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South Korea: Balancing the G20’s Global Impact
Korea’s global impacts moderated by current lifestyle: Korea’s physical impacts through its global value chains are average for the G20 although material usage is one third higher. Importantly, more than half of the impacts are external to Korea and volumes have increased by one half over two decades of rapid economic growth, excepting greenhouse emissions which have doubled.

Lower consumption rates and efforts to retain the traditional Korean diet explain the lower impacts across the land footprint, scarce water and species threats indicators. The footprint of fish production, one quarter of total, is high in G20 terms and is mostly self sufficient, compared to crop, forest and grazing footprints which are mostly imported. Threats to animal species are due mostly to climate change, pollution and wild harvesting (forestry and grazing). Threats are equal from domestic and imported activities, with USA, Indonesia and Malaysia the leading sources of imported threats. The import and export of emissions are equal as materials are transformed and exported as cars, ships, electronics and chemicals.

Korea’s per capita GDP, slightly above average, ranks it in the middle of the G20. In absolute GDP terms, Korea ranks twelfth and this position slips for different metrics of economic production such as ‘purchasing power’ or ‘embodied value added’. Repayment of net international debt has been rapid following the 1997 Asian financial crisis and Korea now ranks second lowest of the thirteen indebted countries of the G20, and may cancel its net debt in the next few years.

Social spending remains subservient to economic growth: The gini measure of inequality ranks Korea in the G20’s most equal quarter behind Germany, France, the EU and Japan. The inequality measure has declined from a high point in 1976 and has been relatively stable since 1992. Analysts note that the gini coefficient, based on earned income, does not capture the full nuance of Korea’s accumulated wealth inequality, since the top one tenth possess nearly one half of total wealth.

The jobs required for domestic consumption is one half of one full time equivalent per citizen, close to the G20 average. Three in five of these jobs are located domestically in Korea, with two in five located in external trading partners with China, India, Indonesia and Japan the dominant contributors to the 13.4 million external workers (see pie diagram next page). External workers in Korea’s global supply chains are paid at one half the rate of domestic workers with future constraints looming if wages rise in supplying countries. Improving female workforce participation and irregular worker’s conditions will require increased social spending, possibly to the short term detriment of infrastructure investment, economic growth and debt repayments.

Innovation and territorial disputes are no strangers to Korea: In 1800, with a population of 9.4 million and life expectancy of 26 years, Korea, the ‘hermit kingdom’, had withdrawn to two centuries of relative peace set within two millennia of conquest and warfare. As early as the 1200s its printing and other technologies were well ahead of Europe but progress slipped when Confucian ideals replaced pragmatic solutions. Depending on net immigration rates, today’s population of 49.7 million will decline to 46 million by 2050 while median age increases from 40 to 54. Unemployment is low at 4% (youth 12%), one third of the workforce is irregular and low paid, while 3D jobs (dirty, dangerous, difficult) are increasingly done by migrant workers. Female work participation rate is low while one in six Koreans, and more than half of the elderly, live below the poverty line.

Korea’s energy poverty (coal reserves of one year’s consumption, one month of gas and minor oil) make it one of the world’s leading importers. Some marine basins are highly prospective but investment in external prospecting, production and construction is now the focus. Technologically advanced refineries, oil stockpiling and chemical industries now concentrate domestic value adding. Two thirds of electricity production is fossil and one third nuclear, with minor hydro, tidal, wind and solar. The goal for renewables is one eighth of electricity by 2027.
Korea’s ‘Green Growth Strategy 2.0’ in jeopardy: Based on three pillars of strategy, technology and finance, Korea’s response to the Asian financial crisis was to redesign the first period of compressed development, that left it fossil fuel dependent and materially intense, with a rapid revolution in domestic energy, export production and low impact lifestyles. The difficulty in provoking such large structural change is immense and to date, global leadership in lithium-iron batteries and light emitting diodes add to, rather than replace the exceptionally successful sectors of shipbuilding, chemicals and automobiles. While innovative products and market share are key elements, Korea’s starting point for a green transition may lag behind Germany and Japan. The ‘creative’ has now replaced the ‘green’ economy in presidential policy. Rapid economic growth to repair social equity and working conditions will possibly outpace the green transition in the near term.

Renewable electricity requires a step change: Modelling of current policies suggests renewables will produce one tenth of electricity by 2050 while total delivered power grows by 80% and emissions stabilise at current levels. The alternative, a fully renewables transition, could meet national requirements, grow electricity by one half and reduce emissions to one tenth of current levels. Wind and solar dominate production while using four fifths of the available wind resource but less than one percent of the solar and geothermal resources. Costs over the transition were $600 billion for the renewables transition, one tenth higher than the fossil fuel strategies where ongoing fuel costs limited cost advantages.

