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Trading in Virtual Water: An Analysis on the Legal Implications of Trade in Virtual Water and the Necessity for Legal Mandate

ELAN SANJEEVI¹

ABSTRACT

Water is a basic element of life and plays an important role in sustaining ecosystems and human societies. Despite its plentitude, many countries face severe water shortages, exacerbated by factors such as population growth, industrialization and climate change. The concept of virtual water – water embedded in the production of goods, particularly agricultural products has emerged as a significant aspect of international trade, offering a potential solution to global water scarcity. This paper explores the implications of virtual water trade distinguishing from real water and its impact on the environment and water crises, particularly in India. India as a major exporter of virtual water faces challenges related to water depletion and environmental degradation raising questions about the sustainability of the current practices. This paper critically examines existing international and national legal frameworks, identifying the gaps and proposing the necessity of a legal mandate to regulate virtual water trade. Ultimately this paper calls for a balanced approach to virtual water trade, aligning economic benefits with environmental sustainability and equitable access to water resources.

Keywords: *Virtual Water, Water Scarcity, Environmental Sustainability.*

I. INTRODUCTION

“There’s plenty of water in the universe without life, but nowhere is there life without water”

---Sylvia Earle

Water is one of the three basic components of life i.e., food, water and shelter. It is said that life on earth started with water. The nature of water is so unique that the amount of available water on earth is easily fixed by the life cycle of water from land to ocean, and from ocean to the atmosphere and comes right back to land.² Besides, it is well established that access to clean drinking water is a fundamental right under not just international legal frameworks but also under Article 21 of the Indian Constitution, 1950 through the plethora of judicial precedents in

¹ Author is a student at School of Law, Alliance University, Central Campus, Bengaluru, Karnataka, India.

² DR. SUKANTA NANDA, ENVIRONMENTAL LAW (4th ed. 2015).

India.³ Access to clean water and sanitation forms SDG 6. Despite such significance of water and its abundance, many countries face water crises and experience water poverty. This is because water shortages are caused increasingly due to the increased demand for water by humans due to various factors like population growth and explosion, increased use in industrialisation and urbanisation, lifestyle changes from need to luxury etc.⁴ It is also caused by climate change resulting in droughts, rise in pollution, floods etc.⁵

To combat the contamination and over-exploitation of water, it is necessary to introduce sustainable and efficient use of water and for this purpose many countries have legislations regulating pollution in water bodies and national policies that are conservation-oriented. In India, we have the Water (Prevention and Control of Pollution) Act, 1974 and the National Water Policy, of 2012. Moreover, the international community at large, in the International Conference in Water and Environment (Dublin Conference) in 1992, felt that water can be efficiently and sustainably used only when economic valuation is attached to it and this view led to the adoption of the Dublin Statement where principle 4 stated water as an economic good.⁶ In 2000, the World Water Council adopted the World Water Vision which stated that water should be treated as an economic good and introduced a cost pricing system for services rendered with water for utilization by the people.⁷ On account of the global water crisis, it has been commonly accepted that to resolve issues of water scarcity, unsustainability and inefficiency, water needs to be treated as an economic good. The economic good of water is traded in different forms, namely, real water and virtual water. The trade-in virtual water has been gaining momentum as it helps in the sustainable use and allocation of water.⁸ Moreover, India is said to be the biggest exporter of virtual water.⁹

The focus of this paper is to understand the concept of virtual water and how it is traded. It shows the difference between the terms 'real water' and 'virtual water'. The paper also studies

³ International Covenant on Economic, Social and Cultural Rights, 1966, Article 11 & 12; also *Bandhua Mukti Morcha v. UOI*, AIR 1984 SC 802.

⁴ *Water Scarcity*, SCIENCEDAILY https://www.sciencedaily.com/terms/water_scarcity.htm (last visited on Jul.29, 2021).

⁵ *Id.*

⁶ P. Van Der Zaag & H.H.G. Savenije, *Water as an Economic Good: The value of Pricing and the Failure of Markets*, UNESCO-IHE VALUE OF WATER RESEARCH REPORT SERIES NO.19 (Jul, 2006) https://www.waterfootprint.org/media/downloads/Report_19_Water_as_an_Econ_Good.pdf (last visited on Jul.29, 2021).

⁷ World Water Council, *World Water Vision* (London: Earthscan, 2000), at 2

⁸ Alix Gowlland Gualtieri, *Legal Implications of trade in 'Real' and 'Virtual' Water Resources*, (International Environmental Law research Centre, 2/2008-IELRC, 2008), <http://ielrc.org/content/w0802.pdf> (last visited on Jul.29, 2021).

