Floodplain Restoration

Floodplains are areas along rivers that are or used to be natural retention spaces of water from rainfall or high river discharges. These natural areas partly vanished due to urbanisation, were drained for agricultural purpose because of its fertile soil, or were separated from the river. Due to their importance for flood risk reduction, floodplains are increasingly restored to recover natural processes.
Floodplain restoration can encompass a broad range of activities as, for instance, lowering the floodplain level or widening it, re-meandering of the river, bank stabilisation, or the removal or relocation of existing structures or engineering solutions (e.g., dike) but also the relocation of local citizens to restore the area. Overall, the existing and restored floodplains need to be protected.

Overview

Type Mixed

Approach Restoration

Hazard They can be restored to reduce the risk on **Riverine Flooding.**

SDGs

Direct Benefits

Runoff Storage

Different restoration actions can enlarge runoff storages, for instance, the creation or restoration of wetlands, or integrated ponds and basins. While, for instance, widening the river does not directly provide storage areas.

Slow Runoff

River runoff can be slowed if the roughness of the floodplain is increased, for instance, through wetland creation.

Soil water retention

The restoration of floodplain and introduced vegetation can enlarge soil water retention capacities. Furthermore, the removal of river sediments can increase the permeability of the soil and therefore enhance infiltration.

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Co-benefits	**Water Quality** Restoration features such as wetlands, vegetation buffers or ponds can improve the water quality of the river by filtering sediments, nitrates, and phosphates. **Biodiversity** Restoration and creation of aquatic and terrestrial ecosystems will be beneficial for plants, fishes, birds, and also mammals. **Carbon Storage** Biomass of planted forests and other vegetation but also unsealing of soil or the improvement of their condition can enlarge carbon storages and sequestration. **Recreation** Restoration activities such as creating parks can enable recreational activities for local citizens or increase tourism.
Costs	A great cost of floodplain restoration activities are land acquisition costs, especially, for large scale activities. Other implementation and restoration costs depend primarily on the chosen features. For instance, planting of vegetation, excavating the riverbed, removing sediments, or relocating existing structures or people have very different price ranges.
NBS Related Policies	• EU Biodiversity Strategy for 2030 • Habitats and Birds Directives • Water Framework Directive • Floods Directive • Common Agriculture Policy • European Green Deal • UN Convention on Biological Diversity • Climate Change Adaptation Policy
Funding Options	• Rural Development Programme • LIFE+ Climate Action • EU Green Deal

Design Implementation

Scale	Watershed/Mesoscale (1 km - 100 km)
Slope	Max. 3 %
Soil	Organic and alluvial sediments
Land Cover	All land covers but critical infrastructure, dense urban areas, and forests
Plants	Restoration may include the planting of native grasses, shrubs, and trees, or wetland vegetation.
NBS Combinations	Ponds & basins, urban parks, wetlands (marshes), or riparian buffers can be implemented within the floodplain.

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NBS Suitability Mapping

(Below are the layers and specifications listed that were used for analysing the suitability of this Nature-based Solution for your area)

Land Cover	All land covers but critical infrastructure, dense urban areas, and forests [LUISA Base Map 2018, Batista and Pigaiani, 2021]
Soil Parent Material	Organic and alluvial sediments [Parent Material (European Soil Database v2.0), European Soil Data Centre (ESDAC)]
Slope	Up to 3 %
Infrastructure	Buildings (areas without buildings) [ESM, Corbane and Sabo, 2019]

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Case Studies:

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http://nrcsolutions.org/johnson-creek-restoration-portland-oregon/

https://www.therrc.co.uk/sites/default/files/projects/23_swindalevalley.pdf

https://www.therrc.co.uk/sites/default/files/projects/2_mayesbrook.pdf

https://restorerivers.eu/wiki/index.php?title=Case_study%3AThe_Manzanares_River_Restoration%3A_Demolition_of_an_obsolete_dam_and_riverine_ecosystem_rehabilitation

https://westcumbriariverstrust.org/projects/river-restoration-strategy

https://climate-adapt.eea.europa.eu/metadata/case-studies/lower-danube-green-corridor-floodplain-restoration-for-flood-protection

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