Biodiversity needs protection and restoration: While two thirds of Korea has forest cover and one sixth is protected areas, biodiversity status is declining due to the multiple pressures of economic development and pollution. Of the 221 threatened species documented, propagation and restoration plans are underway for one quarter of them. Increased areas of, and linkages between conservation areas combine with regulations and intellectual property rights which limit exports and exploitation of threatened species and habitats.

External jobs serving Korea: 13.4 million full time equivalents

Consumption indicators for Korea: per capita values and rankings

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>PER CAPITA VALUE</th>
<th>PER CAPITA RANK</th>
<th>ABSOLUTE VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2-e: tonnes</td>
<td>14.0</td>
<td>8</td>
<td>693 m</td>
</tr>
<tr>
<td>Scarce water use: litres</td>
<td>294,540</td>
<td>9</td>
<td>14,662 GL</td>
</tr>
<tr>
<td>Species threats: per million people</td>
<td>5.6</td>
<td>13</td>
<td>262</td>
</tr>
<tr>
<td>Land footprint: globally-averaged hectares</td>
<td>1.7</td>
<td>13</td>
<td>82.1 m</td>
</tr>
<tr>
<td>Material usage: tonnes</td>
<td>25.2</td>
<td>5</td>
<td>1,253 m</td>
</tr>
<tr>
<td>Inequality (Gini)</td>
<td>--</td>
<td>--</td>
<td>0.32 (rank 15)</td>
</tr>
<tr>
<td>Jobs :worker full time equivalents</td>
<td>0.52</td>
<td>8</td>
<td>31.3 m</td>
</tr>
<tr>
<td>Net Debt USD (nominal)</td>
<td>650</td>
<td>11 (of 13)</td>
<td>33 bn</td>
</tr>
<tr>
<td>GDP constant USD (2005)</td>
<td>21,560</td>
<td>10</td>
<td>1,078 bn</td>
</tr>
</tbody>
</table>
Rationale for Indicators

Greenhouse Emissions (CO2-e): The emissions footprint for each person’s consumption leading to heat gain in the atmosphere and oceans and thus increasing climate disruption (due to accounting uncertainties, the indicator excludes land use, land use change and biomass burning). Measure: Tonnles of CO2 equivalents per capita excluding land use change, forestry and biomass burning Year 2011, Source- Eora Global Database http://worldmrio.com/

Scarce Water Use: The scarce water use footprint. Over- extraction increases threats to human water security and river biodiversity in 30 of the globe’s 47 most volumetric river basins. This scarce water is eventually consumed as clothes, food and beverages. Measure: litres of scarcity-weighted water use per capita. Year 2011, Source-Eora Global Database http://worldmrio.com/

Endangered Animal Species (Species threats): Land clearing and over-fishing are two of 15 or more drivers of accelerated rates of biodiversity endangerment. This species threat footprint traces endangered animal species from the IUCNs ‘Red List’ to complex trade networks of threatening production activities. Measure: number of endangered animal species (species threats) per one million of human population. Year 2000, Source- Eora Global Database http://worldmrio.com/

Land Footprint (Land): The land footprint in trade corrected terms or consumption terms required for built infrastructure, crops, forest, fishing and grazing. Same accounting principle as the ‘ecological footprint’ but excludes energy/carbon land as the emissions indicator specifically accounts for that impact. Expressed in ‘globally-average hectares’ adjusted for productivity potential. Measure: Land area in globally-average hectares required to underpin consumption footprint. Year 2011 Source- Eora Global Database http://worldmrio.com/

Material Footprint (Material usage): The material use footprint. Increasing material use by developed and developing economies poses long term threats to sustainability at both ends. Limits to resource quality of virgin materials and a faster consumption lifecycle suggest issues for disposal and recycling. Measure: total material flow in tonnes per capita. Year 2008, Source- Eora Global Database http://worldmrio.com/

Inequality (Gini coefficient): The footprint or production chain measure of the distribution or spread of wages within a country, across the population. A smaller rich elite and a large working poor gives a higher Gini coefficient while a more equal country has a lower value (e.g. South Africa 0.59, USA 0.38, Japan 0.29). Measure: Time series of Gini footprints computed as part of Eora employment studies. Data not yet available as part of Eora Database. Year 2011

Employment Footprint (Jobs): A social indicator measuring the domestic and outside workforce required to maintain domestic consumption and lifestyle. A cascade of lower paid workers delivers goods and services through complex production chains to more affluent consumers. Measure: Full time equivalent workers (domestically and out-of-country) per capita of domestic population, Year 2011 Source- Eora Global Database http://worldmrio.com/


Gross Domestic Product (GDP): A conventional and widely accepted economic measure of development and progress in each country. This is not a footprint or production chain measure. Measure: GDP per capita in deflated 2005 US dollars from United Nations data depository Year 2012 Source- GDP by Type of Expenditure at constant (2005) prices: http://data.un.org/

Key References


