



A Wolf in Plastic Clothing: Identifying Plastic Use in Global Industries

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Global Challenges of Plastic Pollution – MIT Global Change Forum



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Plastic Pollution

Plastic pollution causes ecosystem degradation from suffocation, dispersal and starvation of plant and animal species (Thushari & Senevirathna, 2020).

It can also have negative impacts on:

- the productivity of fisheries and industries reliant on natural capital
- tourism
- human health (WHO, 2022)



Plastic Policies

Plastic pollution policies to date have been focused on consumer facing plastic products (Howard et al., 2019). This includes:

- Canada's plan to remove some single-use plastics (e.g. plastic straws, plastic bags, plastic cutlery and plastic plates)
- Peru's policy to ban single-use plastics at its natural and cultural protected areas
- EU's approval of a reduction in single-use plastics

Appropriate data and tools are required to identify and target the major sources of plastic pollution.



Economic data can be used to identify plastic use and contribute to an understanding of potential policy targets.

Input-Output Data

- Input-output data provide a representation of the flow of goods or services in different regions.

SOCIAL ACCOUNTING MATRIX		EXPENDITURES				
		<i>Production activity</i>	<i>Factors of production</i>	<i>Institutions</i>	<i>Other (exogenous)</i>	TOTAL
RECEIPTS	<i>Production activities</i>	Interindustry transactions		Consumer expenditures	Exports	
	<i>Factors of production</i>	Value added			Net factor income from abroad	
	<i>Institutions</i>		Wages and profits	Transfers and taxes	Transfers (remittances)	
	<i>Other (exogenous)</i>	Imports		Imported consumer goods		
	TOTAL					

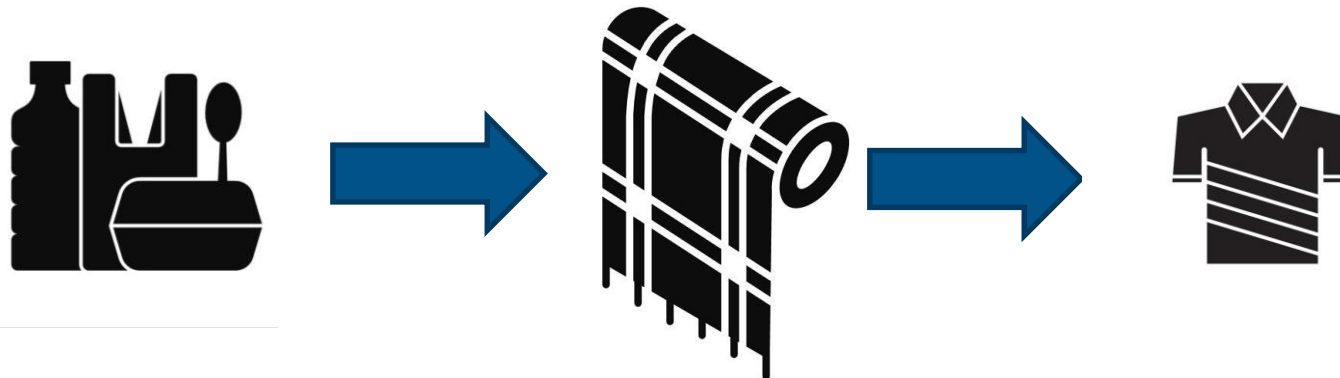
- It can be used to understand the use of plastics by different industries and the flow of those plastics through the world economy.

Input-Output Data

- Direct use of plastic occurs when an industry uses inputs of a plastic commodity.

