



How to fund the Trans-European Nature Network (TEN-N)

**Resilience Bonds
(Insurance for Landscape Resilience)**



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Resilience Bonds

(Insurance for Landscape Resilience)

Resilience Bonds are financial mechanisms designed to decrease the risk of damage by extreme weather events and **make available funds** to prepare for a natural disaster (similar to a discount on life insurance premiums in exchange for healthy life choices).

Extreme weather events, that used to happen every 30, 50 or 100 years, are occurring more frequently and becoming increasingly destructive. As such, insurance companies' business models are being put at risk (where the funds collected during long periods of no natural disasters would finance an occasional costly natural disaster). For example, the 2021 summer floods in Germany, Belgium, and the Netherlands cost insurance companies record amounts of money in payouts (around 12 billion euros). It is **cheaper to prevent natural catastrophes than to manage the damage and rebuild afterwards**. Climate change is making it necessary to decrease the risk and to invest in adaptation, yet the insurance model is still based on managing risk.

The **restoration of nature** has the potential to **increase landscape resilience to climate change**, as natural areas are the best buffer zones for extreme weather events, protecting infrastructure, agricultural fields, and urban areas. Through complex modelling, it is possible to translate climate risk reduction into future monetary savings.

This instrument has the potential to raise the profile of nature restoration and conservation, shift the focus from grey to green infrastructure, and link the benefits of landscape resilience projects with insurance companies, thus potentially unlocking a new type of funding.

Assessment of Resilience Bonds as a funding opportunity for connectivity measures

Who is this factsheet for?

- ✓ Public institutions or entities managing protected areas
- ✓ Local and central governments
- ✓ Insurance companies

Resilience bonds are an innovative financial instrument that can be applied to loosen and direct funds to create, expand and improve existing protected areas.

Resilience Bonds are relevant for:

- ✓ Protected areas that are looking to improve their conservation state, expand their size or create ecological corridors.
- ✓ Urban regions that want to increase their green spaces.

Important considerations

- A Resilience Bond does not raise finance directly, the funds become available through saving costs on insurance premiums.
- One of the issues facing Resilience Bonds is that the covered area needs to be large in order to have a significant impact (actions need to be done at landscape scale) to provide measurable and quantifiable risk reduction.
- Timeline and timespan of projects and bonds need to align (beginning of a project and issuing a resilience bond, average duration of 3 to 5 years). Resilience Bonds can be issued more than once for a given area but always need to increase landscape resilience.
- Co-financing, and the costs of implementing ecosystem services actions can be bigger than the bond rebate (saving on premium insurance costs), so complementary sources of finance may also need to be found.
- Resilience Bonds are not an “application” type of finance such as grants or projects, and as such, they need to be designed between the interested parties (governments and insurance companies, with expert input from environmental organisations and academics).
- Resilience Bonds are designed to invest in preventing extreme weather events which are getting increasingly more regular. Robust modelling is required to link, prove and monetise a given project with a demonstrable reduction in expected losses, to show its effectiveness in reducing disaster risk.
- The reasons for insurance companies to invest in nature-based solutions are varied but include: risk reduction and cost savings in the long run, reputational gains and customer loyalty, and expansion and access to new markets.

Strong points

Potential to free and align funds that can be invested in the restoration or conservation of nature

Good match with nature restoration and conservation projects: Can be a good fit for this financial instrument (provide impact at scale, reasonable risk reduction, and clear outcomes).

Raise the profile of nature restoration actions (nature-based solutions) as a viable and cost-effective climate adaptation measure through quantifiable risk reduction.

Green infrastructure tends to be easier to implement than grey infrastructure (e.g. it is easier to block drainage pipes, flood an area and restore a wetland than to build a dam).

