Institutional Models for Canal Irrigation Used Worldwide:

Comparison of Select Cases

"Improving Irrigation Service Delivery in India"
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Outline of this presentation

1. Introduction
2. Context
3. Evolution of Irrigation Service Delivery
4. Example Cases
5. Discussion

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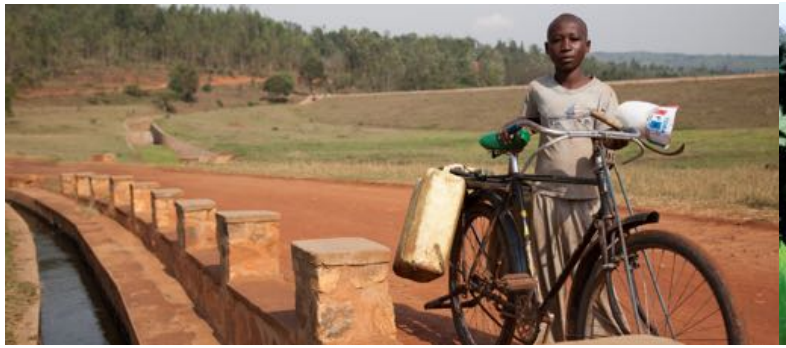
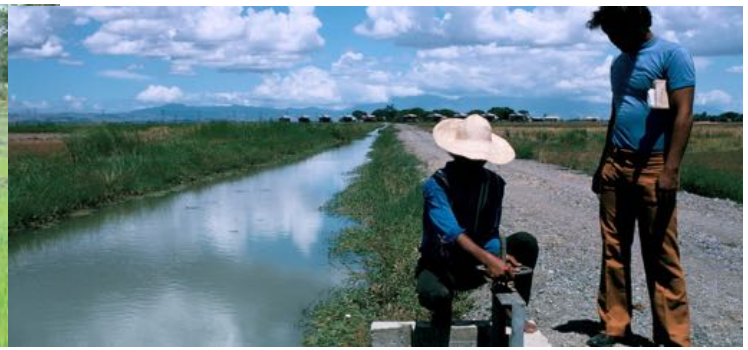
Where does India fall within the broader global context of irrigation institutions?





Typical Irrigation-related Organizations

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Forms of these are found in India

Govt. agencies (Ministries, Departments)	• Developed, owned and operated by govt. (central or local) • Financed by mixture publicly allocated funds and service fees
Communal Irrigation Scheme	• Developed by irrigator, owned and operated by community • Financed by service fees or in-kind labor and materials
Water User Associations	• Developed by irrigators, often govt. mandated • Owned & operated by irrigators, financed by service fees
Semi-Autonomous Irrigation Agencies	• Regulated by govt., could be owned and operated by govt. /users • Financed by service fees & subsidized by public funds
Canal companies	• Developed as non-profit corporations, self owned & operated • Financed by mix of service fees & loans in the corps. name
Public Utilities/ Parastatals	• Regulated by govt., owned and operated by corporation • Developed as for-profit corporation; financed by service fees

Adapted from Johnson et. al, 2009: 15

Evolution of Irrigation Service Delivery

Stage 1 — Generally prior to the late 1800s

- Individual irrigation schemes developed by users
- Managed at the village / community level through participatory processes
- Brazil is an example of Stage 1

