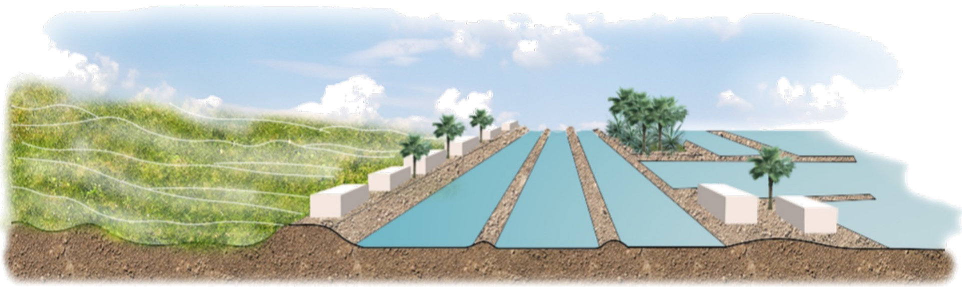
NbS-52: DRAINAGE REDUCTION IN RICE PADDY FIELDS



Drainage channels along rice paddy fields of the Mekong River Delta
Source: WWF, RoyalHaskoning

Polyculture through drainage management in channels along rice paddy fields.
Source: WWF, RoyalHaskoning

LANDSCAPES SUPPORTED

EbA (ECOSYSTEM-BASED APPROACHES)

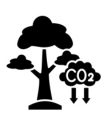
- SOIL FERTILITY ENHANCEMENT
- FLOOD REGULATION
- INTEGRATED WATER RESOURCES MANAGEMENT
- BIODIVERSITY CONSERVATION
- CLIMATE RESILIENCE

MAIN PROBLEMS ADDRESSED

FOOD SECURITY

FLOOD CONTROL

DISASTER RISK REDUCTION



CARBON SEQUESTRATION

Drainage reduction in rice paddy fields addresses climate resilience and food security by optimizing water management through controlled irrigation and reduced water drainage.

In regions like the Mekong River Delta, where rice cultivation is crucial, this approach involves maintaining higher water levels during the rice growing season, reducing the need for frequent drainage.

Technically, it enhances soil moisture retention, reduces water consumption, and minimizes the release of methane, a potent greenhouse gas, by creating anaerobic conditions. This method can also help mitigate the risks of saltwater intrusion, a growing concern in coastal areas. On the landscape level, it supports floodplain ecosystems and maintains natural hydrological cycles, while promoting sustainable land use practices.

Socially, drainage reduction ensures stable crop yields, improves farmers' resilience to climate-related extremes like droughts and floods, and strengthens food security in vulnerable rural communities. It can be applied in other Southeast Asian regions, such as the Chao Phraya Basin in Thailand and parts of South Kalimantan in Indonesia, where similar climatic challenges are faced.

ECOSYSTEM SERVICES AND ACTIONS

SUPPORTING

- **Soil Fertility Enhancement**: Maintains higher water levels, which promotes anaerobic conditions that enrich soil organic matter and support nutrient cycling.

REGULATING

- **Flood Regulation**: By maintaining controlled water levels, drainage reduction helps manage floodwaters, reducing the risk of flooding downstream.

PROVISIONING

- **Improved Crop Yields**: Enhanced soil fertility and water availability lead to more stable and productive rice cultivation, supporting food security.

SOCIAL BENEFITS

- **Resilient Livelihoods**: Helps farmers adapt to climate-related changes such as droughts and floods, improving community resilience and long-term food security.

