Taking –up and leaving behind knowledge;

a history of irrigation design approaches for Smallholder farmers in Southern Africa

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RESILIENCE

Introduction

- Designing irrigation systems for smallholders continues to be problematic in delivering the expected results

- In the past participatory design methodologies have been pushed as an approach towards sustainable irrigation development

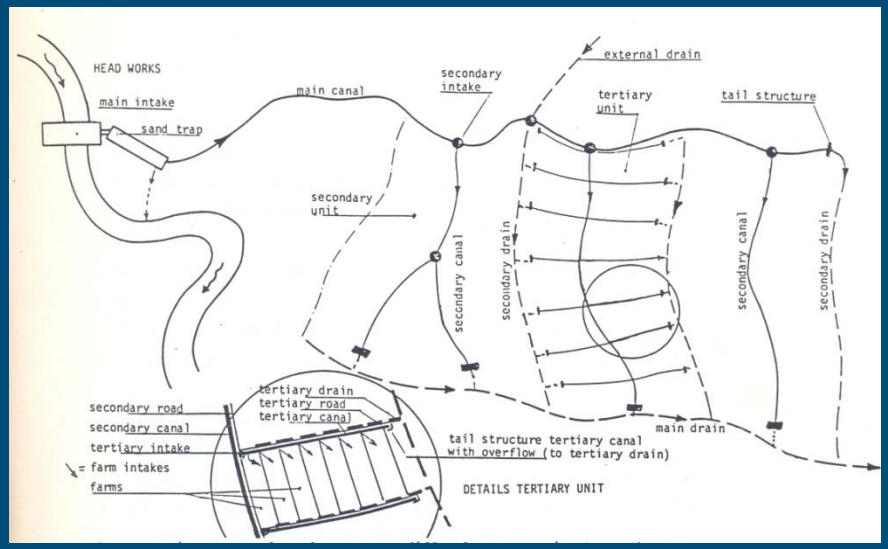
Introduction

- There seems to have been a standstill in the development and improved of approaches to designing smallholder irrigation systems
  - Coupled to a period of very low international investment in irrigation systems

- Interest and investment in irrigation has picked-up again – but technocratic design and implementation practices seem to have the upper hand, why?
  - This presentation tries to give a historical context in which designing approaches where developed to understand the current standing in this field and its interface with social sciences.

Some definitions

- Design is the end product of the designing process
- Design approaches are methods of making a design
- Irrigation system: the infrastructure needed to take, transport and deliver water to a plant
- An irrigation design is not only a technical design



A short history on irrigation design(ing)

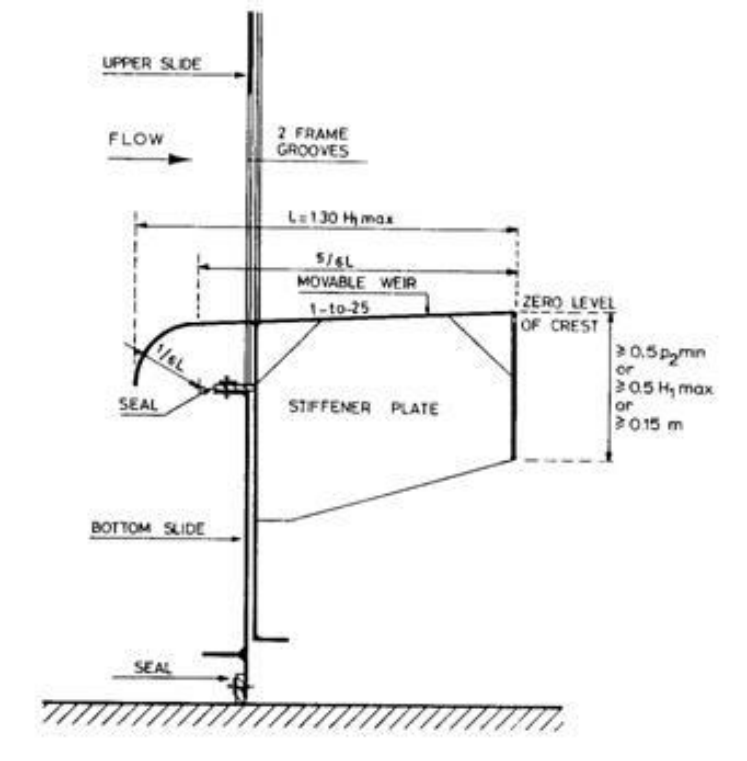
- Colonial agriculture in the 19th century:
  - Shift from trading with colonies to active intervention and settlement by means of irrigation
    - its about control of land and people on it
  - Study tours by engineers to build on existing knowledge and technologies
  - Development of irrigation schools, i.e. the Dutch, the French, the British