⁹ Roshan Kishore, *India is the Biggest Virtual Exporter of Water*, MINT (Apr.27, 2016), <https://www.livemint.com/Opinion/bPPHFHv19qBaA5qrPa6SuN/India-is-the-biggest-virtual-exporter-of-water.html> (last visited on Jul.29, 2021).

the positive and negative impact of trade in virtual water on the environment. It analyses further whether the trade in virtual water contributes to the water crisis and scarcity in India. It deliberates on the laws applicable to the trade in virtual water. The paper further evaluates the gaps and issues involved in trade in virtual water. Finally, the paper makes some suggestions and recommendations about the inevitable need for a legal mandate

II. CONCEPT OF TRADE IN VIRTUAL WATER

“Water is the driving force of all nature”

---Leonardo Da Vinci

Before we delve into the concept of trade in virtual water, it is crucial to understand the meaning of the term ‘virtual water’. Virtual water is the realization of the amount or quantity of water that is required to produce different types of goods and services.¹⁰ In other words, it refers to the water that is embodied in the product in a virtual sense and not a real sense.¹¹ It is most commonly used concerning agricultural products. For example, to prepare a kg of rice, it takes 2,688 litres of water and 8,763 litres of water to prepare a kg of goat meat.¹² While ‘virtual water trade’ refers to the amount of green or blue water that is utilised or consumed in the process of producing agricultural goods which are then internationally traded in the international market.¹³ This concept of virtual water trade was introduced by Prof Tony Allan and was built by him on the apprehensions of Israelis *“not to ‘over-export’ water-intensive agricultural products given emerging local water scarcity”*.¹⁴ It was introduced by Prof Allan as an alternative to war due to scarce water resources by countries affected by water scarcity by increasing imports of foods that have high water intensity.¹⁵ It is also called as the ‘embedded water’, ‘exogenous water’ and ‘hidden water’. It is said to be the addition made to the indigenous water of a country.¹⁶ Inspired by the concept of virtual water trade, Prof Arjen Hoekstra introduced the concept of ‘water footprint’ as a tool to measure the total quantity of water used for the production of a particular commodity and the total consumption or pollution

¹⁰ Allan J. A, *Virtual water: a strategic resource*, GROUND WATER 36, 545–547. (1998).

¹¹ A.Y.Hoekstra, *Virtual Water Trade: Proceedings of the International Expert Meeting on Virtual Water Trade*, IHE DELFT VALUE OF WATER RESEARCH REPORT SERIES No.19 (Dec.12-13, 2002) <https://www.waterfootprint.org/media/downloads/Report12.pdf> (last visited on Jul.29, 2021).

¹² Kishore, *supra* note 9.

¹³ Allan, *supra* note 10.

¹⁴ Fitzgerald Temmerman, *Virtual water Trade & international trade law*, (NCCR Trade Regulations, 2011/15-NCCR/2011) https://www.wti.org/media/filer_public/52/28/522840cd-fce5-45b1-acc1-530a26100255/working_paper_2011-15__ft__01.pdf (last visited on Jul.29, 2021).

¹⁵ Allan, J. A. (1997), ‘Virtual water’: a long term solution for water short Middle-Eastern economies?, University of London, SOAS - Water Issues Group, 21 p.

¹⁶ Haddadin, M.J, *Exogenous water: A conduit to globalization of water resources*, (2003).

of water by a particular country.¹⁷

There are two approaches made to the definition of virtual water. The first approach refers to the amount of water that is utilised to produce the product in reality and the second approach to virtual water content definition is made from the view of the producer to mean, the amount of water that would be required to produce the product at a country where such a product is in sufficiently available due to water scarcity. The latter approach raises problems in circumstances where the production of such a product is impossible in the country importing virtual water.¹⁸ It is said that the system of virtual water was introduced to arrest the economic link that is not visible and to capture the silent political link between the highly water-intensive goods demand and the endowment of water of countries exporting and importing it.¹⁹ The rationale for conceptualizing the term virtual water is “water savings”, “distribution of water scarcity and “efficient utilisation of global water”.²⁰

III. TRADING REAL WATER VS. VIRTUAL WATER

We live in a century where there is reality and there is virtual form. In a sense, for every real product or service, a virtual form is created in the future. Some instances of real and virtual products would be real currency and virtual currency, cryptocurrency, bitcoin etc. Likewise, we now have real water and virtual water. Trade in real water refers to the many ways the actual water is traded as a commodity like bottled water or water that is used in the preparation of cold drinks like Pepsi, coke and other products in which water is added as a component.²¹ The real water is also traded in bulk under the GATT and WTO international trade rules.²² On the other hand, virtual water denotes the total amount of water supplied in the global market through trade in agricultural commodities.²³

(A) Impact of Virtual Water on the Environment

The introduction of virtual water raises export opportunities. This results in the rise in contamination of water levels and leads to increased extraction of water resources to produce

¹⁷ Hoekstra, A. Y. and P. Q. Hung, *Virtual Water Trade, A Quantification of Virtual Water Flows Between Nations in Relation to International Crop Trade*, Value of Water Research Report Series No. 11 (2002).

