

# Recent trends in material flows and resource productivity in Asia and the Pacific



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# List of acronyms related to material flows and resource efficiency

- DE** Domestic Extraction – Materials domestically extracted from the environment which are subsequently used in economic activity
- DMC** Domestic Material Consumption ( $= DE - PTB$ )
- GDP** Gross Domestic Product
- MI** Materials Intensity ( $= DMC / GDP$ )
- PTB** Physical Trade Balance (Net Imports – Net Exports)
- I** Impact (environmental), in IPAT analysis terminology. In this report, the environmental impact considered for the IPAT analyses is extractive pressure, so  $I = DMC$
- P** Population
- A** Level of Affluence of the population
- T** Technological coefficient, in IPAT analysis terminology. This is a measure of the environmental impact (I) generated per unit of income generated. For this study,  $T = DMC / GDP$ , and so is equivalent to MI



# 1 Introduction

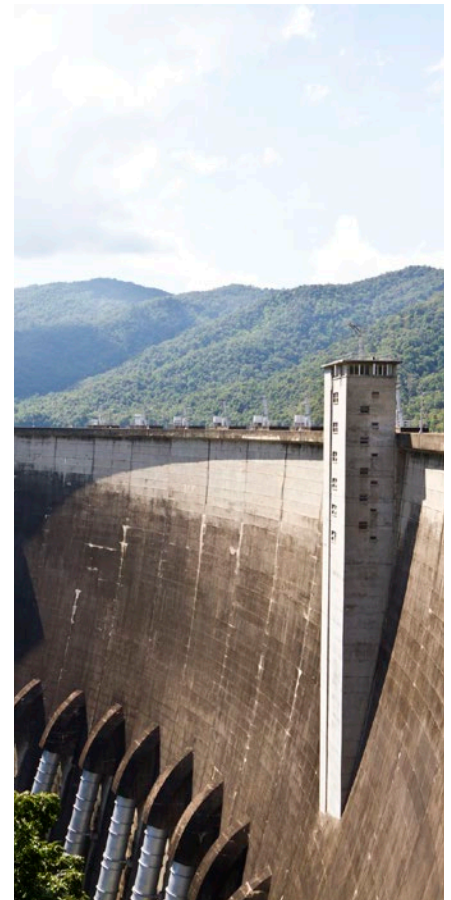


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This report presents an update of a previous report on material flows and resource productivity in Asia and the Pacific (UNEP 2011), and brings together data extending the latest reported year up to 2008 and the onset of the Global Financial Crisis (GFC).

The update shows that very rapid growth in materials consumption by the Asia-Pacific region's population giants continues apace, and as a consequence the region's dominance of world material flows continues to grow. One objective of this update is to focus more on those relatively few countries which account for the vast bulk of the region's materials consumption, as it is the material flows trajectories of these countries that are of greatest importance for the region, and the world as a whole. The set of ten countries examined in detail was determined accordingly, taking the ten greatest aggregate consumers in 2008, rather than trying to provide an overview of different types of economies and sub-regions as done in the previous report.

There has been some revision of the methodology used to compile statistics and perform analyses here, but the methods remain generally consistent with the approach used for the earlier report (UNEP 2011). Where significant changes have been made these are duly noted either in the text or in footnotes, while the updated Technical Annex to the (online) database at [www.csiro.au/AsiaPacificMaterialFlows](http://www.csiro.au/AsiaPacificMaterialFlows) provides a full guide to the current methods. For this report, the number of countries was reduced to those countries for which more reliable data is available, removing numerous issues associated with the availability and continuity of time series data.



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## 2 Main Messages

The Asia-Pacific region continued to assert its dominant position in world material flows, up to and including the onset of the Global Financial Crisis in 2008. The stagnation in growth in materials consumption registered for the rest of the world (ROW) in 2008 was reflected in only a slight moderation within the region.

Asia and the Pacific continues to catch up rapidly in per capita material use terms, with the regional average now being 86% of that of the rest of the world.

The transition of regional economies away from biomass based to minerals based continued, with further contractions in biomass share in both regional population giants, China and India. Construction minerals extraction continued to increase into 2008 underlining the large investment into building cities and infrastructure in the region.

The updated data indicates that the Asia-Pacific region is reverting towards a higher greenhouse gas emitting fuel mix, a trend that was not so clear in the first report (UNEP 2011). This is occurring despite the rapid increase in total tonnage terms of natural gas and increased production of renewable energy.

