

Living with salinity in South Asia: comparisons between 3 ACIAR projects

Ed Barrett-Lennard,
Professorial Fellow, Murdoch University, Western Australia

Many logos here

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What is the Australian Centre for International Agricultural Research (ACIAR)?



Catalyses partnerships
to deliver agricultural
R&D in developing
countries

Brief projects (a few
months to ~5 years)

1. Improved food security & poverty alleviation for smallholder farmers
2. Sustainable management of natural resources, adapting to climate change
3. Better human nutrition, health
4. Gender equity and empowerment women & girls
5. More inclusive value chains, engagement of private sector
6. Building scientific and policy capacity

Three ACIAR projects



Southern Bangladesh and West Bengal (CSI4CZ)

Mekong Delta, Vietnam (FOCUS)

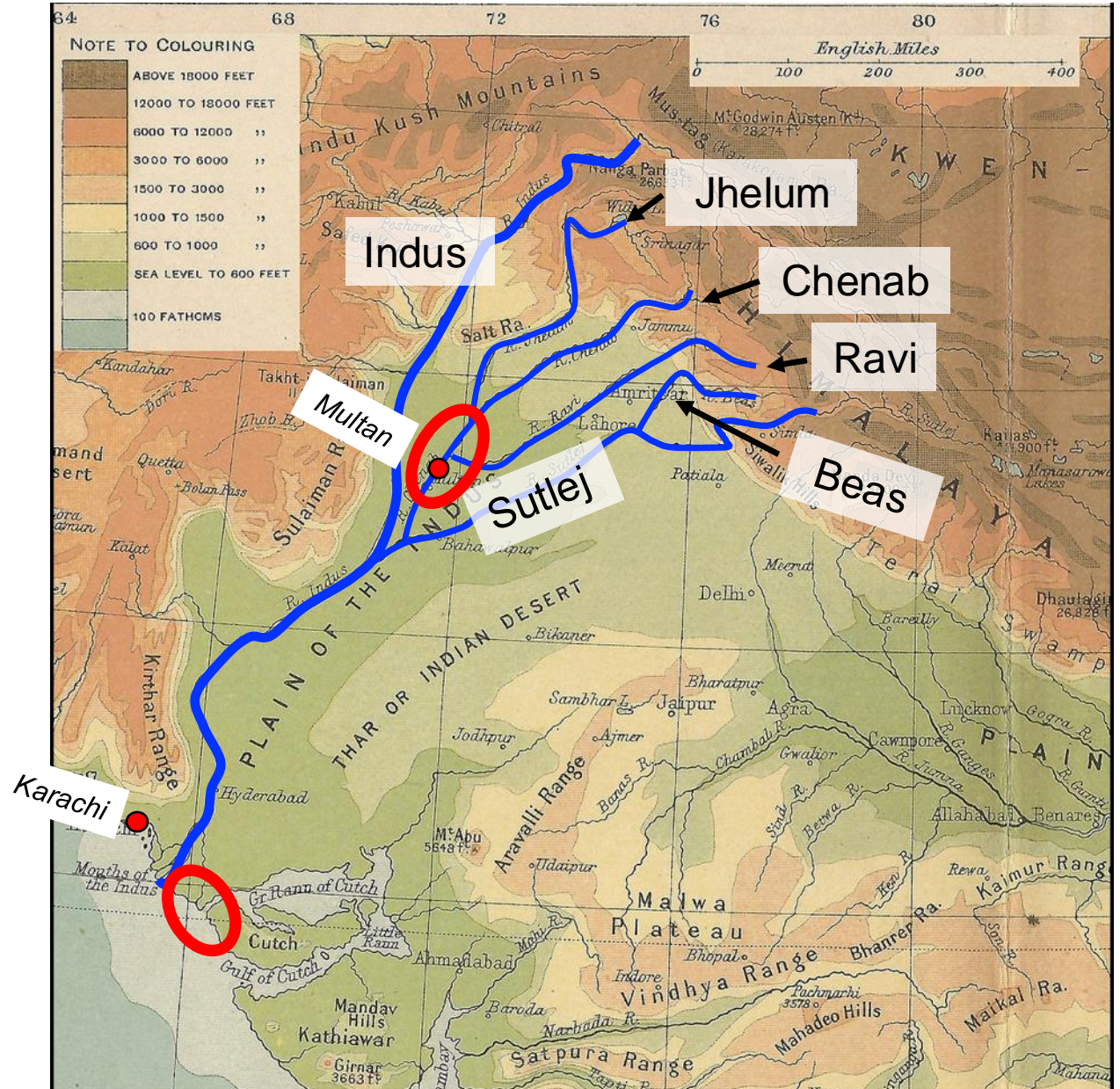
Southern Indus Basin, Pakistan (ASSIB)

Landscape – Pakistan

Vast alluvial plain formed over millions of years in bed of the Indus River and its major tributaries

Three rivers feeding into Indus (Sutlej, Ravi, Beas) have been dammed by India

Water security is a strategic issue



Landscape – Mekong

Multinational river

Rises in the Tibetan Plateau
(China)

