

# International genebanks at risk?

## Assessing and managing natural hazards and political risks

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### Key messages

- International genebanks are key for safeguarding global crop diversity but are themselves exposed to risks.
- Risk exposure varies greatly between international genebanks: on tendency in Asia and South America high exposure to natural hazards, in Africa high political risks.
- Location specific risk assessment is essential. Resilient infrastructure, safety duplications and risk transfer solutions (insurance & funds) are key risk management strategies.

## I. Background

International (int.) genebanks have the mandate to safeguard plant genetic resources (PGR) of the major food crops *ex situ* at special facilities around the globe. They are essential for agricultural development and sustainable food systems.

Often overlooked is the fact, that these facilities and their PGR collections are exposed to several risks jeopardizing their physical integrity. Nevertheless, scientific studies about risk assessment and risk management at genebanks are rare.

## II. Methodology

The study systematically analyses risk exposure and draws conclusions for risk management at 14 int. genebank locations, including CGIAR centres.

Two hazard groups were assessed:

1. **Natural hazards:** location specific assessment for 12 main natural hazards using risk indices of the tool “Natural Hazards Edition” of Munich Reinsurance
2. **Political risks:** country specific assessment by 2 indicators “Worldwide Governance Indicator” (WGI, Worldbank) and “the Fragile States Index” (FSI, Fund for Peace)

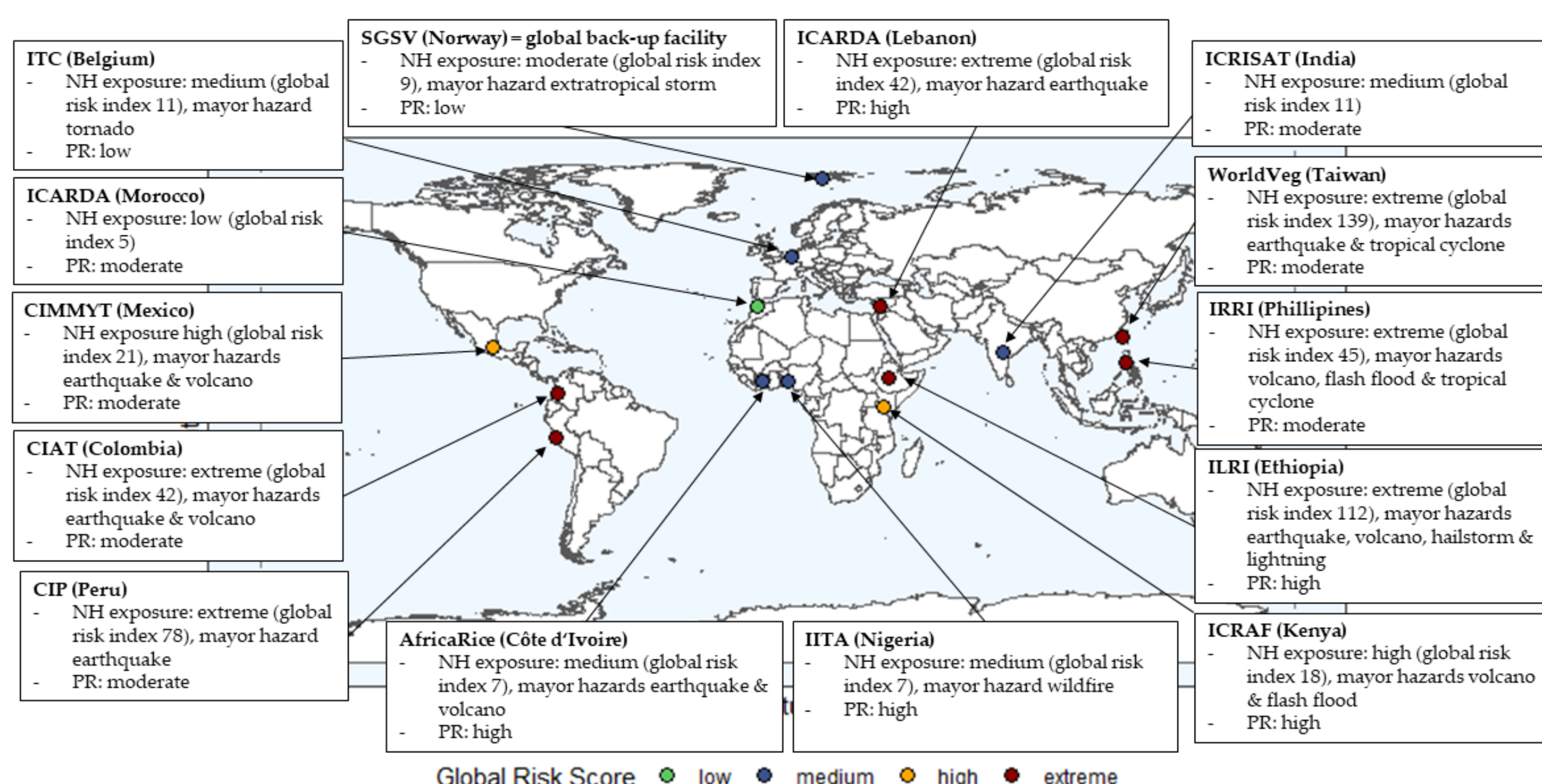


Fig. 1: Location of international genebanks and results of their risk assessment for natural hazards (NH, incl. global risk index with max. value of 300) and political risks (PR)