The physical trade balance of the region continued to show a trend towards increasing and accelerating net imports indicating that exploitation of the resource base within the region is no longer sufficient to support the fast growing economic activity and emerging new lifestyles in the region.

The efficiency with which materials are used has declined further. The fact that material intensity (MI = domestic material consumption/GDP), has continued to increase at the regional level, is cause for concern. MI needs to decrease at a rate roughly comparable to the rate of increase in GDP just to stabilize extractive pressures on the environment. On current trends, extractive pressures on the environment will increase even more rapidly than the region's rapid rate of growth.

Increasing materials intensity has been identified as a much stronger driver of extractive pressures than originally estimated in the earlier report (UNEP 2011). A reworked analysis of driving forces indicates that, rather than moderating the environmental pressures imposed by increasing populations and affluence, changing technology is interacting with the regional redistribution of production activities to accelerate materials consumption at the regional level.

Population growth is now the least important driver of growing extractive pressures on the environment at the aggregated regional level. Growing affluence was the most important driver over the whole study period, while increasing materials intensity was responsible for twice the increase in extractive pressure as population growth over the most recent decade. This indicates that any efforts to stabilize extractive pressures will need to address both affluence and materials intensity, and that stabilizing population, while helpful, will not grant much reprieve from growing environmental pressures.

### 3 Material use patterns and material efficiency in the Asia-Pacific region

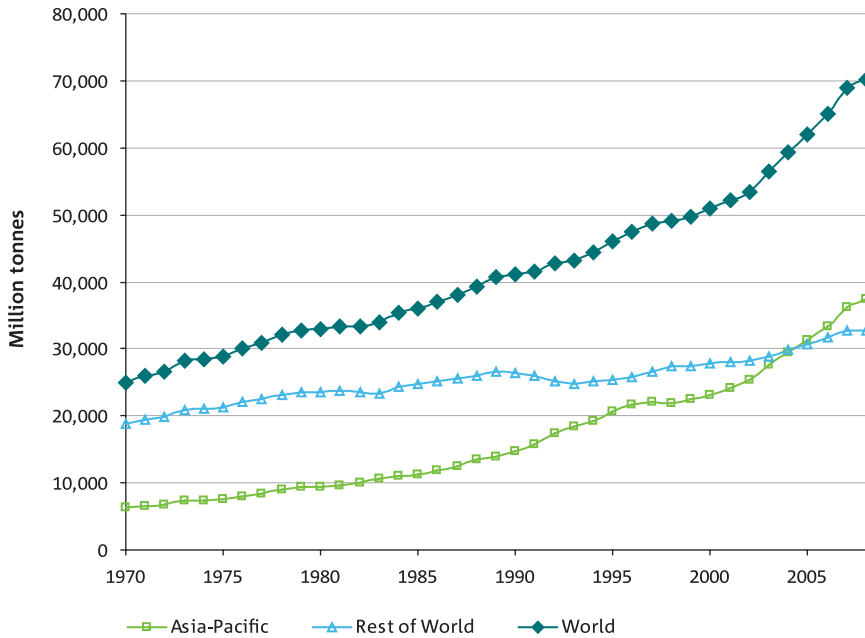


Figure 1 Domestic Materials Consumption for the Asia-Pacific region, Rest of the World, and World, for the years 1970–2008

Figure 1 shows domestic materials consumption (DMC) for the Asia-Pacific region increasing from 6.2 billion tonnes to 37.5 billion tonnes between 1970 and 2008, a compounding annual growth rate of 4.8%. Total DMC for the Asia-Pacific region surpassed that of the rest of the world (ROW) in 2005, having started out from a base of only one third of ROW materials consumption in 1970<sup>1</sup>. Because of the Asia-Pacific region's growing dominance in total world

While rapid growth in the Asia-Pacific of around 4.2% during the decade 1970–1980 only lifted World growth above ROW growth by 0.5 percentage points (ROW = 2.3%, World = 2.8%), growth of 5.6 % in the Asia Pacific from 1998–2008 raised World growth by 1.8 percentage points above the ROW rate (ROW = 1.8, World = 3.6%). Over the initial year of the GFC, in 2008, almost all the World's continued growth in DMC could be attributed to

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