Example of two irrigation schools: Dutch, English

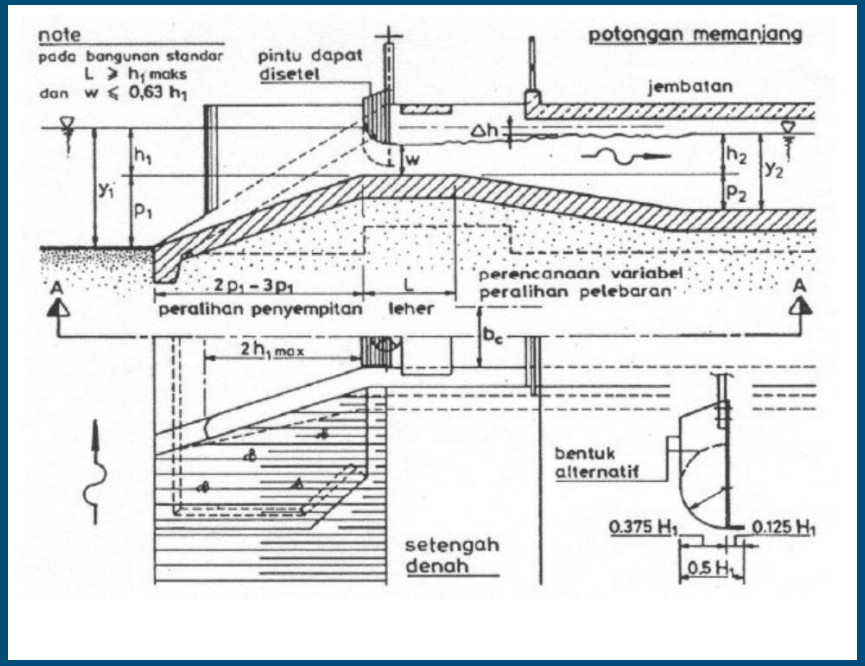
(Ertsen 2007)	Dutch	English
Guiding principles	Max value/land Water gift based on crop	Max value/water Water gift based on land
Design requirements	Adjustability and measurability	Functioning with variable canal flow
Control mechanism	Centralized daily control by official	Central but distant control by official

Different design for water control

Dutch school - adaptive



English school- fixed



After decolonization – 1950s & 1960s

- American based
  - In USA development of most advanced irrigation
  - Big boom in irrigation construction through development aid in the South
  - Irrigation as a means to do nation-building:
    - modernize agriculture, increase export earnings and improve food self-sufficiency,
- Blue print approach to design