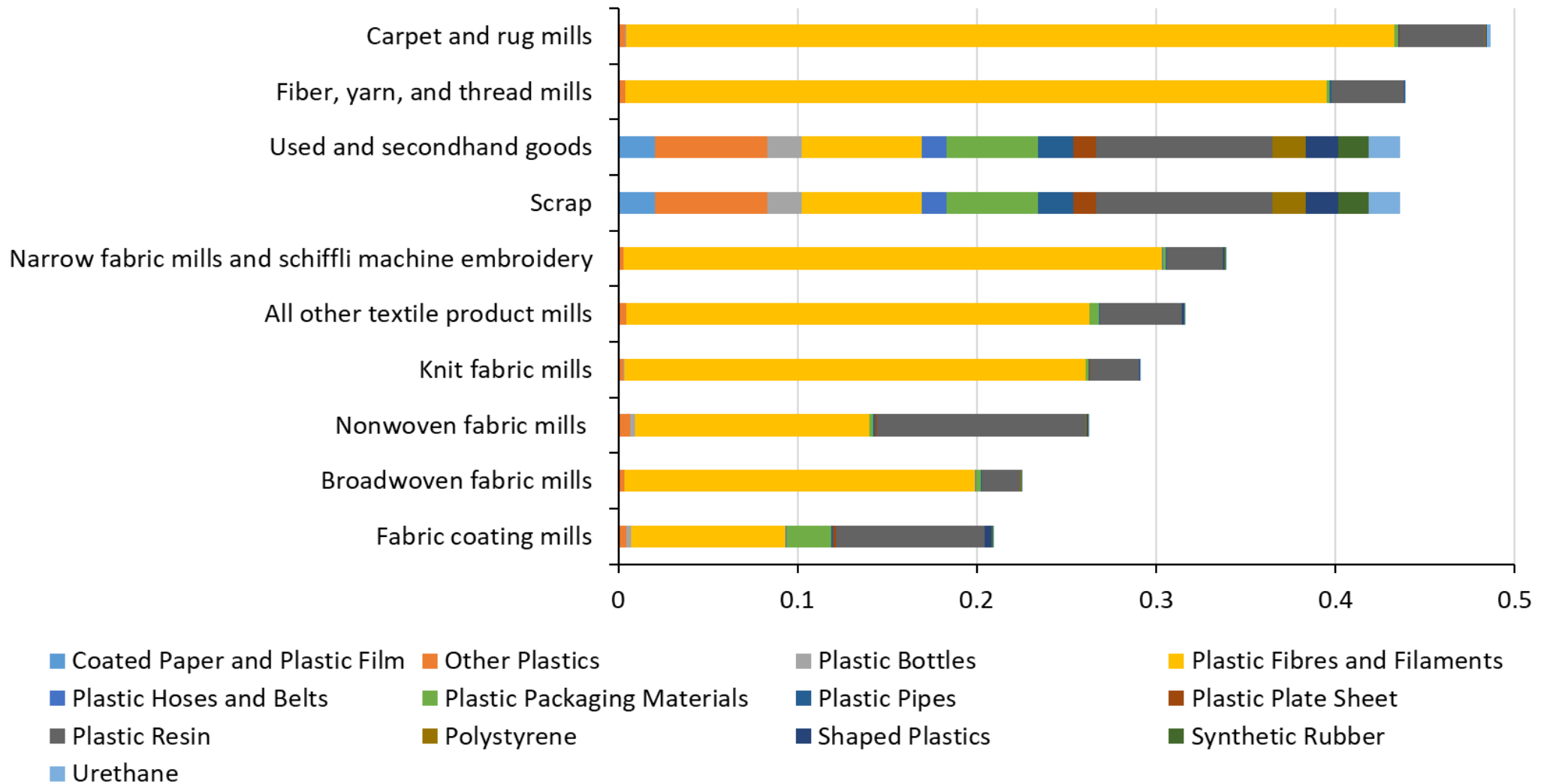


- Indirect use of plastic occurs when an industry uses an input that was produced, in part, using plastics.



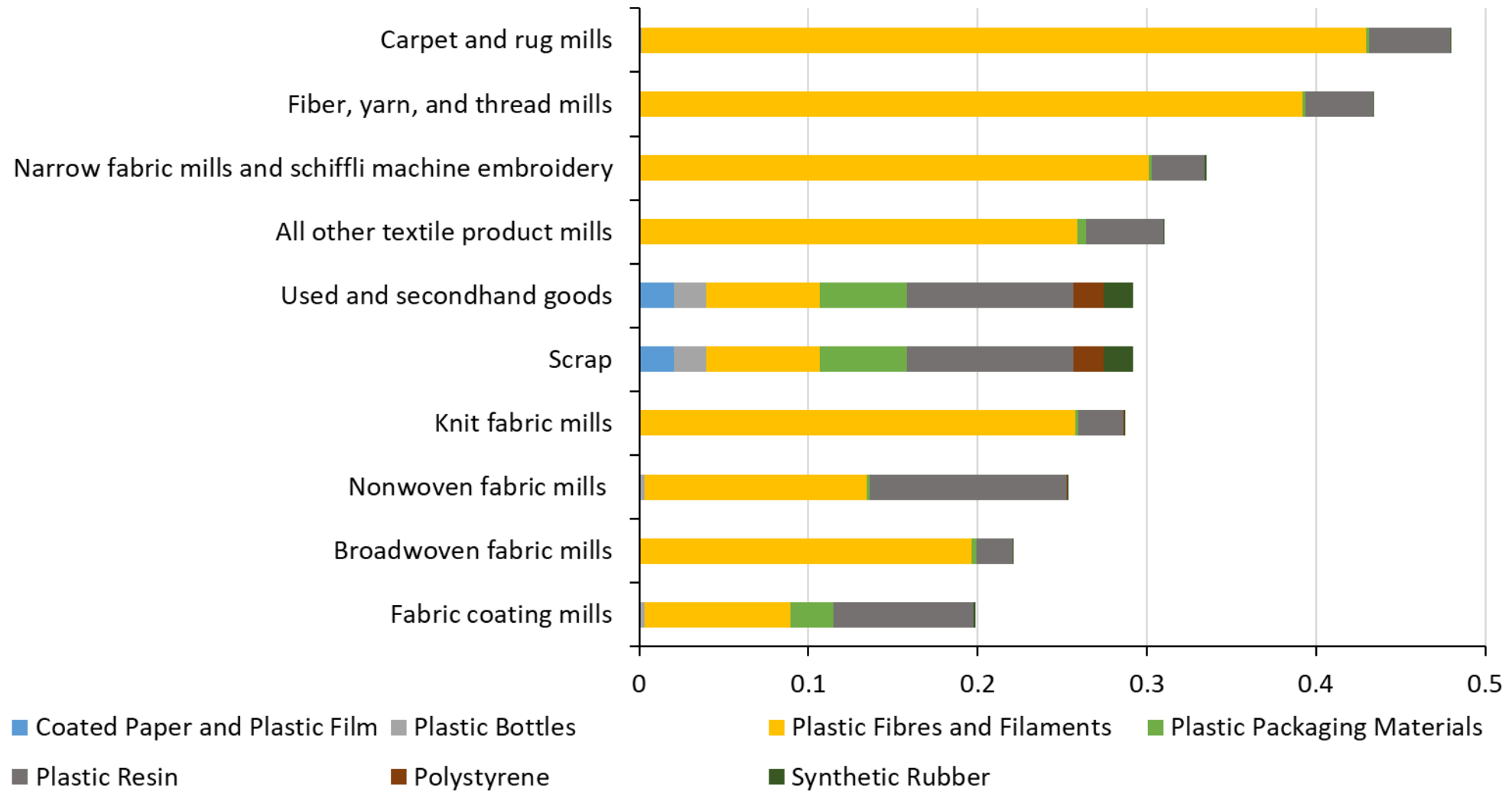
US Plastic Intensity by Industry and by Plastic Type

Plastic intensity is the value of plastic inputs for every dollar of output.