Flows through China,
Myanmar, Thailand, Laos,
Cambodia and Vietnam



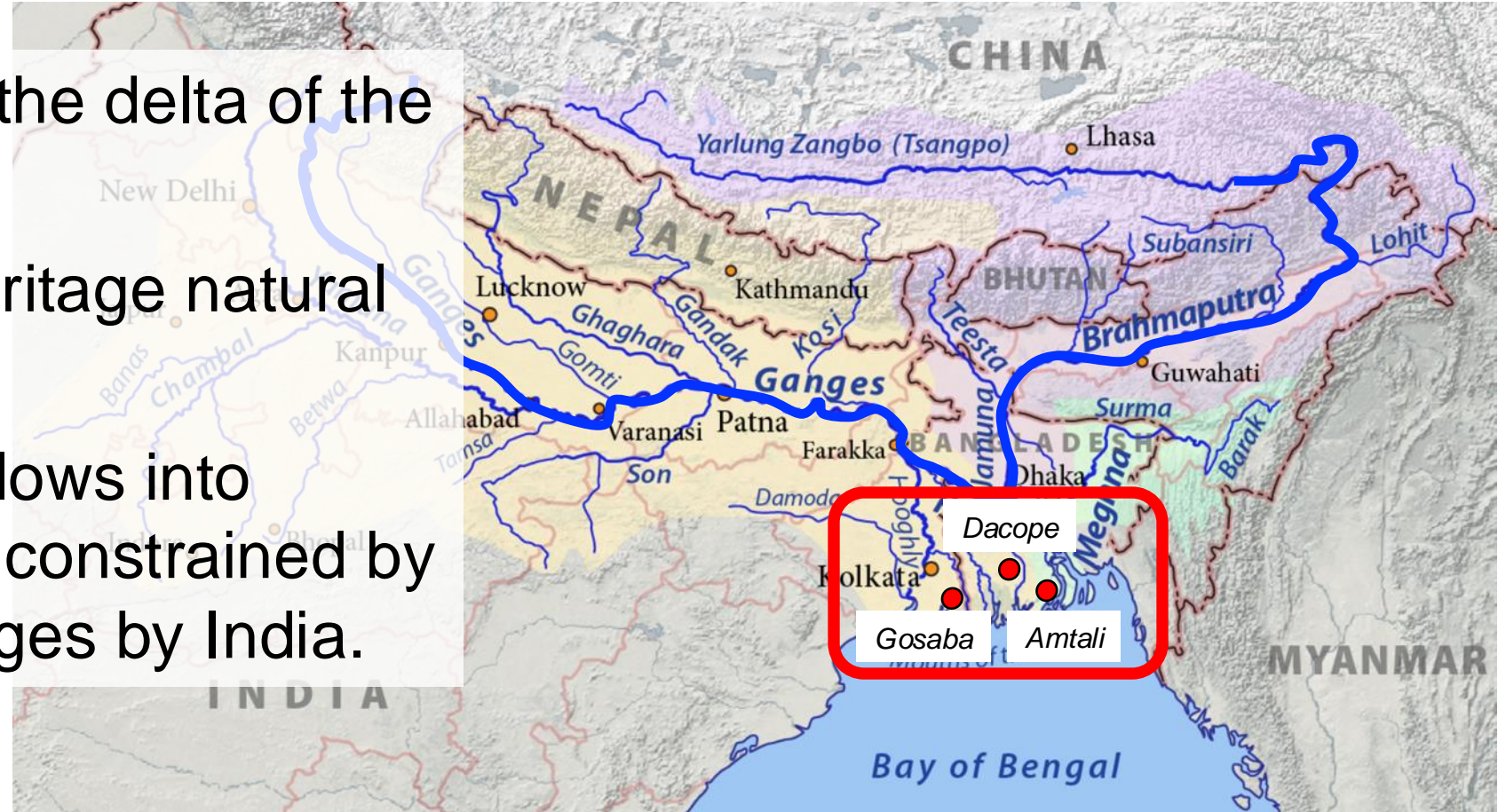
Landscape – Ganges & Brahmaputra Rivers

Farming on islands in the delta of the two rivers.

Adjacent to a world heritage natural forest (Sundarbans).

Amount of water that flows into Bangladesh has been constrained by increasing use of Ganges by India.

Water security is a strategic issue

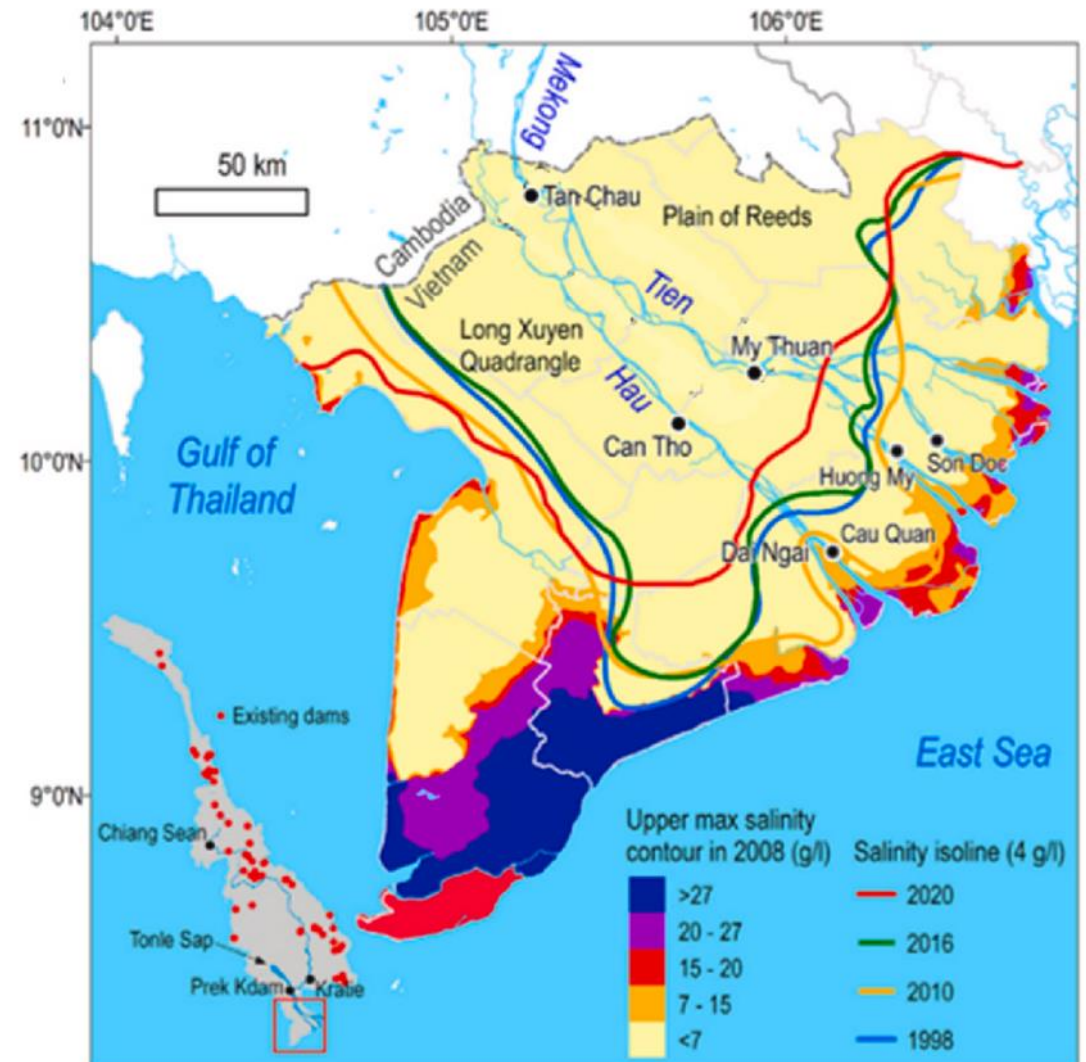


For each of these river systems...

River flows are highly seasonal...

Seawater intrudes up the
water-ways in the dry
seasons...

