Global Value Chains and International Water Security: a Critical Study

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1 Introduction

International trade and protection of the environment.

The rule of the Agenda 21 of United Nations.

WTO and sustainability.

Water has not been considered because:

i. the multiple uses of water;
ii. its process of commoditization;
iii. the legal weakness of the global agreements of fresh water.

The rule of virtual water (Hoekstra, 2010).

1 Introduction

The WTO has gradually lost position due to the expansion of free trade agreements (FTAs).

The rule of the global value chains (GVCs).

Research questioning:

How can water security be critically discussed in international trade, especially within global value chains?

The paper seeks to contribute to water security discussions within global value chains from a critical perspective.

2 Problematizing international trade and water security

The nature and the multilateral trade debate.

Although the value of trade in agricultural products represents only 14% of manufactured goods trade (UNCTAD, 2014), agriculture's impact on water is worse than in industry because they represent approximately 70% of the water used on the planet (OECD, 2016).

22-30% of the water present in terrestrial systems is used to produce food (Falkenmark & Rockström, 2004).

Water scarcity has reached 40% of the population of the planet. Together with clime and population growth, trade in agricultural goods is considered the most important global factor for reducing water security. There is a mutual interference between trade and water availability (Lenzen et al, 2013; Vörösmarty et all, 2015).

3 Mega-trade agreements and the possible impacts on water

The WTO has lost its relevance (Matsushita, 2014).

A new arrangement has been drawn in international trade.

The nexus between FTAs and GVCs.

The rule of the Transatlantic Trade and Investment Partnership (TTIP) and the Trans-Pacific Partnership (TPP).

The investor-state disputes.

4 Value chains, leading companies and virtual water. (In) safe waters in global flows

The notion of global value chains involves market-leading firms and their huge supplier networks (ECLAC, 2013).

Examples of actions of WS in GVCs: food, textile and personal cleaning sector. Specially: water efficiency, mandatory ISO 14046 certification, water treatment, re-use, training, participation in watershed management and reforestation.

Virtual water. Some numbers: Approximately 15% of the water used in the world is destined for exporting virtual water; 67% of this is related to international trade in crops (Dalin, 2012). China, Brazil, India, the United States and Canada are the largest exporters of virtual water in the world (Feng & Hubace, 2015). Brazil exports around 112 trillion liters of freshwater in the virtual mode (Globo, 2012).

4 Value chains, leading companies and virtual water. (In) safe waters in global flows

China and India, which respectively, extract 32% and 20% of their available water.

In the Brazilian regions with the highest agricultural production, water scarcity has been felt significantly.

The fruit sector. International buyers in a vertical relationship lead the CGVs in this segment. They are usually large supermarket groups, determining how fruits are produced, harvested, transported, processed and stored, from an interdependent perspective (Hawkes & Ruel, 2011; Henson & Humphrey, 2015).