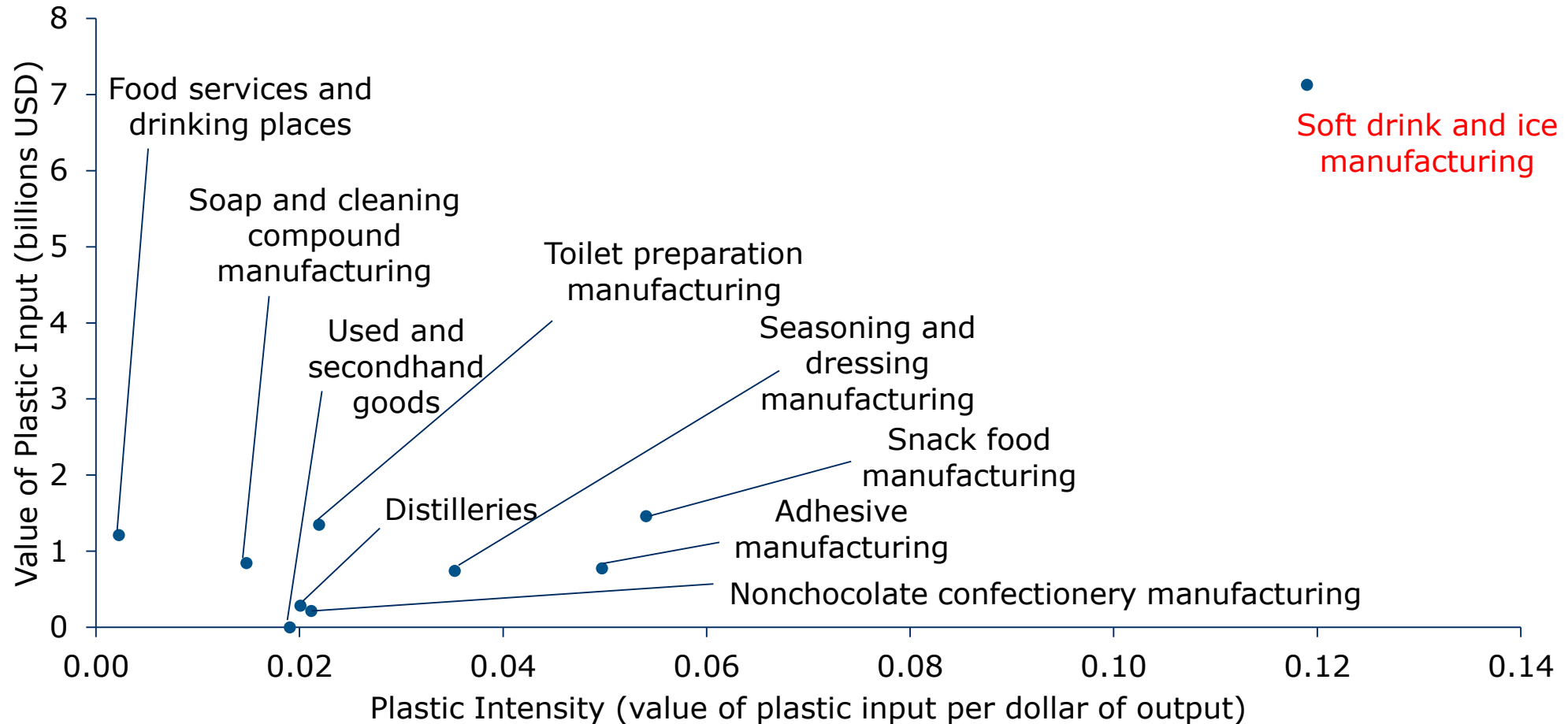


Source: White, D. & Winchester, N. (2023) The plastic intensity of industries in the USA: the devil wears plastic. Environmental Modeling and Assessment, 28, 15–28. Available from: <https://doi.org/10.1007/s10666-022-09848-z>