Causes major problems for irrigation and coastal communities



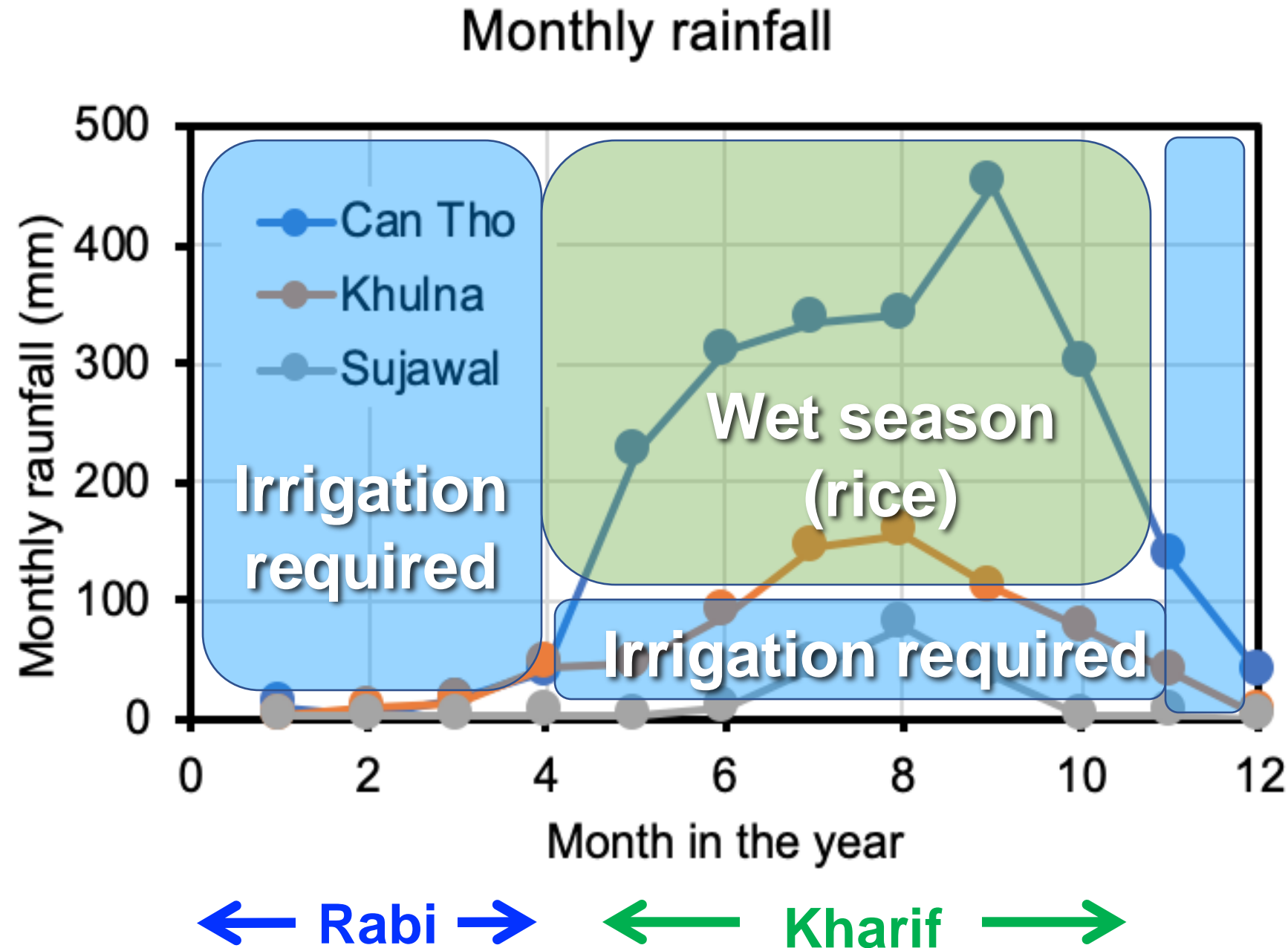
Sources: Kaveney et al. (2023); Loc et al. (2021)

Rainfall & irrigation

Rainfall is higher in Vietnam (e.g. Can Tho)...

...than Bangladesh (e.g. Khulna)

...and southern Pakistan (e.g. Sujawal).



Groundwater

Important as source of irrigation and drinking water especially in southern Pakistan and Bangladesh

Concerns

Groundwater is limited resource

Can lead to soil sodicity and salinity in Pakistan

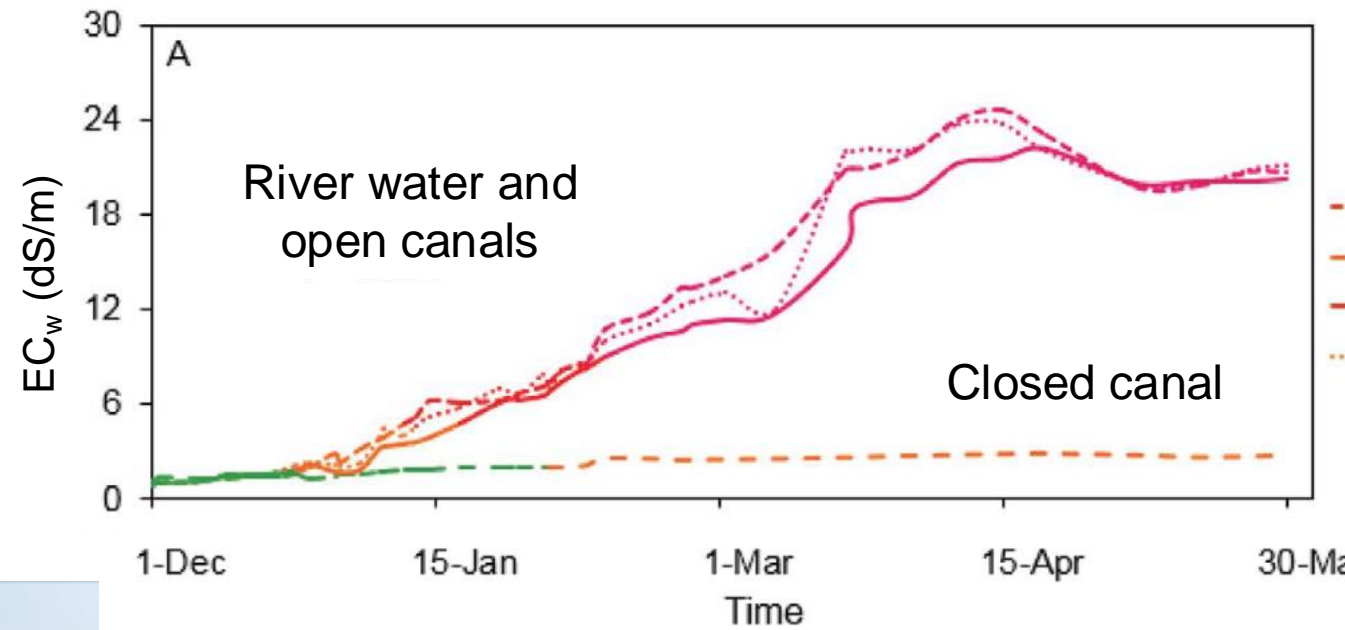


Salinity – Bangladesh & West Bengal

Seasonal seawater intrusion;
shallow water-tables

Land lies fallow in rabi-season

Impoverishes
communities



Source: Mila et al. (2022)

