

# InsuResilience Sectoral Community on Nature-based Solutions and Risk Financing: Workshop on “Quantifying benefits of Nature-based solutions”, 31/03/2022

## Summary document

### The overall context

In late 2020, the InsuResilience Integrated Approaches Working Group launched four sectoral communities to increase the deep-dive into topic-specific discussions. One of them focuses on linking Nature-based Solutions (NbS) and risk transfer instruments. Overall, this sectoral community seeks to share knowledge on NbS and Risk Financing, help explore and test new risk financing solutions and identify ways to further mainstream NbS and Risk Financing into global climate change adaptation and Disaster Risk Reduction agendas.

Current members of the Sectoral Community on NbS:

ADB, AXA, Genesis Analytics, GIZ, Global Affairs Canada, InsuResilience Solutions Fund (ISF), Luxelare, National Disaster Risk Management Fund, Mercy Corps, Munich Re, Munich Re Foundation, ODI, Peace Parks Foundation, Restoration Insurance Service Company, The Nature Conservancy, Umby, UNDP, UNFCCC, Vivid Economics, World Food Programme, Willis Towers Watson

### What are Nature-based solutions (NbS) and what is the insurance link?

NbS are inspired and supported by nature, and can simultaneously provide environmental, social and economic benefits and help build resilience, for example through mass stabilisation, water flow regulation, wind dissipation, and temperature regulation, protect soil and biodiversity, and enhance climate resilience. There is growing recognition of the role of NbS in climate adaptation and disaster risk reduction, but despite mounting evidence of their technical efficacy, NbS face sizeable challenges and barriers to adoption, one of those being lack of clarity on how to quantify NbS benefits, leading to a failure to account for the true value of the generated benefits. Furthermore, for many stakeholders the performance of NbS under extreme hazard conditions and their integrity in the face of climate change remains unclear.

Insurance instruments can reduce financial impacts of climate disruptions, incentivise risk prevention, speed up recovery, and help to build up resilience of communities, businesses and society in general. An important aspect is the risk reduction service that ecosystems provide, for example nature-based flood risk management such a renaturation of rivers, or mountain forests as protection from avalanches. Insurance schemes that recognize the value of these ecosystem services can create incentives for their protection, for example through premium discount for properties protected from coastal flooding by mangrove forests. Many nature-based insurance & investment solutions have been proposed and elaborated conceptually, and some of them made operational.

InsuResilience's SC on NbS recently conducted a survey of how insurers employ NbS. The survey's initial results show that there is awareness across the industry of examples in which risk transfer builds upon NbS in some way, including through risk pricing. Some 70% of insurance solutions referred to in the survey focused on marine and coastal ecosystems (e.g., mangroves). However, the survey also indicates a lack of agreed assessment tools for the NbS benefits, with a majority of insurers relying on pilot studies rather than widely accepted methodologies. The SC agreed to host a workshop to explore this further and discuss how NbS can be better integrated in catastrophe models and insurance pricing to account for changing protection levels. The workshop is a key milestone for the sectoral community and marks the transition from initial scoping (phase 1) to solution-oriented collaboration (phase 2).

## The workshop

The workshop was held online on 31/03/2022 with the aim to

- explore how the benefits and co-benefits of NbS can be quantified;
- evaluate how NbS contributes to risk reduction;
- discuss how NbS benefits can be incorporated into the pricing of insurance premiums;
- share knowledge and learn from those involved in NbS;
- map out next steps on the road towards better alignment between NbS and DRF

The agenda covered three segments and a brief outlook:

