19 Floodplain restoration

Environmental impact	3/3
Risk protection	2/3
Durability	3/3
Affordability	1/3

Intro

A floodplain is a low-lying, flat area of nutrient-rich sediment along the river. A river and floodplain together describe an integrated system. The floodplain enables the water body to transport floodwaters. As a result, upstream (and downstream) retention and expansion areas benefit flood risk mitigation and reduce water logging. However, floodplains face continuous degradation due to permanent flood barriers *(see Category I),* urban and agricultural development, or river channelization. These changes have significantly affected the efficiency of floodplains as aquatic and terrestrial habitats, water qualifiers and natural providers of flood protection. The rehabilitation or conservation of effective floodplains is, therefore, an essential intervention for flood risk mitigation in humanitarian settlements. Floodplain restoration is closely linked to wetland restoration *(see Measure [16]).*

Benefits and Risk

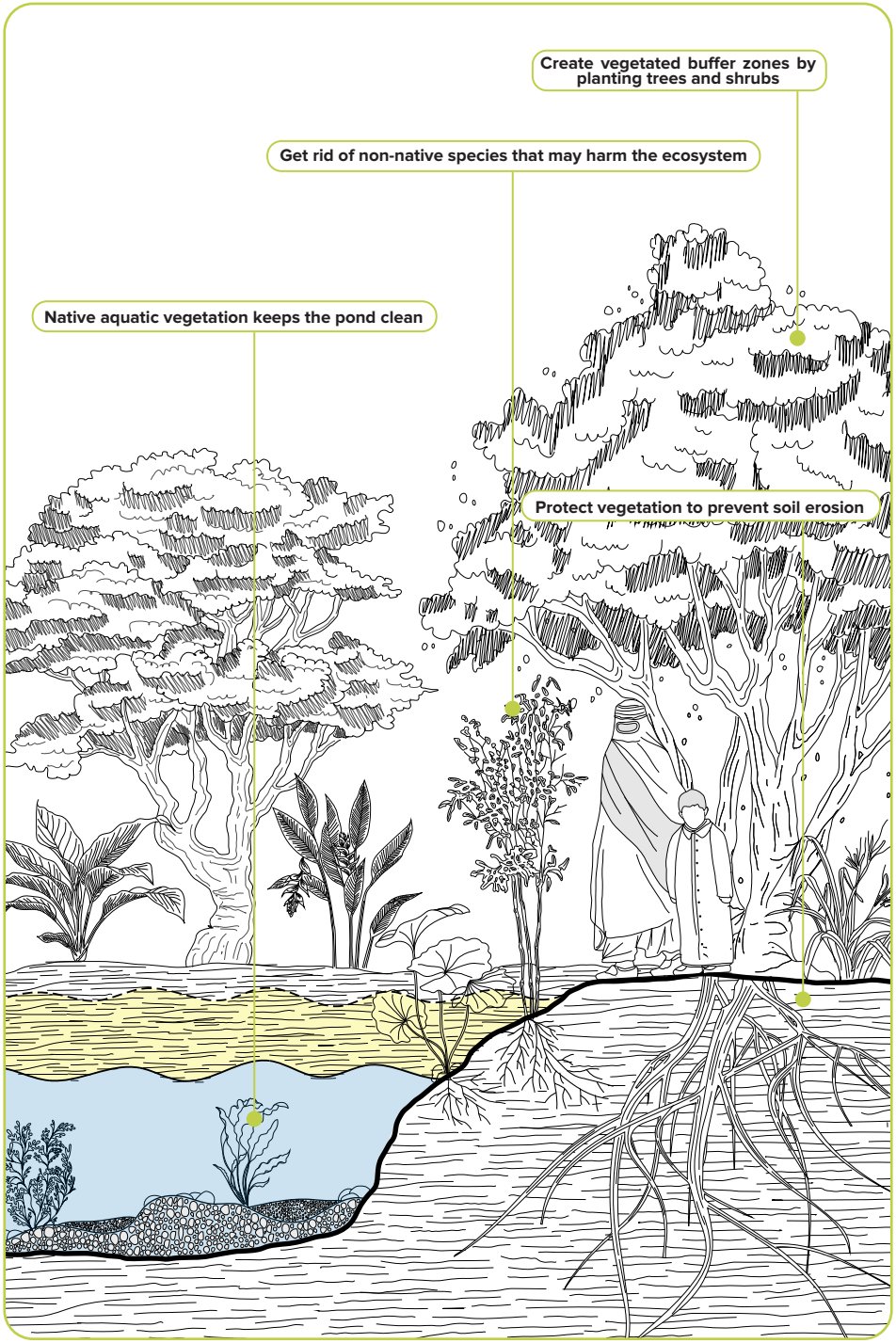
In case of a river spillover, the floodplain slows the water rise. It provides a form of a temporary reservoir before feeding the water back to the river once the flood decreases. By reducing the speed of the flood, the floodplain also reduces downstream erosion, filters the water and improves the overall quality of the water body. Given that the inundation conveys sediments and nutrient-rich soil, the floodplains tend to be fertile and provide rich habitats for wildlife and vegetation. Nevertheless, the flood mitigation effect and the co-benefits of a floodplain depend on its shape, size and composition. In this light, the erection of levees, dams, or other structural measures may be counterproductive if they cut off the waterways from their floodplains. Such disconnection could lead to habitat loss and decreased flood risk reduction.

In general, humanitarian settlements should not be planned and built on or adjacent to floodplains to avoid increased flood risk. Buffer zones *(see Measure [20])* in refugee camps can support flood risk mitigation and floodplain conservation.

