

Understanding the Economic Benefits of NWP

Daniel Kull

Senior Disaster Risk Management Specialist
ECMWF, Reading, UK

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Introduction to the World Bank Group and GFDRR

World Bank Group (WBG)

- ❖ “Twin goals”: end extreme poverty and promote shared prosperity.
- ❖ Source of financial and technical assistance to developing countries.

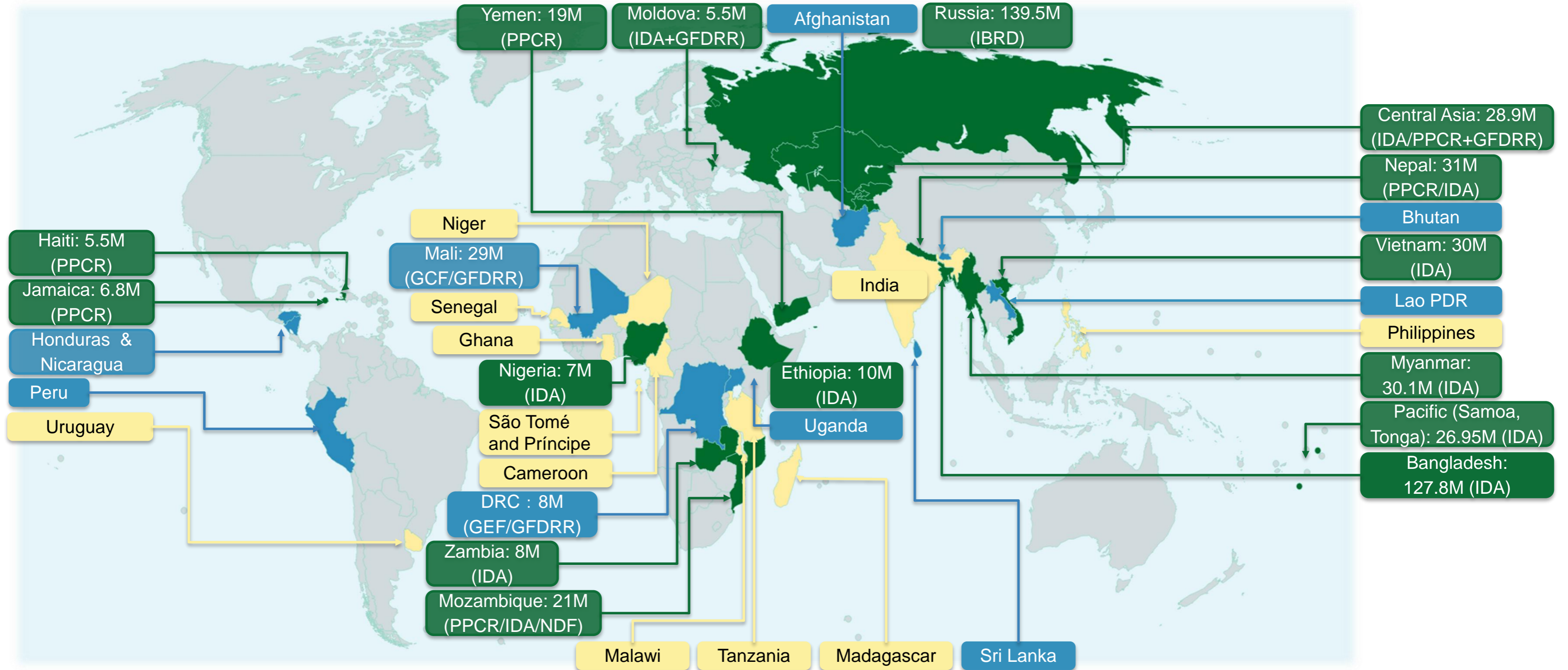
Global Facility for Disaster Reduction and Recovery (GFDRR)

- ❖ Partnership (WBG, UN and countries) to integrate disaster risk management (DRM) and climate change adaptation into development.
- ❖ Knowledge, technical assistance and financing hub for DRM within the WBG.

