

Spate Irrigation: Drinking Water Ponds in Spate Irrigation Areas



Introduction

- Providing drinking water in spate irrigated areas can be problematic (low coverage & high non-functionality)
- Spate irrigated areas generally lack access to reliable or useable groundwater. In fact in large parts of the spate belt groundwater is saline or too deep
- **Why is it useful?**
 - Ponds can collect rain and flood water, and remain an important source of drinking water - for humans but also for livestock
 - Water ponds are low cost water providers

	Thailan	Gatar	Gara Dasti
Population	600	700	350
House holds	75	60	40
Capacity before rehabilitation (m ³)	679	407	401
Capacity after rehabilitation (m ³)	4030	4241	4976
Cost per pond in PKR	337,000	140,000	269,000

Source: Arshad Haroon (2007)

Best practices: DI Khan, Pakistan

- In some places off season floods are not allowed to fill the ponds, as the belief is that spring season water brings more contamination
- Monsoon water - which is more abundant - has a lower concentration of animal droppings and others
- Water users commonly use poignant methods to improve water quality like the use of a hand pump and sand filter to take water from the pond
- This removes the turbidity if not the bacteriological contamination
- Boiling is common but not always used
- Some people use alum (aluminum potassium sulfite); others use almond nuts to remove turbidity)



Development and management of drinking water ponds

- Excavation costs vary from USD 0.40 to 1.20 per m³
- Assuming the sunk cost of the pond is zero, this brings the costs of water provision per capita of water to USD 2.5 to 6.5 compared to the cut-off cost of USD 35 per capita
- To make ponds last longer in many spate areas natural depressions in river and channel beds are used first to draw water
- This resting period allows silt and other impurities in ponds to settle down. Ponds are then used later in the dry season
- Water storage can be increased by deepening the pond
- Some newly built-up ponds last up to 6 months

- The mud from the pond is also a resource – that can be used in house construction, brick making and in soil improvement
- The pond mud may be reused in the construction of houses or in fertilizing fields
- In highlands silt from pond is used as ‘washed soil/new soil’ in high value orchards due to its fertility and porosity
- Upon receding water in ponds the soft material is used for construction of cooking stoves, bins for chicken, troughs for animals and other light purposes
- The use of the mud differs with its hardness:
 - Hard mud with a larger percentage of loam and sand is used to make bricks and burnt into kilns
 - Medium quality material is used for sun dried bricks



Recommendations

Intervention	Technique	Caution
Sediment removal	Tractor	Avoid not to penetrate silt clay layers
	Oxen with plough and scraper-boards	Not possible if sediment is too heavy (clayey)
	Manually	Ibid
Prevention of sediment	Vegetative sediment traps	
	Sediment traps and depressions	Need regular cleaning out
Prevent water contamination by livestock	Separate ponds for livestock	
	Use wall, fences or trenches to keep out livestock	
	Employ guards	
Improve water quality	Use seepage wells	If local geohydrology allows
	Point of use techniques	
Reduce seepage	Lining with polyethylene or geotextile	Take care not to rupture
	Clay pudding	
Reduce evaporation	Deepening ponds	Preferable depth 4-7 meter Take care not to disturb impermeable layers
	Trapezoidal ponds	
	Floating cushions of geomembrane	Proposed (Maanics International 2002) but not tested
Improve access	Stairs and platforms	