Weak points

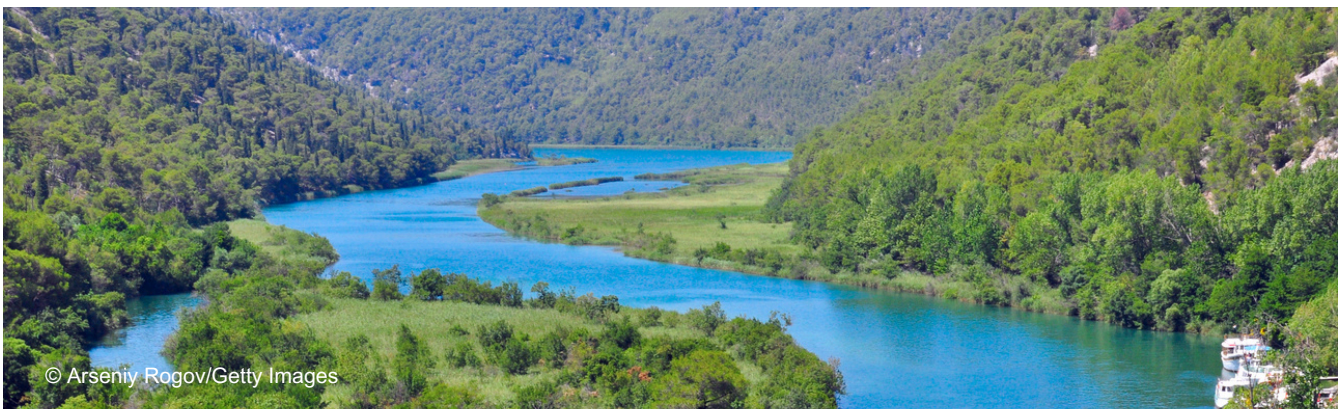
Proximity to valuable insured assets is key (urban areas, industrial complexes, high-value agricultural fields), to show monetary benefits in decreasing of catastrophe risk.

A considerable amount of planning is required to design and execute a Resilience Bond.

Mismatch between institutions: The savings in one governmental institution (central or local government) are not the same for the organisation that usually oversees the restoration or protection of nature.

Requires specialised human resources with skills (e.g. business, economics, and finance) not usually present in environmental governmental organisations.

A new instrument with few to no practical cases.



What activities can a Resilience Bond fund?

A Resilience Bond can free up significant amounts of money, yet its use can be relatively strict. Activities Resilience Bonds can provide finance for:

Types of measures Resilience Bonds funds can be used for		
Network planning costs	Administrative	✓
	Spatial planning	✓
	Biogeographical network planning	✓
	Monitoring and reporting of the protected area network	✓
Protected area establishment costs	Site/corridor designation and management planning	✓
	Administrative	✓
	Remaining knowledge gaps and research needs	✓
	One-off establishment actions	✓
	Compensation	✓
	Land purchase	✓
Management costs	Site (cluster) administration	✗
	Enforcement	✗
	Monitoring and reporting	✓
	Maintenance and restoration measures for species and habitats	✓
	Additional green infrastructure measures (outside protected areas)	✓
	Protected area infrastructure maintenance	✗
Communication and awareness raising costs	Natura 2000-related communication and awareness raising measures, education and visitor access	✓
	Best practice exchange	✓

Examples of application of Resilience Bonds:



Expanding or improving protected areas through land purchase and renting common land long term (to create buffer areas for extreme weather events through tailored management).



Reintroductions or restocking of species to provide key landscape management functions (herbivores for grazing and fire prevention, beavers for wetland restoration, vultures for disease prevention, among others).



One-off nature conservation and restoration actions to restore absent processes (e.g. rewetting a drained wetland or implementing a no-take zone to restore fish stocks and protect fishing industries).



Research projects to clearly demonstrate the link between more and improved space for nature and landscape climate resilience.

Annex I: How to create a Resilience Bond? Step-by-step guide

This series of steps guide the development of Resilience Bonds to expand and improve a network of protected areas.

Initial research

The following points should be analysed by the protected area manager in collaboration with experts:

- Analyse climate change risk in the landscape, with a focus on urban, industrial, and high value agricultural areas, usually through an independent partner (university or other service provider).
- Monetise the value of the damage in the case of extreme weather events.
- Study possible nature-based solutions that could decrease the impact of extreme weather events.



