

Research on Adjusting Virtual Water Trade in Coffee Import and Export Transactions for Vietnam

Nguyen Giang Chau¹ · Nguyen Huong Giang¹ · Nguyen Thi Thu Huong^{1*}

¹ Department of Environmental Science and Technology, School of Chemistry and Life Sciences, Hanoi University of Science and Technology, Hanoi, Vietnam

Abstract

Vietnam, the world's second-largest coffee exporter, is a net virtual water exporter mainly from green water (>95%). Despite high water-use efficiency, limited renewable water and medium stress threaten long-term sustainability.

Introduction

Vietnam, the world's No.2 coffee exporter, trades a high-water-footprint crop (~7,000 m³/t). The study quantifies virtual water flows, evaluates global water saving/loss, classifies sustainability, and suggests reallocation via the VWS index.

Materials and Methods

Data type	Source
W	ITC Trade Map
VWC	WF Network
WSI	FAO Aquastat
TRWR	FAO Aquastat
References	Various

$$VWE_i = VWC_i \times W_i$$

$$VWI_i = VWC_j \times W_j$$

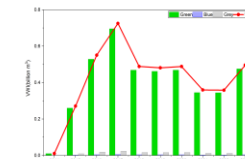
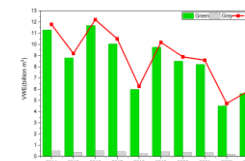
$$WS_{ec,ic} = (VWC_{ic,c} - VWC_{ec,ic}) \times W_{ic}$$

$$VWS_i = \frac{VWD_i}{\sum_{j=1}^n VWD_j} \times Q$$

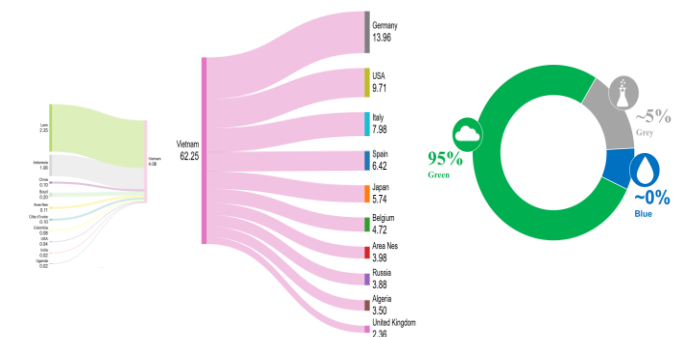
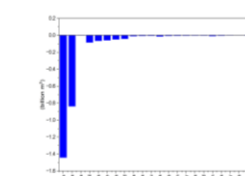
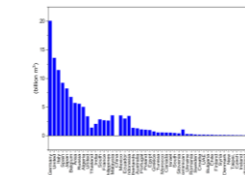
Sustainability	TR WR	V W C	W S I
	Export - Import		
Complete sustainability	>	<	<
Fragile sustainability	>	<	>
High unsustainability	<	>	>
Moderate unsustainability	>	>	>
	<	<	>
Low unsustainability	>	>	<
	<	<	<

Results

1. Virtual water balance and structure



2. GWS/GWL



3. Sustainability and transaction reallocation

Total trade exports VN: 106

- Unsustainable: 13
- Sustainable: 93

Vietnam is a country with average level of virtual water stress and quantity.

