Global exposure and vulnerability to multi-sector development and climate change hotspots


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## Indicator dataset development

- Global coverage of 14 development and biophysical indicators at 0.5° resolution (~50km)
- 3 socioeconomic development scenarios – SSPs 1, 2 & 3
- 3 climate change scenarios – 1.5, 2.0 and 3.0°C

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Sectoral analysis
Energy

- **e1: Lack of clean cooking access**
- **e2: Heat events**
- **e3: Cooling degree days**
- **e4: Hydroclimate risk to power plants**
Energy impacts: 2.0° SSP2
Land impacts: 2.0° SSP2
Multi-sector hotspots
Global hotspot exposure

Byers et al. (2018, ERL)

3.0 °C
Incorporating vulnerability
Vulnerability

Depends on socioeconomic circumstances, e.g.:
- Wealth
- Infrastructure
- Social and cultural background
- Education
- Institutional safety nets

Poverty fluxes:
- Came out of poverty 15%
- Fell in to poverty 13%

Net annual poverty reduction 2% per annum

"lack the economic stability and resilience to shocks that characterizes middle-class households"

Lopez-Calva & Ortiz-Juarez, World Bank, 2011

Poverty numbers:
- < $10 2.2 bi
- < $5 1.3 bi
- < $2 0.7 bi

Vulnerable to poverty

Extreme poverty

Poverty fluxes:
- Came out of poverty 15%
- Fell in to poverty 13%

Net annual poverty reduction 2% per annum
Hot and vulnerable

Byers et al. (2018, ERL)

3.0 °C

Vuln. pop. / km²
income < $10 /day
MSR > 5.0
Regional impacts

- Northern hemisphere regions have better than average impacts
- Most Asian and southern regions are on/worse than average

Byers et al. (2018, ERL)
Exposure & vulnerability (27 regions)

2050 Exposed

Exposed & Vul.

Byers et al. (2018, ERL)

Sustainability

Middle of the road

Rocky road
Keep global mean temperatures as low as possible...
... to reduce exposure of the global population and limit economic impacts.

- Substantial differences between 1.5° and 2.0°C
- South and SE Asia highly exposed even at 1.5°C

Pursue ambitious socioeconomic development, ... targeted in the most at-risk areas to most effectively reduce vulnerabilities.
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