GFDRR Hydromet

- ❖ WBG focal point and service center to mobilize resources, guide and support large investments in hydrometeorological modernization:
 - Capacity building and analytical support.
 - Portfolio development and investment support.
 - Development partners’ coordination.

WBG portfolio overview: selected hydromet projects



- WBG projects under implementation
- WBG projects in preparation
- GFDRR technical assistance only

Triple dividends of resilience

1st Dividend of Resilience: Avoided losses

Increased resilience reduces disaster losses by:

1. Saving lives
2. Reducing infrastructure damages
3. Reducing economic losses

Benefits when
disaster strikes

2nd Dividend of Resilience: Development

Increased resilience unlocks suppressed economic potential and stimulates economic activity by:

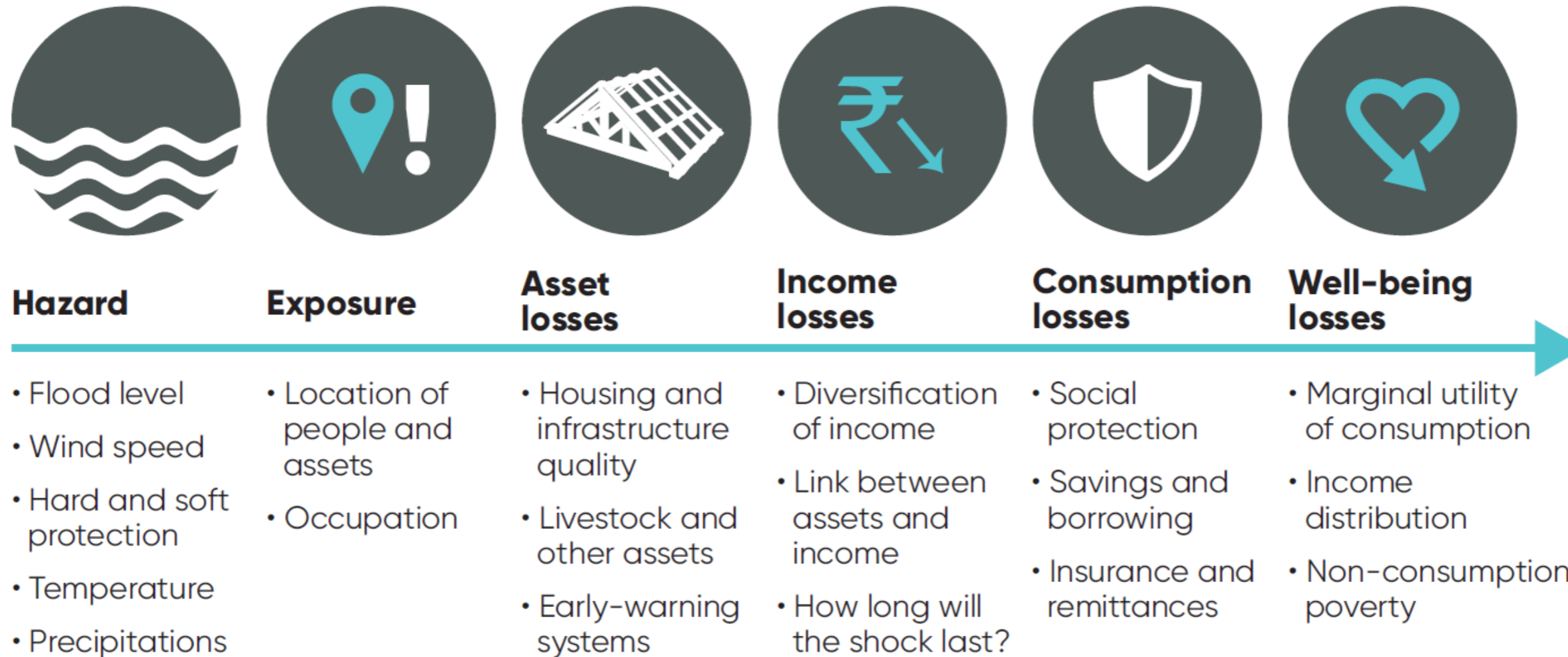
1. Encouraging households to save and build assets
2. Promoting entrepreneurship
3. Stimulating firms to invest and innovate.

