluate each measurement against the criteria in the agreement entries.

A specific HS-NTM code pair was considered to have a **direct linkage to an SDG Target** if: (1) It has a **clearly stated SDG target -related objective** or (2) the examined NTM-HS code combination is not likely to **have any objective other than the one that is relevant to an SDG**.

# Step 1: MAP

**Table 1-** Keywords selected to represent links with SDG 14 and the NTMs that contain these keywords and affect fisheries products.

NTMs	SELECTED KEYWORDS
A11; A12; A14; A15; A19; A31; A32; A62; A63; A64; A69; A81; A83; A84; A85; A851; A86; A89; B14; B19; B31; B32; B41; B42; B81; B82; B83; B84; B85; B851; B853; B859; B89; B9; C1; C3; C4; C9; E1; E123; E129; E311; E32; E329; F61; F65; F69	iuu; illegal, unreported, and unregulated (iuu) fishing; illegal, unreported, and unregulated fishing; catch document; catch documentation scheme; illegal, unreported and unregulated fishing; iuu fishing; catch certificate; catch certification; catch certification scheme; CDS; iuuf; legal origin ; <b>illegal trade ; illegal fishing ; permission of capture ; legal sources trafficking ; traceability            system for fish; lawful fishing traceability of all marine fishery ; fisheries activities that violate            the law; cites; (c.i.t.e.s); endangered species; endangered animal; endangered wild; wild life            (preservation) ; lawfully exported ; wildlife conservation ; convention on international trade in            endangered species of wild fauna and flora ; convention on the conservation of species;            protected species; endangered fauna ; protection of wild life ; wildlife under special protection ;            rare animal ; wild animal conservation ; protection of fauna and flora ; wildlife requires ; wildlife            law; protected animal ; protected wildlife ; wildlife resources conservation and protection act ;            wildlife and plant conservation ; wild life act; wildelife bill; threatened species; wild life            protected ; Protection of Aquatic Wild Animals</b>

Source: Own elaboration.



## Step 2: Preliminary Model - Gravity Model

The gravity model was used to identify the effects of NTMs related to SDG 14 on the fishing sector. The gravity equation estimated in this study represented below has its variables described in **table 2 (next slide)** and followed the recommendations in **table 3 (next slide)** :

$$M_{ijkt} = c + \beta_0 fta_{ijt} + \sum_{n=1}^N \beta_n ntm(n)_{ij,t}^k + \gamma_{it} + \delta_{jt} + \eta_{ij} + \tau_k + \varepsilon_{ijkt}$$



**Insert other variables:** tariffs and value added and intranational data.

**Table 2 - Description of the variables .**

	Variable	Unit	Source
$M_{ijkt}$	Nominal value of imports of good $k$ by country $i$ from country $j$ in year $t$ . The subscripts $i, j$ and $k$ are respectively 58 importing countries, 53 exporters, 305 HS 6-digit products and $t$ is the period between 2012 and 2021.	Current USD	UNCONTRADE - WITS
$fta_{ijt}$	Dummy takes value 1, if countries $i$ and $j$ have a free trade agreement; 0 otherwise.	Binary	Mario Larch
$ntm(n)_{ij,t}^k$	Dummy take the value 1 if importing country $i$ imposes NTMs or grouping of NTMs by clusters of keywords related to SDG 14 on exporting country $j$ for good $k$ in year $t$ ; 0 otherwise.	Binary	UNCTAD - TRAINS
$\gamma_{it}$ $\delta_{jt}$ $\tau_k$ $\eta_{ij}$	Importer-year ( $\gamma_{it}$ ) and exporter-year ( $\delta_{jt}$ ) fixed effects (FE), which control specific phenomena in each country and that vary over time; $\tau_k$ is the product FE and $\eta_{ij}$ is the FE for the country pair, which controls for pair-specific phenomena that do not vary over time.	Econometric procedures	
$\varepsilon_{ijkt}$	Error term		

**Source:** Own elaboration.

**Table 3 - Description of the variables .**

Recommendation	Motives
<p><b>Use panel data with time intervals rather than consecutive years:</b></p>	<p>Cheng and Wall (2005) recommend using panel data with intervals, as allows the adjustment of trade flows to adjustments in trade policies or other changes in trade costs. According to Olivero and Yotov (2012), the most promising are the estimates obtained from intervals of 3 and 5 years.</p>
<p><b>Include directional time-varying (importer and exporter) fixed effects</b></p>	<p>The use of FE allows controlling for unobservable multilateral resistance and other observable or unobservable characteristics that vary over time for importing and exporting countries. Cheng and Wall (2005) and Shepherd (2013) reiterate FE capture the heterogeneity of countries and the effect of unobservable variables that are difficult to measure or that were not well specified in the model.</p>
<p><b>Include country pair fixed effects:</b></p>	<p>The inclusion of country pair fixed effects is relevant to correct the endogeneity between trade flows and certain explanatory variables, such as non-tariff measures (Yotov et al., 2016). They also capture the effects of traditional variables of the gravity model, such as bilateral distance, contiguity, colonial relationship, etc., which justifies not including these variables. Baier and Bergstrand (2007) recommend the use of country pair fixed effects to account for unobservable relationships between endogenous trade policy covariates and the error term in gravity equations. Furthermore, country pair fixed effects will account for other unobservable time-invariant trade cost components.</p>
<p><b>Use the Poisson Pseudo Maximum Likelihood (PPML) estimator</b></p>	<p>Santos Silva and Tenreyro (2006) recommend the use of this estimator which, in addition to dealing with null values, highlights outliers in the analysis, being considered to explain individual heterogeneity of each country. PPML supports binary variables and allows the inclusion of FE, resulting in consistent estimates in the presence of heteroscedasticity (Yotov et. al, 2016).</p>
<p><b>Use PPML-HDFE (High-Dimensional Fixed Effects)</b></p>	<p>According Correa et al. (2020) is a statistical method used to deal with a large number of categories or high-dimensional fixed effects. This combination allows you to efficiently control country-specific or country-pair fixed effects in gravity models, even when there are a large number of categories.</p>