Salinity – Pakistan

South of the country ~40% of irrigated land affected

North of country ~25% of irrigated land affected

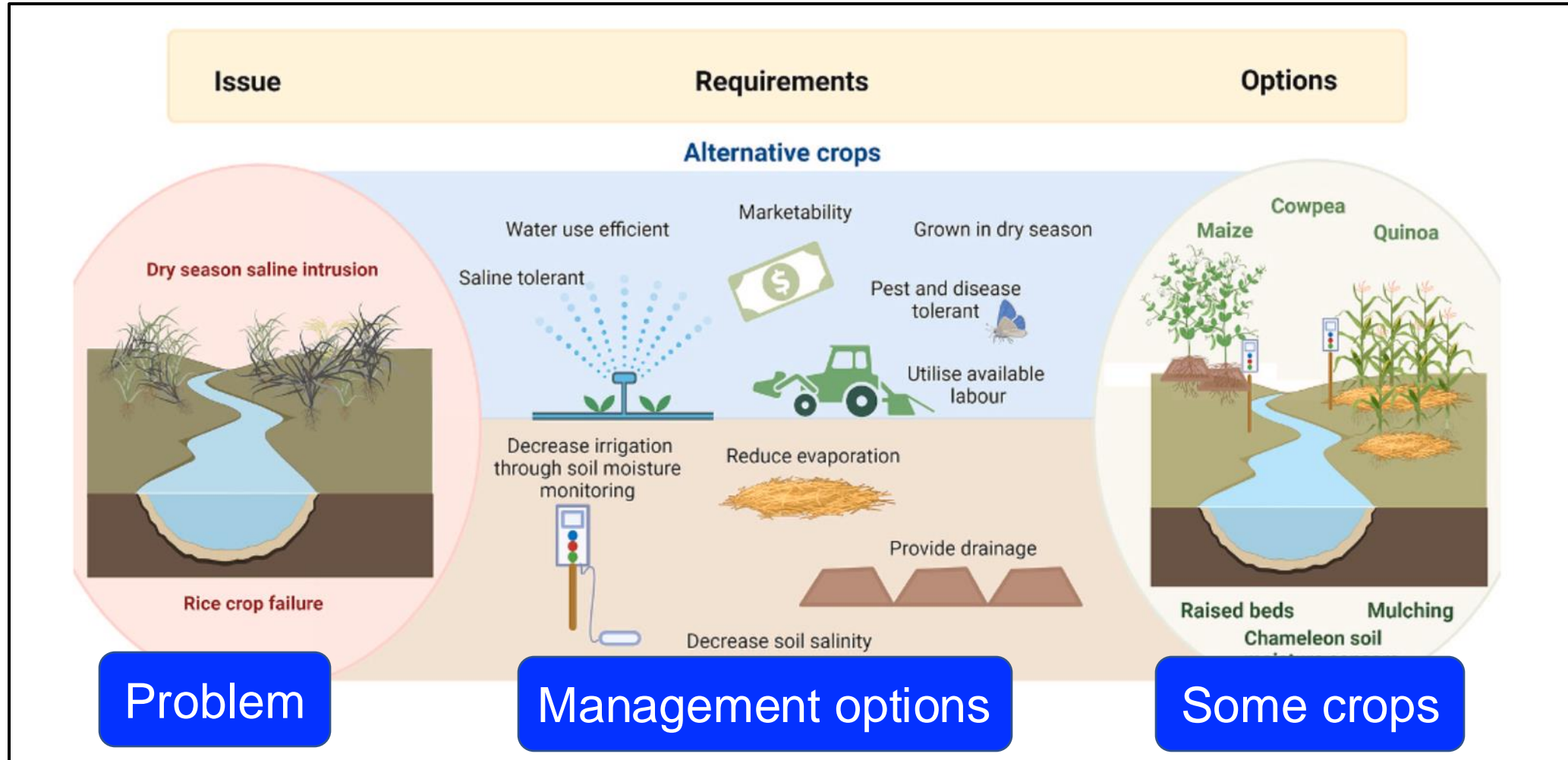
Salt added to land in irrigation water (surface & groundwater)

Associated with sodicity and seepage (= shallow water-tables)