Stage 2 — Mostly in the 1950s/1960s

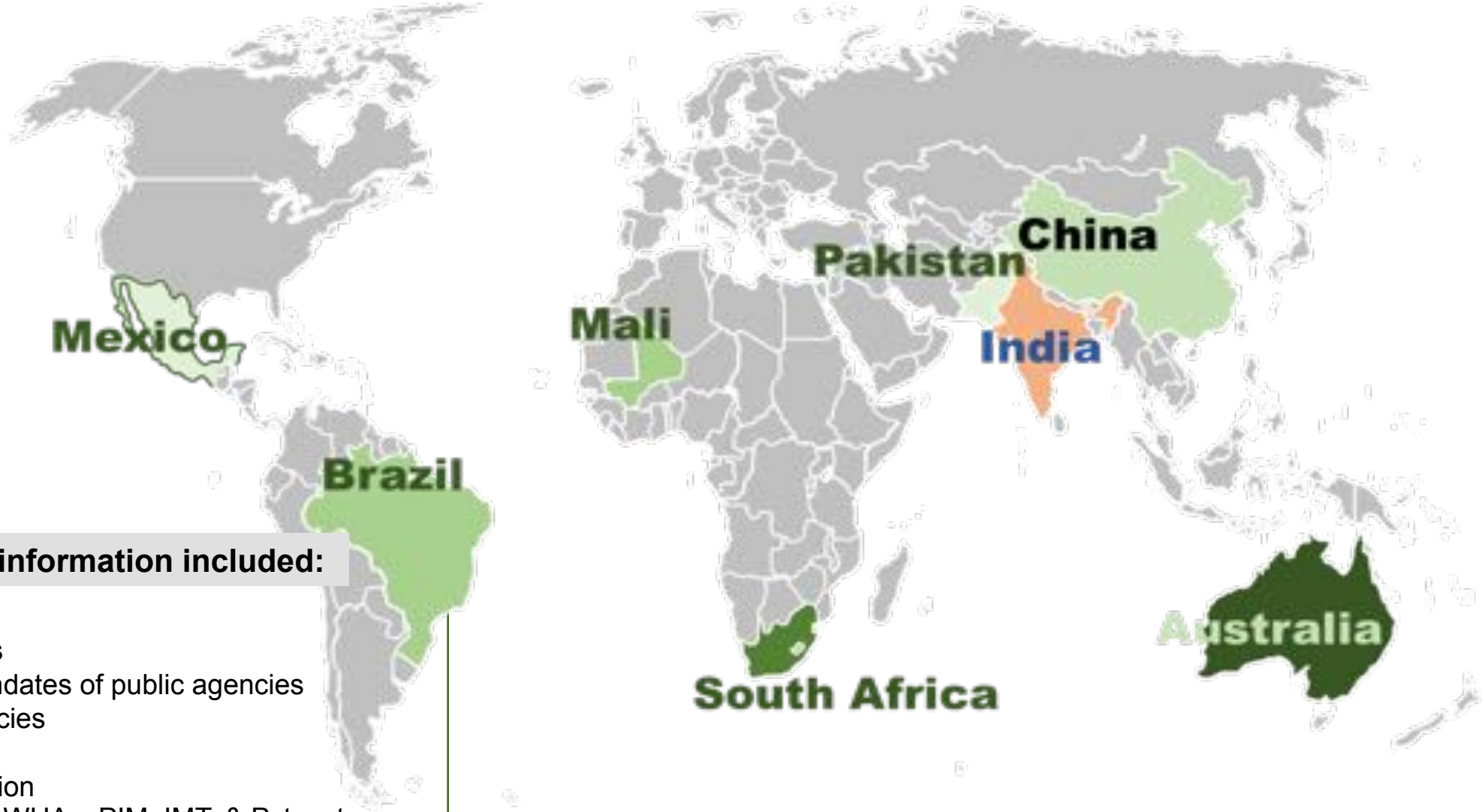
India is a example of Stage 2

- Most irrigation schemes were publicly-developed large-scale systems
- Expansions funded by international development agencies & banks
- Irrigation users mostly removed from infra development processes
- O&M: Low collection of service fees / insufficient public funds

Stage 3 — 1980s onwards

- Many large-scale irrigation systems in disrepair
- Govt. tried re-incorporating users into decision-making using: WUA / PIM/ Service Providers
- Irrigation agencies either:
  - Adjusted mandates to include **river basin planning**, etc. (e.g. northern Mexico)
  - Restructured into **quasi-public agencies** that generate own revenues (e.g. Mali) or
  - Were **absorbed by others** already fulfilling these functions (e.g. Brazil, Australia, Pakistan).

Case Countries and comparisons



Focus on comparable information included:

- Key contextual factors
- Key institutional factors
- Organograms and mandates of public agencies
- Relevant laws and policies
- Funding sources
- Level of user participation
- Description/analysis of WUAs, PIM, IMT, & Pvt. actors

Key Contextual Factors in Case Examples

	Portion of Irrigated Area Using Surface Water	Quantity of Water Delivered through Irrigation System	Average Landholding Size (as of 2000)	Irrigation Systems' Complexity*	Main Crop Types Irrigated (by harvested area)
Mali	99.9%	5 bm3	3.3 ha (1980 data)	Moderately engineered	Rice, Vegetables, Sweet Potatoes
South Africa	91.5%	9.3 bm3	Info not available	Variable	Maize, Wheat, Legumes
Brazil	80.8%	Info not available	72.8 ha	Limited engineering	Sugarcane, Rice, Soybeans
China	69.2%	355 bm3	.6 ha	Variable	Rice, Wheat, Maize
Mexico	60%	59.4 bm3	41.4 ha (1990 data)	Variable	Maize, Grass, Fodder, Soybeans
Pakistan	38.2%	Info not available	3.1 ha	Limited engineering	Wheat, Cotton, Rice
India	**36.3%**	**688 bm3**	**1.3 ha**		**Rice, Wheat, Sugarcane**
Australia	Info not available	8.4 bm3	3,243.2 ha	Highly engineered	Cotton, Fodder, Sugarcane

*Engineering complexity refers to the level of technical skill and sophistication of equipment required for operations and maintenance.