Benefits
Regardless of
disaster

3rd Dividend of Resilience: Co-benefits

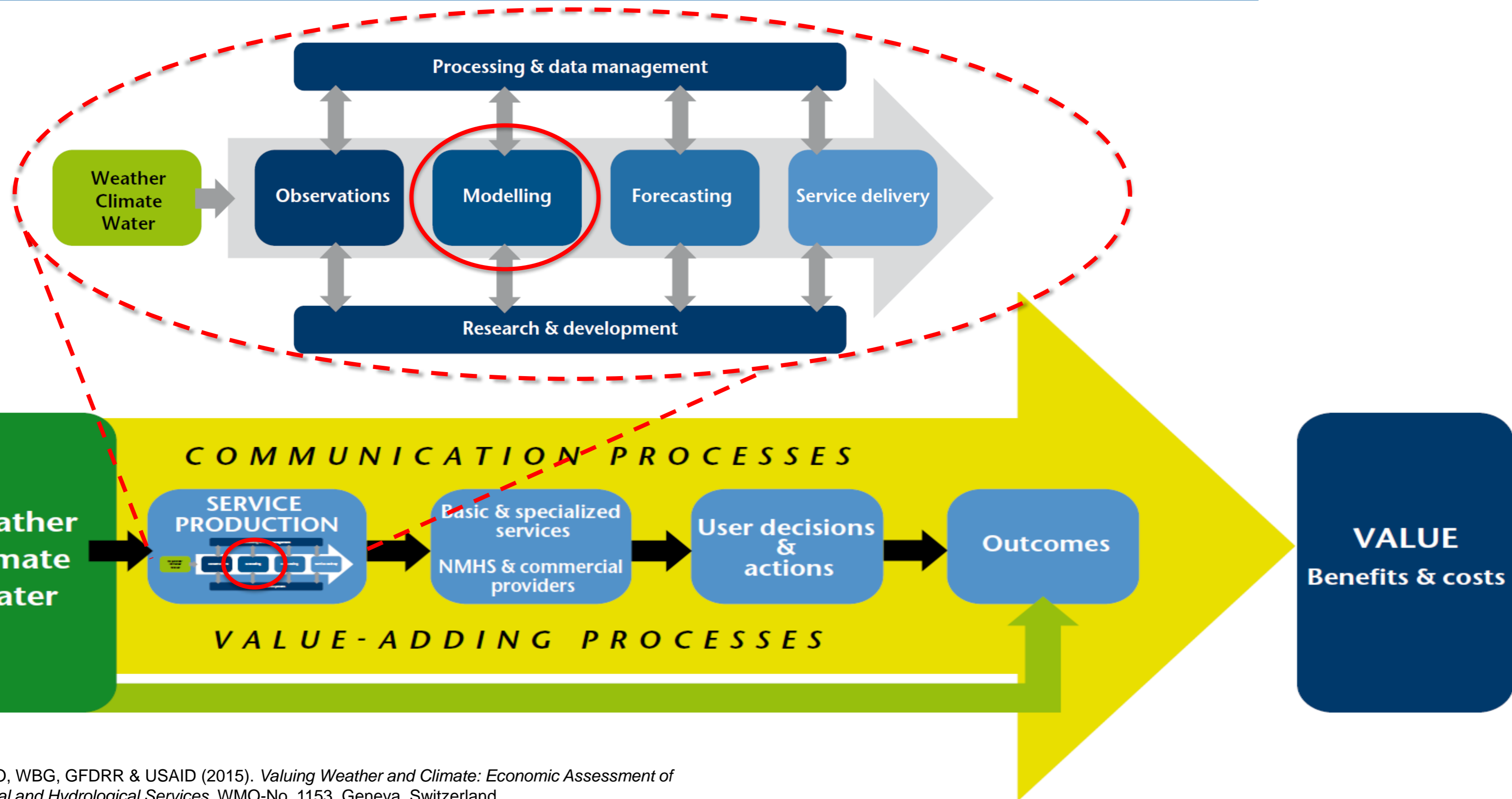
Beyond increasing resilience, DRM projects also yield positive economic, social and environmental side-effects (co-benefits).