Contact with insurance companies

- Discuss with insurance companies the design of a Resilience Bond.
- Design one or more nature-based solutions, linked to protected areas or ecological corridors in a landscape to decrease the risk of damage (buffer areas) from extreme weather events.
- Quantify the decrease in risk that the project can bring.



Issue Resilience Bond

- Resilience Bond is issued by the insurance company.
- The savings in insurance premiums are freed and applied to the climate resilience project.
- Communicate the project with local communities and more broadly through local and national level media.

Annex II: Examples of potential Resilience Bonds

Although catastrophe bonds have been increasing in both size and number, this sub variety (Resilience Bonds) has not been explored yet and no practical cases could be found. Nevertheless, two hypothetical examples of Resilience Bonds are outlined below:

Hypothetical case for Portugal (Coastal protection)

Coastal erosion is a growing problem due to sea-level rise and blocked sediment flows from dams. Marine protected areas in coastal Portugal are small and have low levels of protection (e.g. fishing and dredging are allowed) - most are paper parks with no active conservation measures in place.

More severe storms, increasing sea-level rise, and eroding coastlines combine to pose an increasing threat to infrastructure and human life. Marine protected areas could be buffer areas that mitigate and reduce these impacts, yet they are not fulfilling their role.

A Resilience Bond could create new coastal marine protected areas (both large and small scale) or improve existing ones. The funds could be used to restore sediment flows by removing obsolete and excessive dams (in line with EU targets for free-flowing rivers) and replenishing eroding coastlines with fresh sediment. The Bond could be used to fund the restoration of historical oyster reefs that were degraded by dredging and pollution, and are a nature-based solution increasingly used to protect coastlines. Or it could also be used to restore dune ecosystems, removing invasive alien species and recovering native vegetation. All these measures if implemented at scale have a large potential to buffer infrastructure and people from extreme weather events, and therefore be linked with reduced costs for insurance companies.



Hypothetical case for Leipzig Plains (Flood prevention)

The River Weisse Elster starts in the mountains between the Czech Republic and Germany and flows to the River Saale, the name comes from the Slavic and means “hurrying water”. Many cities, villages and towns are located on the margins of the river and the big part of the river is channelled except from the Leipzig Alluvial Planes.

More extreme weather, and therefore more intense floods, poses a threat to high-value agricultural areas and urban infrastructure. The 2021 floods in this area were the most expensive insurance event in German history. Giving space to rivers and restoring alluvial plains has been proven to decrease the risk of infrastructure damage. The case of the Meuse River restoration in the Netherlands provides a clear example of river restoration. The river was de-channelled and therefore the risk of damage by floods to infrastructure was decreased.

A Resilience Bond could be made for a landscape scale, shifting the risk from the government to the markets, and including all the valuable urban infrastructures along the river. It could be designed to increase the size of the alluvial plain, upgrade the existing area for biodiversity and transform the area into an ecological corridor. Implemented measures could include acquiring more land along the old river plain, recovering a meandering river stream and restoring missing processes in the catchment such as grazing by semi-wild animals (deer and wild or semi-wild breeds of horses, cattle and/or water buffalo). These measures would decrease the risk of damage by floods and would provide new opportunities for biodiversity to thrive.



Annex III: What are the costs associated with the extension of a protected area network

Networking Planning Costs

One-time or recurring costs associated with planning for or updating a comprehensive and well-connected network of protected areas (PAs):

- **Administrative:** Staff, overheads, training, as part of the network planning exercise.
- **Spatial planning:** Surveys and mapping (habitat and species distribution, land use, corridors), site identification information, IT infrastructure.
- **Biogeographical network planning:** Exchange and joint planning (e.g. meetings, travel to neighbouring Member States, information sharing).
- **Stakeholder engagement:** Costs associated with organising meetings with landowners and other potentially affected stakeholders.
- **Monitoring and reporting of the protected area network**