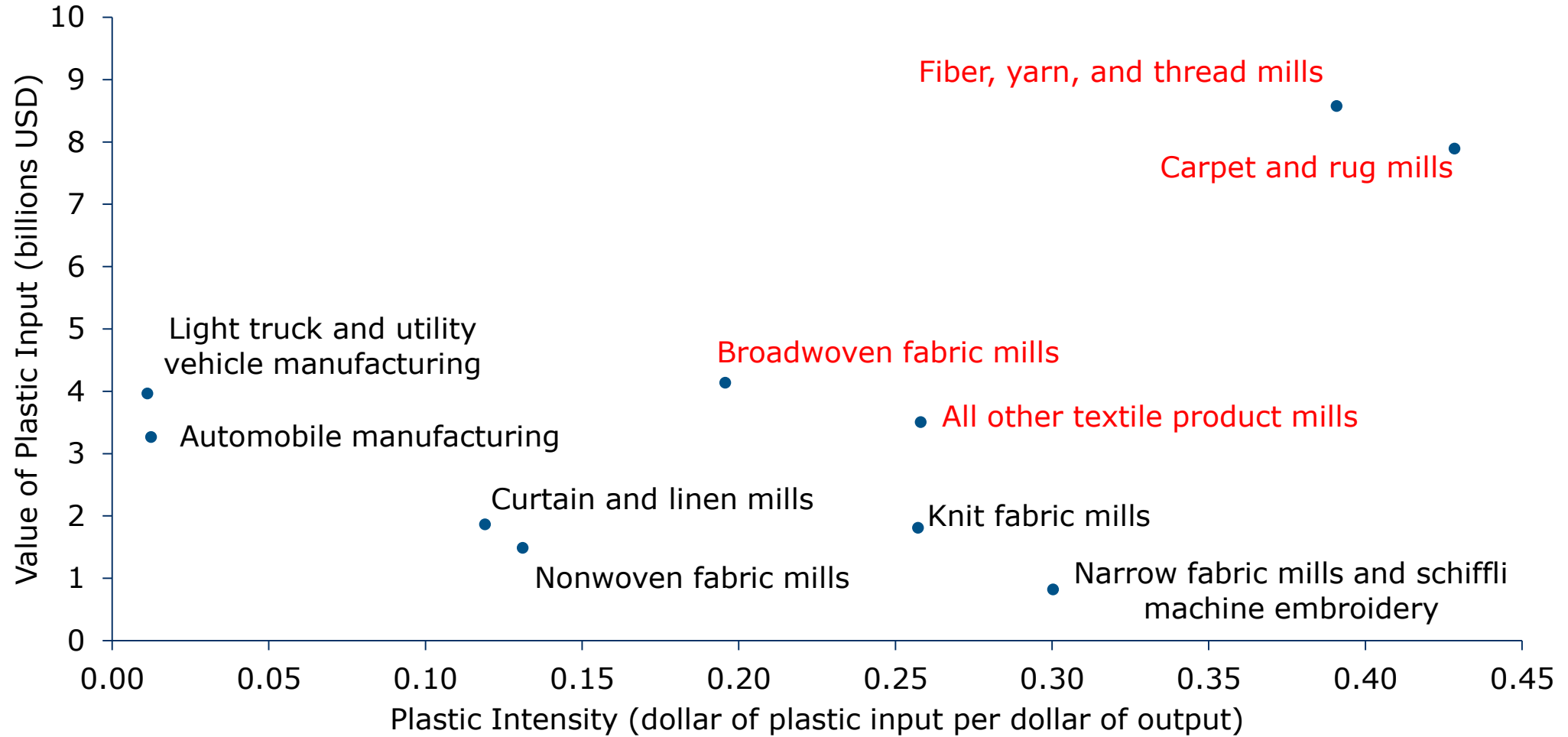
US Plastic Intensity by Industry and by Polluting Plastic Type



US Plastic Bottles Intensity and Value of Plastic Input by Industry

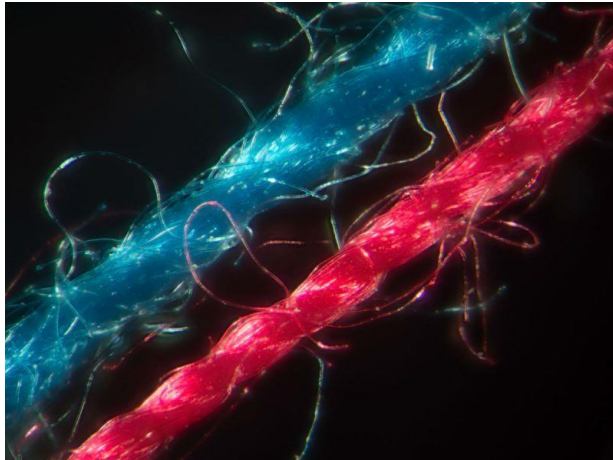


US Plastic Fibers and Filaments Intensity and Value of Plastic Input by Industry



Clothing and Textile Plastic Use

- Food and drink related industries are plastic intensive for some plastic commodities, but they do not dominate the list of the most plastic intensive industries as might be expected.
- Clothing and fabric manufacturing related industries are highly plastic intensive, especially for plastic fibers and filaments.
- Plastic fibers can end up in waterways through the washing of clothes. One piece of clothing can produce over 1900 fibers per wash (Browne et al., 2011).