Adverse weather impacts poverty



- The impact of extreme weather on poverty is more devastating than previously understood, responsible for **annual losses of \$520 billion and pushing 26 million people into poverty every year.**
- Targeted resilience-building interventions protect poor people from adverse weather events and can help countries and communities **save \$100 billion a year.**

Hydromet services production and value chains



Benefits of access to global NWP for low income countries

- Based on data and information from ECMWF, DWD (Germany), Météo France, Met Office (UK) & Met Service (NZ)
- Utilizes approach/assumptions from Hallegatte (2012), which concluded that if hydrometeorological services globally were at the same level as those in high income countries:
 - Additional 23,000 lives saved per year.
 - Up to \$2 billion in additional asset losses avoided per year.
 - Up to \$30 billion in additional economic production per year.
- Major assumptions (among many!):
 - Regional and national capacity to fully utilize NWP products.
 - 15%-35% of hydromet service improvements attributed to better NWP access.
- Analysis for 31 low income countries indicates improved access to NWP could yield **benefits of up to \$500 million per year** (scaled-up including lower middle income countries: benefits > \$7 billion/year).
- **Over 80 times greater than the costs** of delivering/customizing NWP for low income countries.

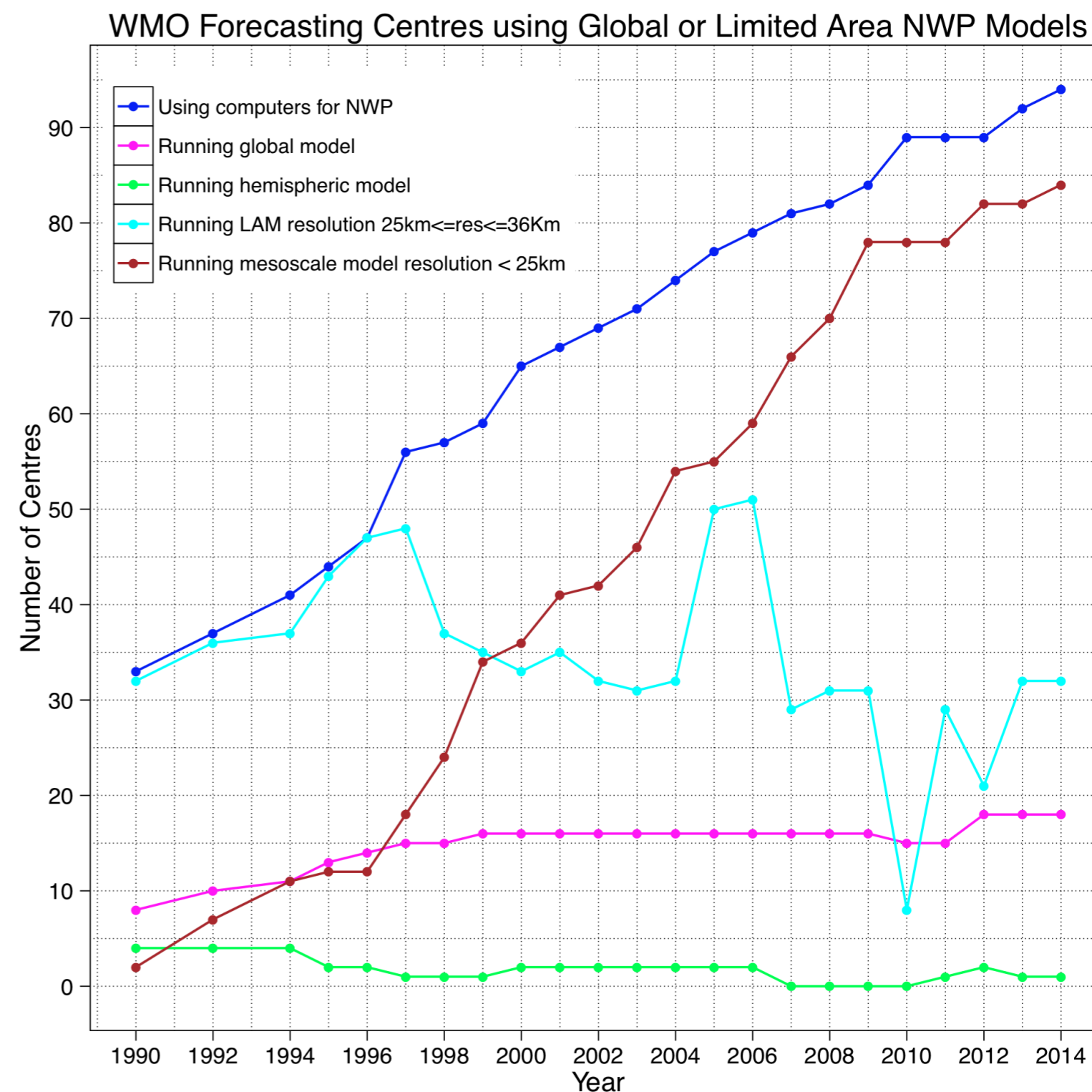
Selected lessons from hydromet modernization projects