Regulation:

Which entity does what?

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	Entity to Allocate Water	Entity to Regulate Water Quality	Entity to Regulate Irrigation PPPs	Entity to Regulate WUAs	Entity to Regulate Fees & Cost Recovery
Andhra Pradesh	Govt. Department	Govt. Department	Govt. Department / Corporation	Govt. Department	State government
Madhya Pradesh	Govt. Department	Govt. Department	River Basin Authority/ Govt. Department	Govt. Department	State government
Maharashtra	Semi-autonomous Water Regulator	Govt. Department	Govt. Department / Corporation	Govt. Department	Semi-autonomous Water Regulator
Punjab	Govt. Department	Govt. Department		Govt. Department	State government
Tamil Nadu	Govt. Department	Govt. Department		Govt. Department	State government
Uttar Pradesh	Govt. Department	Govt. Department	Govt. Department	Govt. Department	State government

River Basin Organization (RBO),
Ministry refers to State & / or Central authorities (State Govt. Department)

Provision

Which entity does what?

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	Designs and Constructs Canals	O&M of Canals	Sets Technical Standards	Distributes Water to Users
Andhra Pradesh	Govt. Department	Govt. Department / WUA	Govt. Department	Govt. Department / WUA
Madhya Pradesh	Govt. Department	Govt. Department / WUA	Govt. Department	Govt. Department / WUA
Maharashtra	Govt. Department / Corporation	Govt. Department / WUA	Govt. Department	Govt. Department / WUA
Punjab	Govt. Department	Govt. Department	Govt. Department	Govt. Department, Farmers (warabandi system)
Tamil Nadu	Govt. Department	Govt. Department / WUA	Govt. Department	Govt. Department / WUA
Uttar Pradesh	Govt. Department	Govt. Department / WUA	Govt. Department	Govt. Department / WUA

