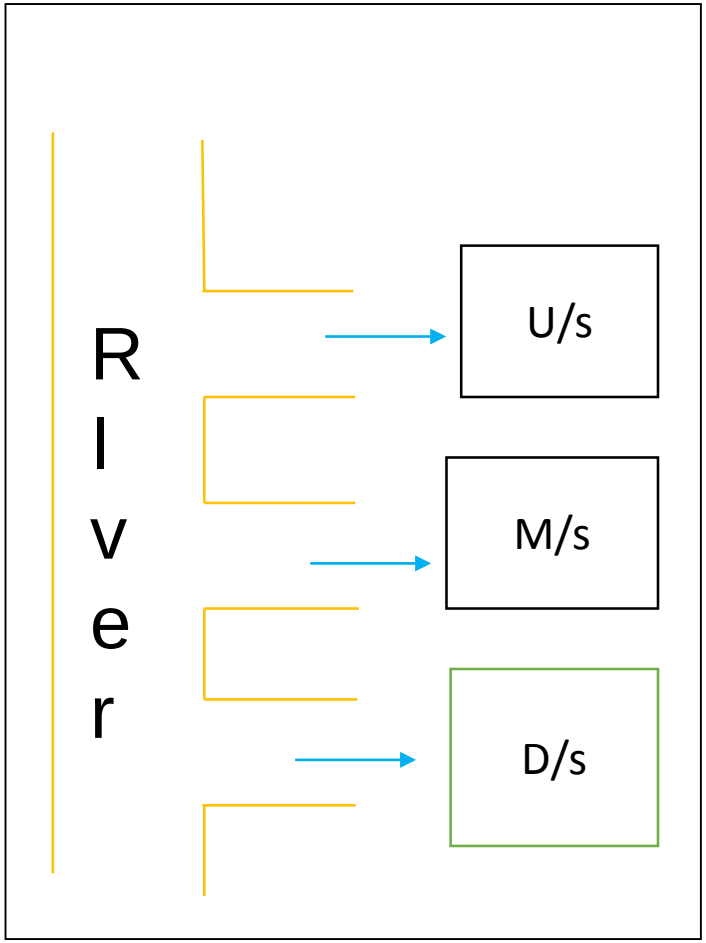
Diverting and Distributing Floodwater
Some Examples

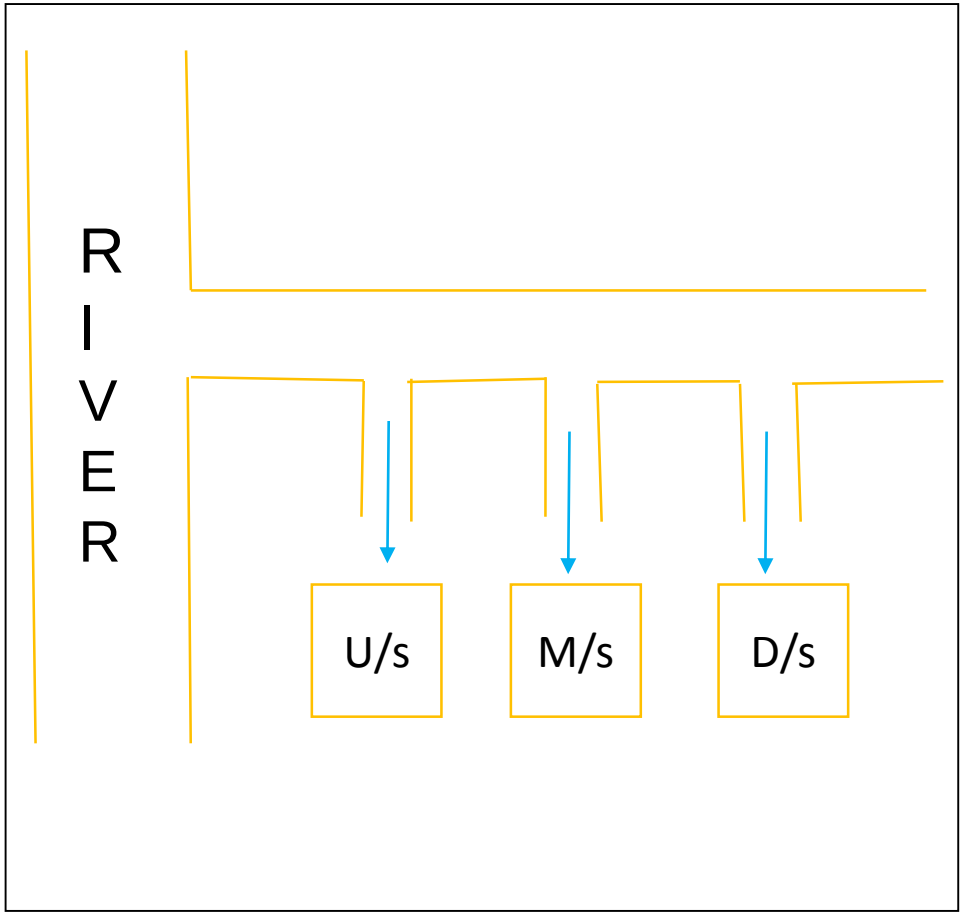
Let us think, guess – we may get it right?