5 Method

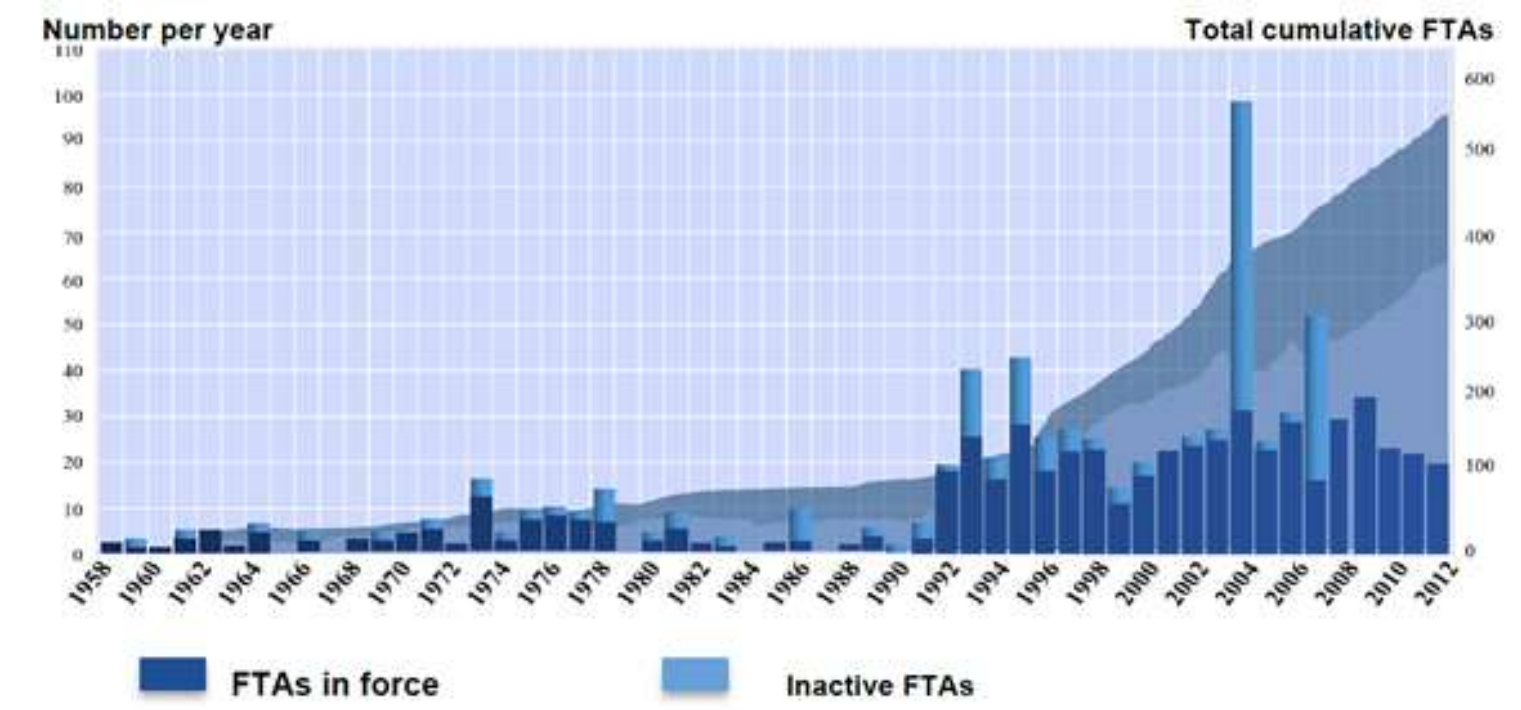
- Descriptive
- Exploratory
- Quali-quantitative
- Secondary source - 235 FTAs available in the WTO database, published between 1994 and 2014.

Trade variables		Water security variables	
TV1	Intellectual property	WSV1	Water in general
TV2	Sanitary and phytosanitary measures	WSV2	Water resources management
TV3	Technical obstacles/Labelling	WSV3	Wetland Management
TV4	Public procurement	WSV4	Management of watercourses / basin development
TV5	Investment	WSV5	Impact of agriculture on water / sustainable agriculture practices
TV6	Agriculture	WSV6	Desertification
TV7	Fishing	WSV7	Waste management (in general)
TV8	Livestock		
TV9	Mining		
TV10	Technology		
TV11	Energy		
TV12	Textiles		
TV13	Chemicals		
TV14	Industry		
TV15	Subsidy		
TV16	Countervailing measures		
TV17	Anti-dumping measures		
TV18	Safeguards		
TV19	Labor		
TV20	Cooperation in general		
TV21	General education		
TV22	Regional integration		
TV23	Transparency		

Source: Carvalho (2015: pp. 34-35)
Table 1: Variables in FTAs – trade and water security