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Funding Source

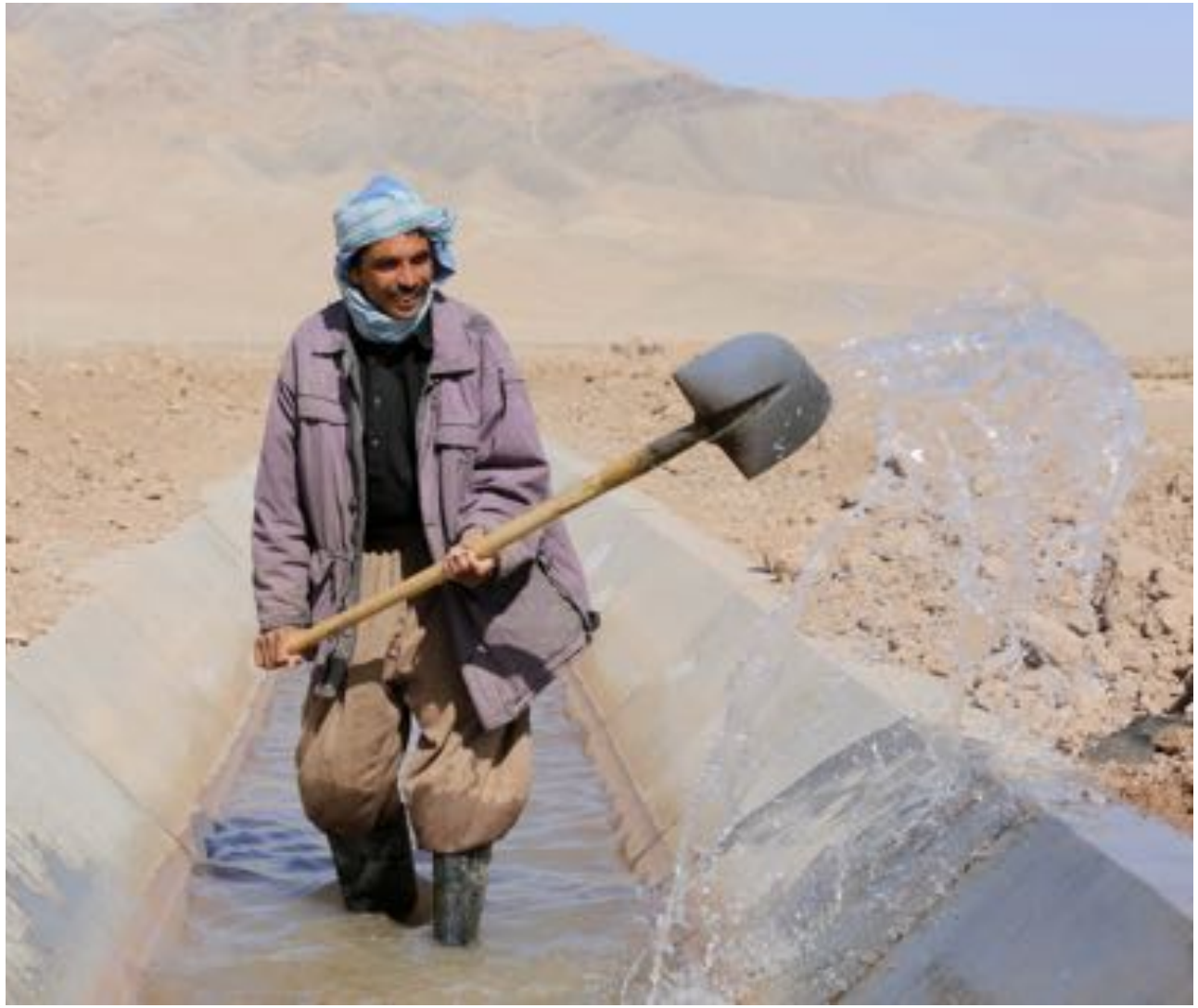
Assessment and collection of user charges				
	Revenue department: assessment & collection	Irrigation department: assessment & collection	Irrigation department: assessment; Revenue department: collection	Panchayat/Block Advisory Committee
Andhra Pradesh	✓	✗	✗	✗
Haryana	✗	✗	✓	✗
Karnataka	✓	✗	✗	✗
Madhya Pradesh	✗	✓	✗	✗
Maharashtra	✗	✓	✗	✗
Punjab	✗	✗	✓	✗
Tripura	✗	✗	✗	✓

Key questions

What are the advantages/disadvantages of separating the Construction and O&M agencies?

Is Independent Regulation necessary?

What functions can and should WUAs perform in services delivery? WUAs vs. Integrated Service Provider



