Salinity constraints and their implications for smallholder farming in North-Aceh, Indonesia

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Background

- At least 70,000 hectares of agricultural fields in Aceh province, Indonesia, were affected by seawater intrusion during the 2004 tsunami.

- The increase in soil salinity has negatively impacted farmers' economy which heavily relies on rice farming (Fig 1).

- We performed a comprehensive survey to gain understanding of the agricultural practices and farmers' perspectives on current challenges in managing salinity in North Aceh, Indonesia.

Figure 1. Salt indicators found in the study area; a. salt-tolerant species *Isolepis cernua* (nodding club-sedge); b. efflorescence; c. salt-affected rice field

Materials & Methods

- 120 farm households in the Village of Blang Nibong, in North Aceh Regency, Indonesia were interviewed using both open and closed questions in 2020 (Fig 2).

- A total of 117 (3 questionnaires were eliminated due to unreliable data) surveyed households were classified into the following categories based on their efforts to overcome the problem of high salinity on their farms.

  ❖ Adaptive (n=86 respondents)
  ❖ Non adaptive (n=31 respondents)

Figure 2. Location of the study area (left panel) and interview of farm households, 2020 (right panel).

Results

- Farmers perceived increased salinity of soil in the farms.

- Salinity causes a reduction in plant growth and increased crop mortality rate throughout the whole growth cycle of rice as the main crop (Fig 3).

Figure 3. Perceived effects of salinity on bio-physical aspects as identified by the farmers (% respondents).

Results cont.

- The highest proportion of the main income in 2019 came from off-farm activities (Fig. 4).

  ❖ The average is about 71% of the adaptive group's and 80% of the non-adaptive group's earnings.

- The highest proportion of farming income in 2019 came from non-rice farming.

  ❖ The average is around 24% of the adaptive group's and 18% of the non-adaptive group's revenue.
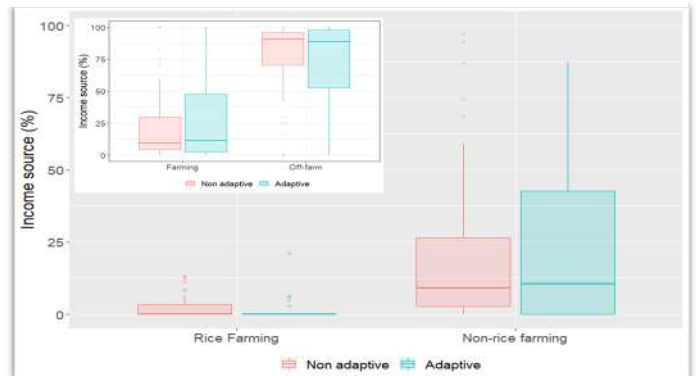

Figure 4. Income share distribution of household farmers of the adaptive and non-adaptive group for the year 2019.

- Adaptive group preferred to have an adequate irrigation system for their land in the future (34%).

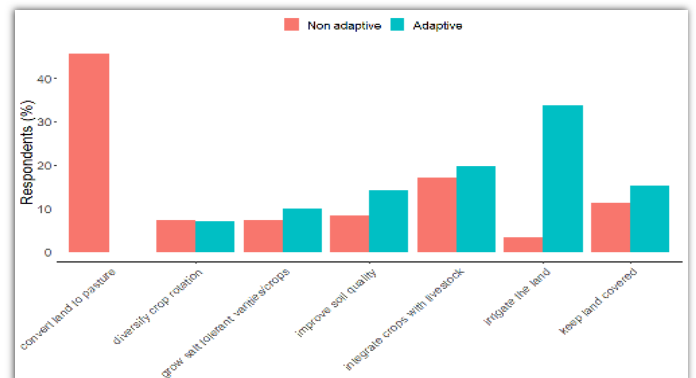- Non-adaptive group mainly chose to convert the land to grazing (46%).

Figure 5. Perceived preferred choice for future adaptation strategy in response to the risks of salinity (% respondents).

Conclusions

- Adaptive and non-adaptive farmers experience an increase in salinity which affects the growth and yield of the major crop (rice).

- The main income share is dominated by off-farm activities, while most of the income from farming is mostly generated from non-rice farming in both adaptive and non-adaptive groups.

- Most adaptive groups favor irrigation as a future salinity management strategy, while most non-adaptive groups prefer land conversion to pasture.

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