CANAL MODERNISATION – MORE OR LESS

Progressions of canal irrigation in Pakistan, Sudan, Armenia

ADRIAN LAYCOCK
Canal modernisation usually means a change in design and operating philosophy from the original.

Upper Swat canal designed a century ago for protective irrigation.
Upper Swat distributary
Upper Swat falls
minor canals renovated with precast parabolics. Engineer resistance!
Popular demand from farmers!
Proportional distribution the only control
Proportional dividers replace open flumes
Refusal gates
(open or shut)

Machai Branch - notch falls.
Machai Branch - notch falls
Main canal given Upstream control with cross regulators
Pehur high level canal - construction
Yeleru LB canal – a natural parabolic
Pehur high level canal – a new parabolic
Pehur high level canal – sept 2002
Pehur high level canal – sep 2005
Pehur high level canal – downstream control gates
Pehur high level canal – downstream control gates
Pehur high level canal – downstream control gates oct 2009
Pehur high level canal – downstream control gates June 2010
Pehur high level canal – downstream control oct 2009
Pehur high level canal – downstream control Maira tail oct 2004
Pehur high level canal – downstream control Maira tail oct 2009
Pehur high level canal – Maira tail
PAKISTAN

1900 – Upper Swat canal for **PROTECTIVE** irrig 40% crop intensity

Supply scheduled / proportional flow / run of river.

By 1960 population trebled. Crop intensity increased to 120%.

1975 Tarbela Dam

By 1990 population doubled again. High value crops. Higher social aspirations

**FLEXIBLE PRODUCTIVE** irrig needed.

Demand scheduled / passive automation / intermediate storage / LP pipelines

2000 Pehur High Level Canal

2020 – active automation on Machai Branch ???

2045 – pipeline distribution with full intermediate storage ????
Gezira, Sudan
Merowe Dam, Sudan
Merowe Dam, Sudan
Multaga 2003
Multaga main canal
Multaga main canal
Atbara 2012
Linear move, Sudan
SUDAN

1920 – Gezira scheme for COMMERCIAL irrig 40% monoculture cotton

    Supply scheduled / proportional flow / run of river.

    By 1980 population trebled. Management breakdown. ANARCHY.

    Black cotton soils self-regulating. = SOME HOPE

2000 – new schemes require different approach

    Sandy soils – sprinklers and lined canals / pipelines

    FLEXIBLE PRODUCTIVE COMMERCIAL irrig needed.

    Demand scheduled / passive automation / intermediate storage / LP pipelines
Armenia canal rehab
Armenia canal rehab
Armenia canal rehab
Armenia canal rehab
Armenia canal rehab – top shutter
Armenia canal rehab
Armenia canal rehab – shotcreting on membrane
Armenia canal rehab – shotcreting on membrane
Armenia canal rehab
Armenia canal rehab
Armenia canal rehab – passive automation
Armenia canal rehab – Mchkyan pump station
Armenia canal rehab – Mchkyan pump station
Armenia canal rehab - Ranchpar pump station 300m head
ARMENIA

1950 – irrigation developed for political reasons under Soviet regime.

No concern for economics or financial returns

Supply scheduled / proportional flow

By 1990 independence. Management breakdown. ANARCHY.

2000 – rehabilitation schemes require different approach

Demand scheduled / passive automation / intermediate storage / LP pipelines