Impoverishes communities



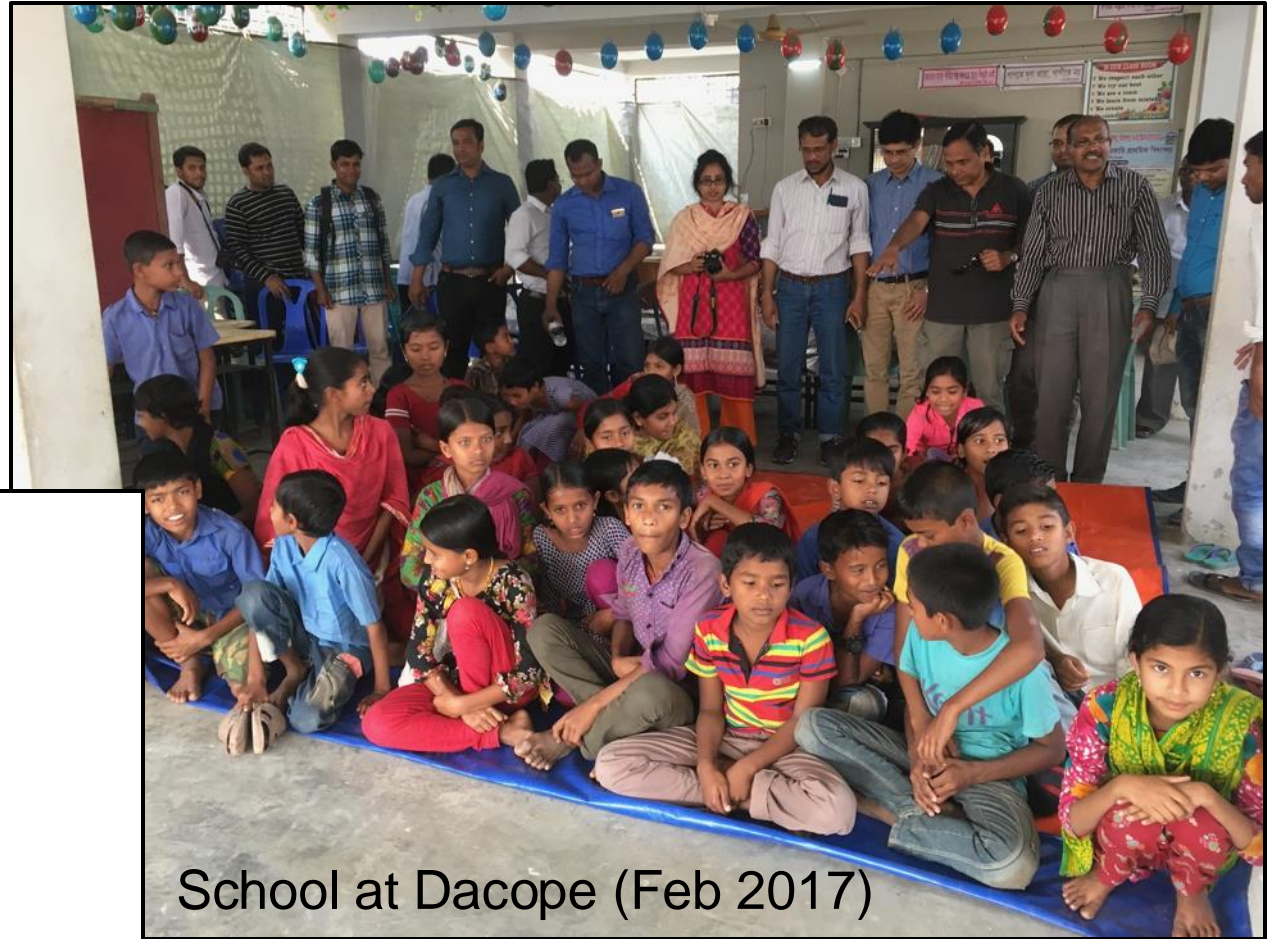
Salinity – Vietnam



Source: Kaveney et al. (2023)

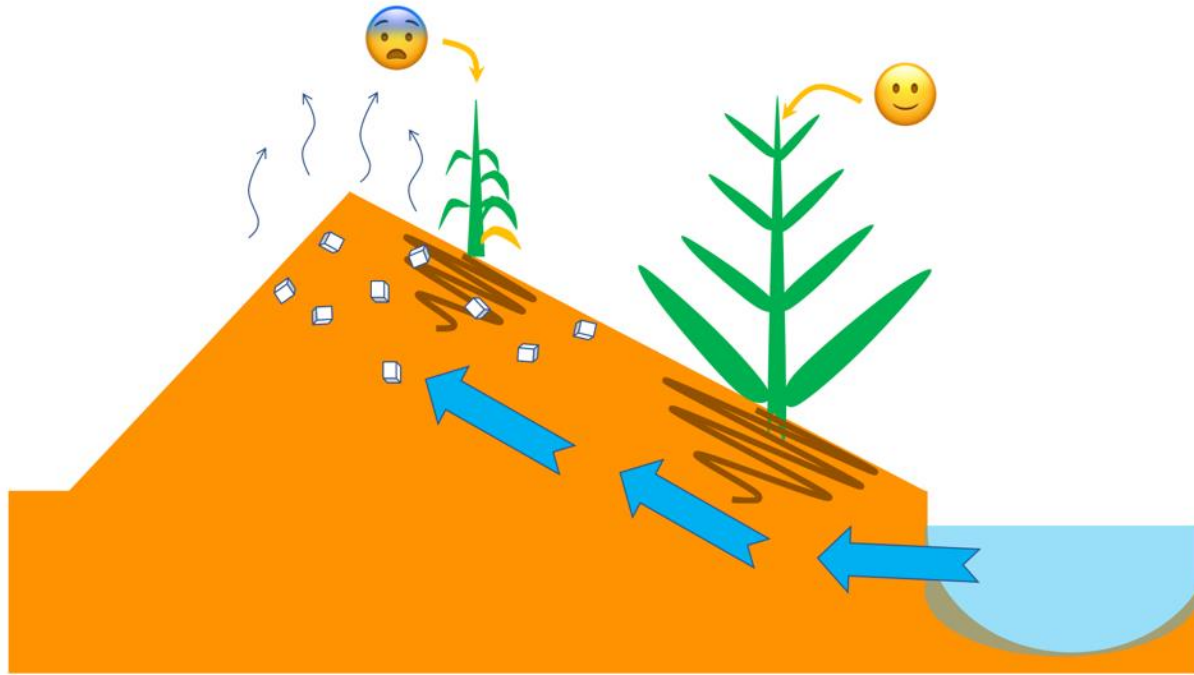
People – literacy

Vietnam > Bangladesh &
West Bengal > Pakistan



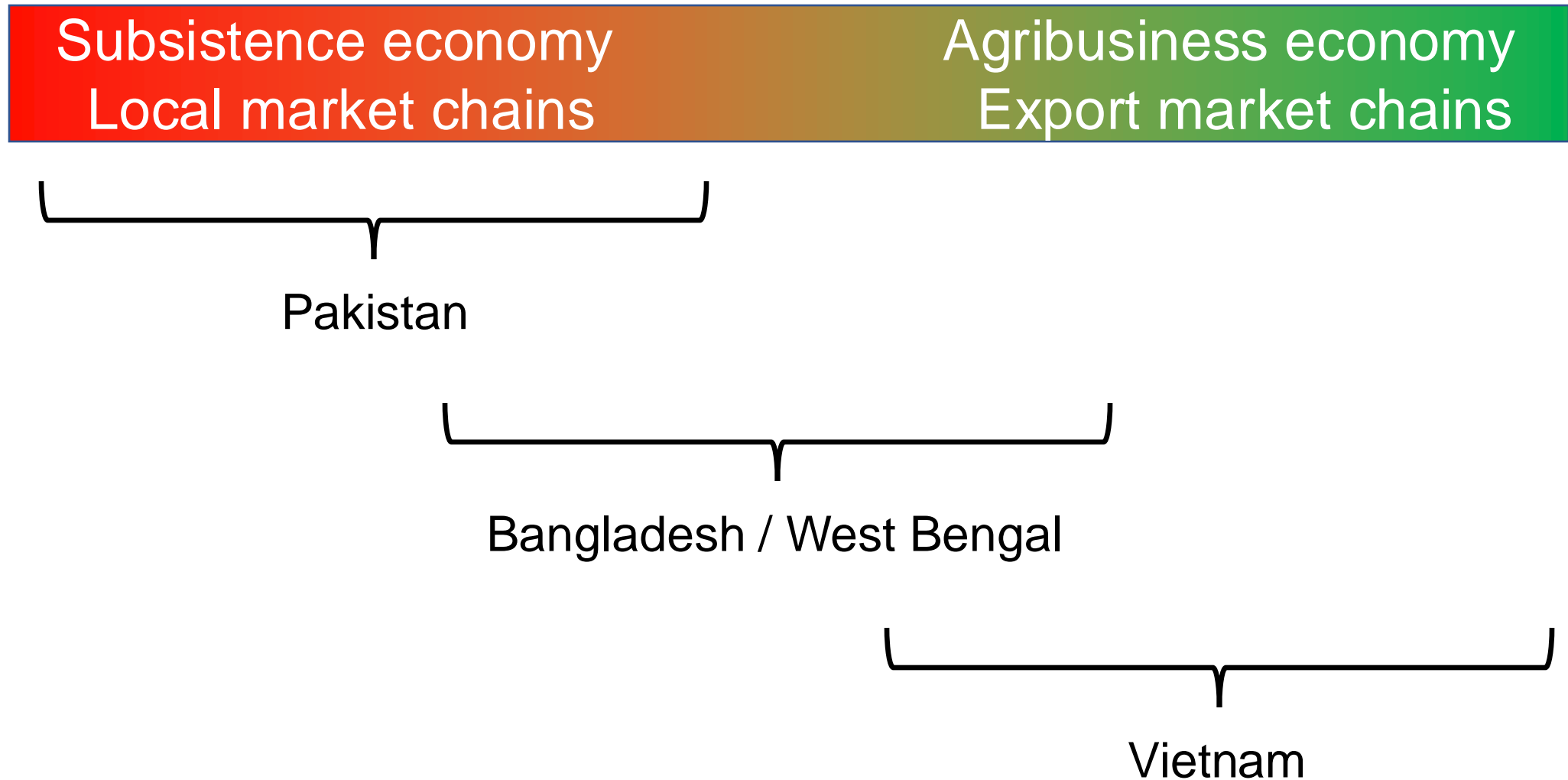
School at Dacope (Feb 2017)

