Trade digitalization / paperless trade for climate-smart trade

by

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APTIR 2021 Recommendation 5: 
Accelerate trade digitalization

“Each single end-to-end trade transaction undertaken fully digitally could save emissions equivalent to planting 1.5 trees. For the whole of Asia-Pacific, this implies savings of about 13 million tons of CO2 annually, equivalent to the carbon absorbed by 400 million trees.”
Climate change and trade facilitation: Estimating GHG Emission Savings from Implementation of Cross-Border Paperless Trade in Asia and the Pacific

Yann Duval¹ and Simon Hardy²

Abstract
The Framework Agreement on Facilitation of Cross-Border Paperless Trade in Asia and the Pacific entered into force in February 2021. While economic benefits associated with paperless trade facilitation are well known, little attention has been paid to measuring the potential environmental benefits. Accordingly, this article sets out to quantify the amount of greenhouse gas emissions that could be saved if all trade-related paper documents in the region are ultimately replaced by digital documents and data exchange, as foreseen in the regional framework agreement. This is carried out by combining detailed descriptions of trade transactions, data on trading volumes and relevant emission factors. Even with conservative assumptions, the emissions saved by fully digitising a single end-to-end trade transaction are equivalent to planting 1.5 trees. For the Asia-Pacific, this implies savings of about 13 million tonnes of CO₂e annually, equivalent to the carbon absorbed by 400 million trees. The results are driven by efficiency gains from handling data digitally rather than by the direct savings of paper and ink.

JEL Codes: F18, H83, Q56

Keywords
International trade, trade facilitation, environment, digitisation, climate change

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Context
• SDGs and climate change crisis
• Framework Agreement on Facilitation of Cross-Border Paperless Trade in Asia-Pacific (UN treaty entered into force 2021)
• Economic and inclusiveness potential of trade facilitation (the simplification and digitalization of trade procedures) well known
• Environmental impact of trade procedures not tracked / quantified

https://doi.org/10.1177%2F26316846211035567;
See also earlier ARTNeT WP (May 2021) at: https://artnet.unescap.org/index.php/publications/working-papers/primer-quantifying-environmental-benefits-cross-border-paperless-trade
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Key results
- Fully digitalizing a single end-to-end trade transaction = emission savings of 1.5 trees
- For Asia-Pacific, equivalent to about 13 million tonnes of CO2e per year (400 million trees)
- Results driven by efficiency gains from handling data digitally rather than by direct savings of paper/ink.

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Climate change and trade facilitation: Estimating GHG Emission Savings from paperless trade implementation

<table>
<thead>
<tr>
<th>Table 1. Channels Through Which Implementing Paperless Trade Affects Greenhouse Gas Emissions.</th>
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</thead>
<tbody>
<tr>
<td><strong>Elimination of physical documents</strong></td>
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<td><strong>Replacement of physical delivery</strong></td>
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<td></td>
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<tr>
<td><strong>Productive hours</strong></td>
</tr>
<tr>
<td><strong>Storage time</strong></td>
</tr>
</tbody>
</table>

**Source:** The authors.
Climate change and trade facilitation:
Estimating GHG Emission Savings from paperless trade implementation

• Overview of Methodology (1)
  – Identify a “typical” transaction
    • Based on 20+ Business Process Analysis (BPA) studies of import/export procedures in Asia-Pacific
      – Scope: BUY-SHIP-PAY (transport of goods not included)
        » No of stakeholders: 13.3
        » No of paper documents: 46.4 (including 22 copies)
        » Trade transaction time: 19.7 days
Climate change and trade facilitation:
Estimating GHG Emission Savings from paperless trade implementation

- Overview of Methodology (2)
  - For each transaction process/activity
    - Identify and estimate change in inputs saved when moving to fully paperless trade.
    - Calculate GHG savings for each process, based on emission factors associated with each input
    - Sum to arrive at GHG savings per trade transaction
  - Scale to national, regional or global level
    - Assuming average transaction size of USD 50,000
Climate change and trade facilitation: Estimating GHG Emission Savings from paperless trade implementation

- Limitations
  - Strong assumptions made due to lack of data
    - e.g. emission factors apply to transactions in all countries

→ Results very much exploratory
**Table 5. Emissions Saved from Implementing Cross-Border Paperless Trade.**