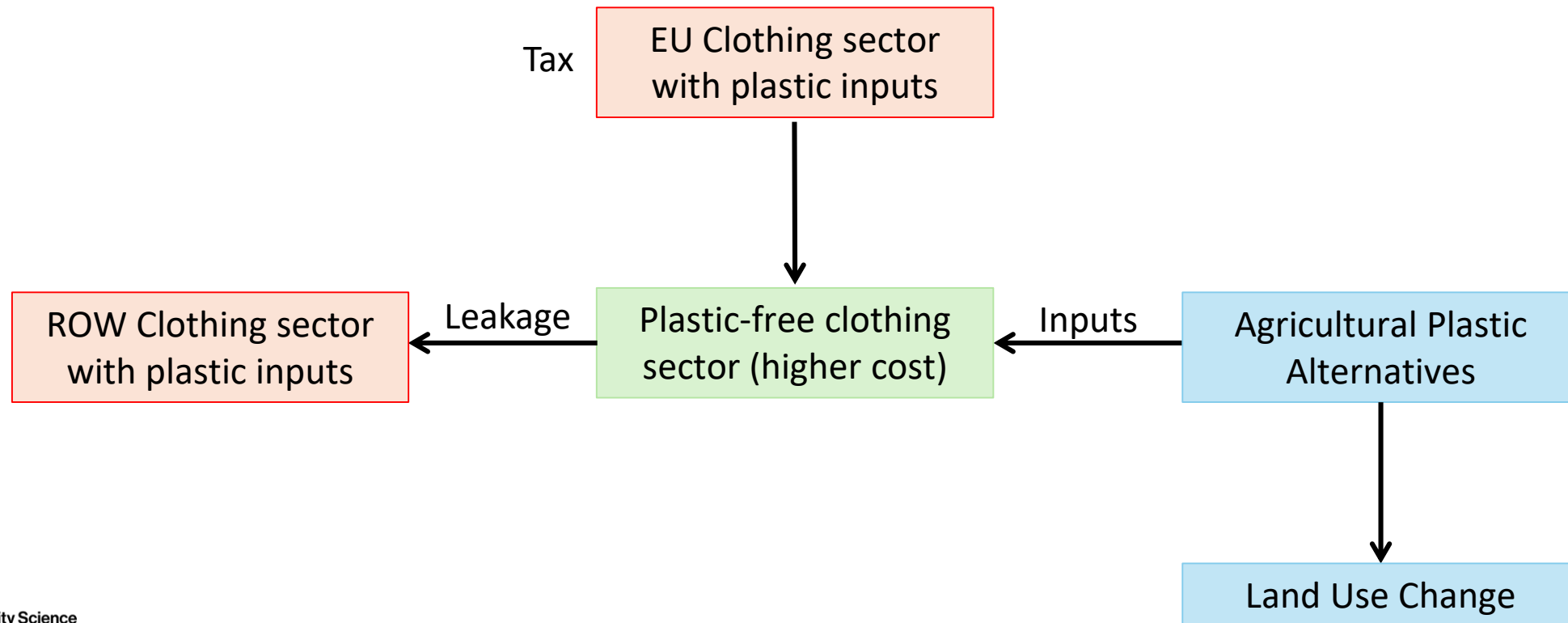


A World without Plastic Clothing

- To combat this pollution from clothing either global sewerage systems need better filtration or clothing needs to be made out of non-plastic materials.
- We used a model similar to EPPA to examine policies which would make clothing and textile production be plastic and synthetic chemical free.

