Assessing the non-renewable material and energy resources (NRMER) needed to advance resilient social health protection (SHP) systems*

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1 Introduction and objectives

Problems:

- Use of natural resources is now more than 3 times 1970 level.
- Physical limits to to the extraction of non-renewable resources.
- Renewable resources likely cannot completely replace non-renewable ones.
- Insecurity of resource supply for SHP systems, a major economic sector accounting for 11% of global GDP.

Objectives:

- Examine SHP systems' **resource footprints** and **resource dependency**.
- Determine the relationship between an aggregated **energy footprint indicator** per capita and **UHC Service Coverage Index**.
- Launch **a global collaboration** on the dependence of **SHP systems** on NRMER.

2 Methodology

- **Input-output analysis** (IOA) of regional SHP systems using **EXIOBASE3** for 44 countries and 5 "rest of the world" (RoW) regions **from 1995 to 2015**.
- IOA is **a top-down approach** to track worldwide industrial output needed to produce the final consumption of a given product in a given region. Environmental extensions are used to translate economic flows into physical flows.
- **References used** :
  - Health expenditure data in **WHO's Global Health Expenditure Database** and **OECD's health expenditure database.**
  - UHC Service Coverage Index from Tracking Universal Health Coverage: 2021 Global monitoring report of **WHO and the World Bank.**

3 Results

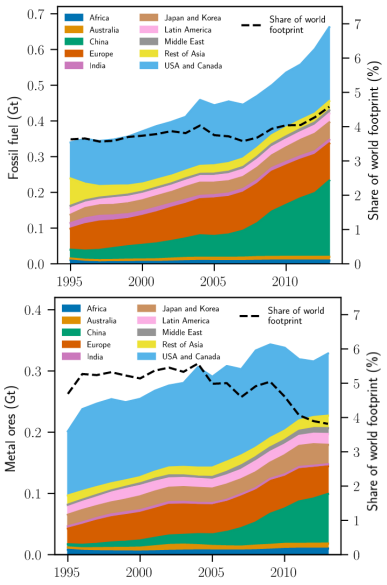

Fig. 1. Evolution of resource footprints of SHP systems between 1995 and 2013.

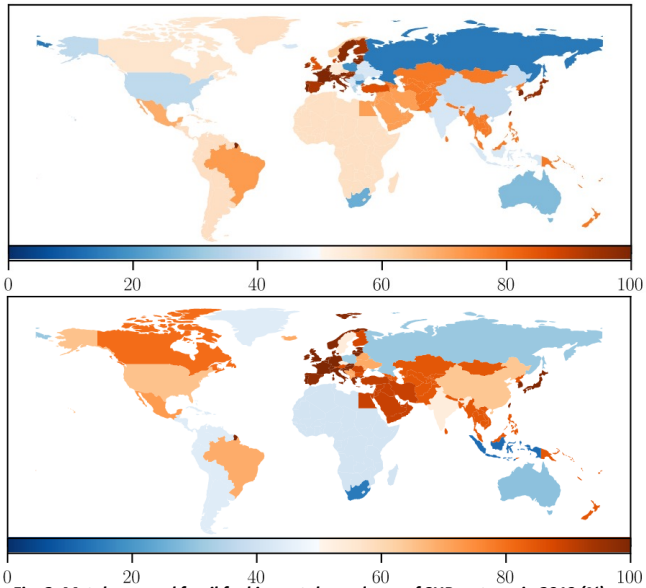

Fig. 2. Metal ores and fossil fuel import dependency of SHP systems in 2013 (%).

Resource footprints and dependency

SHP systems' footprint increases 1995-2013 (Fig. 1):

- **Fossil fuels** footprint reached 662 Mt.
- Global **fossil fuels** footprint ends at 5%.
- **Metal ores** footprint reached 328 Mt.
- Global **metal ores** footprint ends at 4%.

SHP systems **dependence** on imported material and energy resources in 2013 (Fig. 2):

- 80% relied at more than 50% on **fossil fuels imports.**
- 88% relied at more than 50% on **metal ores imports.**

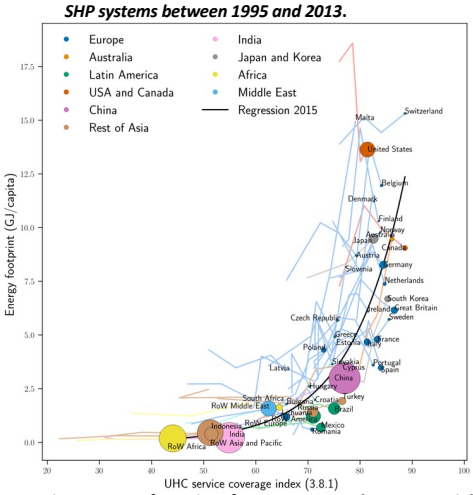

Fig. 3. Energy footprint of SHP systems scales exponentially with UHC Service Coverage Index in 2015.

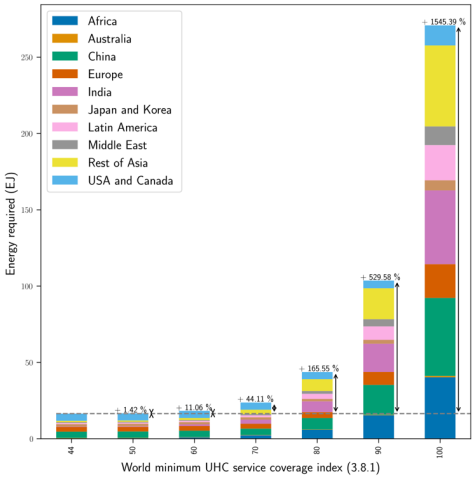

Fig. 4. Energy footprint associated with an increase of the world minimum UHC Service Coverage Index.

Energy footprint

SHP systems' energy footprint per capita followed a **power law** of UHC Service Coverage Index in 2015 (Fig. 3):

- Exponential amounts of energy needed to **support SHP systems' development**.

Effect of increase in world minimum UHC Service Coverage Index (Fig. 4):

- Index increase from 44 to 70 increases energy footprint by 44%.
- Index increase from 44 to 100 increases energy footprint by 1545%.

As environmental impacts associated with these resource footprints are responsible for an increase in some diseases, SHP systems find themselves in a **vicious cycle.**

4 Conclusion

- SHP systems will become **exponentially vulnerable** to NRMER supplies, exposing countries to **SHP systems crises.**
- NRMER scarcity must be **anticipated and forestalled** by reducing demand and adapting SHP systems.
- Bottom-up analyses are required to **deepen understanding, improve equity** and **inform further action**.

- The P4H Network has already proved its ability to bring people together on this topic by proposing to four groups of experts from China, France, Singapore and Switzerland to use a **bottom-up approach** to assess the needs of NRMER to specific items of the Covid-19 response.
- P4H seeks now to launch a **global collaboration** on this topic in order to add the **physical dimension** to monetary analyses of SHP.

*References: Andrieu et al 2022, The Exponential Relationship between Healthcare Systems' Resource Footprints and Their Access and Quality: A Study of 49 Regions between 1995 and 2015, available at SSRN: http://dx.doi.org/10.2139/ssrn.4182423. Work led by the P4H Network with China, France, Singapore and Switzerland.