The design discharge in spate irrigation systems

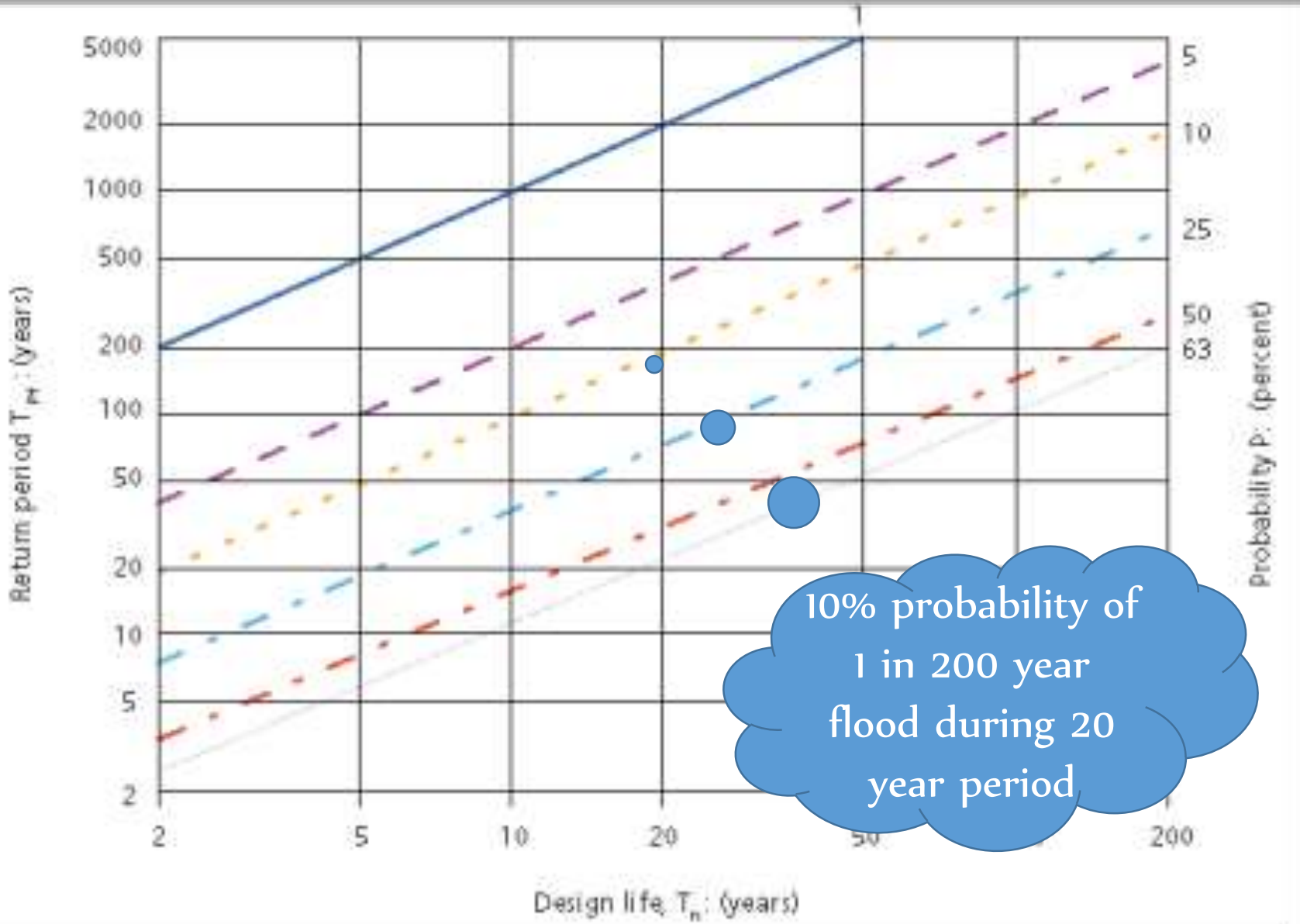
is ……..L S^{-1} ha^{-1}

Which layout do you prefer in spate/flood-based irrigation?