<p><b>Segment 1: What are benefits of NbS and how can we quantify these?</b></p> <ul style="list-style-type: none"> <li>• Presentations by Prof. Dr. Wouter Botzen (Vrije Universiteit Amsterdam), Rafael J. P. Schmitt (Stanford University), and Adriana Quevedo (Overseas Development Institute)</li> <li>• Q&amp;A</li> </ul>
<p><b>Segment 2: How can we quantify NbS risk reduction benefits in CDRFI projects?</b></p> <ul style="list-style-type: none"> <li>• Interactive Slido session</li> <li>• Presentations by Prof. Michael Beck (University of California of Santa Cruz) and Christian Wertli (SwissRe)</li> <li>• Q&amp;A</li> <li>• Showcasing of practical examples with experts from AXA XL, Practical Action/ Zurich Flood Resilience Alliance, and Munich Climate Insurance Initiative (MCII)</li> <li>• Breakout group discussion on case studies</li> </ul>
<p><b>Segment 3: How can NbS benefits be incorporated into the insurance value chain?</b></p> <ul style="list-style-type: none"> <li>• Brief inputs by different experts, including from Willis Towers Watson (WTW), Risk Management Models, Analytics, Software &amp; Services (RMS)</li> <li>• Concluding discussion: What are challenges and how can we overcome them?</li> </ul>
<p><b>Closing remarks and next steps</b></p> <ul style="list-style-type: none"> <li>• Short interview with Dr Jaroslav Mysiak (The Euro-Mediterranean Center on Climate Change)</li> </ul>

Moderation was conducted by Swenja Surminski, LSE - Grantham Research Institute (supporting the InsuResilience Secretariat), breakout session discussions were guided by

InsuResilience Secretariat staff. The sessions were open to all InsuResilience Global Partnership members and facilitated by the InsuResilience Secretariat, bringing together experts from across different sectors and communities. 50 participants joined from across the world including IGP members and non-members, and representing a range of sectors and countries.

If you would like to get in touch with one of the speakers, please visit the following link: [padlet](#).

### Who joined the Workshop:



## Summary Segment I

### Prof. Dr. Wouter Botzen: Assessing benefits of Nature Based Solutions (Institute for Environmental Studies, University of Amsterdam)

- Wetlands in the Netherlands that have been implemented to reduce flood risk also bring ecological benefits. That makes it complicated to assess the various benefits. Therefore, **NbS value categories** and **assessment methods** can be more narrow or broader (**climate risk reduction – climate risk assessment, property markets – hedonic pricing, household welfare – stated preference surveys**).
- The (co)-benefits of NbS for homeowners and other residents near NbS sites are broader and include amenity and recreation values, biodiversity values and health benefits.
- New meta-data analyses allow for a more rapid assessment of these (co-) benefits to homeowners and households more generally.
- Although the risk reduction from NbS alone may not be sufficient for recouping NbS investment and maintenance costs, the broader societal value often is.

### Rafael J.P. Schmitt, Ph.D: Mapping and Quantifying Natural Capital for disaster risk reduction: Introducing case studies from the Natural Capital Project (InVEST)

- **Key product by Stanford University: InVEST** (integrated valuation of ecosystem services and tradeoffs) – free, open-source software with global user base.
- Offer users the ability to **model many different ecosystem services** (e.g. flood mitigation, slope stability, wave and wind energy): InVEST models biophysical benefits that can then be translated to monetary values or livelihood impacts.
- InVEST is a **stand-alone tool for biophysical modeling**, but ideally it will be integrated into a broader decision-making context: Assessment process: scoping – compile data – build scenarios – analyze and synthesize – reach out.
- Example of innovation: Landslides are a major hazard. Yet, current models for larger scales/data-poor areas cannot capture the role of vegetation and where NbS can be

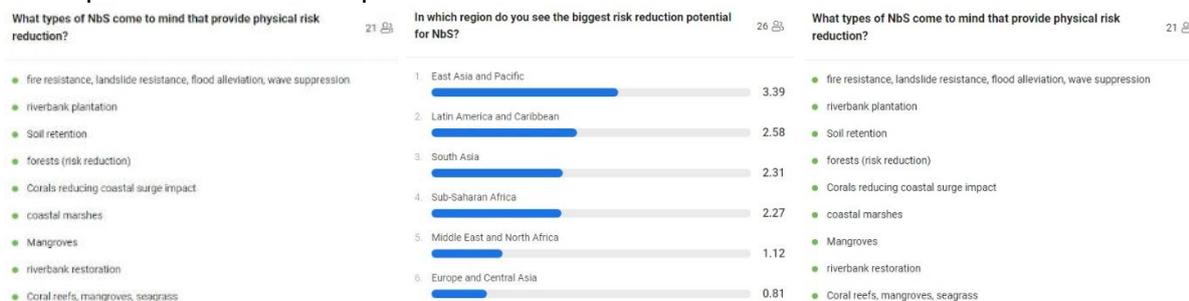
effective, and the value of hazard reduction. Therefore, InVEST combines in its innovative natural hazard assessments hillslope stability models, graph theory and probabilistic rainfall analysis to close that knowledge gap.

