



Resource Use and Economic Growth in Asia and the Pacific

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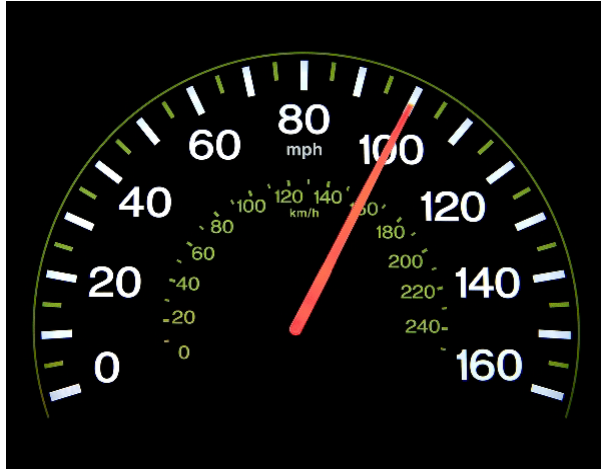
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Why is sustainable use of resources and resource efficiency important for the region?

- Before 2008, **pressure points** including climate change, water and food availability, price surges for strategic raw materials, and peaking global oil supply are **converging in an unprecedented manner**
- Current global patterns of production and consumption are hitting the real limits of global resources and ecosystems
- Asia and the Pacific has twin objectives of **raising standards of living** (alleviate poverty) and **environmental integrity**
- When global growth stalled, countries such as China maintained rates of growth above 6% throughout, and have returned to double digit rates of growth
- Sustainable resource use will be instrumental for the region to ensure socio-economic development in a world in which resources are more constrained and the absorptive capacity of ecosystems is decreasing rapidly
- Challenge for public policy to achieve a **transition to a Green Economy enabled by resource efficiency and systems innovation**
- This will not occur spontaneously but will require well designed policies

Broadening the compass for decision making



Measuring material flows and resource efficiency

The CSIRO and UNEP Asia-Pacific material flow database

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CSIRO and UNEP Asia-Pacific Material Flows online database

Introduction

This data set on material flows in the Asia and Pacific Region was produced as part of a collaborative research project funded by the United Nations Environment Programme (UNEP). Further information on the UNEP may be found at <http://www.unep.org/>. The data set has been used for two United Nations reports:

- UNEP (Forthcoming). Resource Efficiency: Economics and Outlook for Asia and the Pacific. CSIRO Publishing, Canberra
- ESCAP/ADB/UNEP 2010. Preview, Green Growth, Resources and Resilience: Environmental sustainability in Asia and the Pacific. Bangkok: United Nations (available in September 2010).

The dataset on Asia-Pacific material flows is based on international data sources and most recent methodology for material flow accounts. Please refer to the [technical annex](#) for a detailed description of data sources and methods.

Material flows and resource productivity indicators are among the most important indicators available for monitoring changes in the patterns and rates of resource use as economies grow. As incentives and interest in building green economies through the promotion of green growth expands, this data is intended to help governments, policy researchers and all interested stakeholders to i) develop a better understanding of how economic growth patterns influence resource use ii) evaluate the impacts of policies that have been adopted in the past; and iii) and to develop effective strategies to minimize resource use through targeted sustainable consumption and production policies and actions.

[Open Material Flows Database](#)

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UNEP

[United Nations Environment Programme](#)
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Partners

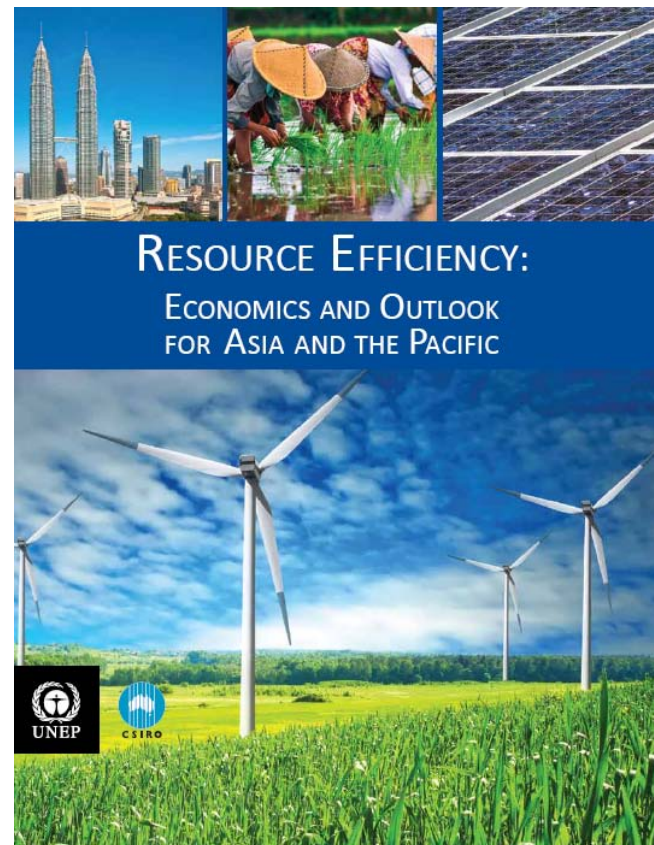
[United Nations Economic and Social Commission for Asia and the Pacific](#)
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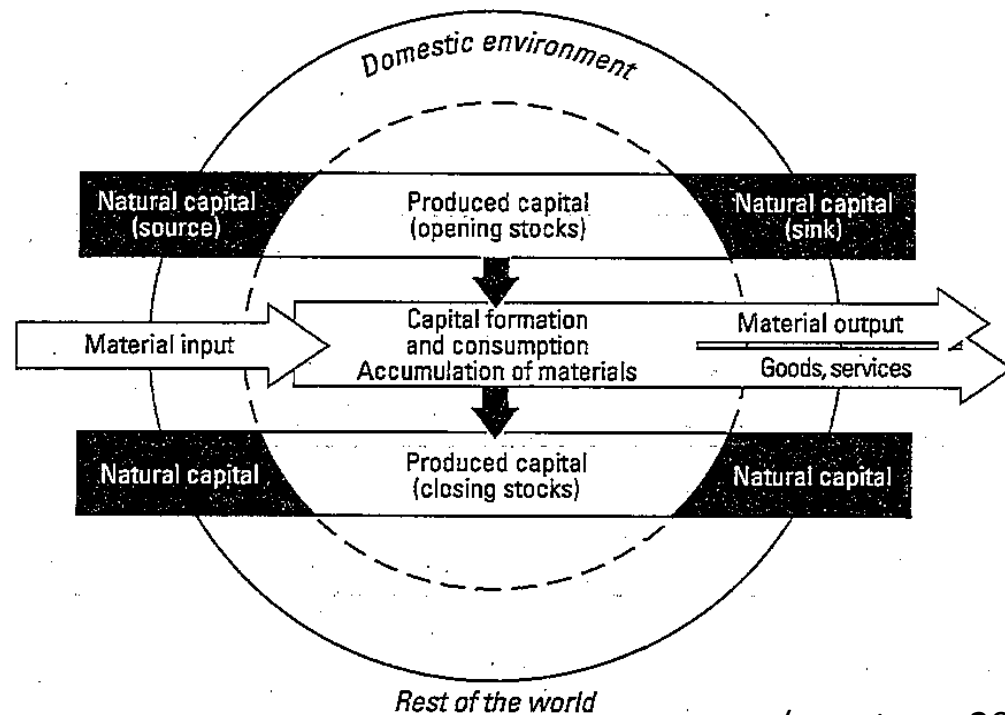
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Integrative measures of the society-environment interface

- Physical material flow accounts (MFA)
- Physical and monetary system for integrated environmental and economic accounting (SEEA)
- Satellite accounts to the System of National Accounts