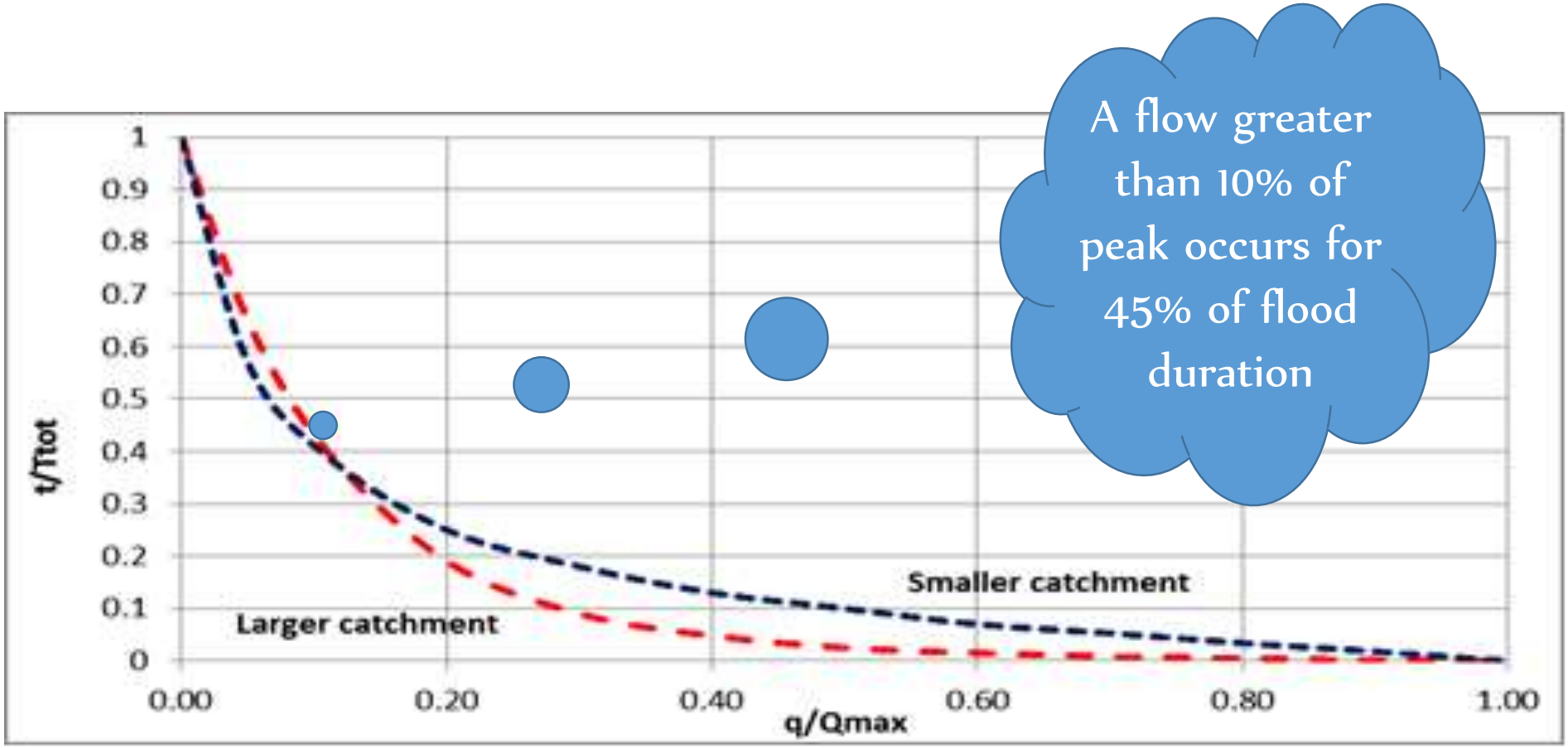


Getting the hydrology right: flood Risk and Resilience



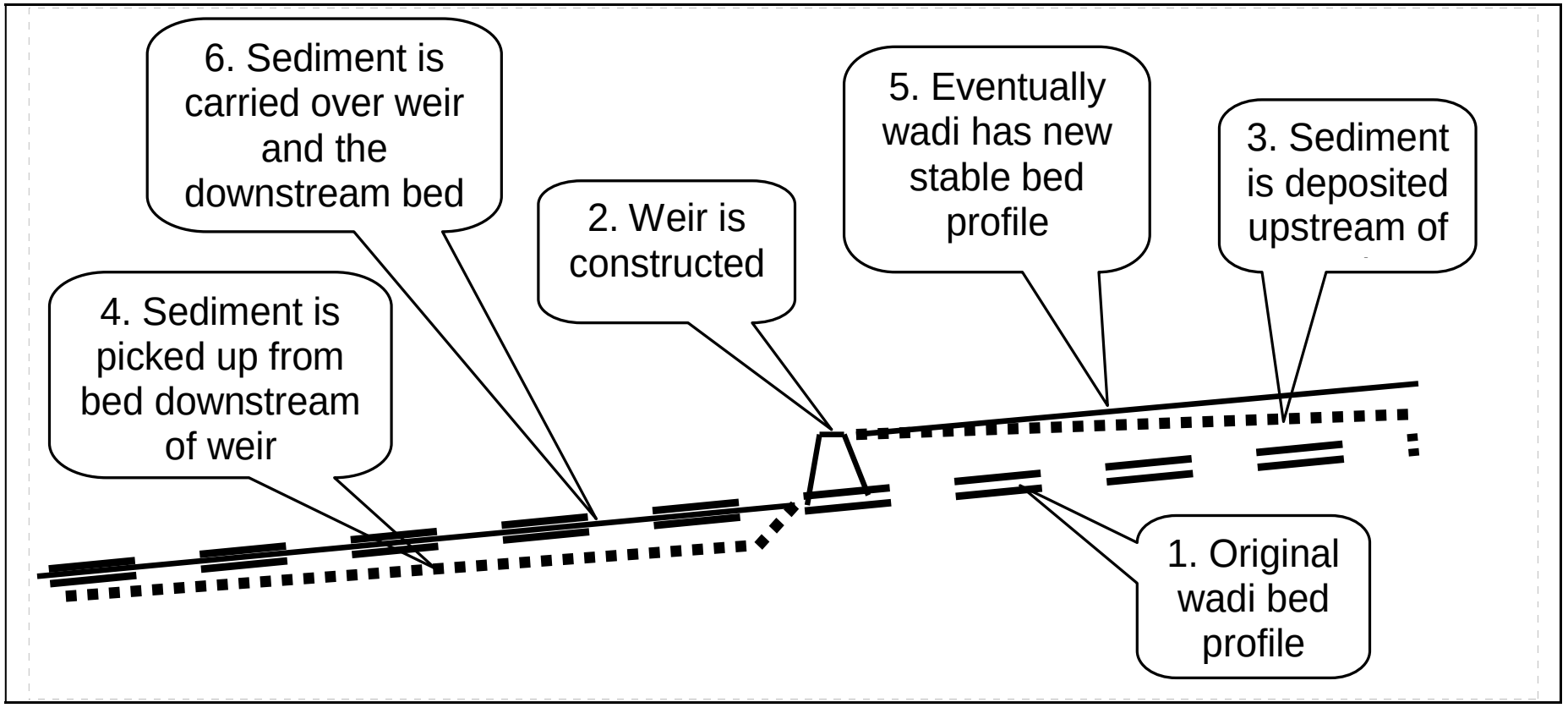
Getting the hydrology right: Flood duration curve?

- An indicative basis for overall water availability
- Larger catchments will tend to have longer recessions so more water is available at low proportions of peak flow



Stabilizing seasonal river bed

- A simple example of how a structure can affect the regime condition causing the bed downstream of the structure to temporarily drop. Eventually a new regime will be established.



Divide Walls Impede Flushing Upstream of Weir: Yemen

Divide Walls Removed

Innovations in flood water diversion – Ethiopia

Main innovation: combination of gabion and masonry: maintaining safety at a lower cost. Gabion cost is about one fifth of masonry.