### Adriana Quevedo: Policy implications of quantifying NbS (ODI)

- NbS has been **adopted by international organizations over time**, e.g. Convention on biological diversity (G7/G20).
- **Complexity of NbS definition:** The most widely used definition is by IUCN. However, there are difficulties in deriving an operational definition from the conceptual one. Therefore, IUCN developed 8 standards to support operational definition of NbS.
- **Key characteristics of NbS in the economic case:** 1) public good, 2) time scale, 3) spatial scale, 4) dynamic, and 5) performance reliability. These characteristics pose additional transaction, maintenance and overall opportunity costs, which affect the overall business case of the NbS in focus.

## Summary Segment II

Participants shared their experiences and views via a brief interactive session:



Two main presentations were given:

### Prof. Michael Beck: Quantifying Flood Risk & Benefits from Nature-based Solutions (University of California of Santa Cruz)

- Developed a flood risk model which allows to assess damages with/without ecosystems
- Allows to analyze where NbS (mangroves) have the largest monetary benefits.
- Use these annual estimates of flood reduction benefits to determine the present value (PV) for each hectare of mangroves -> this is particularly important to conduct **cost-benefit analysis**.
- Analysis **where** mangroves have been lost since 1996 - **where would be the greatest restoration benefits?**
- Data to estimate flood reduction benefits can be found [here](#).

### **Christian Wertli: Insurance to protect natural assets and enable nature-based solutions (SwissRe)**

- Approach is **to put value/price tag on nature** as it provides value itself (e.g. tourism sector, benefits for mental and physical health etc.); this is important because benefits of nature are often underestimated.
- **Insurance can help to protect nature** and improve the understanding of NbS value to society
- Protection can take place pre- and post-event.
- Major challenge is **to achieve scale in NbS** (laws, regulation and taxonomy are obstacles that remain).
- Insurance is part of the puzzle, if the NbS is not insured, it may not be financed at all.

Three practical examples were showcased:

### **Chip Cunliffe: The Coastal Risk Index ([CRI](#)) (AXA)**

- Question is how to integrate ecosystems into risk models?
- Risks to physical assets are being derived from **1) storm surge and 2) sea level rise.**
- Dynamic sea level rise projections are integrated into the model.
- Benefits of restoration of lost mangroves are determined and quantified
- Model/index is built as granular as possible and is **designed for 8 return periods.**
- Data will be open source, model valuable for insurers (more accurately price the certain risk) as well as for governments (e.g. mapping their exposure etc.)

### **Bikram Rana: Flood resilience program lower Karnali, Nepal (Practical Action)**

- Local materials are used to build measures to reduce flood risks.
- Cheap and easy method to provide NbS and functions as natural barrier against floods.
- Natural barriers are **accompanied by flood insurance programmes.**
- **Incentives** to local communities to engage in NbS have to be considered – **direct benefits need to be visible.**

### **Maxime Souvignet & Eike Behre: The Economics of Climate Adaptation (Munich Climate Insurance Initiative)**

- The question is how to transform understanding of the NbS benefits into action?
- [Economics of Climate Adaptation](#) (ECA) has been developed by ETH Zurich and Swiss RE and there is the open-source tool [CLIMADA](#) for public use
- Benefits of **NbS have to be considered against the benefits** of other adaptation measures.
- **Use exposure analysis to calculate annual expected damages** for different sectors (e.g. critical infrastructure, housing etc.) in the present but also for the future scenarios.
- **The ECA** approach is used to identify measures and to help in the decision-making process.