<table>
<thead>
<tr>
<th>Estimated emissions saved per transaction (gCO₂e)</th>
<th>Average</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>3,814</td>
<td>1,562</td>
<td>7,041</td>
</tr>
<tr>
<td>Ink</td>
<td>14</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>Transport</td>
<td>3,509</td>
<td>850</td>
<td>7,381</td>
</tr>
<tr>
<td>Printer</td>
<td>129</td>
<td>53</td>
<td>238</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td><strong>10,240</strong></td>
<td><strong>918</strong></td>
<td><strong>41,731</strong></td>
</tr>
<tr>
<td><strong>Productive hours</strong></td>
<td><strong>30,098</strong></td>
<td><strong>16,346</strong></td>
<td><strong>62,857</strong></td>
</tr>
</tbody>
</table>

**Estimated emission savings**

- Average: 47,804
- Low: 19,734
- High: 119,273

Trees required to match these savings in a year:

- Average: 1.5
- Low: 0.6
- High: 3.8

**Aggregate Estimates (metric tons CO₂e)**

| Asia-Pacific estimated emission savings | 12,984,573 | 5,360,132 | 32,397,150 |
| Trees required to match these savings in a year | 412,208,662 | 170,162,923 | 1,028,480,951 |

**Source:** The authors.

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See also earlier ARTNeT WP (May 2021) at: https://artnet.unescap.org/index.php/publications/working-papers/primer-quantifying-environmental-benefits-cross-border-paperless-trade
ESCAP paperless trade emissions calculator

MANUALS AND TRAINING MATERIALS

23 August 2023

ABSTRACT

The Paperless Trade Emissions Calculator of United Nations ESCAP (2021) allows users to calculate and compare the greenhouse gas (GHG) emissions associated with the production and delivery of paper or paperless trade procedures. This tool provides a standardized way to assess the carbon footprint of paper-based and paperless trade processes, enabling users to make informed decisions on reducing their environmental impact.

1. Data

The calculator requires data on the paper use, transportation, and storage of goods during the trade process. Users must input values for the following:

- Quantity of goods (metric tonnes)
- Import volume (tonnes)
- Export volume (tonnes)
- Number of documents

2. Assumptions

The calculator makes assumptions about the environmental impact of various activities, such as:

- Paper production
- Transportation
- Storage

3. Results

The calculator outputs the estimated emissions per transaction, allowing users to compare different trade scenarios.

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ADDITIONAL FILES

Trade Value Data (10 KB)
TPAD Data Page Numbers (33 KB)
Cartridge Page Yield Calculations (14 KB)
Emmission Calculator Version 2 (109 KB)

Climate change and trade facilitation:
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• Conclusion & way forward
  – Significant climate change mitigation benefits of trade facilitation and paperless trade on a per transaction basis
    • Useful to decrease the “direct effect” of trade on the environment, but trade facilitation also has a “scale effect” (increased number of transactions → increased trade and economic activity)
  – But GHG emission savings from paperless trade remain small compared to emissions from international transport of goods → need to specifically target transport emissions
    • “global emission-saving estimates from paperless trade implementation represent only 1.1% of the emissions from fuel used in global supply chains (Duval and Hardy, 2021)”
THANK YOU

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www.unescap.org/our-work/trade-investment-innovation
Environmental impact of the export process of Bangladesh readymade garments

- Extends BPA methodology to environmental impact assessment
  - Primary data collected from exporters
- Environmental impact of “as-is” process measured in terms of
  - GHG emissions,
  - waste generation and
  - water usage
- → confirms importance and potential to reduce environmental impact through trade digitalization

Asia-Pacific Trade and Investment Report on Accelerating climate-smart trade and investment for sustainable development

How can trade and investment-related policies be more “climate-smart” - and help address climate change?

www.unescap.org/kp/APTIR2021
Effects of trade and investment on GHG emissions is complex – no simple answers and better data needed.

- **Direct effect**: GHG emissions due to transportation and trade procedures
- **Scale effect**: GHG emissions due to increased economic activity
- **Regulatory effect**: Effect of trade on adoption of certain climate-related policies
- **Composition effect**: GHG emissions due to production structure
- **Technique effect**: Spread of climate-smart products and technology

www.unescap.org/kp/APTIR2021