Mound and furrow irrigation



Oral communication in local
languages is key

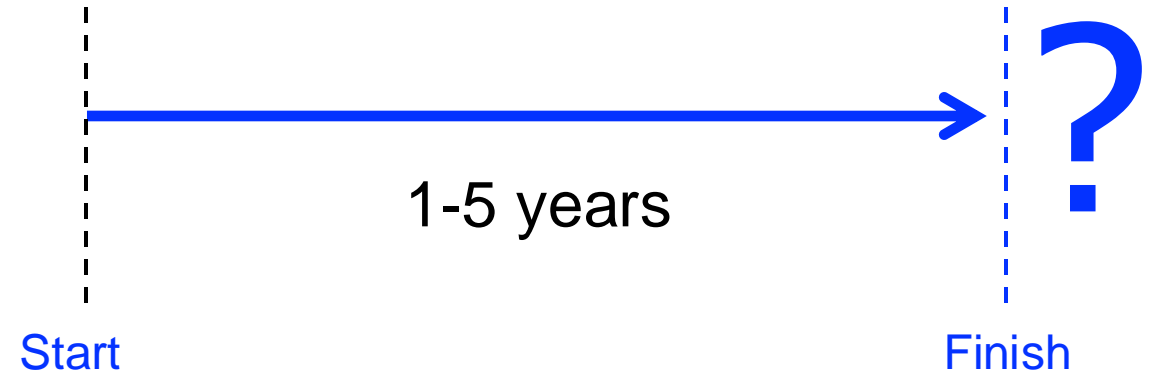
Agricultural development



Extending the message



Every ACIAR Project



Agricultural extension is key

DARDs

Vietnam > Bangladesh / West Bengal >
Southern Pakistan

Location is important

Universities & NGOs

Solutions in common – e.g. straw mulches



Zero till potatoes with rice straw mulch –
Gosaba Island

Other solutions in
common

Shallow drainage
Mound and furrow
irrigation

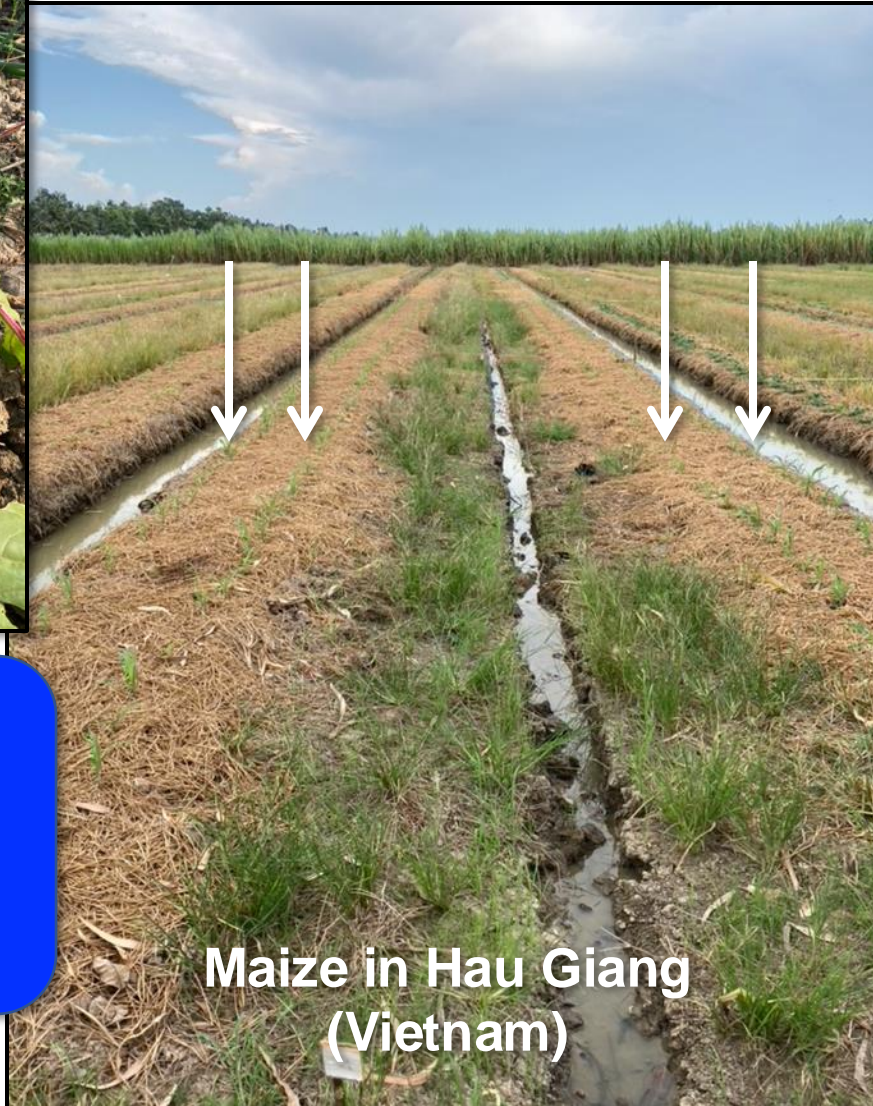
Pakistan
Gypsum

Solutions in common – e.g. crops



Beetroot in West Bengal

Spectacular success in Vietnam



Maize in Hau Giang (Vietnam)