The presentations were followed by break-out group discussions – some key points observed during discussions:

- Risk modellers should integrate NbS into their solutions for example when modelling storms and riverine floods and including NbS defenses which are already in place (not considering possible future outlooks and concepts).
- Vegetation should not be a static variable within risk models, allowing users to model and better understand the risk reduction effects of investments in NbS.
- **Population at risk is a crucial variable** when using databases (depends on the resolution of data).
- **Most experience with coastal/mangroves**, but there are also examples how damages increase with a loss of vegetation in non-coastal areas (trees and other vegetation can protect).
- Quantification of NbS benefits and scalability are key considerations – **data limitations** are a barrier. Robust data can be hard to obtain.
- At the **community level**, various challenges exist:
  - o Quantifying NbS solutions is crucial to convince investors, but communities might have a conflicting understanding of what the value of the projects is. It's a matter of understanding and of different values attached to NBS by local and global stakeholders.
  - o There's a need for a combination of global models and more small-scale analysis and local communities' perceptions. While models are becoming more granular (for example flood model at 5m scale), they also need to be linked to economic valuation methods in order to be used for insurance product development. This is an area that is still under-researched.
  - o Some projects run community engagement workshops to identify the value of assets and services important to them – this is an example of science co-creation and important to generate acceptance of measures and methods.
  - o community priorities can be integrated into program design and delivery: What do people treasure? Important to consider this when exploring vulnerabilities.
  - o Probabilistic models could be applied in data-scarce environments to help the community. Models so far remain at a pilot stage, we need more studies to reach scale.
- **Standards** for assessing how well NbS performed in DRR could be useful. Currently assessments are hard to compare or to understand.
- Investment in NbS could be boosted by Sustainable Finance Disclosure Regulation (SFDR) from EU; there is also a need for public pressure to investments and to put emphasize to nature when investing; ESG label is one opportunity to outdate long-standing investment structures.

## Summary Segment III

### **Maya Dhanjal: How can NbS benefits be incorporated into the insurance value chain? (Willis Towers Watson)**

- Insurance/risk financing can help to improve risk understanding and close the protection gap.
- Parametric insurance is one tool to provide liquidity and maintain ecosystems/NbS
- Achieve best price for clients by using robust data (e.g. objectively and independent parameter, available in real time etc.), otherwise very difficult and costly to insure.
- The more the insurance industry is able to quantify NbS, the better it is able to provide effective insurance products.

### **Robert Muir-Wood: Catastrophe Modelling for Nature (Risk Management Solutions)**

- Hazard x Exposure x Vulnerability = Risk.
- Exposure: different approaches could all be considered and applied:
  - o Economic exposure (such as buildings in the path of a storm surge)
  - o Human injury and mortality exposure (as people in the path of landslides)
  - o Nature exposure (threat to biodiversity)
- Important to not only rely on the monetarization approach for NbS.
- For Nature there can be benefits in sustaining alternative perspectives (e.g. health/welfare, diversity/density of nature).

## Outlook

Swenja Surminski gave an **update on two focus areas for the SC on NbS** and invited further input from members and non-members to help develop these into actions:

- The SC NbS is commissioning a series of **short video tutorials** on NbS which will be shared with the wider community. Contributions range from 'how to' to brief summaries of projects and experiences. Those interested in providing videos should contact Lea Kulick at the InsuResilience secretariat.
- The **SC NbS is participating in a new EU funded project – NATURANCE**: Insurance for nature - nature for insurance. The project is a collaboration across different European research institutes and practitioners. Overall lead is Jaro Mysiak (The Euro-Mediterranean Center on Climate Change) who outlined plans and ambitions in discussion with Swenja Surminski (LSE), who leads the innovation hubs for NATURANCE. The main objective of the Naturance project is to examine technical, financial and operational feasibility and performance of solutions that are built upon and combine disaster risk financing & investments with nature-based solutions. It is set up to stimulate dialogues, knowledge sharing and mutual learning across different areas of policy and practice. The project's ambition is to produce a comprehensive and collaborative assessment of nature-based insurance and investment solutions from societal and business perspective. The overall goal is to encourage adoption of jointly elaborated principles, performance metrics and recommended approaches to analysis and design, in accordance with EU framework for sustainable finance. The SC NbS is a partner and will be involved in this project from autumn 2022 onwards.