¹⁸ Hoekstra, *supra* note 11.

¹⁹ El-Sadek, A, *Virtual water trade as a solution for water scarcity in Egypt*, WATER RESOUR. MANAGE, (2010) 24, 2437– 2448.

²⁰ Suparana Katyaini & Anamika Barua, *Assessment of interstate virtual water flows embedded in agriculture to mitigate water scarcity in India (1996-2014)*, 53 (8) WATER RESOURCES RESEARCH (Aug.1, 2017) <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016WR020247> (last visited on Jul.29, 2021).

²¹ Gualtieri, *supra* note 8.

²² *Id.*

²³ *Id.*

more agricultural products.²⁴ The escalation in the virtual water trade internationally has led to the loss of control over water resources from local communities residing near the water body, thereby shifting the control to Multinational corporations, retail companies and agribusinesses.²⁵ The prevailing protest by farmers in New Delhi is a result of the three farm laws enacted by the Union Government which gives control to corporate companies about agricultural products. Moreover, agribusinesses escalate the adverse impacts on the environment by depleting groundwater and freshwater resources. It also leads to the closing of rivers and falling groundwater tables.²⁶ Most commonly affected by the environmental consequences of deteriorating water are the poor people who cannot afford the rising prices of clean water.²⁷ Other environmental costs of virtual water are over-extraction and exploitation of water in countries that are rich in water and encouraged to cultivate crops that are water intensive and the environmental cost of shipping the agricultural products.²⁸

(B) Does Virtual Water add to the water crisis in India?

It is argued that there cannot be any more profitable method used for the production of goods that are water intensive and that the virtual water contains in itself real water. The popular argument advocating virtual water is that a country could preserve its freshwater by becoming an importer of virtual water. This argument, however, fails to take into account the economic development angle. In a country like India, where agriculture is the backbone of the country, virtual water indeed adds stress to the water-logged places and contributes to the water crisis in India.

IV. LEGAL FRAMEWORK APPLICABLE TRADING IN VIRTUAL WATER

The legal framework that is applicable to trade in virtual water can be classified into two categories, namely, international trade legal framework and National Legal framework.

(A) International Legal Framework

With the advent of liberalisation and globalization, products traded internationally are subject to WTO agreements. Virtual water trade will be subject to international trade regimes. The trading in virtual water embedded in agricultural products comes under tariff reduction,

²⁴ Jeroen Vos & Rutgerd Boelens, *The politics and Consequences of Virtual Water Export*, (Nov, 2016) https://www.researchgate.net/publication/310901298_The_Politics_and_Consequences_of_Virtual_Water_Export (last visited on Jul.29, 2021).

²⁵ *Id.*

²⁶ *Id.*

²⁷ *Id.*

²⁸ Gualtieri, *supra* note23.

regulation for water efficiency, reforms for subsidy and water labelling.²⁹ The WTO Agreements that are involved with virtual trade in water are GATT, 1994 in case of products that are not agricultural products, the Agreement on Subsidies and Countervailing Measures, 1994, the Agreement on Agriculture, 1994 and the Agreement on Technical Barriers to Trade, 1994. The main issue discussed in the trade negotiations of the Doha Conference was to reduce subsidies that distort trade and to include improved access to the market by the reduction in tariffs as it was felt that subsidy elimination and reduction of tariffs will affect the virtual water trade.³⁰ Liberalization alone will not enhance virtual water trade to address the problem of the water crisis. Both types of water labelling, namely, labelling of the source of water or water intensity labelling as fossil aquifers have implications in international trade law.³¹

(B) National Legal Framework

In the Indian Legal Framework, the term water is subject to the State List under Schedule VII of the Constitution of India, 1950 about “17. *Water that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List – I*”³² Union list of the Indian Constitution provides in its entry 56 about water as follows: “56. *Regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union are declared by Parliament by law to be expedient in the public interest.*”³³ Under these entries, the Centre enacted the Water (Prevention and Control of Pollution) Act, 1974 to prevent pollution in water bodies and to maintain and restore wholesomeness of water. India also enacted a National Water Policy in the years 1987, 2002 and 2012. None of the legal provisions or policies mentions the term ‘virtual water trade’. Nevertheless, India is the biggest exporter of virtual water.³⁴ Recent debates on the interlinking of rivers project discussed the value of trade in virtual water in principal crops over other states.³⁵