End 1960s-1970s: disillusion around irrigation

- Low performance, siltation canals, salinization, negative gender effect

- **Two reactions:**

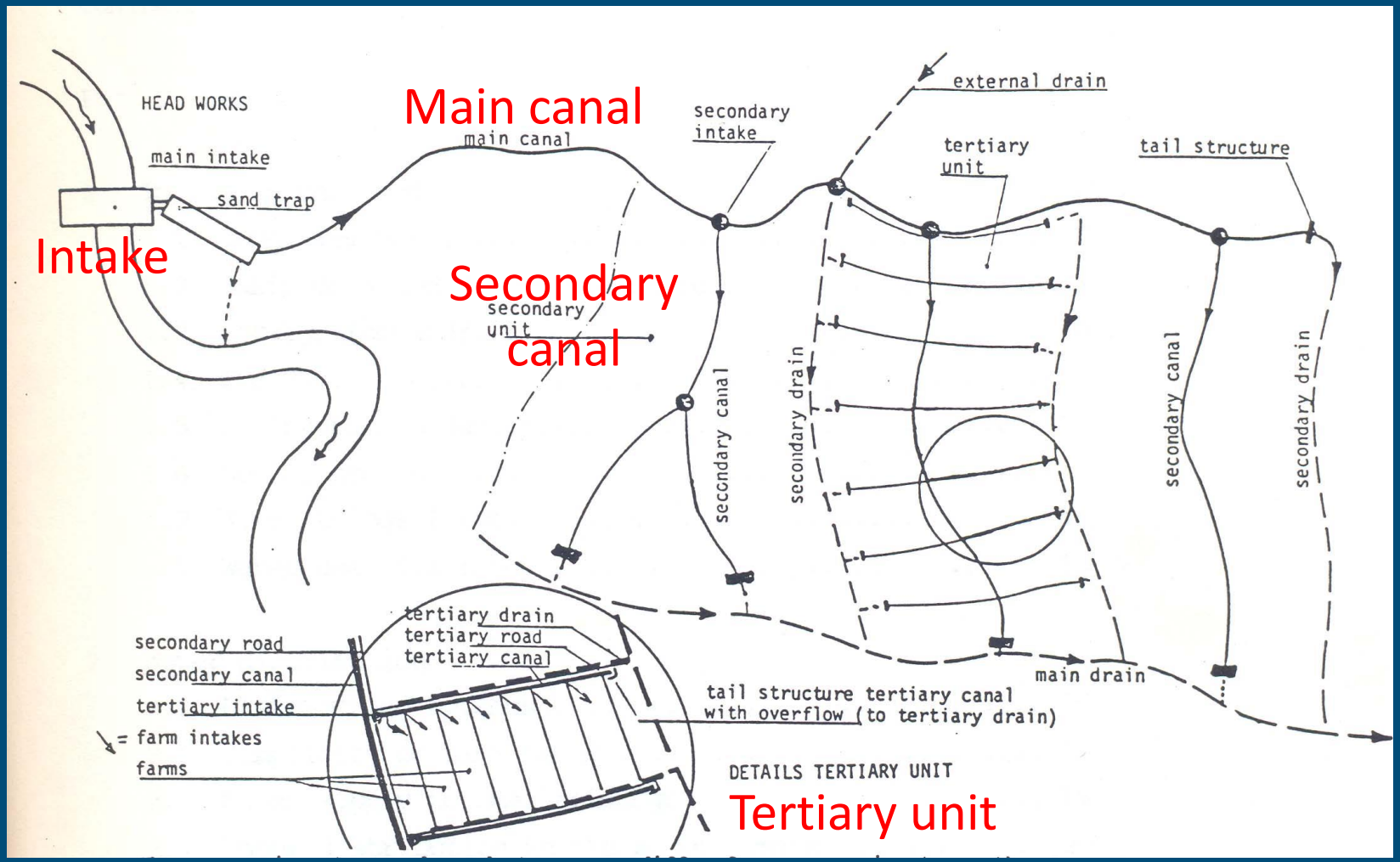
(1) **Tertiary block is where the problems manifest themselves**

- On farm development
- Introduction of water rotation schedules at tertiary level based on crop water requirements (FAO 1977)

(2) More attention for institutional/organizational aspects

- Adjust the farmer to the technology by better organizing or training them to use the technology as envisaged
- Establish Water Users Association (WUA) to improve farmer organization