Innovations in flood water management

Innovations in flood water diversion and distribution – Gabions in Afar, Ethiopia

Complete utilization of diverted flood by gradually dissipating its energy through a series of distribution canals

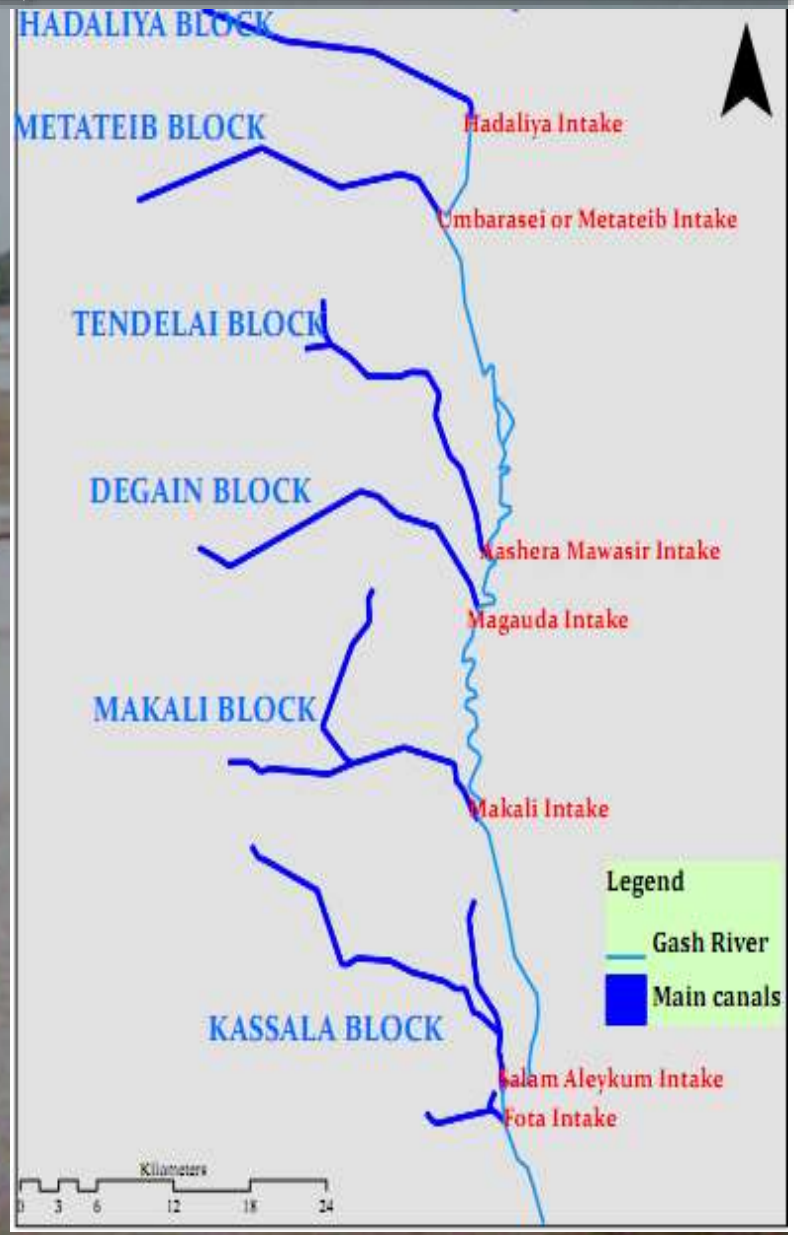
Scour sluices: limited success in sediment management