V. ANALYSING THE GAPS AND ISSUES OF TRADE IN VIRTUAL WATER

The concept of virtual water trade is very much new to the existing water trade policies in India. Virtual water in India has stayed hidden from our policymakers like its name. There are many

²⁹ Edith Brown Wales & Lydia Slobodian, *Virtual Water, Water Scarcity, and International Trade Law*, 17 J. INTL. ECON. LAW 717-737 (2014) <https://scholarship.law.georgetown.edu/cgi/viewcontent.cgi?article=2634&context=facpub> (last visited on Jul.29, 2021).

³⁰ Doha Ministerial Declaration, WT/M/N(01)/Dec/1, Adopted on 20 November 2001.

³¹ Wales & Slobodian, *supra* note 29.

³² Constitution of India, Schedule VII, State List, entry 17.

³³ Constitution of India, Schedule VII, Union List, entry 56.

³⁴ Kishore, *supra* note 12.

³⁵ S. Parveen & I-M- Faisal, *Trading virtual water between Bangladesh and India: A politico-economic dilemma* 6 Water Policy 1(2004).

positive consequences to becoming a virtual trade importer. Some of them are reduced water usage in agriculture, water efficiency and conservation. However, there are some gaps and issues in the trade of virtual water which need to be addressed. Firstly, the need to shift from virtual water exporter to importer to avoid surplus export carries with it the risk of unemployment and disadvantage to farmers. In a country, where already the farmers are dissatisfied due to the recent enactment of far laws, lack of water for cultivation, low standard of living for farmers, and increasing suicides of farmers, such a drastic shift would pose severe risk to the cost of farmer's lives. Secondly, the term 'virtual water trade' carries with itself definitional confusion as the bare reading of the term 'virtual water trade' would lead one to understand that water is being traded like a stock in stock exchanges or Renewable Energy Certificates in Power Trading Exchanges. Further, the word virtual makes one think that it is something like a game in virtual reality and virtual would raise confusion of how one would utilise such water and trade it.

Thirdly, there is a need to evolve universal accounting standards and methods to calculate virtual water that is utilised, consumed and polluted and which would be traded as different countries would evolve different approaches to calculate the virtual water traded. There are chances of miscalculation or a particular sector being completely omitted. In such a case the virtual water spent would still be an expense as it would not be a non-expense just because it was not provided for. Fourthly, some chances developed countries would prefer to import virtual water, thereby, preserving its natural water resources. This would be unfair to most water-rich exporting countries as it would be stressed to supply the developed country in addition to countries facing severe water scarcity with water-intensive products and goods. Such a situation might also lead to a worst case scenario of armed conflict or war. And lastly, water as an economic good when traded internationally would have a pricing system that would inflate over the years. This is directly detrimental to achieving not just Sustainable Development Goal 6 to achieve clean water and sanitation for all but also infringes and encroaches upon the fundamental right water and fundamental right to clean drinking water to all under Article 21 of the Constitution of India, 1950. Besides, the rise in prices of virtual water imports would adversely impact the affordability of virtual water in countries facing severe water scarcity.

VI. SUGGESTIONS AND CONCLUSION

The following are some suggestions and recommendations to formalise trade in virtual water in India:-

- There is a need for a clear-cut definition and the distinction between virtual water trading

and trading in virtual water which suggests a stock exchange-like situation for water.

- Formalisation of trade in virtual water must be done through a legal framework or policy which is specific to water or virtual water as an economic good.
- The legal framework should contain the following aspects:
 - i) Proper definition
 - ii) Different categories of water
 - iii) Accounting for the water consumed by different sectors and activities
 - iv) Sustainable and efficient use of water
 - v) Promote the import of virtual water
- Need for a National Water Policy to include goals on virtual water trade and the goals must concentrate more on the import of virtual water than export to conserve water and avoid water stress and crisis.
- Encourage farmers to take up cultivating water-efficient crops and shift towards water conservation.
- Make industries and the agricultural sector keep account of the water used to track virtual water.
- Create awareness about the concept of virtual water among farmers, agriculturalists, industries and others to attain sustainable development.

Understanding and having sufficient knowledge of virtual water would help states against water mismanagement and avoid water scarcity. Besides, the calculation of virtual water helps the Central government to allocate water better in case of water conflicts based on the performance of each state's virtual water. Trade in virtual water also helps prevent climate change to an extent and attain self-sufficiency in different countries.

To conclude with a quote of Mahatma Gandhi - "*Earth provides enough to satisfy every man's needs, but not every man's greed*"

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