## III. Results

### Natural hazards:

- Large differences in exposure between genebank locations (Fig. 1 & 2)
- Most exposed genebanks are WorldVeg, IRRI and CIP (Fig. 2), while back-up facility SGSV with moderate exposure and low vulnerability

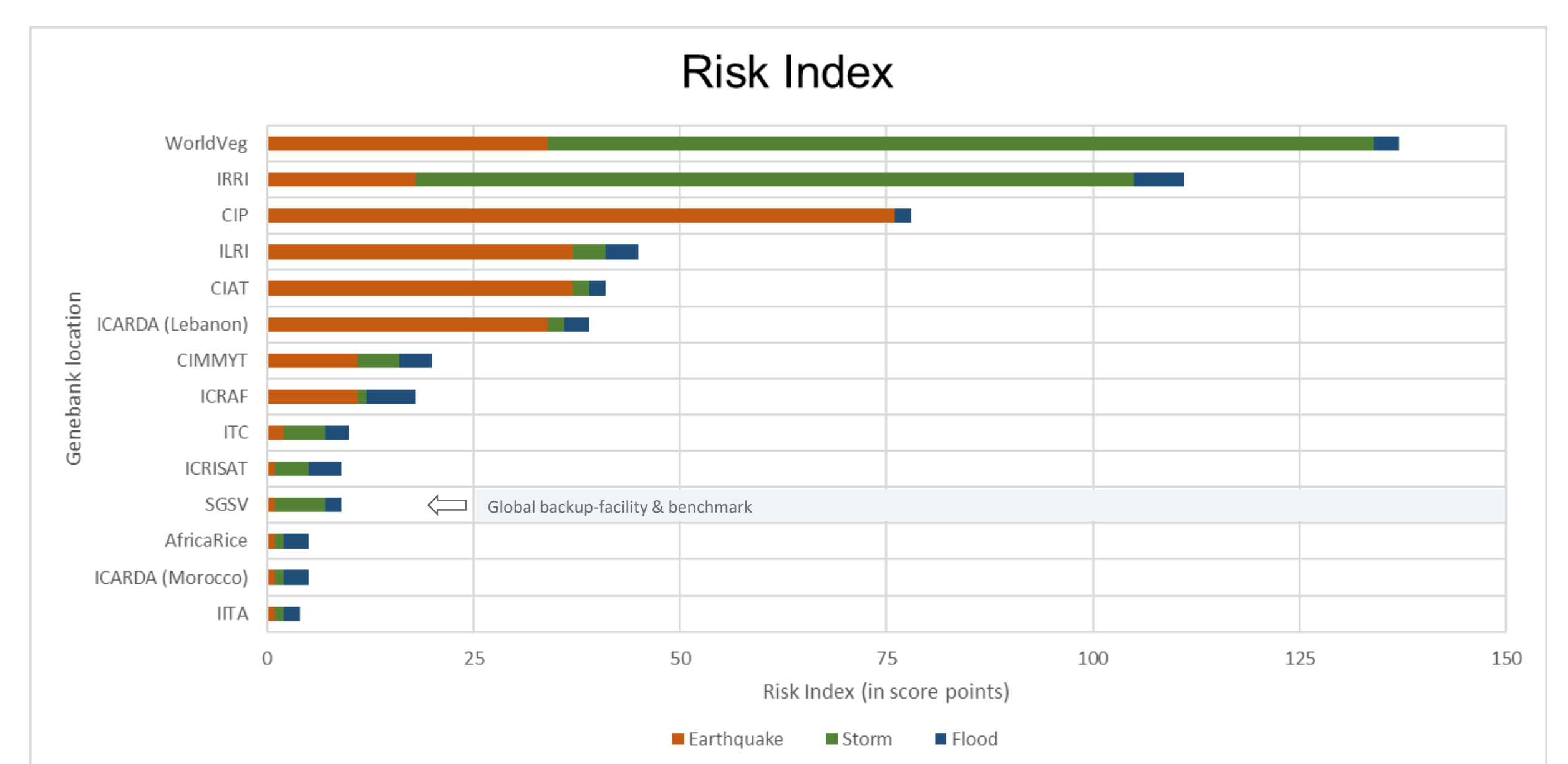


Fig. 2: Risk exposure per natural hazard group (0 = no exposure, 100 = highest risk per hazard group), using risk indices of Munich Reinsurance

### Political risks:

- High concurrency between indicators WGI and FSI
- High risk for genebanks in Africa; most exposed are IITA and ILRI (Fig. 1)

## IV. Conclusions for risk management

Aim: Reduce vulnerability of genebanks by

1. Conducting **holistic risk assessment**
2. Implementing **location specific risk prevention/mitigation measures**, including
  - Increasing resilience of infrastructure
  - Efficient system of safety duplications at other genebank locations
3. Developing **risk transfer** solutions (e.g. insurance coverage and funds) to speed up repairs and recovery after damage. Prerequisite: economic valuation of the individual PGR collections

### References and further reading:

- Herbold, T.; Engels, J.M.M. Genebanks at Risk: Hazard Assessment and Risk Management of National and International Genebanks. *Plants* 2023, 12, 2874. <https://doi.org/10.3390/plants12152874>
- Master's Thesis by Herbold, T. "Hazard assessment and risk management of national and international genebanks for a sustainable conservation of plant genetic resources", supervised by Prof. Dr. Christian Lippert and Prof. Dr. Karl Schmid, University of Hohenheim (unpublished, request under [theresa.herbold@gmx.de](mailto:theresa.herbold@gmx.de))