Flow-through dams

Challenge: Too much water **Adaptation response:** Riverine flood protection

Description

Flow-through dams (also known as perforated dams) are constructed solely for the purpose of flood control and mitigation of flood risks in downstream communities and ecosystems. Unlike reservoir dams, which are at built primarily for water storage or power generation, the spillway (opening) is built at the same height as the riverbed level, allowing the river to continue its natural flow in normal conditions. When water levels rise above the spillway, the dam restricts the amount flowing through the opening, decreasing peak flood flow. Since flow-through dams minimally affect rivers natural flows, under normal conditions negative environmental and socioeconomic impacts, such as sediment accumulation, restriction of water flow to downstream communities and ecosystems, and breaching during very extreme flood events, can be minimized or avoided altogether.

Implementation

Flow-through dams are constructed in high flood-risk areas, particularly those with important infrastructure and livelihoods. Planners, local decision makers and construction engineers are the typical stakeholders involved in construction site choice, as well as spillway and wall height selection, and setting of desired river flow rates and dam carrying capacity. Post dam construction socio-economic and environmental impact assessment criteria should be established as part of implementation to avoid negative impacts on ecosystems and local communities. Operational management typically includes general maintenance and occasional clearing of sediments or other accumulations preventing optimal water flow.

Environmental Benefits

- Maintains natural river dynamics. Water with sediment can flow through the spillways, reducing accumulation and maintaining natural sediment flows.
- Preserves fish migration routes.

Socioeconomic Benefits

- Provides flood control and protection, thus reducing flood damage.
- Reduces expenses in post-flood reconstruction and rehabilitation efforts.
- Provides recreational benefits.

Opportunities and Barriers

Opportunities:

- Improving flood control is an important climate change adaptation benefit in areas suffering from high seasonal rainfall variability
- The dams generally have a lower level of negative environmental and socioeconomic impacts compared to conventional dams
- The dams can be converted to reservoir dams at a relatively low cost in case of major water supply changes

Barriers:

- Implementation requires a number of conditions to be met, which are not suitable for all areas, therefore may be limited feasibility in some locations.

Implementation considerations*

Technological maturity:	4-5
Initial investment:	3-5
Operational costs:	2-3
Implementation timeframe:	3-4

* This adaptation technology brief includes a general assessment of four dimensions relating to implementation of the technology. It represents an indicative assessment scale of 1-5 as follows:
Technological maturity: 1 - in early stages of research and development, to 5 – fully mature and widely used
Initial investment: 1 – very low cost, to 5 – very high cost investment needed to implement technology
Operational costs: 1 – very low/no cost, to 5 – very high costs of operation and maintenance
Implementation timeframe: 1 – very quick to implement and reach desired capacity, to 5 – significant time investments needed to establish and/or reach full capacity
This assessment is to be used as an indication only and is to be seen as relative to the other technologies included in this guide. More specific costs and timelines are to be identified as relevant for the specific technology and geography.

Sources and further information

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