Same problems caused by floods and farmers

But the reasons are of course different

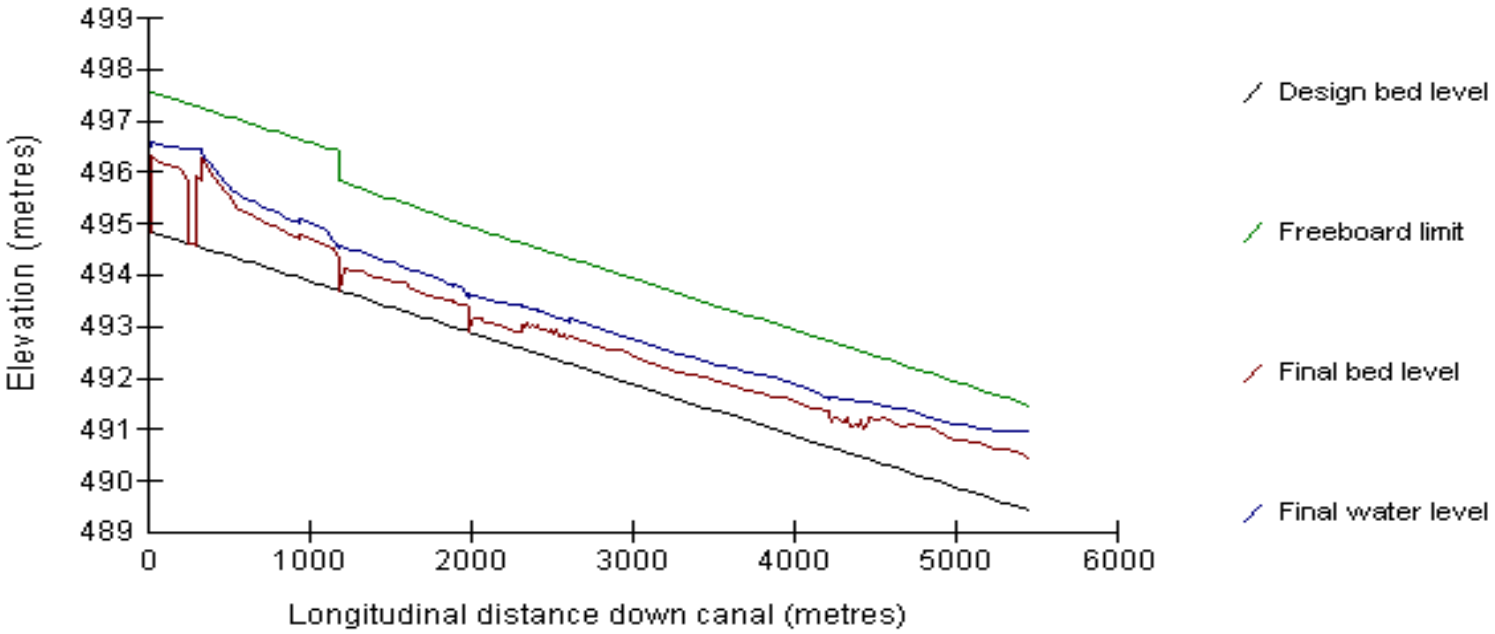
Drop structures – usually unsuccessful

Sediment control and flood diversion improvement in Gash Agricultural Scheme, Sudan



Tewoderos Fikrie Zenebe

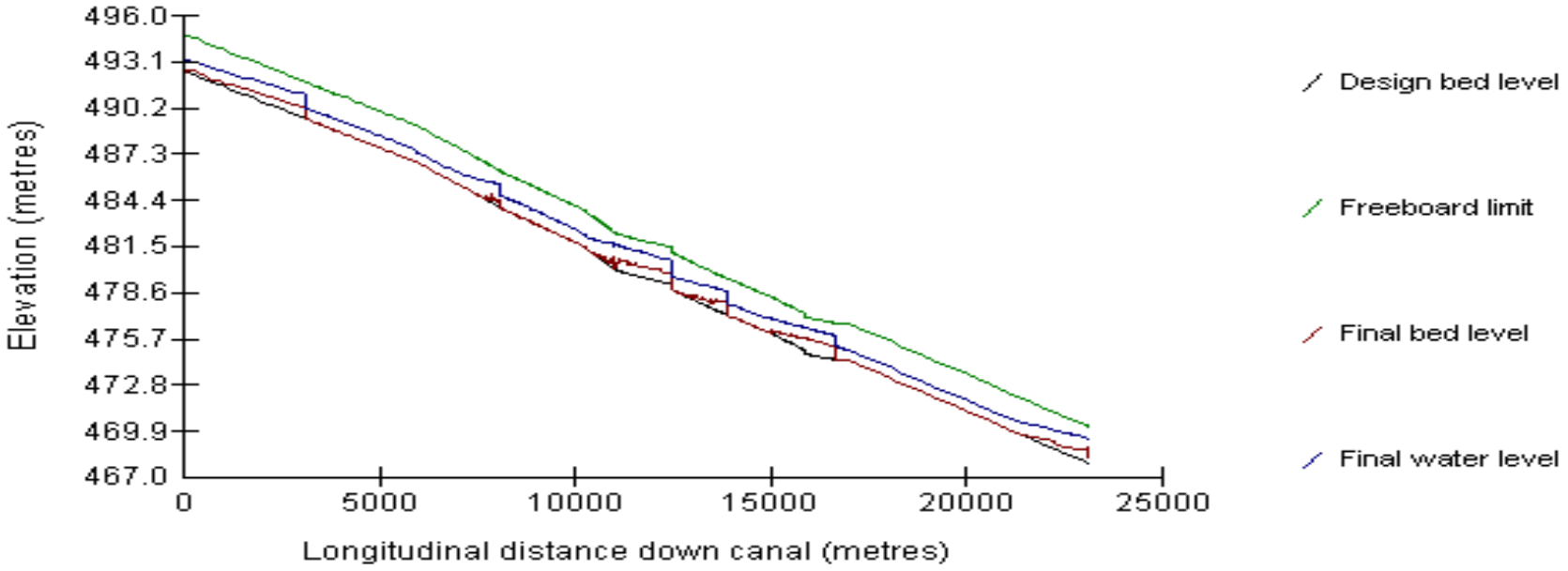
SHARC Model Results Fota Main Canal (slope 0.045%).