PA Establishment Costs

One-time or recurring costs associated with planning for placement, levels of protection and designation of additional PAs and corridors:

- **Site/corridor designation and management planning:** Site identification (land surveys, GIS data, land parcel data, species and habitat data), designation, legal protection, management planning, impact assessment and permit issuing.
- **Administrative:** Staff and salaries, trainings, overheads or office acquisitions, planning and coordination with other PA management teams in cross-border PAs.
- **Remaining knowledge gaps and research needs:** Additional surveys and research, engaging external expertise, modelling of ecological changes under climate scenarios, social impacts, capacity building.
- **One-off establishment actions:** Time and tools (incl. machinery) for:
 - **Infrastructure:** e.g., building trails, removing roads, removal of river barriers.
 - **Landscape restoration:** e.g., fencing, breaking off/moving dykes, engineering works, bulldozing, clear-cutting non-native trees, replanting, recreating floodplains.
 - **Creation of corridors and connectivity / defragmentation features:**
Infrastructure or restoration actions e.g., green bridges, creation of green infrastructure features along water courses or transport networks for biodiversity.
- **Compensation:** Establishment of alternative income-generating activities, short-term compensation, one-off stewardship contracts with landowners.
- **Land purchase:** e.g., buy outs, land swaps.

Management Costs

Fixed and variable, recurring annual or one-off costs of post-implementation management and day-to-day activities:

- **Site (-cluster) administration:** Staff and salaries, trainings, overheads, coordination with other PA management teams in cross-border PAs, renewal of stewardship contracts with landowners.
- **Compliance checking and enforcement:** Equipment, data, staff.
- **Impact assessment and permits:** Assessments of development projects, control and issue of permits or licenses for activities or developments.
- **Monitoring and reporting:** At site/corridor level.
- **Maintenance and ongoing restoration measures for species and habitats,** incl. tools and machinery.
- **Additional green infrastructure measures** outside the PA: Maintenance and ongoing restoration measures for species and habitats in corridors, buffer zones, steppingstone habitat patches etc.
- **PA infrastructure maintenance:** Access (roads, paths), hides, visitor centres, parking lots.

Communication and Awareness Costs

- **PA-related communication and awareness raising measures, education and visitor access:** general communication and awareness-raising measures, education, access to visitors, etc.
- **Best practice exchange** between PA managers.



Annex IV: References and further recommended reading

Definition of Catastrophe Bond

<https://www.investopedia.com/terms/c/catastrophebond.asp#toc-understanding-catastrophe-bonds>

Resilience Bonds

<https://journals.openedition.org/factsreports/4910>

<http://cpicfinance.com/resilience-bond-for-risk-reduction/http://cpicfinance.com/resilience-bond-for-risk-reduction/>

Insurance costs with extreme weather events

<https://www.dw.com/en/natural-disasters-mean-record-year-for-german-insurance-payouts/a-60267113>

Meuse Restoration Initiative

https://www.rivierparkmaasvallei.eu/sites/default/files/2101005_maasinbeeld.pdf

EU Biodiversity Strategy 2030

<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0380&from=EN>

<http://cpicfinance.com/resilience-bond-for-risk-reduction/http://cpicfinance.com/resilience-bond-for-risk-reduction/>

Recommended reading

<https://www.bbc.com/future/article/20170515-resilience-bonds-a-secret-weapon-against-catastrophe>

<https://www.trading-risk.com/article/29o65vrdorizfddm9bhts/resilience-bonds-a-concept-too-ambitious-or-ahead-of-its-time>

<https://www.dw.com/en/natural-disasters-cost-280-billion-in-2021-german-insurance-firm/a-60378575>

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Author

Daniel Verissimo, Rewilding Europe
daniel.verissimo@rewildingeurope.com

Design

Simone Prestes Dürrnagel, EUROPARC Federation
Cover image: Kriephoek, Yves Adams

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www.naturaconnect.eu



[@naturaconnect](https://www.linkedin.com/company/naturaconnect)



naturaconnect@iiasa.ac.at



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