Good practice

3rd Rhône's correction, Switzerland

Levees *(see Measure [01])* describe one of the most expedient flood control methods, especially where space is scarce. However, due to their drawbacks *(e.g., aggravating risks in case of collapse)*, solely flow containment must be avoided. In Europe, where river restriction started several centuries ago, recent events show that the use of levees must be reconsidered. For example, for the Rhône River in Switzerland, the 3rd flood protection concept is in progress. The project ensures balanced goals between flood protection, biodiversity, and socio-economic constraints. Where levees cannot be avoided, the concept provides enough space for the river's expansion during flood periods. Such river widening shows similarities with the river restoration strategy. Today a large bunch of examples of river expansion may be found all over Europe, especially in the Netherlands.



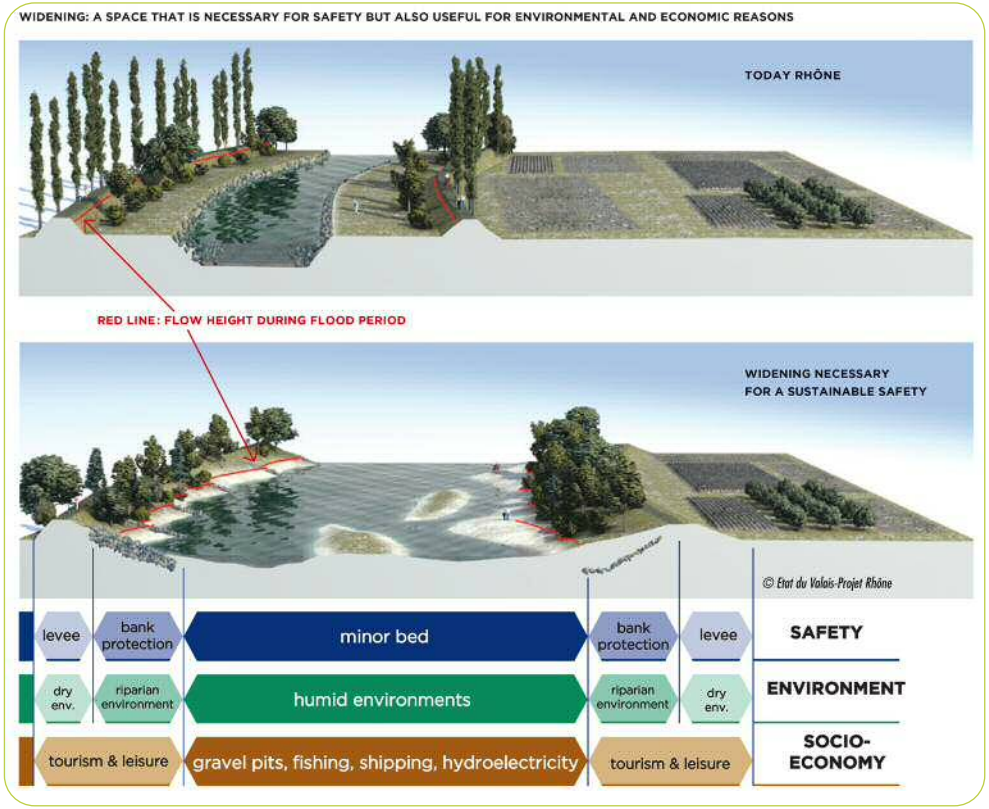


Fig. 19: *3rd Rhône's correction. Etat du Valais 2015.*

Overview of Criteria

Type of Intervention:
Nature-based.

Scale of Intervention:
Supra-settlement.

Materials:
Wood, Native Vegetation.

Environmental Impact:
Floodplains improve the overall water quality and can support the reduction of chemical and nutrient pollution. Due to their fertility, they provide rich habitats for wildlife and vegetation. As a result, floodplain restoration and rehabilitation can increase an area's biodiversity *(Scnat Netzwerk 2020)*. However, the processes of floodplain restoration *(e.g., removing invasive species)* can disturb the existing habitats over a short time period or change the water flow dynamics. At the same time, the restoration can introduce new invasive species. In the case of former pollution or contamination of floodplains, the redistribution of the substances is possible. Such disturbances should be considered and kept as minimal as possible.

Targeted Natural Hazard:
Coastal / Riverine Flood.

Targeted Vulnerable Assets:
Buildings, Transport, Technical Infrastructure.

Strategy Type:
Reduce Hazard Magnitude.

Implementation Time:
Medium (1 month - 1 year), Long (> 1 year).
In general, the restoration of ecosystems implies long and complex processes. Depending on the extent and local conditions, that might also be the case with rehabilitating floodplains. Public awareness and support are important in such processes since the long-term effect of the restored floodplain will pay off *(Climate Adapt 2022)*.

Effect Duration:
Long-term (>10 years).

Investment Costs:
Medium, High.

Maintenance Costs (yearly):
Low (<10% investment costs).

Climate ADAPT (2022)
Rehabilitation and restoration of rivers and floodplains. Available online at https://climate-adapt.eea.europa.eu/en/metadata/adaptation-options/rehabilitation-and-restoration-of-rivers, updated on 9/29/2023:34:14.

NWRM, Natural Water Retention Measures (2015)
Floodplain restoration and management. Available online at http://nwrm.eu/measure/floodplain-restoration-and-management, updated on 9/29/2023:30:19.

Scnat Netzwerk (2023:31:33)
Floodplains: a natural system to preserve and restore (EEA Report, 24/2019). Available online at https://scnat.ch/de/uuid/i/96de4fa4-ee4a-5f7e-9f07-ca302becfabf-Floodplains_a_natural_system_to_preserve_and_restore.

Flood Risk in Humanitarian Settlements: Compendium of Mitigation Measures

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