6 Results

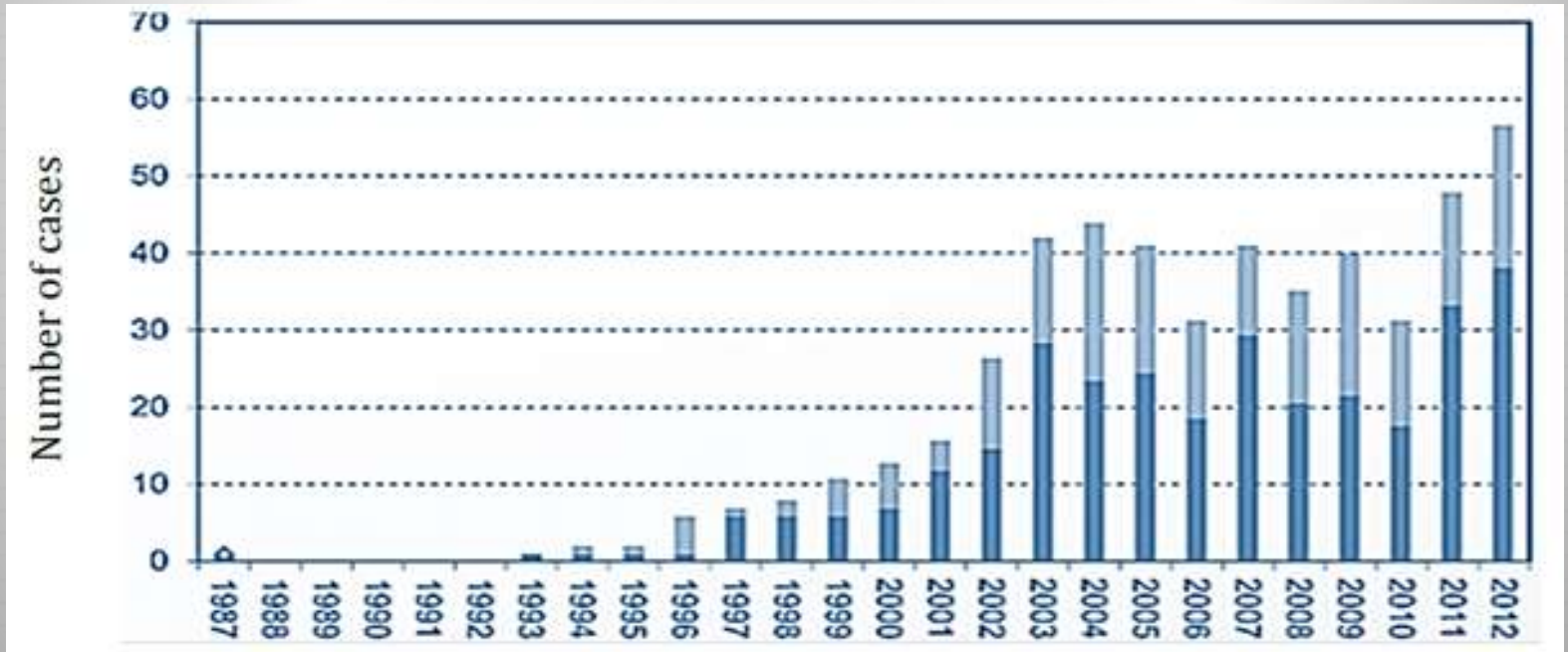
6.1. Free trade agreements



Source: WTO (2013: p. 61)
Figure 1: Free Trade Agreements in the GATT System (1949 - 2012)

6 Results

6.2. Evolution of the disputes in the arbitral courts of investment



Source: UNCTAD (2013: p.2)