1950s-1970s From Main system to Tertiary unit



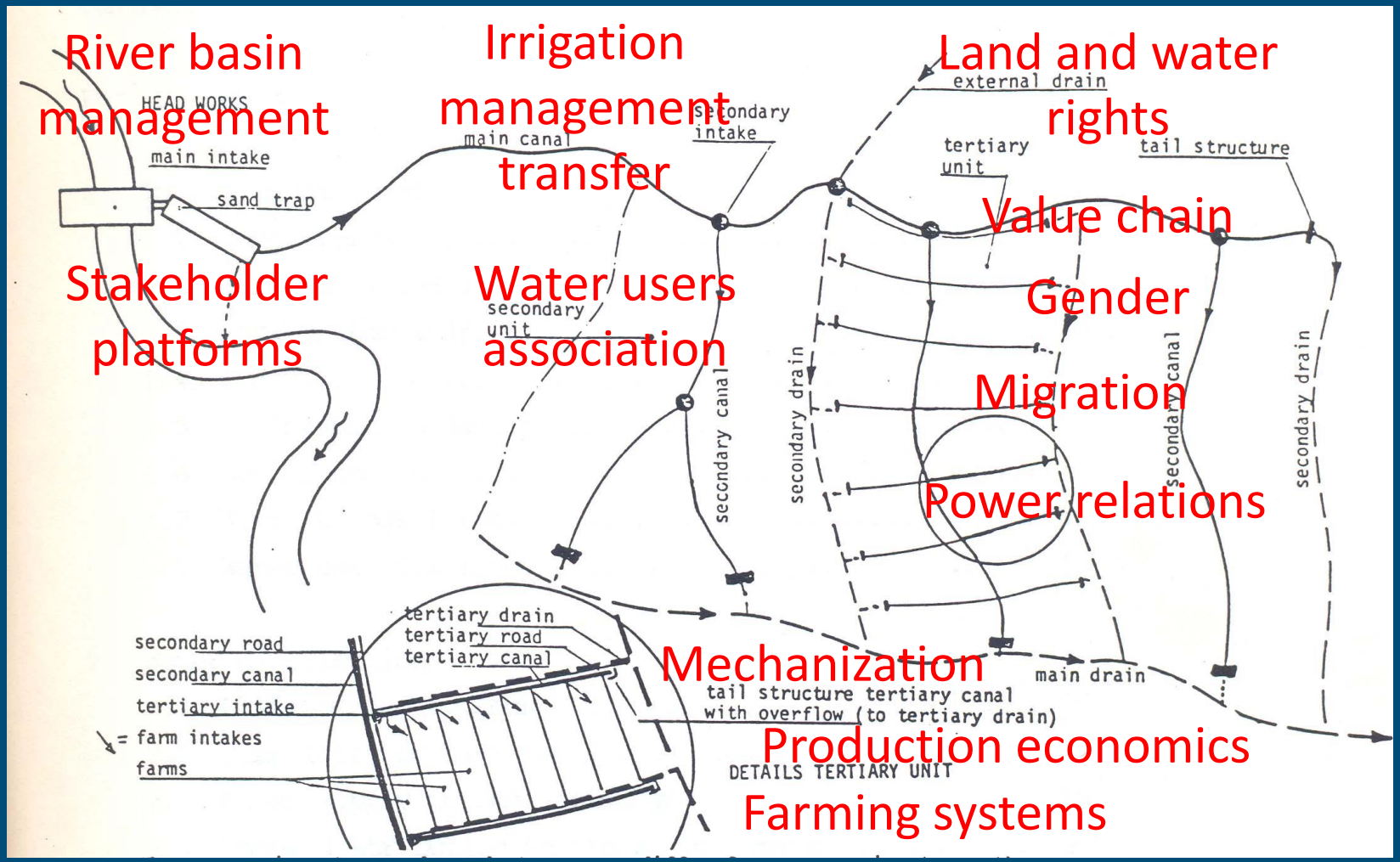
1970s-1980s Experimenting with participatory design & farmer management

- Bottom up, grassroots approaches (Rondinelli 1983)
- Indigenous technical knowledge (Richards 1985)
- Rapid Rural Appraisal and Participatory rural appraisal (Chambers 1983)
- Farming system research (Chambers 1989)
- Actor oriented (Long and Long 1992)

International trends: 1980s back to main system management 1990s up to river basin management

- In 1980 Chambers & Wade point at importance of main system management:
  - Problems manifest themselves at tertiary level, but are caused upstream in the system, hence improve water supply to tertiary outlet though management change
  - Disfunctioning bureaucracies, insecure water supplies cause hoarding
- Attention shifts to irrigation management:
  - IIMI (IWMI) started in 1985 as CGIAR institute
  - Start of Irrigation Management Transfer
  - Continued technical attention for modernization (automation) & rehabilitation of irrigation systems

1980s- 1990s back to main system management and up to river and across disciplines



1990 – State of the art of participatory irrigation design

- Feb 1990 workshop on Sustainable design of FMIS in Sub-Saharan Africa
  - Interactive design as process
  - Design as more than a series of technical choices
  - 3 socio-economic levels – plot-system-wider environment
  - At each level – check between assumptions & African realities
  - Participation or negotiation? Adapt to existing situation/actor