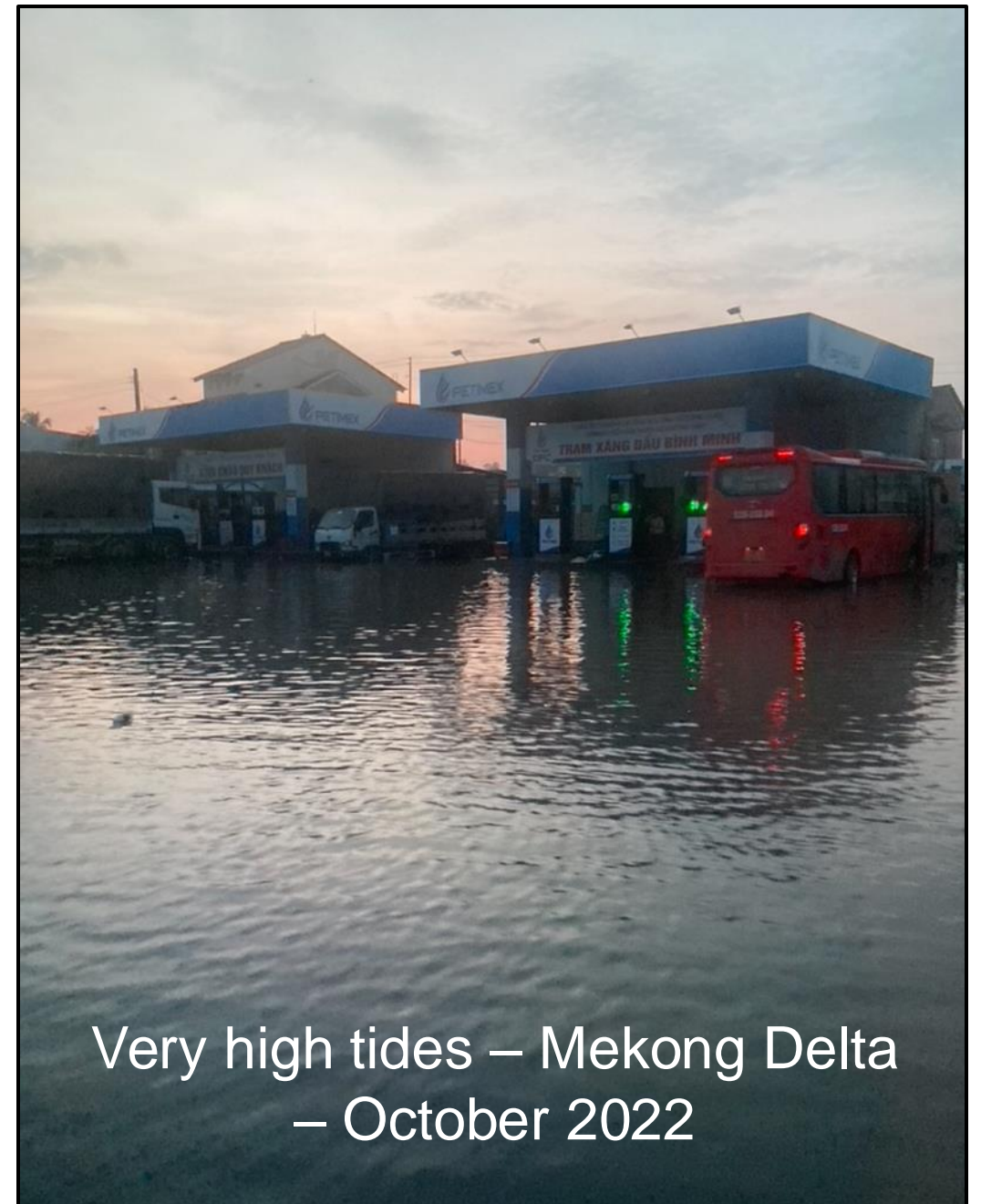
Maize at Amtali (Bangladesh)

Climate change is coming

Sea level rise (~2 m by 2100)

Heat stress

Increasingly severe tropical cyclones



The future

We aspire to change on a massive scale...

To do this will require:

- Training/capacity building of extension staff
- Innovative extension mechanisms
- Focus on 'next things' (pathology, entomology, plant nutrition, etc.)
- Deep export-focused market chains
- New infrastructure



Change occurs with...

...good content (science)

...and good processes (social)

Farmers will not adopt saline agriculture if they don't own it



Charles Sturt University
Gulbali Institute
Agriculture Water Environment

Stakeholder Engagement for Research and Learning (SERL): Theoretical Underpinnings and Guidelines for Facilitators