- ❖ Modernization of NMHSs is a **high value investment** delivering a broad range of socio-economic benefits.
- ❖ Building infrastructure is less challenging than **building institutions, strengthening capacity and sustaining them.**
- ❖ Prioritize public services – **open data approach is best.**
- ❖ **Leverage international and regional systems and partners.**
- ❖ **Weigh innovation verses reliability, scale and sustainability.**
- ❖ **Increasing demand for full access to global NWP.**



NWP demand from developing countries

- ❖ **Quantifying the impact** of severe weather is much more important than characterizing the weather.
- ❖ For example, hydrological and hydraulic models **need to be driven by high resolution NWP** (preferably ensembles) to inform better decisions on likely impacts and response.
- ❖ The need for higher resolution local area models and linked hydrological models will increase, putting **more demand on access to the best available global mesoscale ensemble products.**
- ❖ Simply making all digital data freely available is not what is required; it needs to be properly curated to **ensure reliability and usability.**



Computing & Internet services becoming more affordable

Global data storage cost trend:

-38% per year (1992-2012)

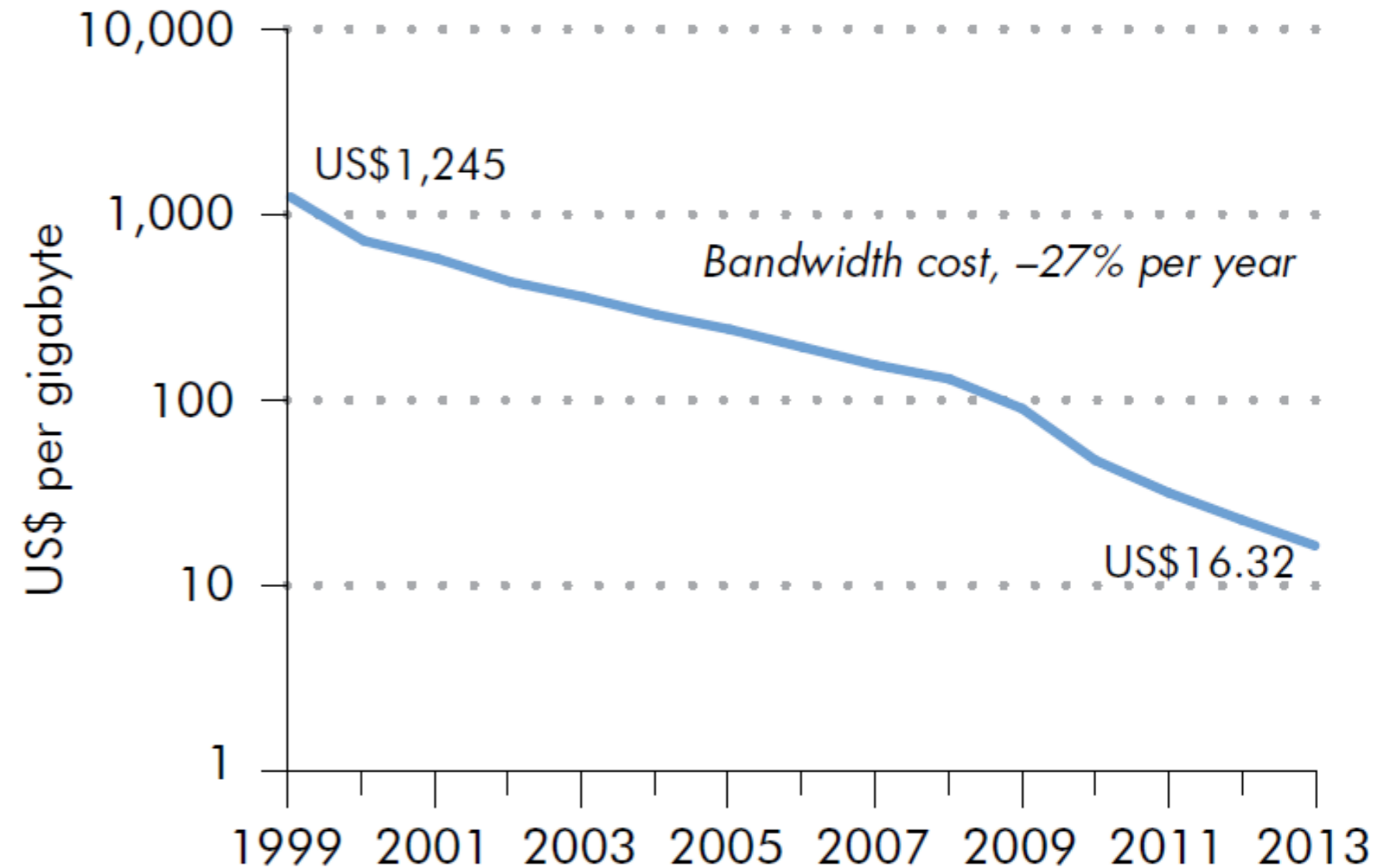
Global bandwidth cost trend:

-27% per year (1999-2013)

Global computing cost trend:

-33% per year (1992-2012)

b. Global bandwidth cost trend, 1999–2013



More usage = more value generated

The more NWP is used to inform decisions, the more value it will generate.