Total water volume		
Volume requested (all turnouts)	37.56	Mm3
Volume usefully supplied is	8.21	Mm3
Ratio supplied to requested is	22	%
Volume lost to seepage	0.00	Mm3
Total seepage rate from input	0.00	m3/s
Ratio supplied to requested at the intake	22	%

The total sediment deposited in the canal = 0.0359 Million m^3

SHARC Model Results Fota Main Canal (slope 0.1%)



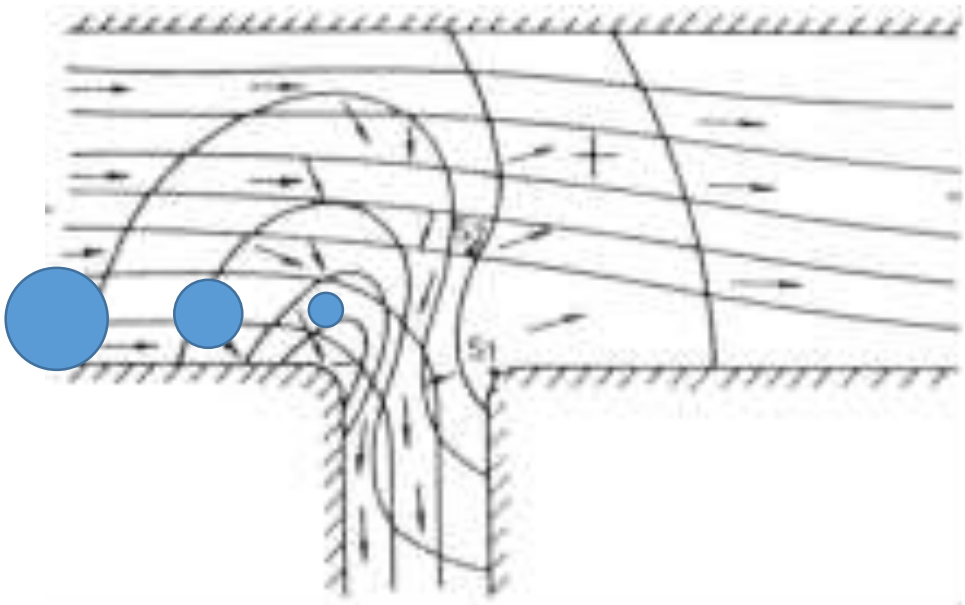
Total water volume		
Volume requested (all turnouts)		Mm3
Volume usefully supplied is	35.86	Mm3
Ratio supplied to requested is	96	%
Volume lost to seepage	0.00	Mm3
Total seepage rate from input	0.00	m3/s
Ratio supplied to requested at the intake	96	%

The total sediment deposited in the canal = 0.024 Million m3

Warning: Right-angled Intakes

FAO's 2002 irrigation design manual, (Volume 2 module 7 figure 39), specifically recommends right angled intakes for silt laden rivers. However, physical and numerical models and field experience all demonstrate that **frontal intakes divert the minimum of bed load** to canals and right angled intakes increase the amount of sediment entering the canal.

The slower bottom flow carrying most sediment turns the corner more easily



Let us think, guess – we may get it right?

What is the angle of diversion and width of main canals you recommend?

Overflow control structures – Stone Pitch (Yemen)

Overflow control structures: field inlets with stoplogs (Pakistan)

Thank you