Key References

- FAO Aquastat
- Johnson et al., 2009
- IWMI, 2007
- World Resource Institute, 2013
- Global Land Outlook, Land Tenure and Rights, 2017
- Rights and Resources Initiative, 2015
- World Bank Governance Indicators, 2016 data set
- Ghumman et. al, 2014
- PPIAF and World Bank, 2016
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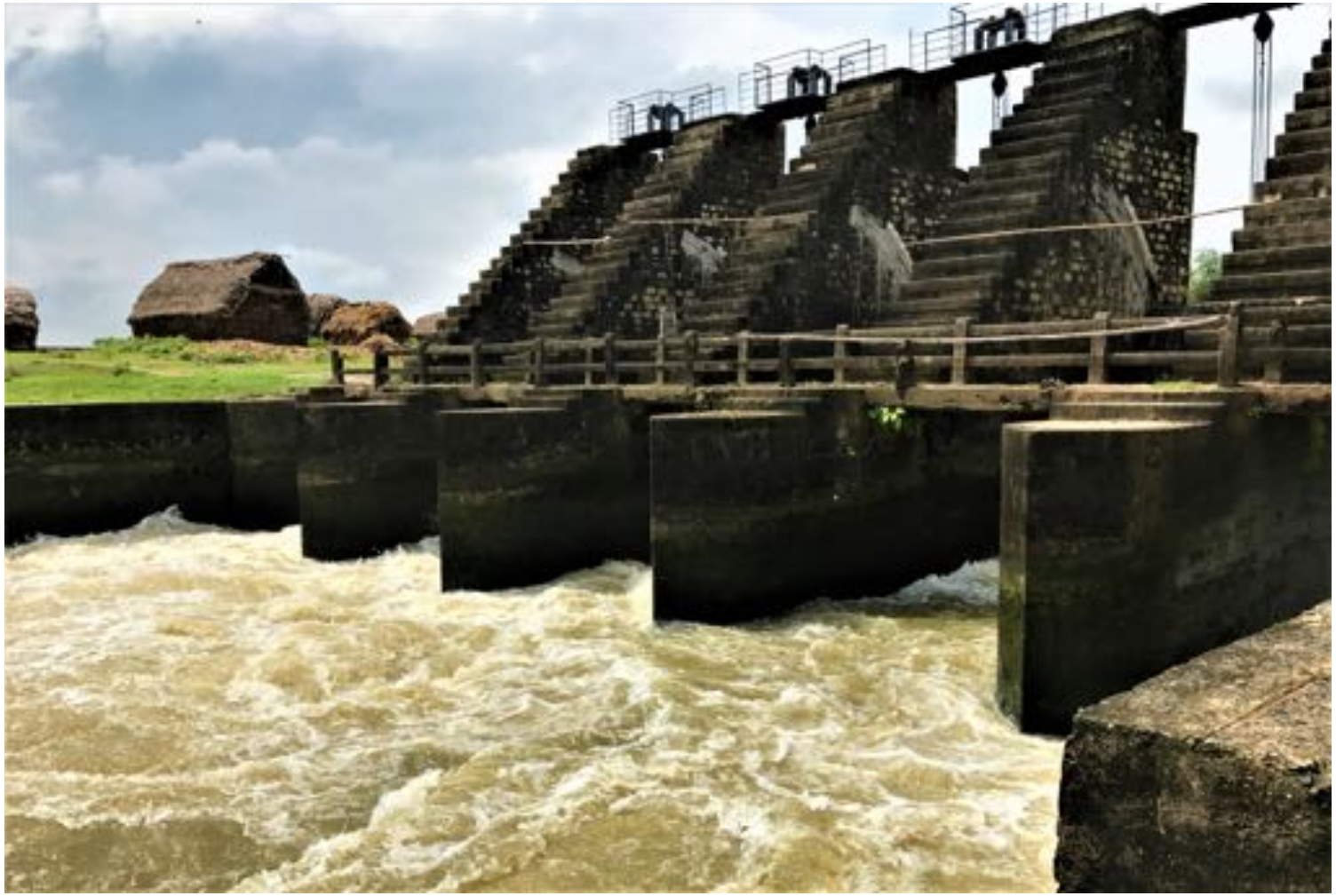
- Lowder et. al, 2017
- Internal conversation with TTLs, Specialist from the World Bank

Annexures



Annex 1a: Methods

- Consultation with World Bank irrigation experts (scoping and review)
- Review of academic, grey literature, and documentation from FAO
- Review of information available from key actors as applicable including:
  - National, regional and local government
  - Quasi-governmental agencies and parastatals
  - Private entities
  - Non-governmental organizations
  - International and multi-lateral donors
- Case selection and evaluation (further elaborated below)
- Data aggregation and synthesis (emphasizing visualization)

Annex 1b: Guiding Questions

1. What are the archetype models of irrigation service delivery from around the world?
2. What key factors – geographic, economic, pollical – influence irrigation service delivery institutions around the world?
3. What are important examples of irrigation service delivery from around the world?
4. What insights can these examples provide for India?

Annex 1c: Case Scoping, Selection, Diagnostic and Comparison

- Scoping process primarily included:
  - Consultation with WB experts
  - Review of literature

- Selection criteria included some combination of the following:
  - Similar or comparable government structure to India (federated or decentralized)
  - Similar geographic context (large, multiple climatic zones, reasonable availability of surface water)
  - Similar development challenges to India

- Outliers also included for purpose of capturing the full spectrum of models
- Information gathered according to methods noted above
- Synthesis and comparison completed using tabular and diagrammatic tools

Annex 2: Reflection Points

1. To what extent, do the following scenarios hold true for India?
2. What are the implications for irrigation institutions?

- Globally, 75% of the additional food needs could be met by increasing production of the low-yield farms to 80% of that of high-yield farms – even with differences in land quality. Greatest potential increases in yields are in rainfed areas.
- Globally, irrigation could contribute 55% of the total value of food supply by 2050, but would require 40% more water.
- In South Asia, more than 50% of the cropped area is irrigated BUT productivity is low — the key is improving water productivity rather than expanding farm areas.