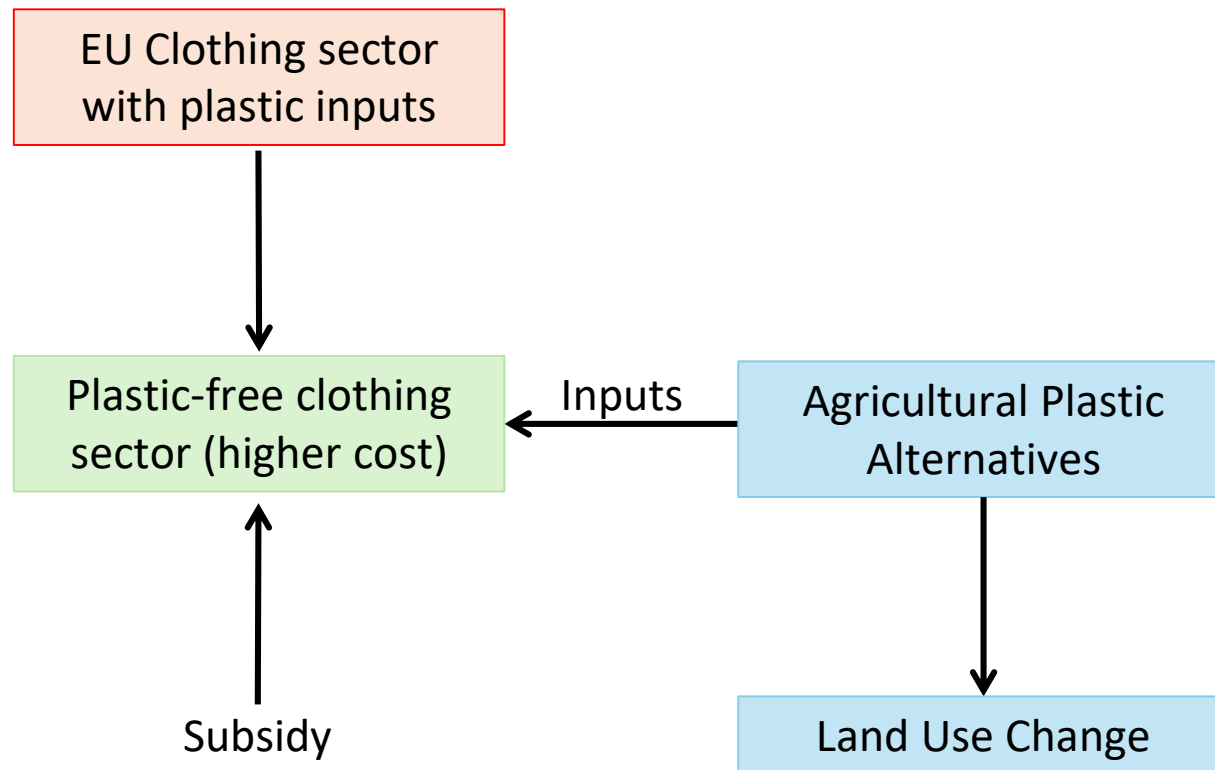
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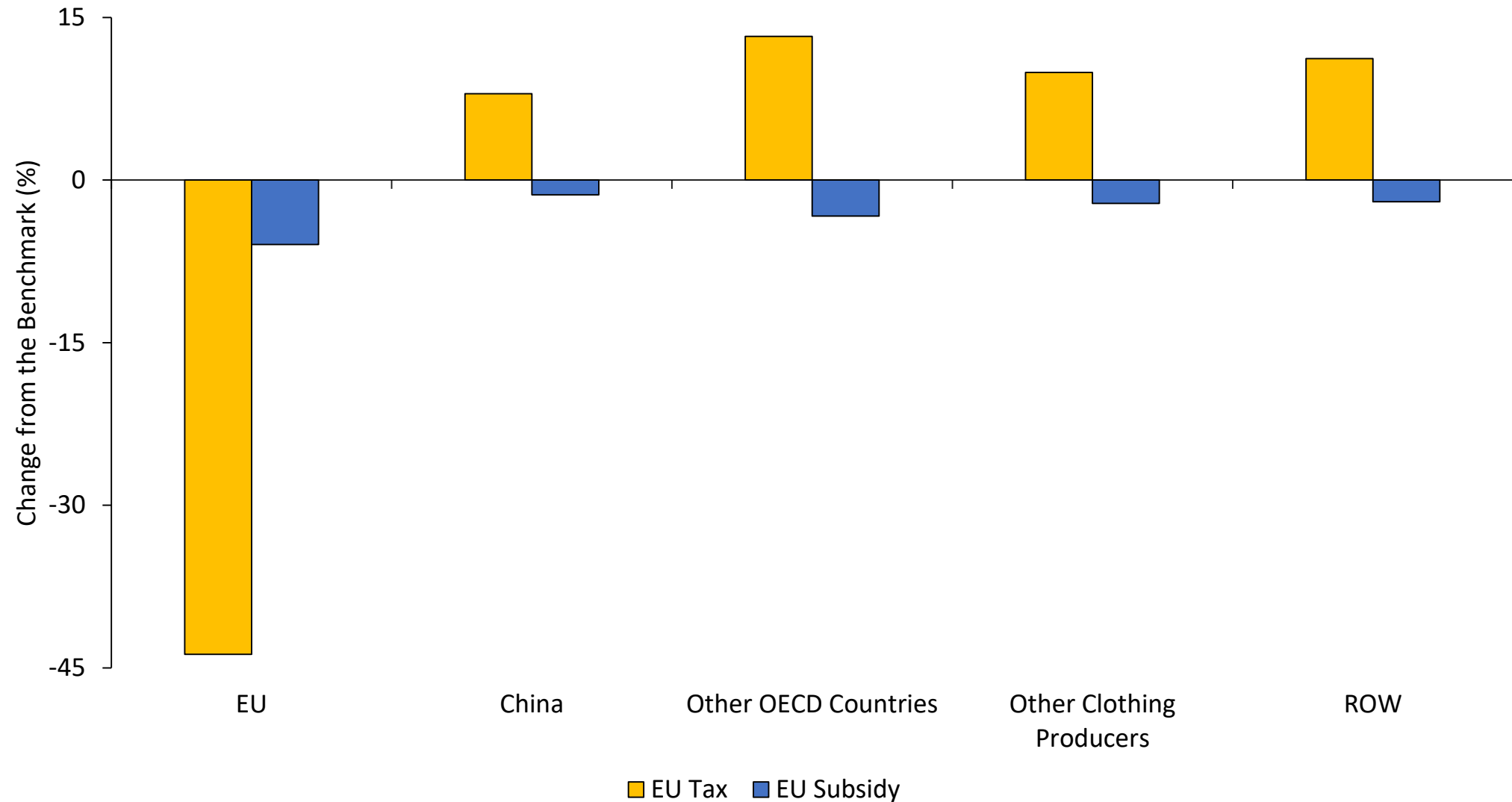