Increasing Demand for Free Landsat Data

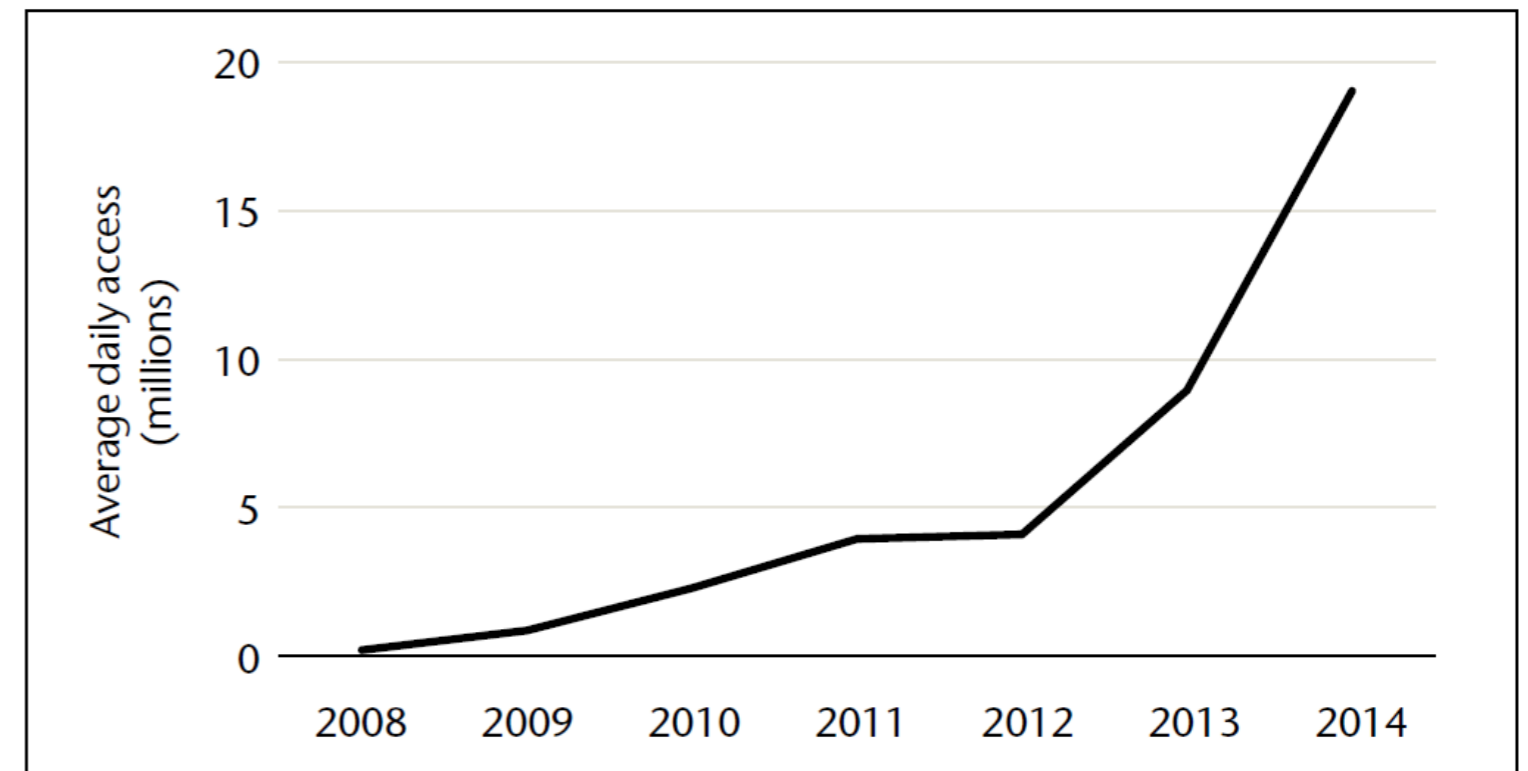