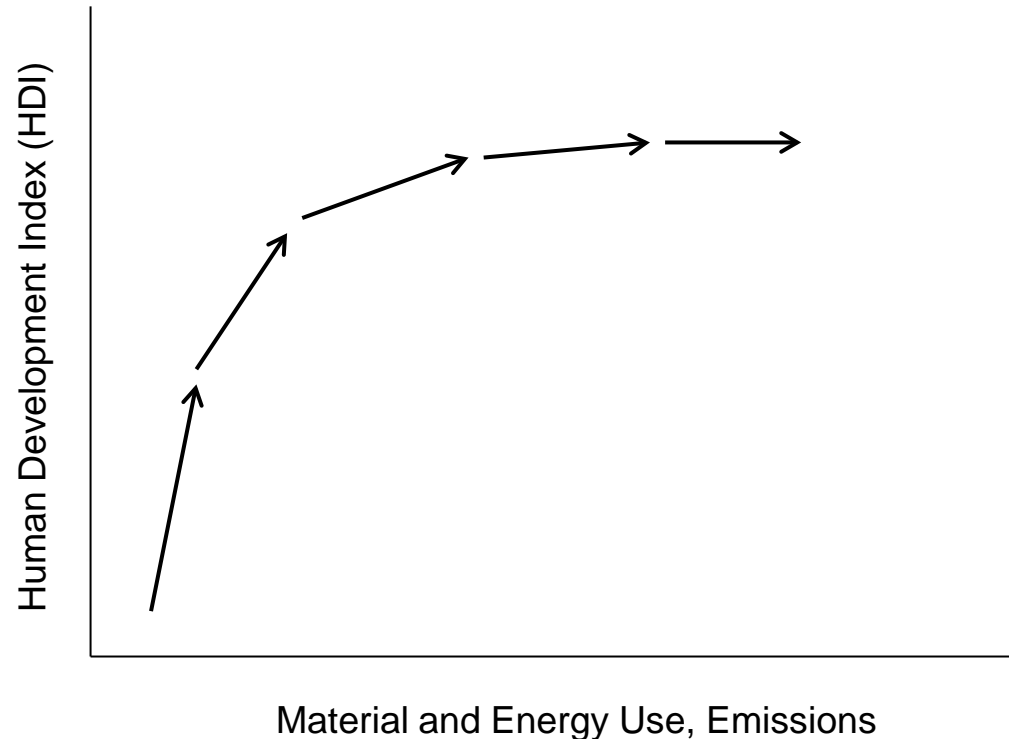
(Bartelmus, 2002)

Specific to Asia

- Traditional (customary) and modern system (modern State) operate in parallel/contradiction
- Rural/urban differences and linkages
- Rural areas provide workers/consumers and their subsistence
- Urban incomes as driver of rural transition
- Food security vs. export incomes
- Dual objectives of environment and development (material standard of living, poverty, exclusion)
- Very specific socio-cultural characteristics
- Speed and scale of industrial transformation
- Almost no impact of current economic crisis

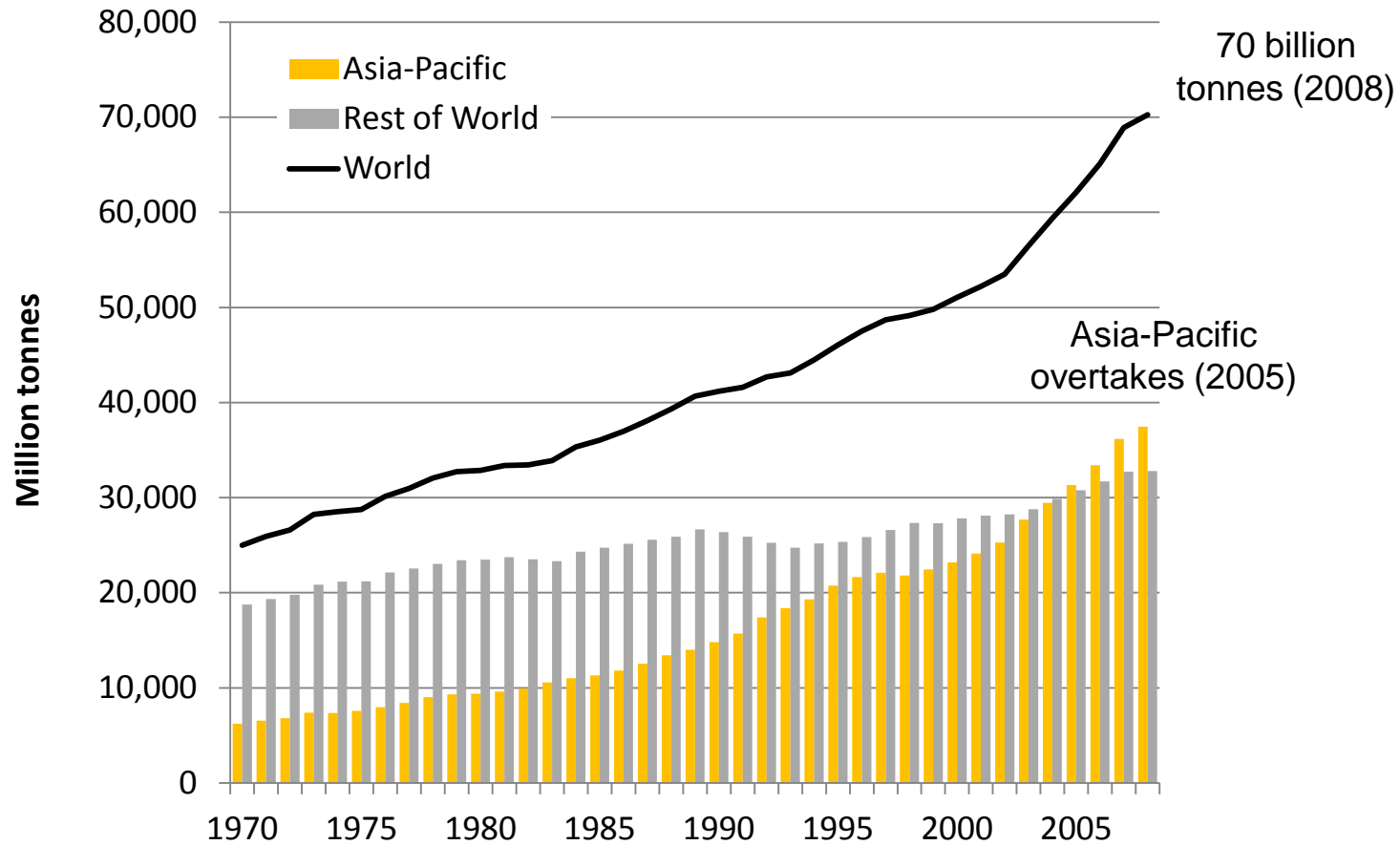
Relationship between natural resource use and HDI

- Highly non-linear relationship
- Different costs of education, life expectancy and per-capita income
- 1970: Globally uniform high-human development has been restricted by natural resource availability
- Today: Enough natural resources but unevenly distributed (Steinberger, 2010)