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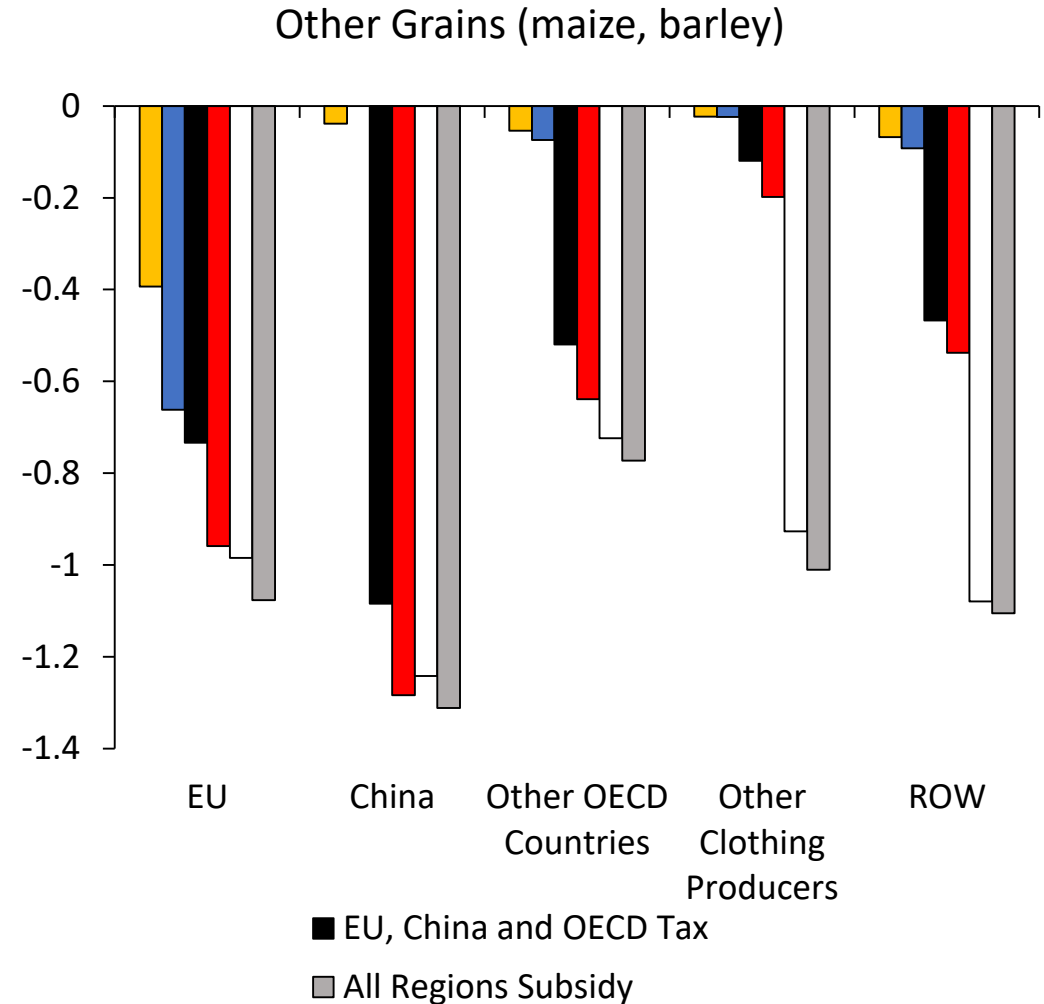
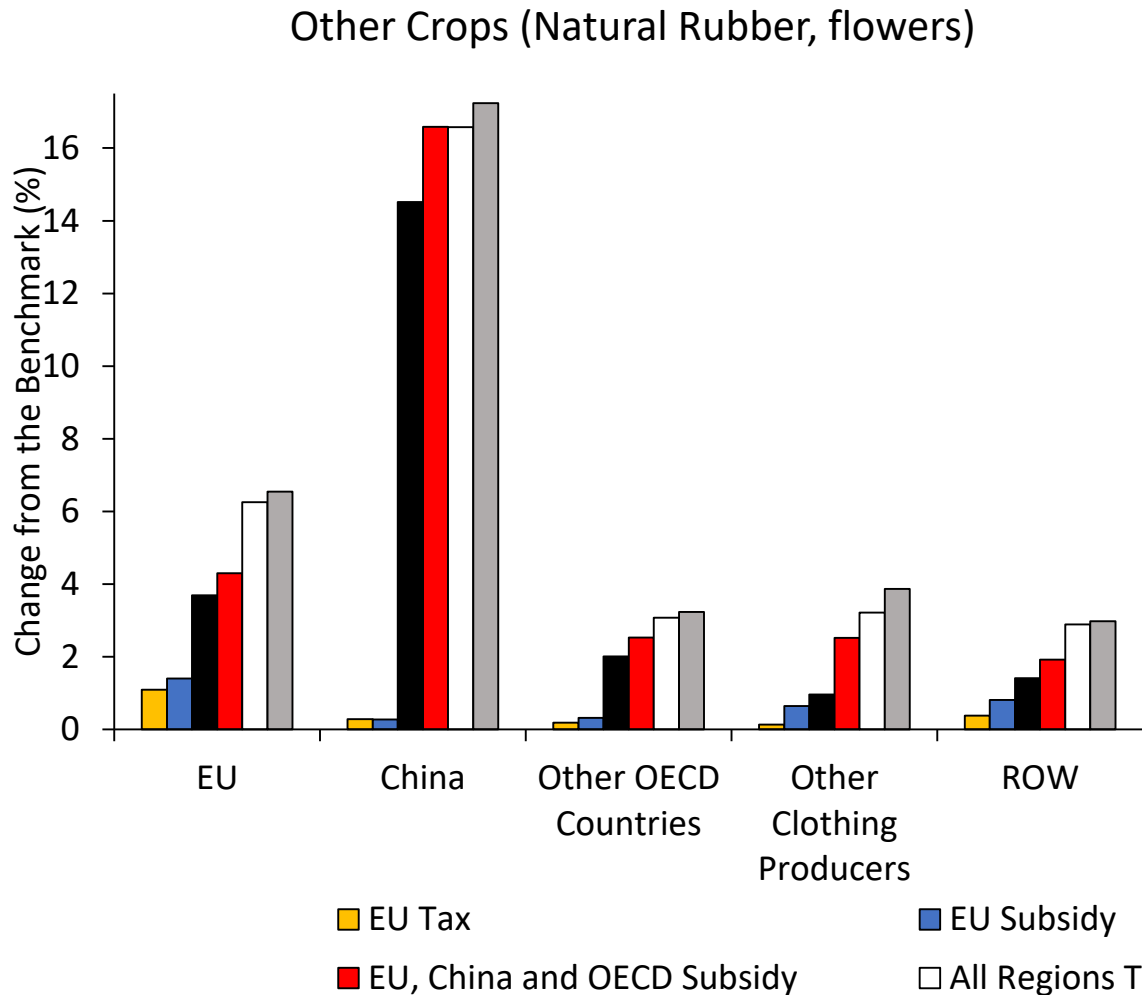