Figure 2: Evolution of disputes in the arbitral courts of investment

6 Results

6.3. Associations between water and trade in FTAs

Trade variables	Water security variables							
	WSV1	WSV2	WSV3	WSV4	WSV5	WSV6	WSV7	WSV8
TV1	0,026	0,010	0,000	0,000	0,000	0,071	0,001	0,127
TV2	0,492	0,101	0,000	0,000	0,032	0,129	0,018	0,161
TV3	0,422	0,847	0,000	0,000	0,126	0,505	0,149	0,321
TV4	0,306	0,033	0,000	0,000	0,000	0,000	0,000	0,847
TV5	0,012	0,075	0,000	0,000	0,369	0,848	0,356	0,516
TV6	0,001	0,000	0,000	0,000	0,000	0,001	0,000	0,012
TV7	0,007	0,002	0,000	0,000	0,007	0,019	0,000	0,229
TV8	0,280	0,211	0,000	0,000	0,016	0,133	0,021	0,249
TV9	0,011	0,005	0,000	0,000	0,008	0,086	0,046	0,197
TV10	0,011	0,005	0,000	0,000	0,021	0,018	0,000	0,047
TV11	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,016
TV12	0,000	0,000	0,000	0,000	0,001	0,177	0,000	0,076
TV13	0,001	0,000	0,000	0,000	0,000	0,002	0,000	0,249
TV14	0,099	0,015	0,000	0,000	0,000	0,000	0,000	0,333
TV15	0,321	0,144	0,000	0,000	0,003	0,015	0,002	0,467
TV16	0,417	0,191	0,000	0,000	0,004	0,020	0,012	0,505
TV17	0,068	0,023	0,000	0,000	0,023	0,050	0,000	0,640
TV18	0,078	0,101	0,000	0,000	0,003	0,238	0,000	0,264
TV19	0,034	0,010	0,000	0,000	0,003	0,012	0,000	0,053
TV20	0,727	0,742	0,000	0,000	0,742	0,858	0,517	0,932
TV21	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,122
TV22	0,063	0,009	0,000	0,000	0,000	0,000	0,000	0,055
TV23	0,060	0,007	0,000	0,000	0,000	0,000	0,000	0,137

Source: Carvalho (2015: p.330)

Table 2: TCP - trade versus water (Fisher's Exact Test)

7 Discussions

The environmental debate and trade regionalization.

Social-environmental framework and disputes.

The Investor-State Dispute Settlement System.

The International Center for Settlement of Investment Disputes (ICSID)

Water sector - Tanzania, Bolivia and Argentina

WTO Dispute Settlement Body (DSB) and environment issues

7 Discussions

Water security in FTAs: waste management (64 agreements); water resource management (34 agreements); agricultural impact on water and sustainable agriculture practices (32 agreements); desertification (17 agreements). 34 agreements considering water in general were identified, without citing sustainability guidance (Carvalho, 2015: p.330).

Some statistical associations between variables in those treaties were found:

7 Discussions

i. The variables "agriculture", "energy", "chemicals", "industry" and "public procurement" have a statistical link with the variables "water", "water resources management", "sustainable agriculture" and "waste management", expressing the nexus between water, food and energy security;

ii. FTAs that have investment clauses are not associated with any concern with water security. However, FTAs dealing with these clauses are linked to the water issue in general (perhaps in supply services). This strengthens the concern about environment, investment and the Investor-State Dispute Settlement System within the mega-agreements.