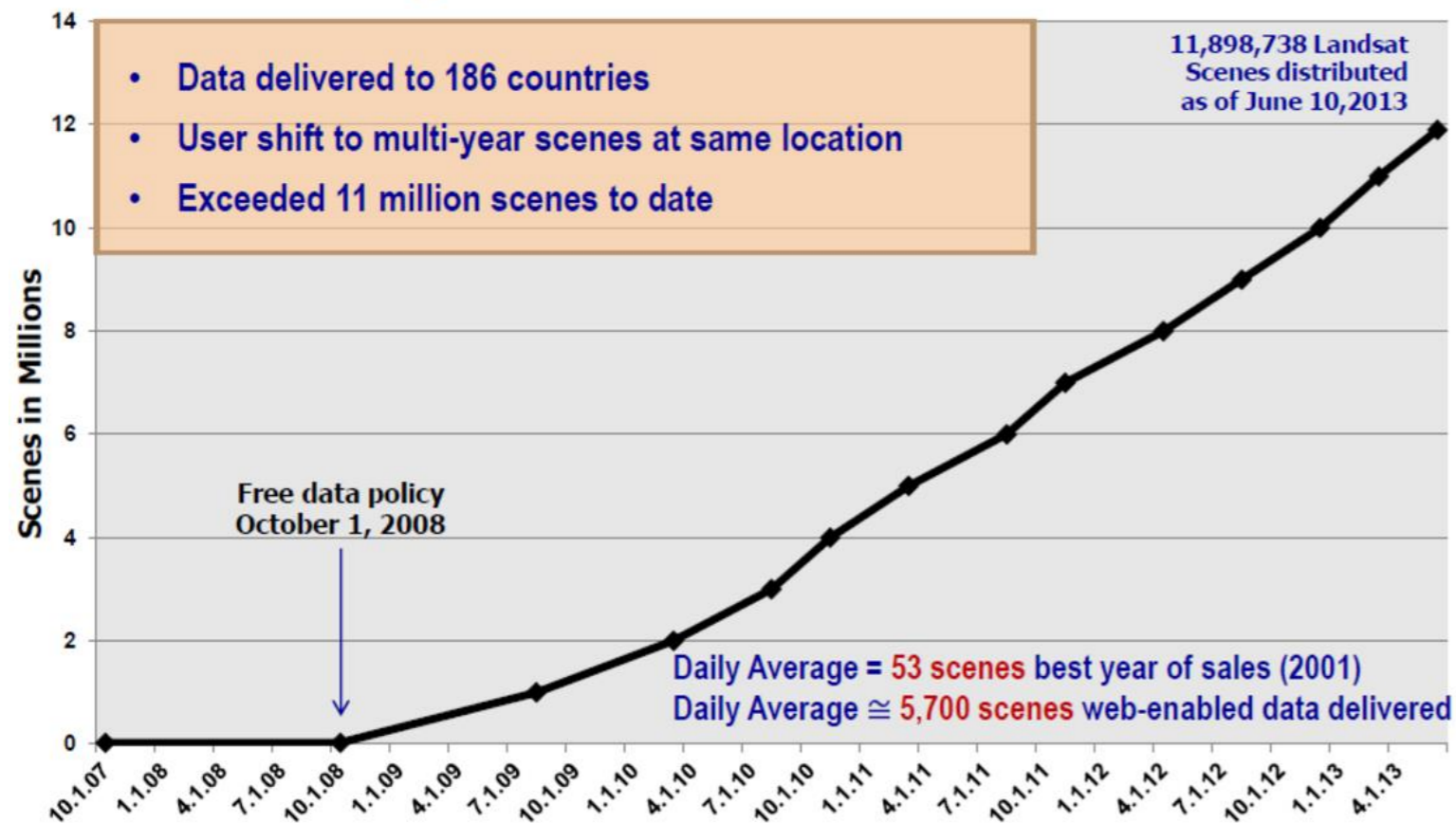