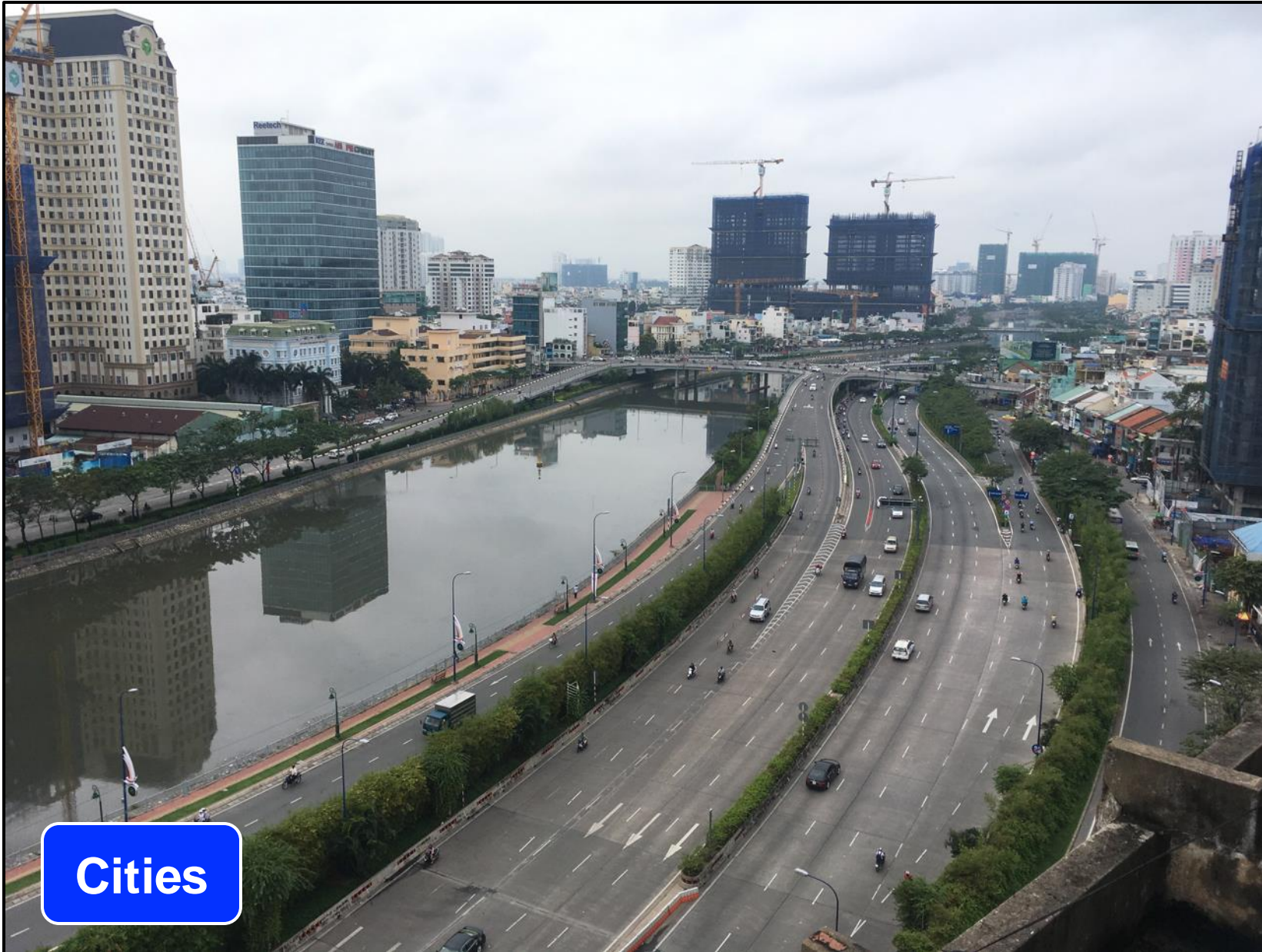
Sandra Heaney-Mustafa, Mohammad Yousif Channa, Tahira Baloch, Mohsin Ali Channa, Benazir Kumbhar, Iqra Mohiuddin, Muhammad Faisal Riaz, Arzoo Rubab, Akhtar Hussain Samoo, Syed Muhammad Ali Zahid, Babar Zaman

Sandra Heaney-Mustafa

Deltas are...



Deltas are...



Cities

Deltas are...



Roads

Deltas are...



Markets

Deltas are...



Wetlands

Deltas are...



Fisheries

Deltas are...



Places of rest...

Deltas are...



...and of beauty

Deltas are...



Farms

Deltas are...



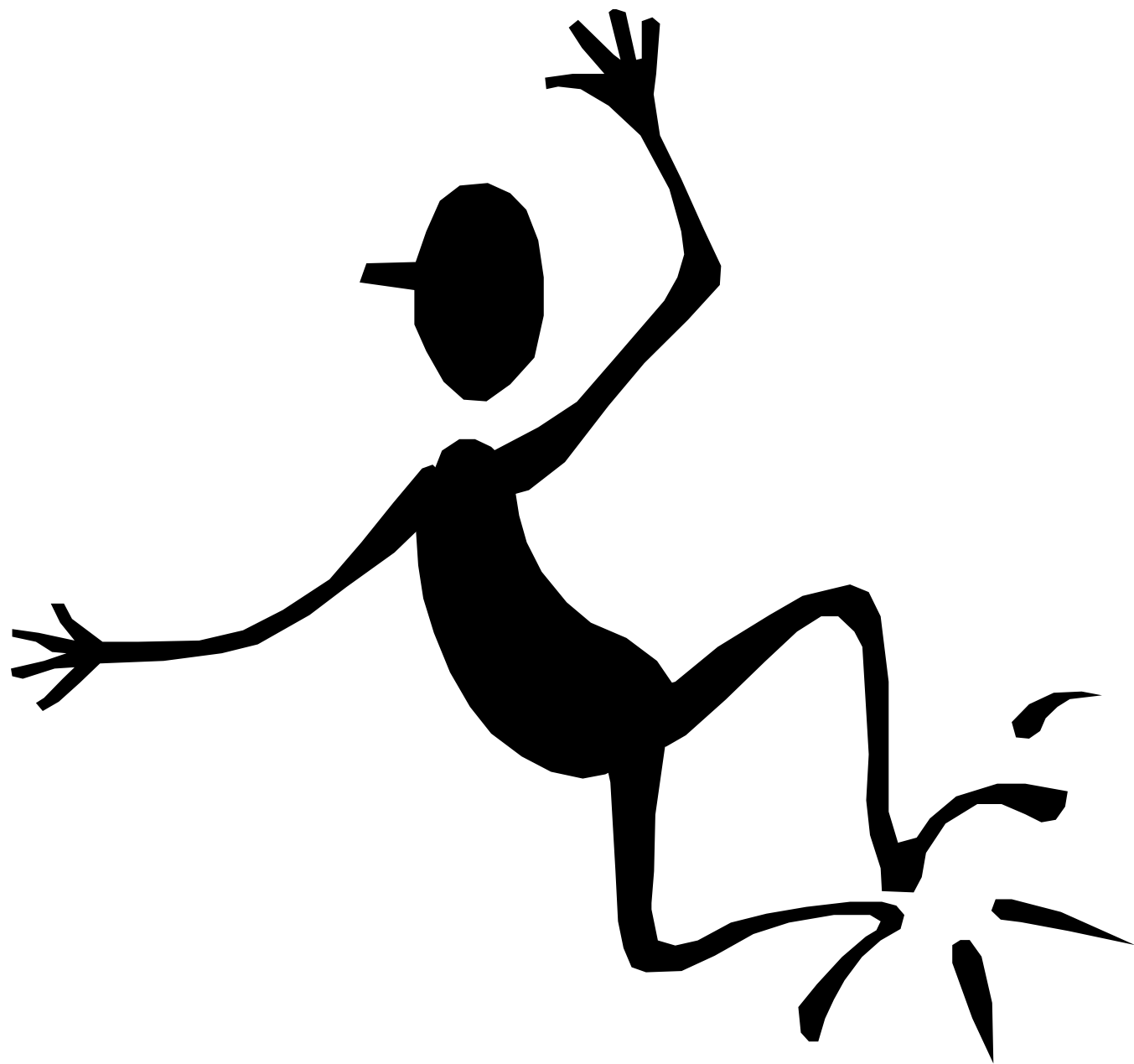
farmers

Deltas are...



Places of wisdom

Photographed on the gate of school at Dacope (Feb. 2017)



ed.barrett-lennard@dpird.wa.gov.au

