Identification of best agricultural practices with better GHG benefits in salinity-affected areas in South Asia

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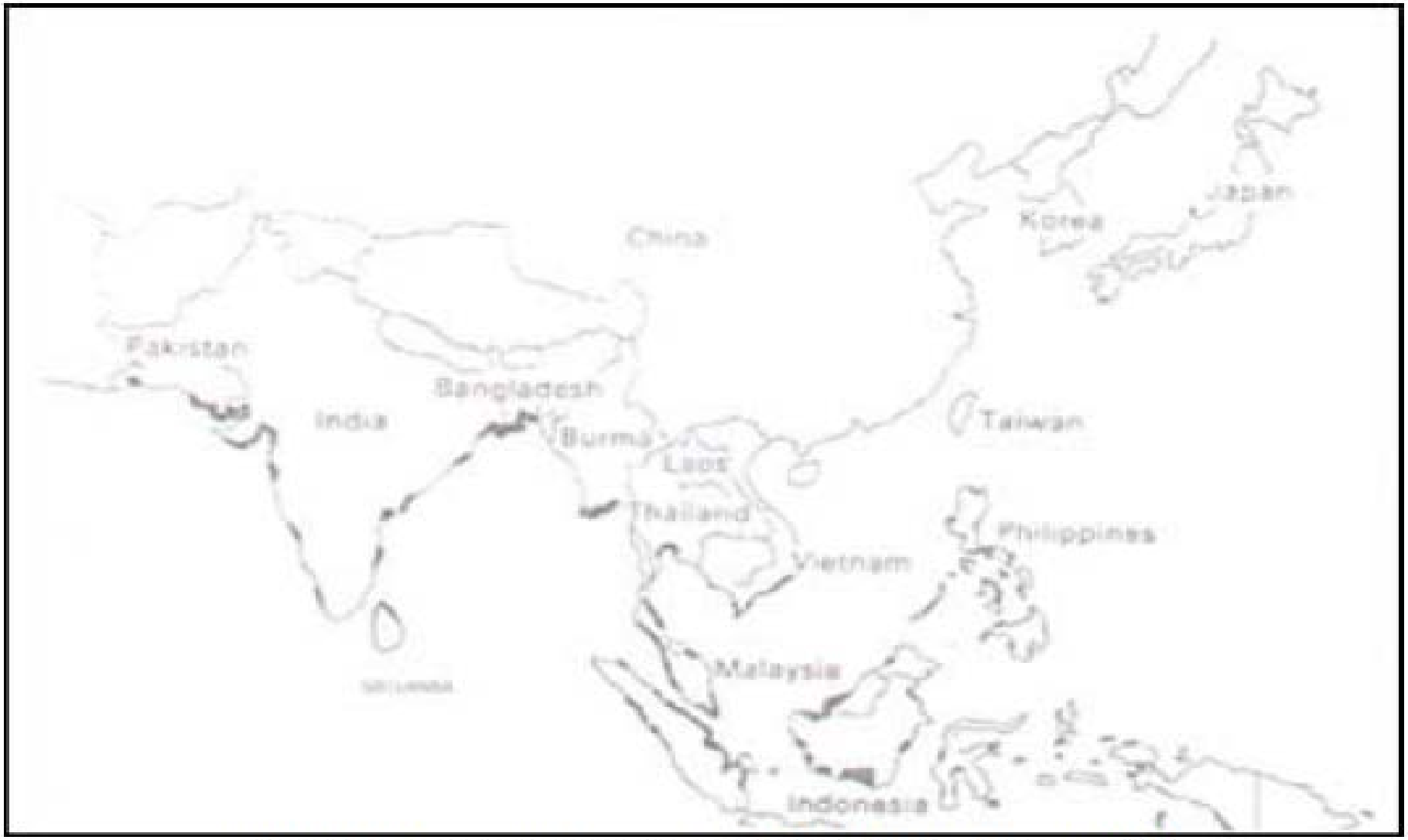
Background