Change in Clothing Exports



Source: White, D. & Winchester, N. (2024) Making a material difference: The impacts of a change to plastic-free clothing. The Australian Journal of Agricultural and Resource Economics, 69(1), 200-231. Available from: <https://doi.org/10.1111/1467-8489.12599>

Land Use Change



Conclusions

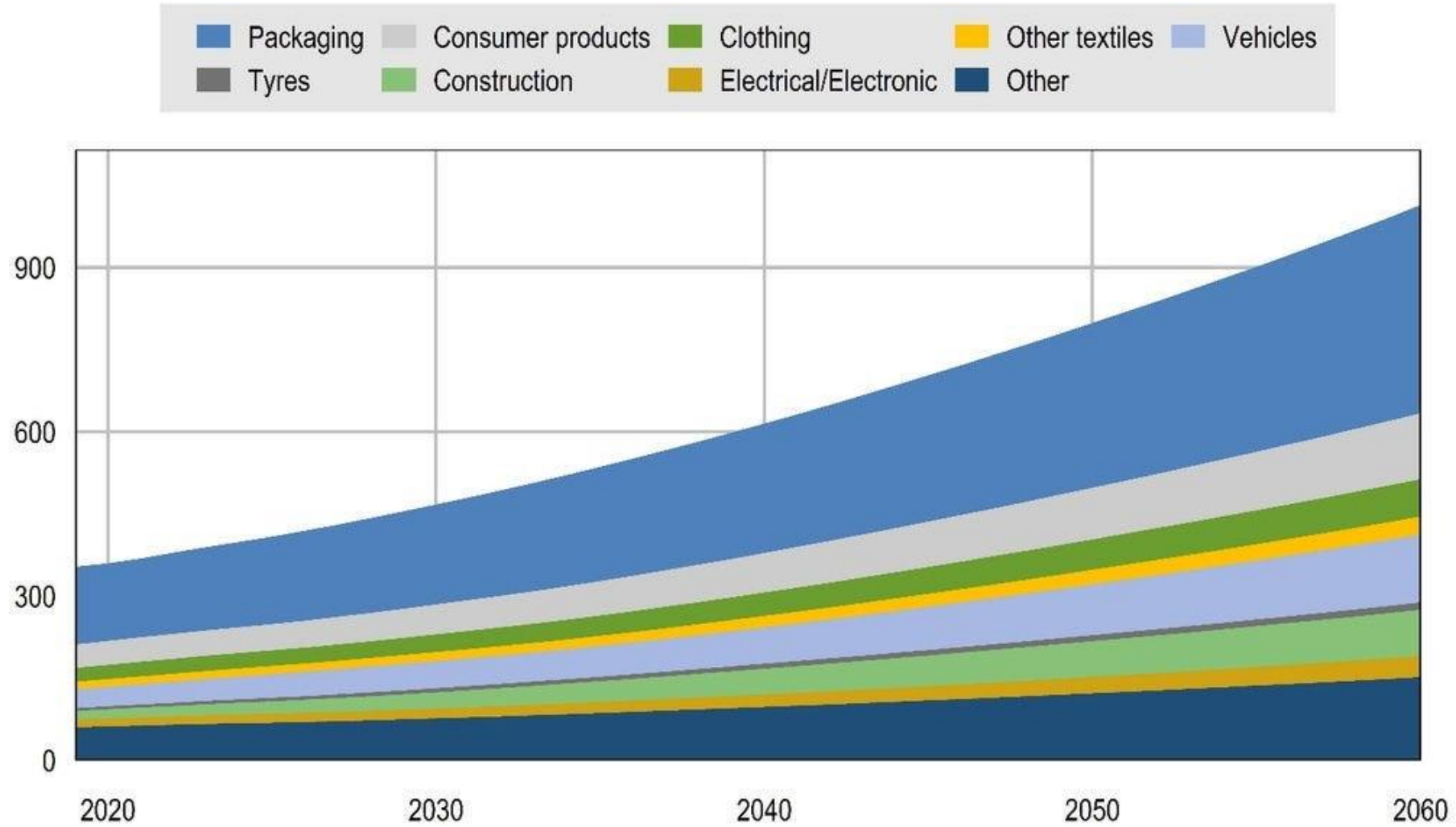
- Economic data and modeling can help contribute to a reduction in plastic pollution.
- Input-output data provides a tool to identify industries which could be the focus of policies such as the clothing industry.
- Economy wide modeling offers a tool to track plastic use and examine potential plastic policy impacts.
- CS3 can provide strategic knowledge and key sustainability solutions to manage plastic pollution.

Thank You!

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Plastic Waste by Application (Mt)



Source: OECD (2022) *Global Plastics Outlook: Policy Scenarios to 2060*, OECD Publishing, Paris, <https://doi.org/10.1787/aa1edf33-en>.