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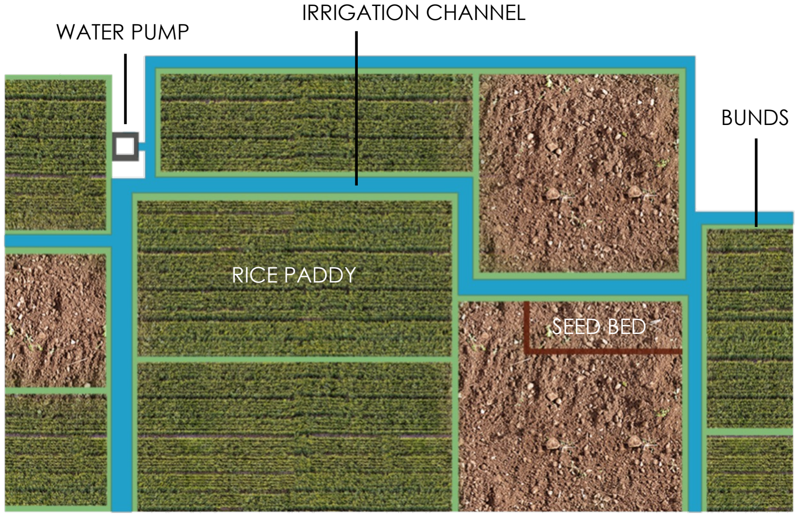
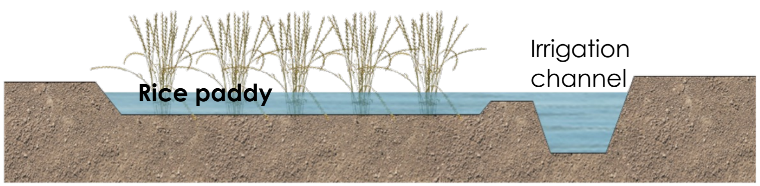
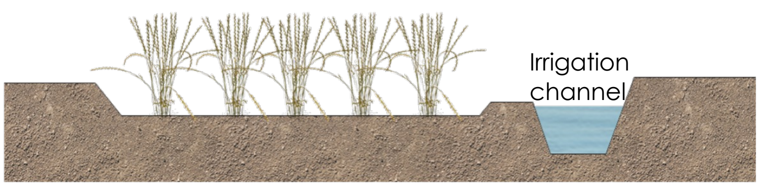


Reduction of drainage in rice paddy fields



Water level during flood season



Water level during dry season

PROJECT'S CHALLENGES & RISKS

- **Land Use Conflicts :** Moving levees away from rivers often requires land acquisition or repurposing
- **High initial costs:** The upfront costs of planning, acquiring land, and constructing levee setbacks are substantial.
- **Displacement :** The creation of setback areas may displace people, wildlife, or existing ecosystems.
- **Maintenance and Monitoring Needs :** Although levee setbacks offer long-term benefits, they may require ongoing monitoring and maintenance to ensure they continue functioning as intended.

NbS co-BENEFITS AND THEIR INDICATORS

Increased Soil Fertility
Higher soil organic matter content and improved nutrient levels measured after maintaining water levels..

Reduced Greenhouse Gas Emissions
Decrease in methane emissions, monitored through periodic soil gas sampling during the rice-growing season.

Enhanced Water Retention
Improved water retention in the soil, measured by soil moisture content during dry periods.

- **Improved Biodiversity**
Increased presence of aquatic species and wetland flora, tracked through biodiversity surveys in the rice fields.
- **Flood risk Mitigation**
Lower incidence of downstream flooding, monitored through water flow data and flood event records in nearby areas.
- **Increased Resilience to Climate Change**
Stable crop yields and reduced vulnerability to climate extremes assessed through yield data and climate stress reports.

COST ANALYSIS

Direct Costs
Costs for water management infrastructure range from $100 to $300 per ha annually.

Indirect Costs
Displacement, legal costs and uncertainty in flood protection.

Time Horizon
50–100 years for ecosystem recovery and long-term flood mitigation.

- **Direct Benefits**
Flood risk reduction, biodiversity restoration, carbon sequestration, water quality improvement.
- **Indirect Benefits**
Groundwater recharge, recreation, reduced urban heat, and climate resilience..
- **Risk Assessment**
Environmental, social, financial, and climate-related risks that could affect project success.

REFERENCES:

The Netherlands, Nijmegen, Room for the river project.
US, Reconnecting the Missouri River Floodplain.

IMPLEMENTATION OPPORTUNITIES:

Thailand, Chao Phraya River basin, Upper and central floodplain areas outside of urbanized zones.

Indonesia, Jakarta, Ciliwung River, Upstream and midstream areas.