Growth

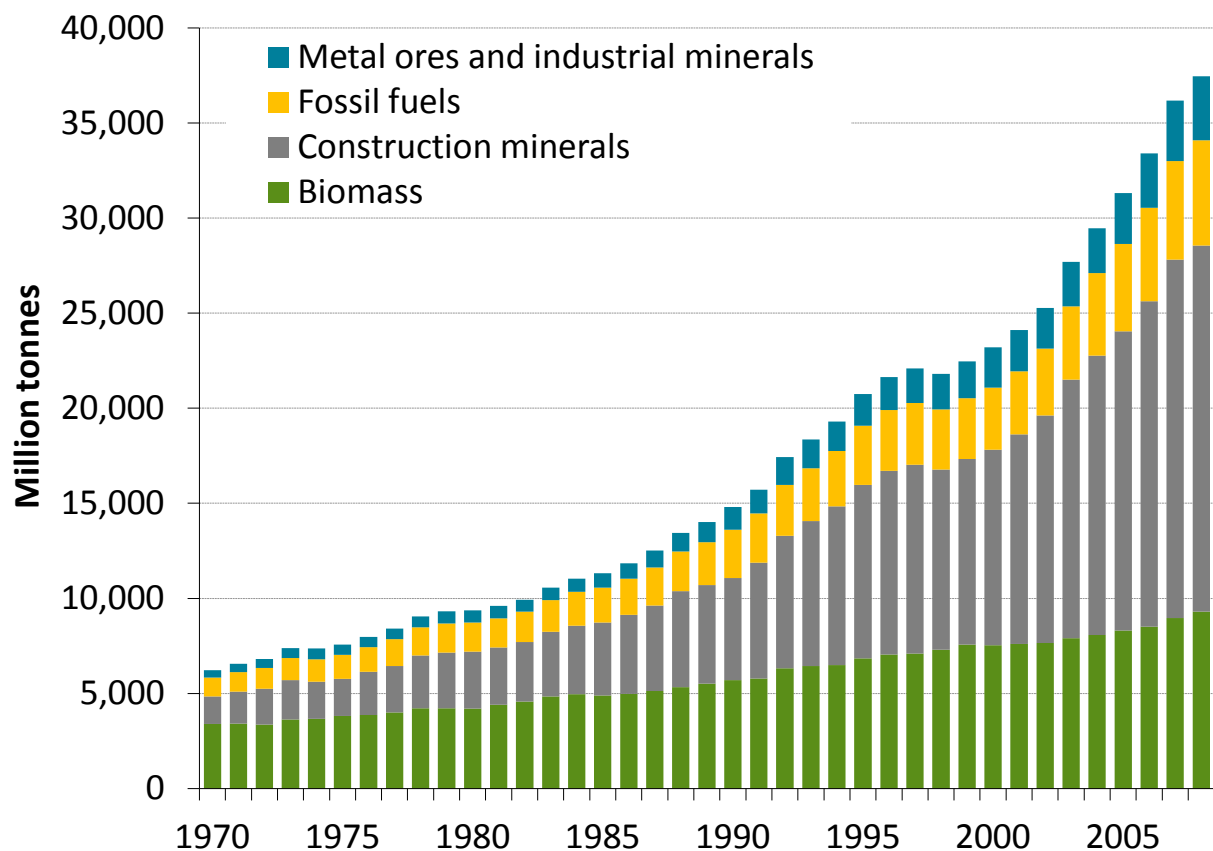
Domestic material consumption (DMC)



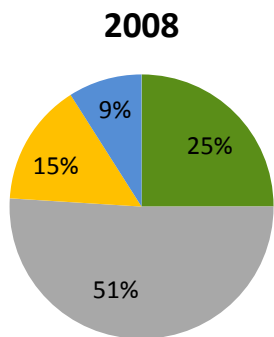
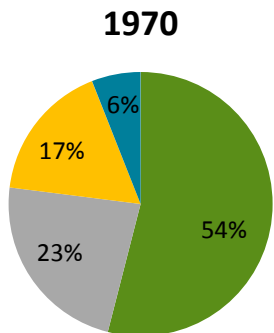
Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)

Transition to new materials

Domestic Material Consumption (DMC)

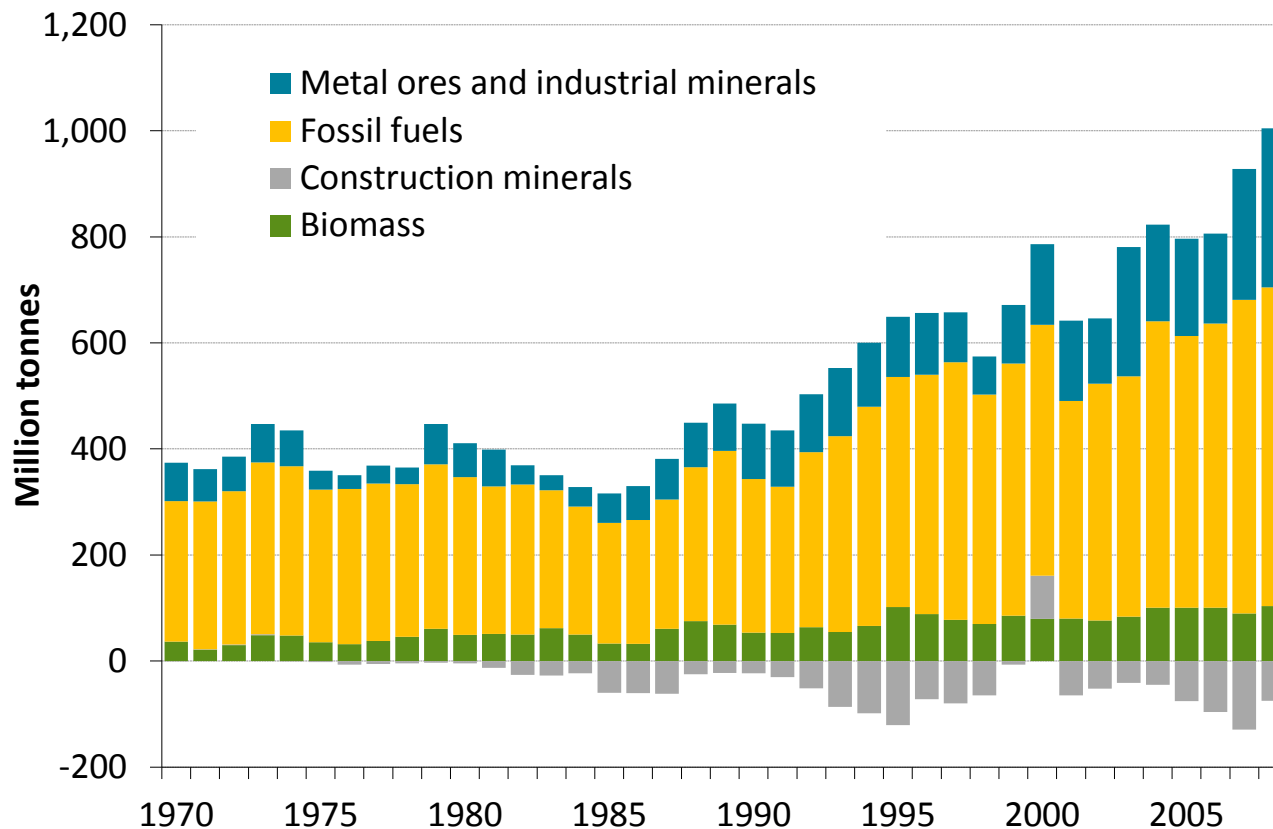


Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)



Increasing dependence on natural resource imports

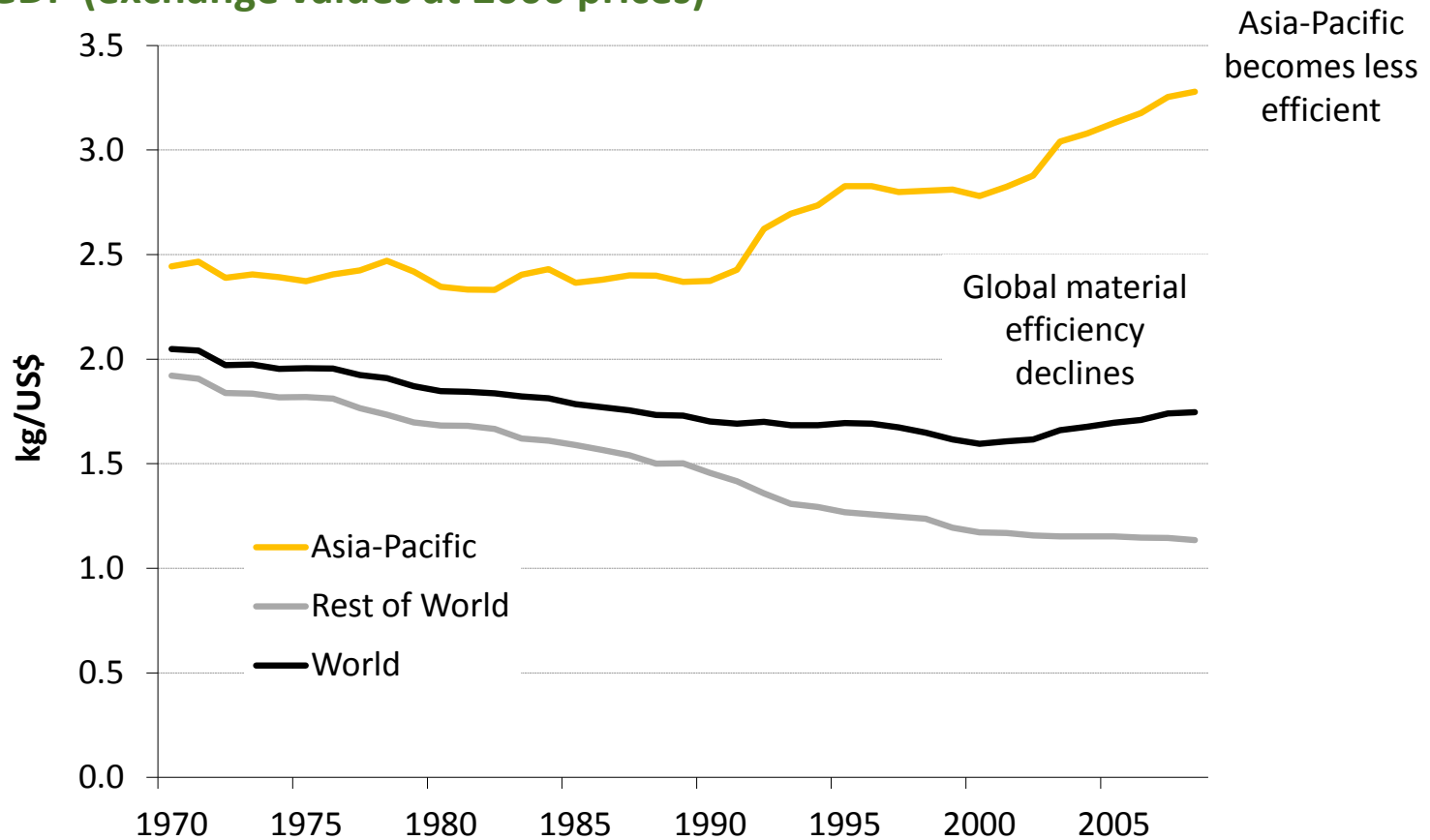
Physical Trade Balance (PTB) measured as Imports minus Exports



Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)

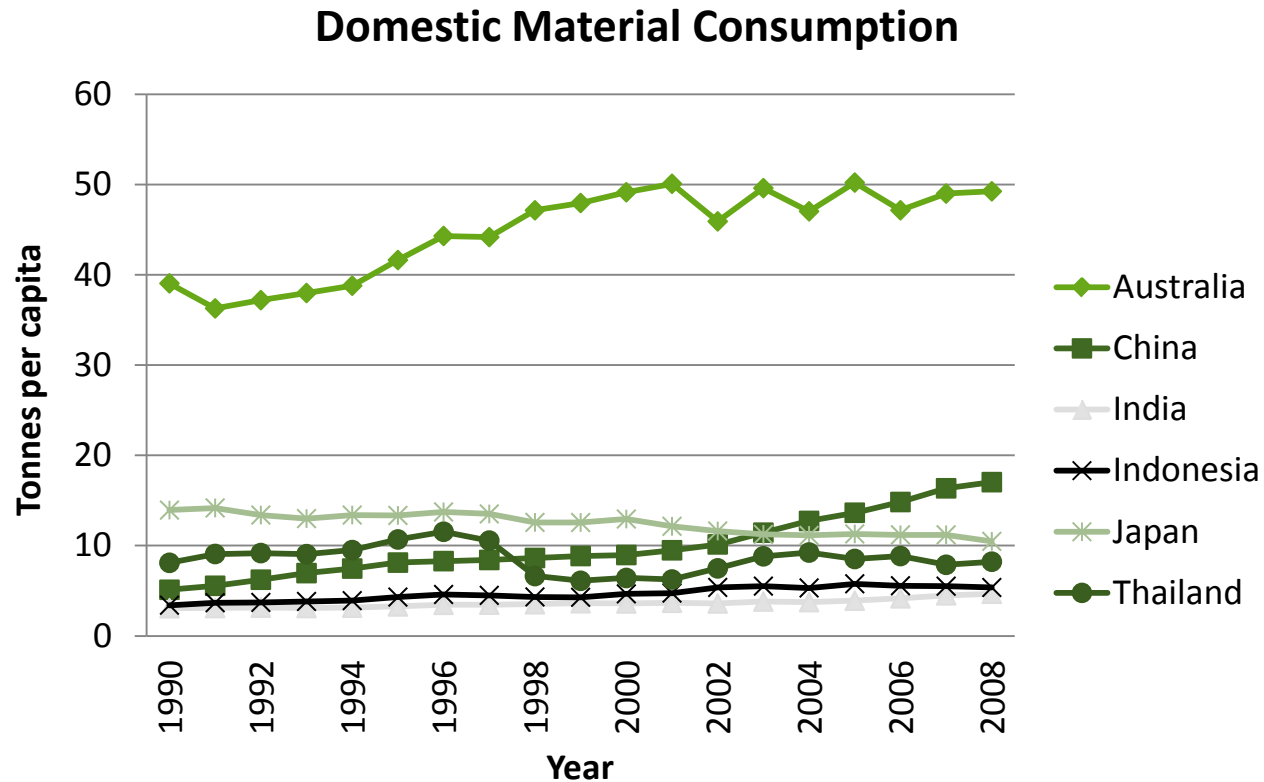
Material efficiency

DMC per GDP (exchange values at 2000 prices)



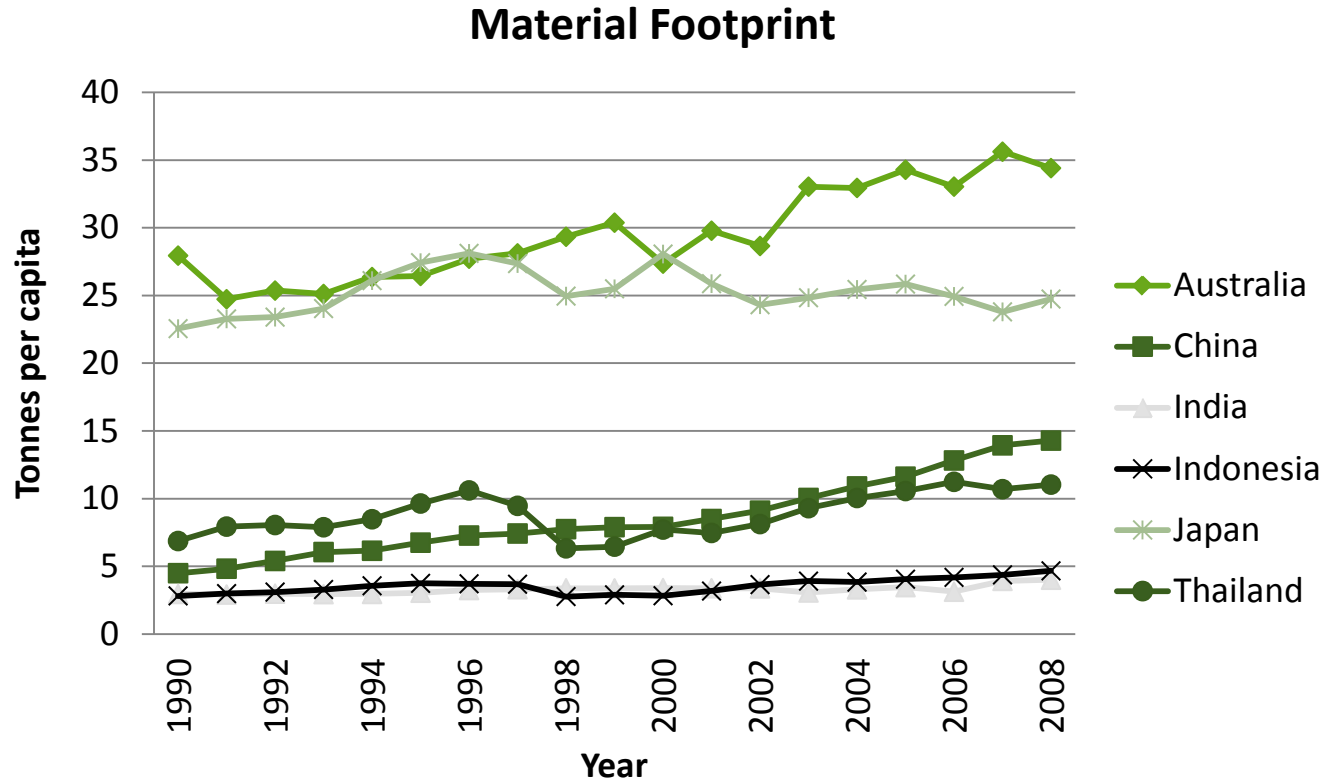
Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)