Three socio-economic levels (Horst & Ubels 1993)

Technical system	Forms of use	Social aspect	Social systems
IRRIGATION SYSTEM	agricultural use	– production rationale – intra-household organization – access to resources	FARMING SYSTEM
	irrigation organization	– organizational structure – processes and skills – objectives and norms	LOCAL COMMUNITY
	external relations	– types of external needs – accessibility – conditions posed	INSTITUTIONAL AND COMMERCIAL ENVIRONMENT

Figure 6.4: Linkages between forms of use and social environment.

Assumptions vs reality: examples

- Farming systems
  - Who is the smallholder? Blue printing the farmer, full time/part time, multiple income strategies
- Local community
  - Existing organisational structures and boundaries vs required organisational structures and boundaries of the irrigation system
- Institutional environment
  - Marketing
  - Extension services

1990s Getting stuck – Participation tyranny

The international workshop on Design of sustainable farmer-managed irrigation in SSA

- Results in the publication of the State-of-the-Art book "Irrigation design in Africa, towards an interactive method (Ubels and Horst 1993)

- Irrigation tainted, investments dropped
- Participation elevated from method to goal

2000s – Reinventing Wheel

- Revival in investment in irrigation
  - Blair's commission for Africa (2005)
  - World Bank report (2008)
  - New model – Public Private Partnerships

- Re-invention of the wheel:
  - Plethora of participatory design projects, is still dominant discourse on how to address irrigation design
  - But it appears to re-start with the practices of the 60's and 70's
    - Blue printing drip systems
    - PROIRRI

PROIRRI - Site development path

Pathway quick overview	Infrastructure development	Water mgmt support (IO)	Production support (PA)	Value Chain development	Financial services
Phase 1 Quick scan & prefeasibility (short pre-phase)	Technical pre-feasibility and hydrology assessment	Quick scan on current water users & water use in area	Quick scan on membership, farming systems, willingness to engage in project	Quick scan on markets and market players along value chain	Quick scan on credit acces, local savings mechanisms, financial literacy of PA.
Transition: Quick scan shows site meets eligibility criteria + expression of interest from beneficiaries					
Phase 2 Particip. Diagnosis & scheme development planning	Topographical Survey, Participatory Preliminary Design	Establishment of interim IO + drafting of constitution, prep. for water right, land right	Farmer survey + farming systems analysis + PA establishment support+ rainfed support	Joint market identification & business plan devt.	Financial literacy training, establishment of local savings groups
Transition: Agreed scheme development plan + Signed Performance Agreement					
Phase 3 Commitment, consolidation & facilitated implementation	Detailed design, Infrastructure construction (incl. support infrastructure)	IO strengthening on O&M, M&E, financial mgmt. Training of operators, PPP, farmer water mgmt training	Prod. extension on rainfed and irrigated production, specific rice and horticulture support. matching grants, PA cap. Building	matching grants for value addition.	Credit access facilitated through strategic partner
Transition: Infrastructure transfer agreement + renewal of Performance Agreement after evaluation + gradual phase out plan					
Phase 4 Gradual phasing out of external facilitation (several growing seasons)	Support to IO pump operation, efficient scheme operation, repair & maintenance	Cont. training + 'graduation' of IO for full O&M (incl. with local service providers, or professional staff)	PA cap. building continued and follow up matching grants + 'graduation'	matching grants for value addition.	Credit access facilitated through strategic partner

Conclusions

- Interest and investment in irrigation has picked-up again – but technocratic design and implementation practices seem to have the upper hand, why?

- Disincentives against a shift from blueprint to interactive:
  - Accountability problem – accountable to whom?
  - Blueprints result in more efficient construction & higher profits
  - Vicious cycle – farmers blamed for low performance, so why involve them in design? – next unsustainable technology is designed – for which farmers are blamed

Conclusions -2

- For a irrigation design to work it needs to reflect the local socio economical context:
  - Change from ‘adapt user to system’ to ‘adapt system to user’
- Social-economic sciences need to take the lead in explaining social economical context in terms of (irrigation) infrastructural design requirements to engineers