Figure 10.1. Growth in usage of the Norwegian Meteorological Institute's web services following adoption of open-data (2006) and open-access (2007) approaches

Sources

Left figure: GEO (2014). *The Group on Earth Observations Looks Toward a Second Decade of Data Sharing*, Geneva.

Right figure: WMO, WBG, GFDRR & USAID (2015). *Valuing Weather and Climate: Economic Assessment of Meteorological and Hydrological Services*, WMO-No. 1153, Geneva.



Conclusions

- ❖ Global NWP has the potential to additionally generate **tens of billions of US\$ in socioeconomic benefits** per year in developing countries.
- ❖ To fully realize these potential benefits, **real-time access to numerical products as digital information** (rather than images) is needed, accompanied by **training support**.
- ❖ Simply making all digital data freely available is not sufficient; it needs to be **properly curated to ensure reliability and usability**.
- ❖ This generates an incremental cost to NWP producers supplying information to developing countries, such that **additional resources to ensure reliability and usability are required**.
- ❖ Global NWP and its potential benefits for developing countries fulfill the utilitarian principle; it should therefore be treated as a **global public good**.
- ❖ Therefore, to realize the untapped potential of global NWP, **equitable international financing solutions** should be developed to ensure sufficient accessibility for developing countries.
- ❖ However even with unhindered access to the full set of global NWP products, **significant investment is needed in regional and national** forecasting, early warning, capacity building, and preparedness capacities to fully leverage NWP products.

Thank You



Daniel Kull, Senior Disaster Risk Management Specialist

Email: dkull@worldbank.org

Telephone: +41 22 748 1015

