

# POLICY BRIEF

Traditional and local knowledge to disaster risk reduction

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## Local practices to mitigate salinity problem in coastal Bangladesh: Lesson from the ground reality

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### SUMMARY

Salinity intrusion is a significant issue in coastal areas of Bangladesh, particularly during the dry season, and it poses various challenges for agriculture, drinking water, and overall livelihoods. The local communities are practising different adaptation strategies based on the learning from the ground context. These local adaptation practices such as long-distance piped irrigation technique, water reservoir development, raised bed farming system and rainwater harvesting technology are very prominent in mitigating the adverse effects of salinity in coastal Bangladesh. Efforts to manage and mitigate soil salinity are crucial for sustaining agricultural productivity in coastal regions of Bangladesh, where millions of people depend on agriculture for their livelihoods and food supply.

### Background

Soil salinity in the coastal areas of Bangladesh is a major problem due to seawater intrusion, inadequate drainage, and over-irrigation. Farmers in the region like Dacope and Khulna often struggle to grow crops that are sensitive to salinity, such as rice and some varieties of vegetables. The local farmers depend on freshwater from limited sources mainly from rainwater, canals, ponds and rivers. It should be noted that groundwater for irrigation using deep tube wells failed because of very high salinity levels and diminishing groundwater levels in the dry season. Because of the high salinity in groundwater and surface water, the people in these areas use rainwater collected during the rainy season for use during the dry season. Soil salinity is a significant issue affecting crop production in Bangladesh, particularly in its coastal regions. Local communities have developed several practices to mitigate the salinity problem in these areas. This policy brief highlights the promising local adaptation practices to mitigate the adverse effects of salinity and sustain the agricultural production system in coastal Bangladesh.

### Long-distance irrigation and water reservoir technique

The local communities use two different techniques for irrigation or use water for agricultural production systems.

Firstly, they use small ponds to store the non-saline rainwater, which is fed to the crop field through a long pipe. Sometimes water source and crop field, requiring to use a very long pipe to fetch irrigation water from the source (~ 1 km) (Figure 1). This technique helps to use irrigation water from a long distance and minimizes the chances of water loss between the crop field and water sources. Secondly, local people store the saline water in a small reservoir for a month to precipitate the soluble salt. Then, it is transferred into a big-sized pot and kept for another 2 weeks. This allows the soluble salt to precipitate for the second time. Then, water from the top of the container is taken out carefully as a source of non-saline irrigation water.

### Raised Bed Farming and rainwater harvesting

Raised bed farming can be an effective technique to mitigate the salinity problem in coastal areas of Bangladesh, where soil salinity is a significant challenge due to its proximity to the Bay of Bengal. Farmers in coastal areas adopt raised bed farming techniques, which involve creating raised beds or mounds of soil for crop cultivation. This minimizes direct contact between plant roots and saline soil, improving crop yields. Rainwater harvesting systems are installed in households and communities to provide freshwater during the dry season. This reduces reliance on



Figure 1. The long distance piped irrigation system and small water reservoir implemented at Dacope, Khulna

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Figure 2. Raised bed farming and rainwater harvesting in the coastal Bangladesh

saline groundwater. It can indeed be a valuable strategy to mitigate salinity problems, where the intrusion of saltwater into freshwater sources is a significant issue. Rainwater harvesting, when integrated into a broader water resource management strategy, can play a vital role in mitigating salinity problems and improving the resilience of coastal communities in Bangladesh and similar regions. The annual average rainfall in the coastal area of Bangladesh is more than 2,400mm and rainwater harvesting has been practised by the local community very frequently (Ghosh et al., 2015).

### Challenges to mitigate salinity problem in coastal Bangladesh

Mitigating the salinity problem in coastal Bangladesh is a complex and multifaceted challenge. Salinity intrusion in this region is primarily caused by factors such as rising sea levels, climate change, and over-extraction of groundwater. Here are some challenges:

- Over-extraction of groundwater for irrigation and drinking water contributes to saltwater intrusion into aquifers. Salinity affects agricultural productivity, which is a primary source of livelihood for many coastal communities.
- Ensuring access to safe drinking water is a challenge due to salinity intrusion.
- Developing and maintaining infrastructure in saline-prone areas is costly and challenging.
- Many people in coastal Bangladesh may not fully understand the causes and consequences of salinity intrusion.
- Ensuring coordinated efforts among government agencies and stakeholders can be challenging.

Addressing the salinity problem in coastal Bangladesh requires a holistic approach that combines engineering, agriculture, policy, education, and community engagement.

Long-term sustainability and resilience against salinity intrusion will depend on integrated efforts at various levels of governance and society. The three major identified policy gaps are:

- Limited efforts from the community people to adopt the new adaptation practices proposed by the local government and extension workers.
- The financial support from the government organizations is very limited for the sustainable production system in the coastal belt of Bangladesh.
- The local community representative should be included in the national policy board for policy development.

### Policy Recommendations

It is important to note that the above-mentioned adaptation practices alone may not eliminate salinity issues, especially in highly saline areas. A holistic approach that combines raised bed farming with other salinity mitigation strategies, such as reclamation of saline soils, use of salt-tolerant crops, and improved water management, is often necessary for long-term sustainable agriculture in coastal regions with salinity challenges. Collaboration between government agencies, NGOs, and farmers is also crucial to implement and promote these strategies effectively. However, we recommend adopting the following programs to mitigate the salinity problem in the coastal belt of Bangladesh.

1. The government should facilitate the extension of the proposed adaptation practices in collaboration with the Department of Agricultural Extension (DAE) and other relevant stakeholders.
2. The local government and NGOs should provide financial support to the community for the initial establishment of the system to implement these technologies.
3. The community people should be trained by the experts to implement these technologies.

## References

Ghosh, G.C., Jahan, S., Chakraborty, B. and Akter, A., 2015. Potential of household rainwater harvesting for drinking water supply in hazard-prone coastal area of Bangladesh. *Nature Environment and Pollution Technology*, 14(4), p.937.

## About Us

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