7 Discussions

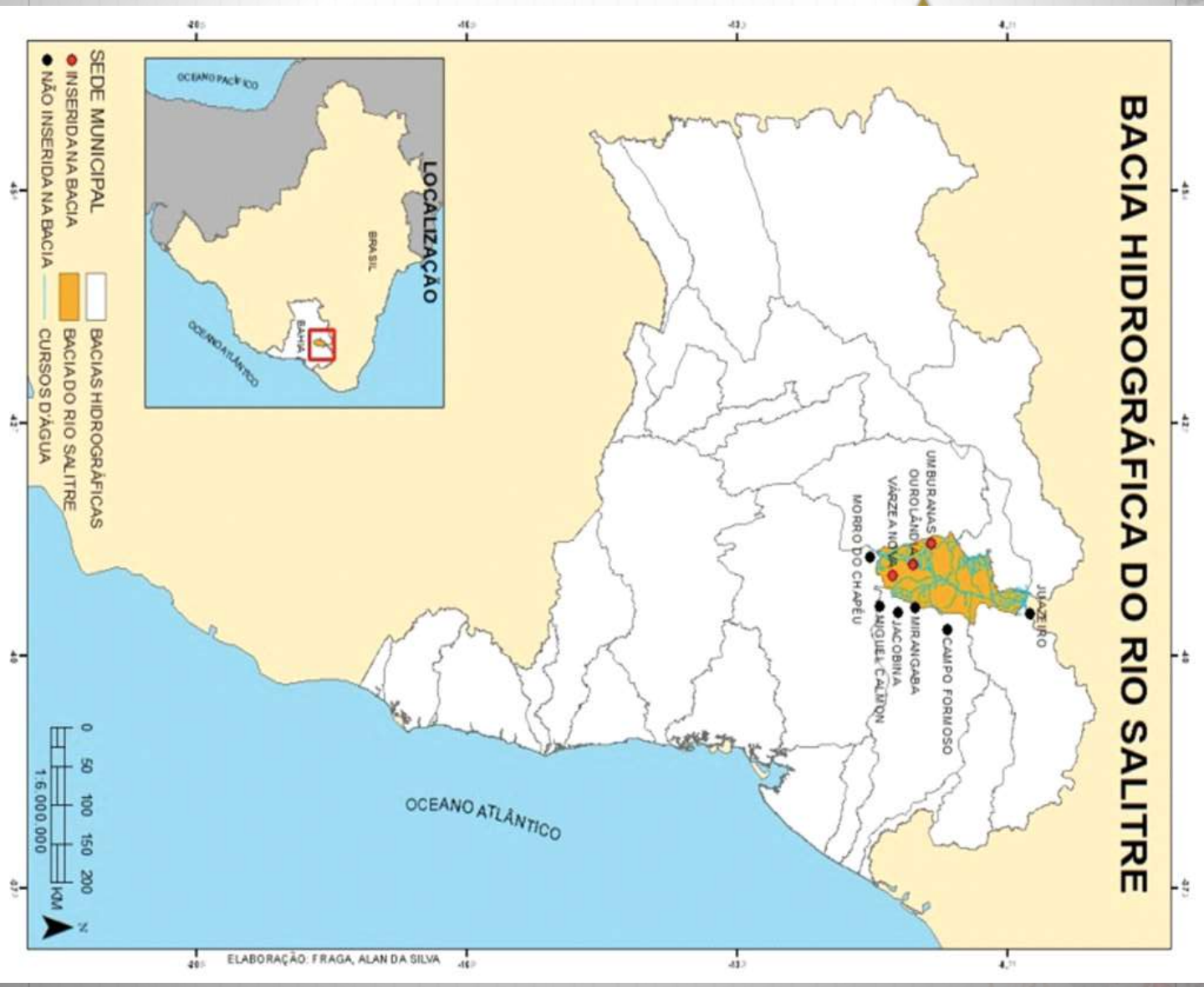
The fruit sector in the Salitre River region

This region covers the Petrolina-Juazeiro Pole, which is made up of approximately 20,000 hectares of irrigated areas (Rossi, 2015).

This zone produces mango and grapes, whose main buyers are chains of the United States and the European Union. It was exported 156,337 tons of mango and 34,384 tons of grapes in 2015, respectively, accounting for 99% and 84% of Brazilian exports.

Considering virtual water exportation in 2015, it is estimated that the region sold about 230,000,000 m3 (1470 m3/ton) in mango production and 14,200,000 m3 (414 m3/ton) in grape cultivation, according to the parameters of Mekonnen and Hoekstra (2011)

7 Discussions



7 Discussions

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Campos dos Cavalos - currently, nine outbreaks concerning social and environmental conflicts have been recorded in this zone, all of them involving the scarcity of water.

Certain communities, some of which are even involved in fruit agro-production, have organized themselves into occupation campaigns known as the "Landless Movement", focusing closely on the lack of access to water (Rossi, 2015).

8 Conclusions

The chains have exacerbated social and environmental problems in different producing regions, such as the Salitre River Basin in Brazil. In other places of South America this matter has also accelerated the process of desertification (Schwarz, Schuster, Annaert, Maertens & Mathijs, 2016).

The non implementation of the TTIP and TTP reduces the risks represented by the investor state dispute settlement mechanisms.

The rule of the US.

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