Per-capita Domestic Material Consumption



Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)

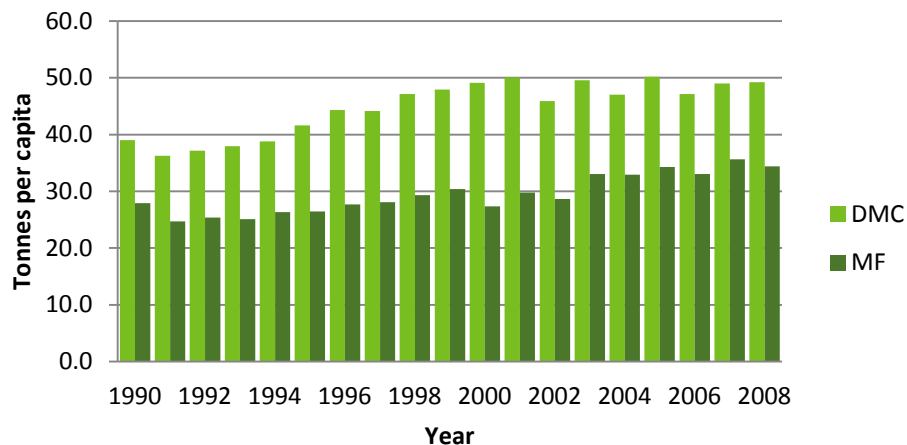
Per-capita Material Footprint



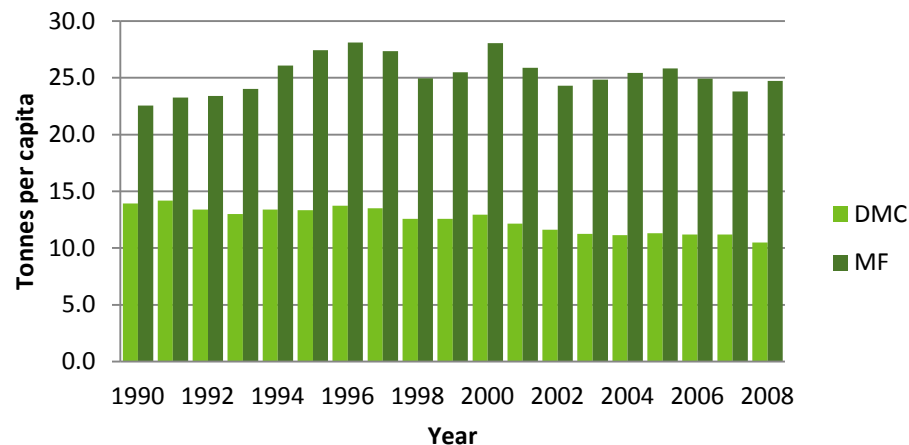
Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012), Wiedmann et al. (forthcoming)

Comparing Domestic Material Consumption (DMC) and Material Footprint (MF)

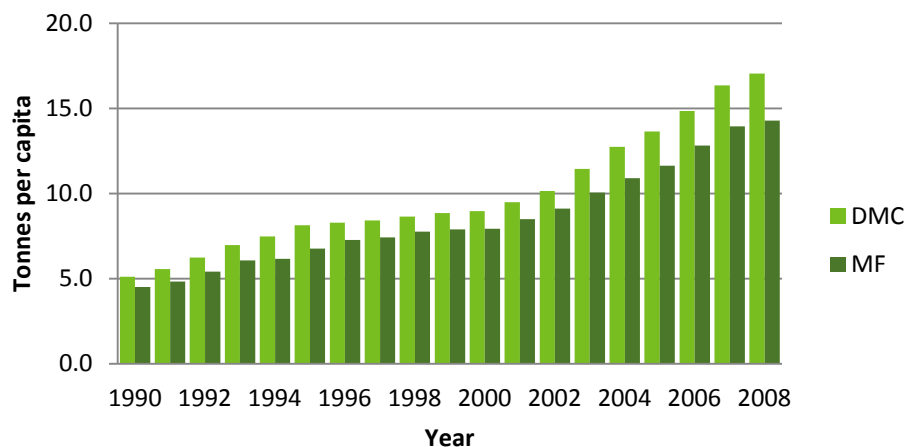
Australia



Japan



China

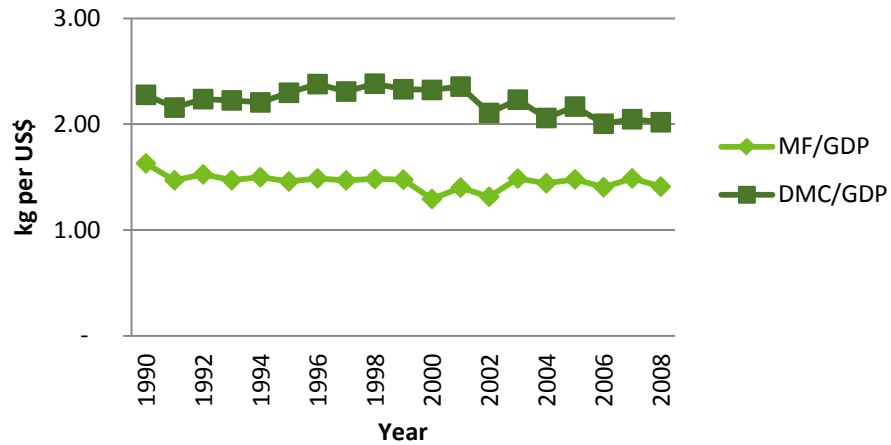


Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012), Wiedmann et al. (forthcoming)

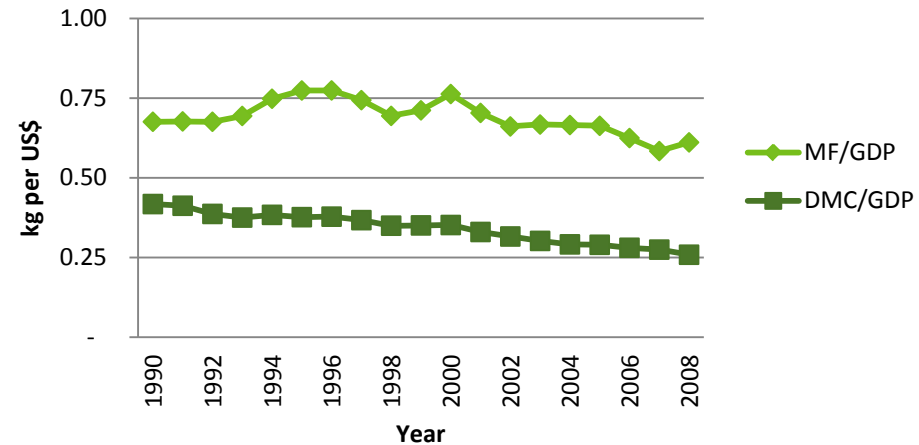
Resource Efficiency

DMC per GDP (exchange values at 2000 prices)