South Asian region

- Agriculture employs ~60 % of the workforce and ~20% of the total GDP
- ~32% global rice production and rice is the staple food
- Salt water intrusion in paddy areas due to Sea level rise and irrigation
- With climate change, the number of people annually affected by coastal flooding will significantly increase, along the coasts from Pakistan through India, Sri Lanka and Bangladesh (Church et al., 2013)
- second lowest in terms of regional level food security and salinity intrusion could significantly affect the food security
- Soil salinity is a major challenge for rice production in all four collaborating countries



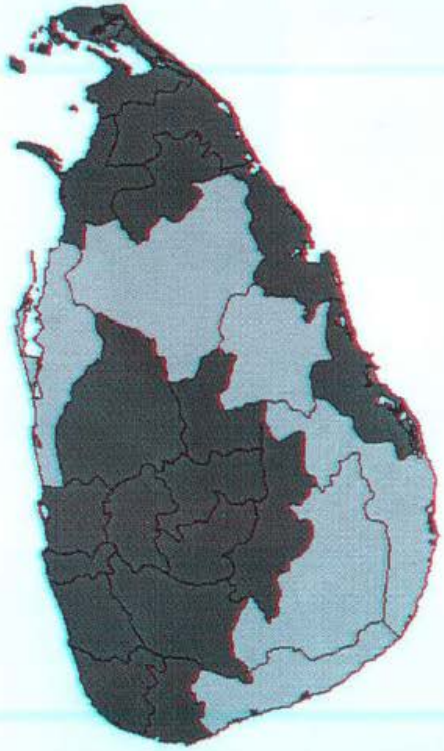
Source: Ponnamperuma and Bandyopadhya, 1980

Coastal saline soils in South and South east Asia
(The extent is far greater now: Bangladesh- 1.2 m ha; India- >2 m ha; Sri Lanka- ~0.1 m ha)

Saline paddy fields in Sri Lanka

in coastal areas

in inland areas



(Sirisena, Unpublished data

Project overview

- Salt water intrusion has affected the low-lying agricultural areas of South Asia (causing cropland abandonment, reduced plant growth and yields)

- Remedial measures adopted on salt-affected soils will enhance future climate change if they cause high levels of net GHG emissions.

- This study will select the best management practices (BMPs) for the salt-affected rice cropping systems of the South Asia considering net GHG emissions and other socioeconomic benefits

- The outcome will be used to
  - raise awareness among farmers and policy makers on climate-friendly BMPs
  - make recommendations for policymakers in developing adaptation policies and strategies

Planned activities in brief..

- Mapping salinity areas

- Site selection, field visits and greenhouse gas measurements and analyses

- Farmer surveys and focus group discussions (and consistent interaction with the Department of Agriculture and agricultural extension services)

- Analyses on the benefits in relation to changed levels of emissions and socioeconomic aspects

- Selection of BMPs

- Recommendations for policy decision making and farmers (through awareness creation)

Remedial measures for salt-affected soils and potential benefits

- Vary depending on the country and the type of soil

- Some remedial measures include
  - Soil reclamation (land leveling and efficient irrigation management (flood water level))
  - Soil amendments (e.g. organic manure)
  - Salt tolerant varieties

- Potential impact on emissions
  - Reduced CH_4
  - Increased N_2O with lower water level
  - Increased soil carbon stocks
- Socioeconomic benefits

Relevance to improved policy decision making

- Long-term Goal of the Paris Agreement: To keep the increase in global average temperature to **well below 2°C** (3.6°F)

  (mostly through reduced emissions)

- Paris Agreement is a legally binding instrument with equal commitment to all member countries

- NDC's have incorporated salt water intrusion impacts on agriculture and reclamation of marginal areas:

  "*Introduce suitable land and water management practices for central highlands and other marginal areas to minimize land degradation and to improve land and water productivity*" (Source: NDC of Sri Lanka)

- Quantified emission reductions and other benefits of BMPs will provide a tangible outcome for improved policy decision making