**Source:** Own elaboration.



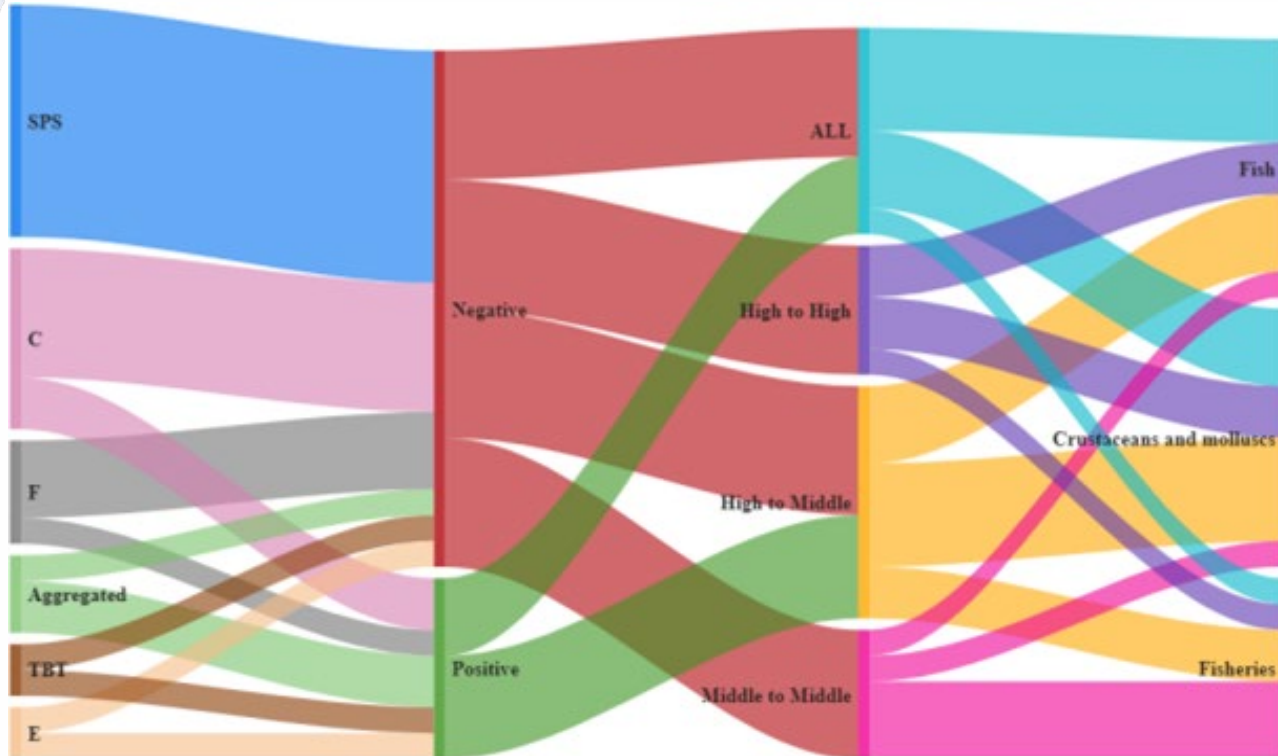
# PRELIMINARY RESULTS

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# Preliminary Results

Figure 1: Estimation results for NTMs linked to SDG 14



Preliminary results corroborate the literature when the **effects of NTMs vary by type, sector and income level** (Disdier et al., 2008; Santeramo & Lamonaca, 2019, 2022). This means **the results may vary according to the sample and the NTMs**, suggesting the need to explore more specific subsamples.

# Preliminary Results

**Negative results** may indicate that **NTMs associated to SDG 14 represent a challenge for trade**, regardless of the income level of the issuing country.

For the NTM to act as an instrument of environmental trade governance, exporting countries must obtain compliance with the NTM.

Otherwise, very strict environmental-related NTMs may cause trade to be diverted to importing countries with more lenient environmental regulations.

## Next steps

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Identify new NTM keywords related to MEAs related fisheries;

Cluster variables based on the environmental objectives of the NTMs;





# Thank you!

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**Scarlett Queen**  
scarlettqueenn@gmail.com

**Frédéric Mertens**  
mertens.br@gmail.com

**Michelle Martins**  
michelle.viana@ufv.br