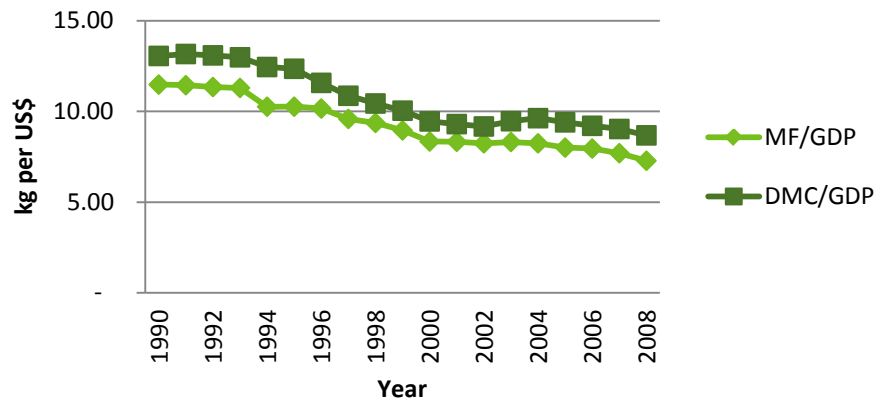
Australia



Japan

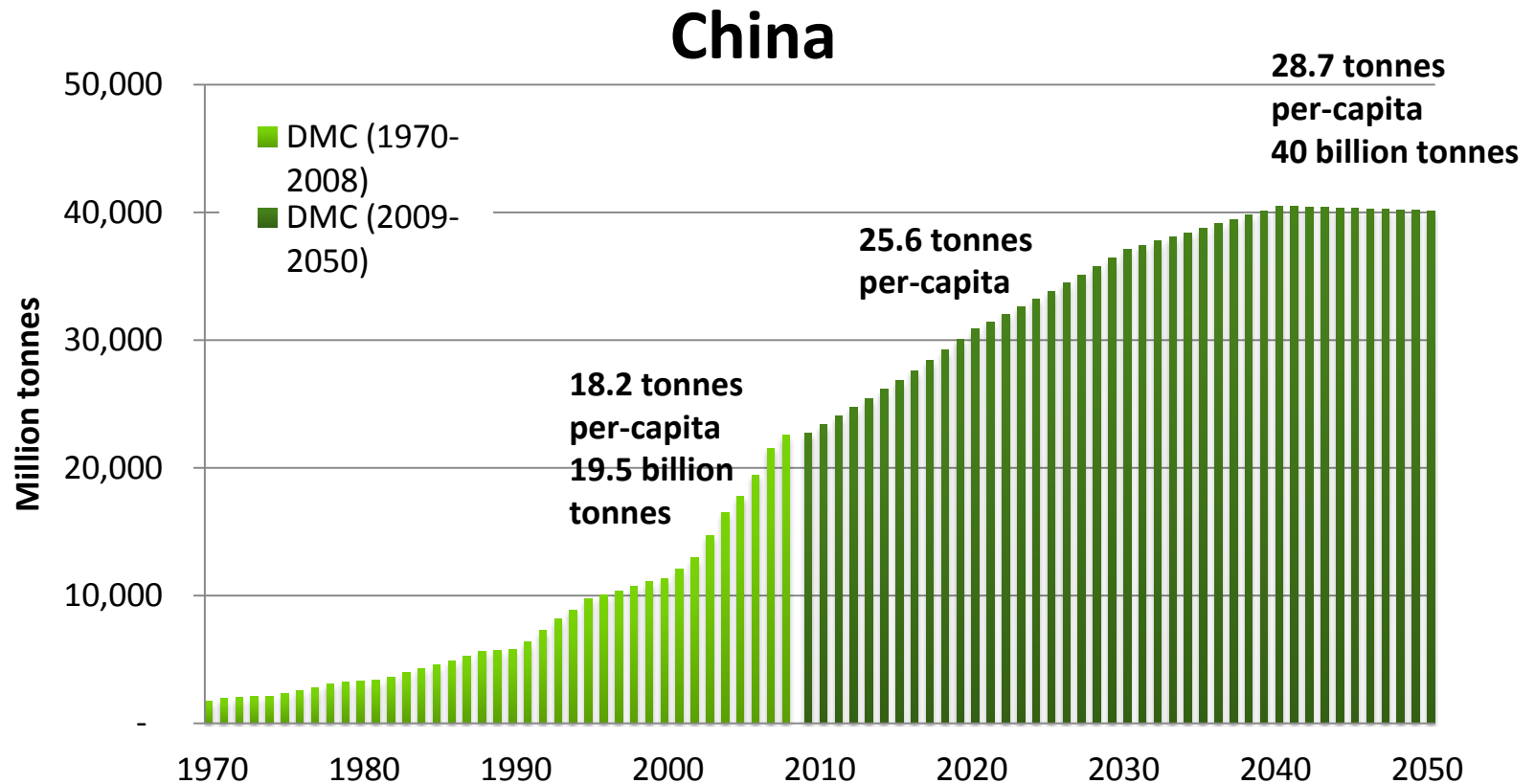


China



Future of material use, example of China

Domestic Material Consumption (DMC)

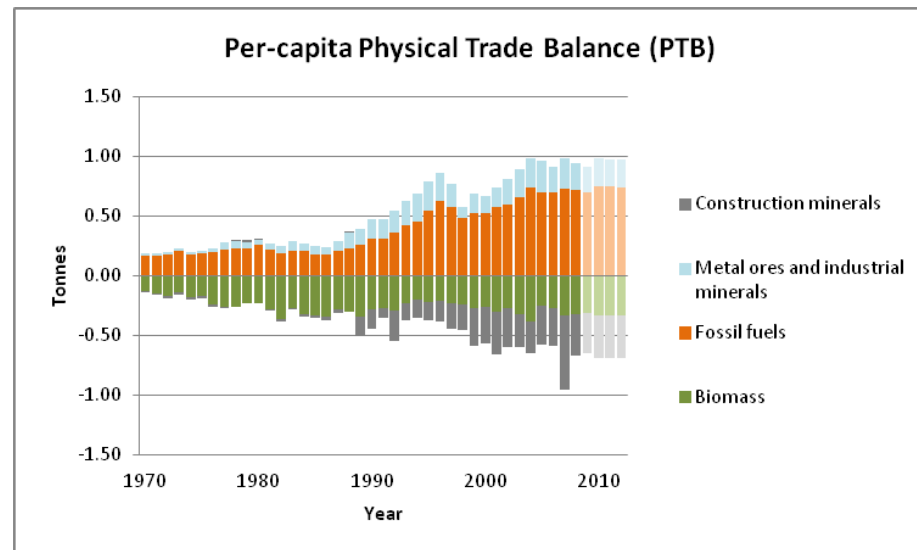
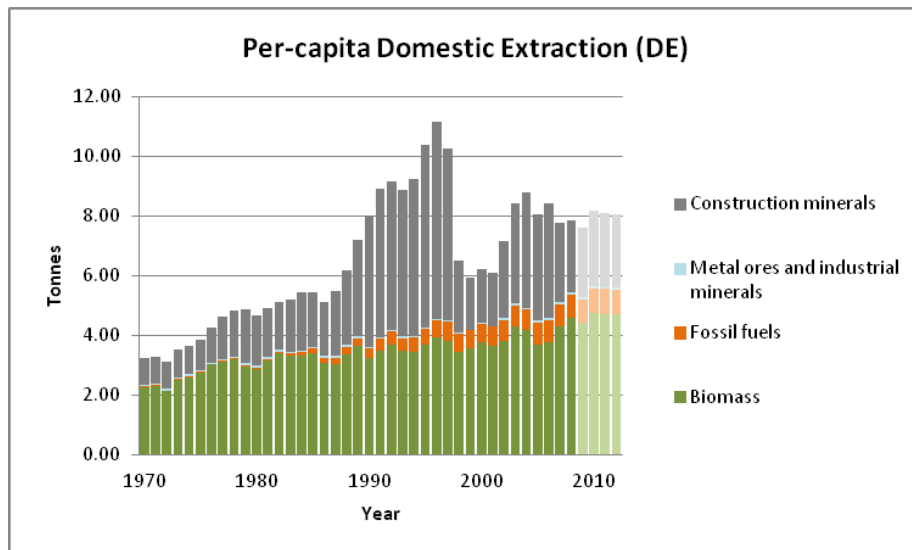


Assuming decadal GDP growth to decline to 3% per annum by 2050
5% per annum improvement in material intensity
Medium population projection of 1.4 billion by 2050

Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)

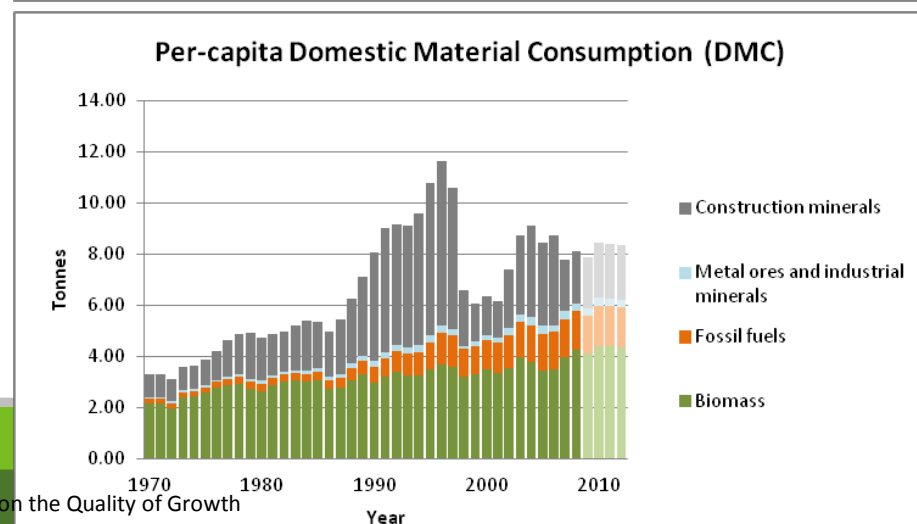
Thailand – Resource use profile

Source: CSIRO and UNEP Material Flow and Resource Productivity Database



www.csiro.au/AsiaPacificMaterialFlows

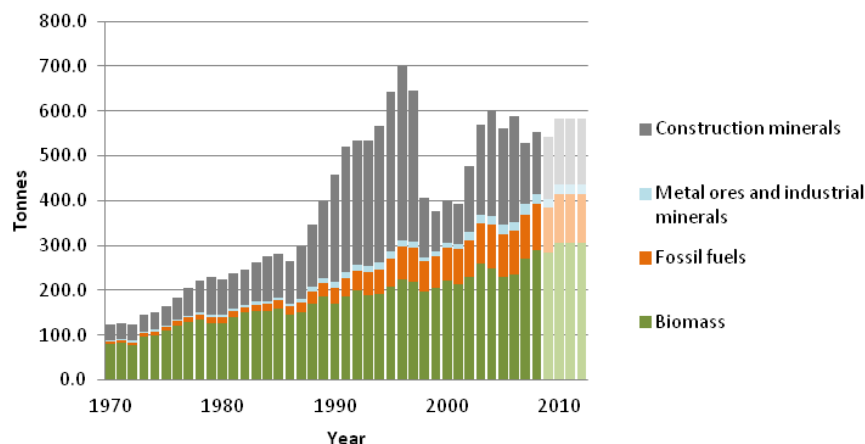
Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)



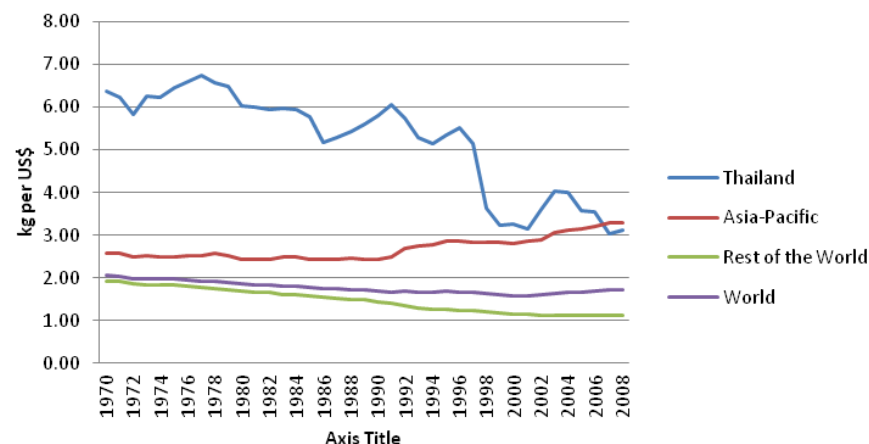
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Domestic Material Consumption (DMC)

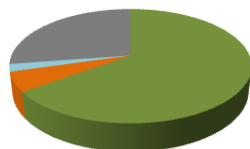


Material Intensity (DMC/GDP)



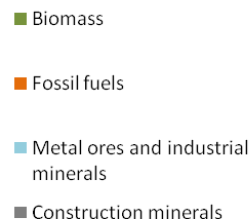
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1970



120 million
tonnes

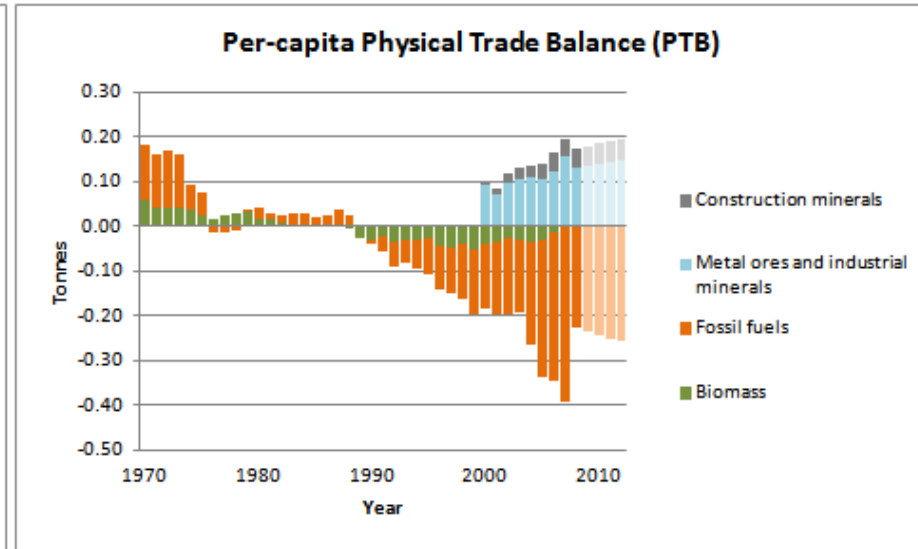
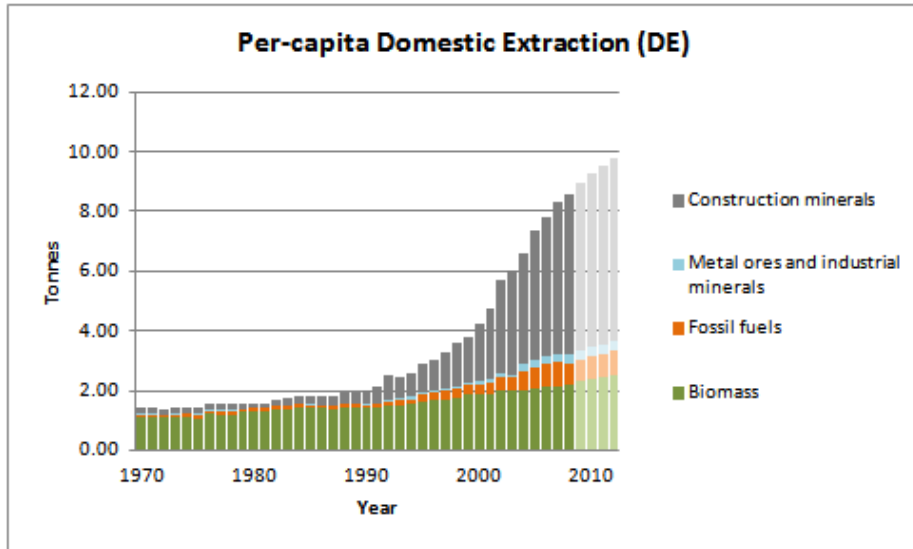
2010



580 million
tonnes

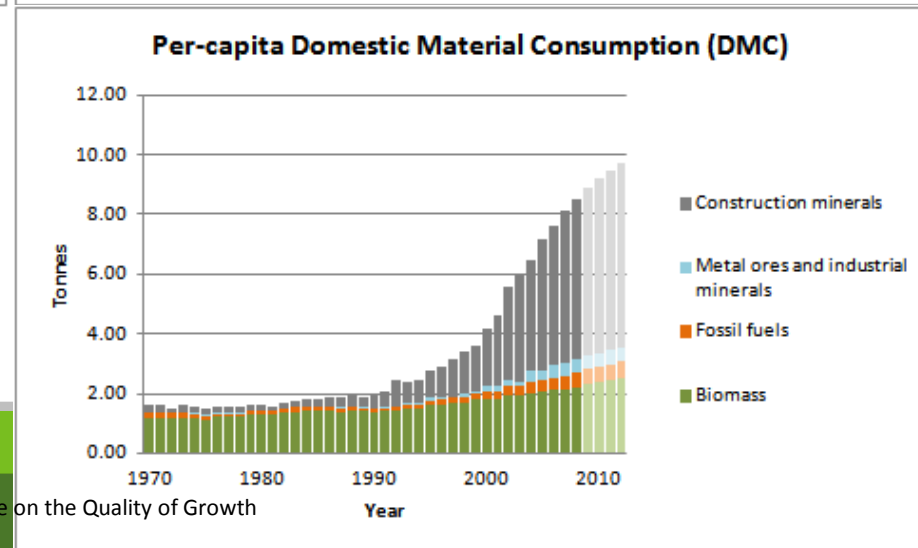
Viet Nam – Resource use profile

Source: CSIRO and UNEP Material Flow and Resource Productivity Database



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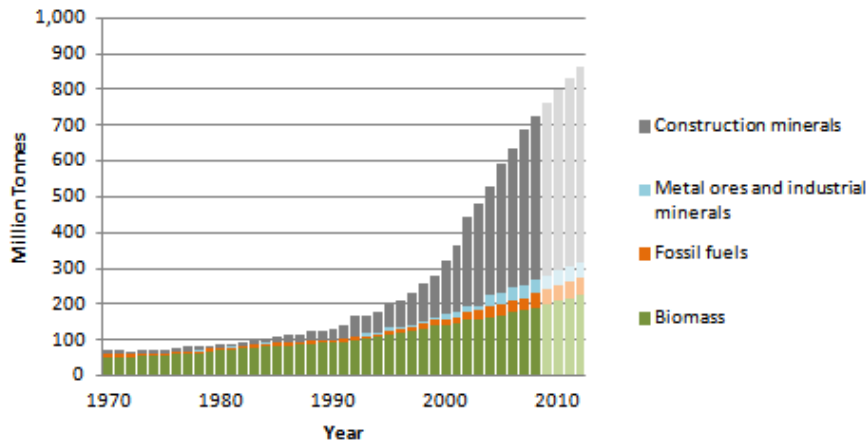
Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)



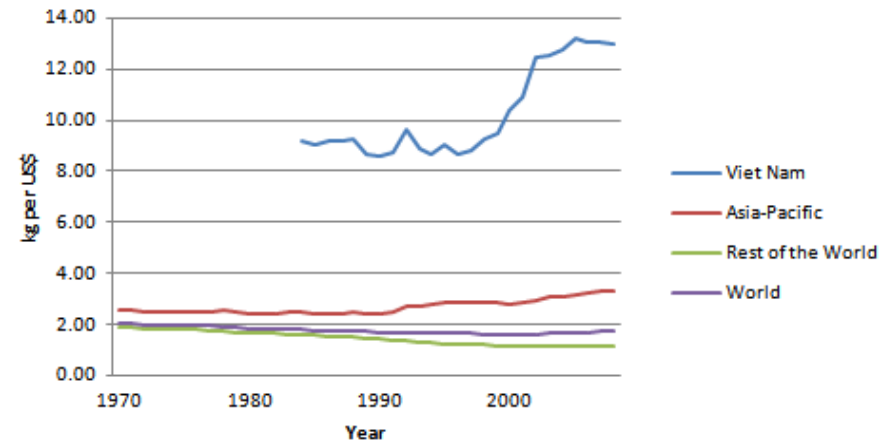
Viet Nam – Resource use profile

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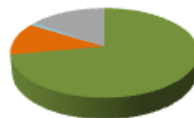


Material Intensity (DMC/GDP)

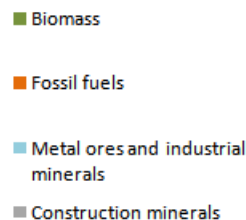


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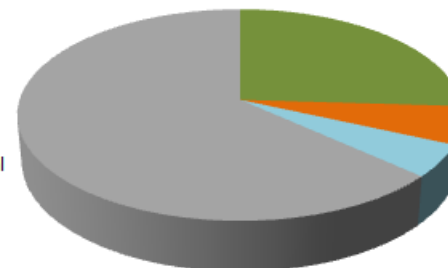
1970



70 million
tonnes



2010



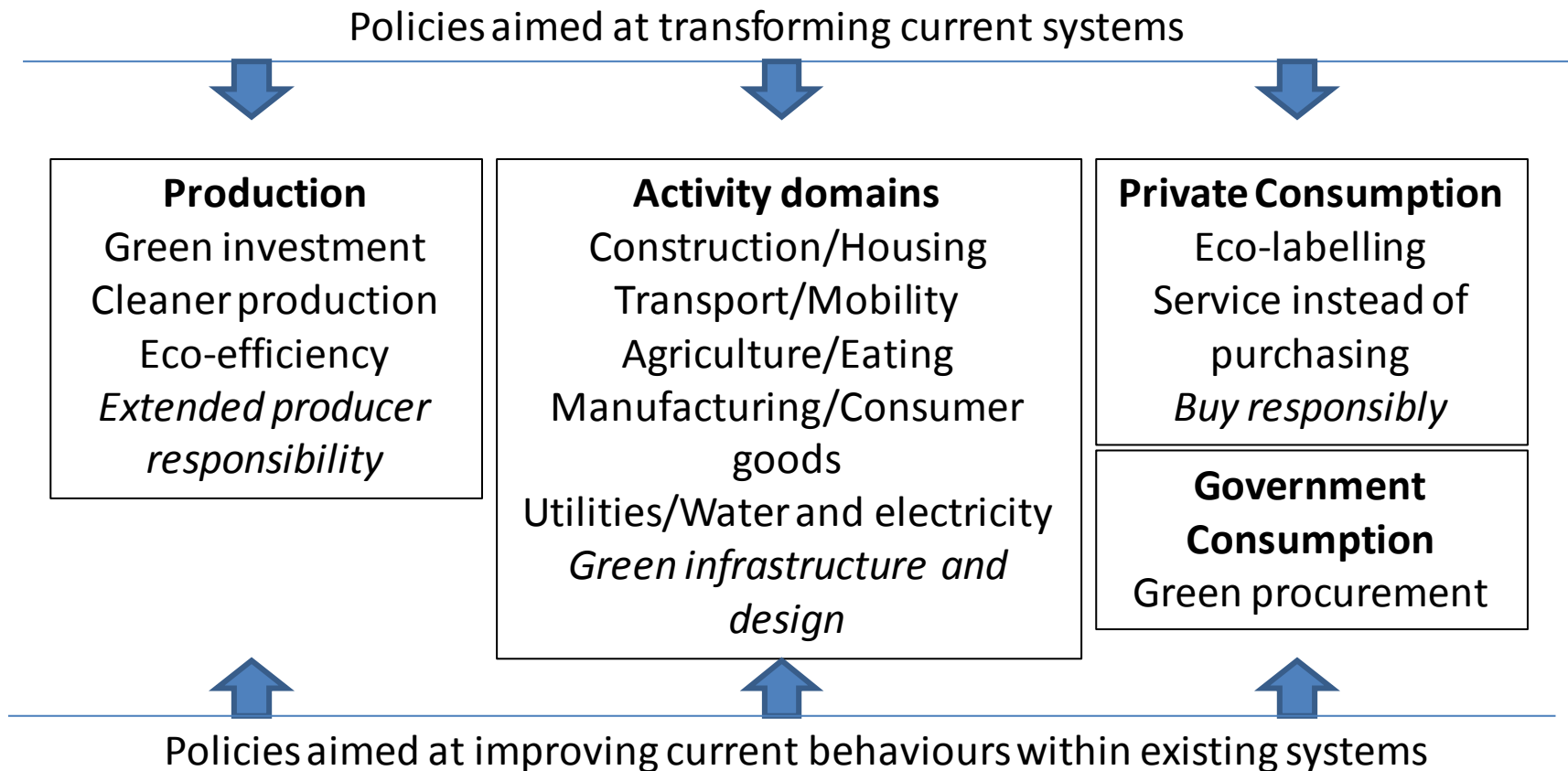
800 million
tonnes

Drivers of growing material use

	Δ DMC (million tones)	$\log\Delta P$ Population	$\log\Delta A$ Consumption	$\log\Delta MI$ Material intensity
1970-1980	3,114	50%	60%	-10%
1980-1990	5,445	41%	56%	3%
1990-2000	8,397	31%	35%	34%
2000-2008	14,248	18%	48%	34%

Source: Schandl and West (2010), UNEP (2011), West and Schandl (2012)

Incremental and transformational policies





Thank you

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