



Coastal Irrigation Management in Groundwater and Soil Salinization

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DESCRIPTION

In many regions of coastal areas, water and soil salinity are common risks, affecting a variety of water uses such as irrigation, drinking, household, fisheries, and ecosystem function. Soil salinization is one of the most common forms of soil degradation on the planet, affecting one billion hectares worldwide. Because of irrigation and other intensive water usage, salinization, and lengthy periods of drought, freshwater supplies are becoming increasingly scarce.

Through soil salinization and reduced freshwater availability for irrigation, groundwater salinization has an influence on both natural vegetation biodiversity and agricultural production in coastal locations. Because salinity can reduce the ability of plant roots to absorb water, salinization is strongly linked to the process of desertification. The characteristics of irrigation water that characterise its quality differ depending on where it comes from. The quality of water is also affected by whether it comes from surface water bodies (rivers and ponds) or from geologically diverse groundwater aquifers, as well as if it has been chemically treated. If there is a detrimental chemical component, it can impair plant growth directly through toxicity or inadequacy, or indirectly by changing the plant's nutrient availability.

The quality of irrigation water is determined by its impact on soils and farmed crops, as well as its management. To keep other inputs at their best, high-quality crops require high-quality irrigation water. The coastal area's salinity impairs soil quality, reducing rice output. Many rice fields are transformed into shrimp ponds as a result of the coastal saline problem, and total rice output suffers as a result. With the desiccation of the soil, the severity of the salt problem in the coastal area grows. It affects crops depending on the degree of salinity at critical growth phases, reducing production and, in severe situations, resulting in total yield loss. Salinity affects around 53% of the coastal areas.

Due to the lack of fresh water and soil deterioration caused by salinity intrusion as a result of sea-level rise, agricultural production would suffer. According to a World Bank research,

increasing salinity from a 0.3 m rise in sea level will diminish net rice production by 0.5 million metric tonnes in Bangladesh's coastal area. The salty front begins to infiltrate inland throughout the winter, and the afflicted areas increase dramatically from 10% during the monsoon to over 40% during the dry season. Sea flow (saline water) has been detected travelling far within the country, contaminating both surface and ground waterways. It has been determined that saline water incursion has risen, and that this trend will continue as sea levels rise.

When good quality water supplies are numerous and readily available, water quality concerns are typically overlooked. This is changing in many places, particularly in coastal and metropolitan areas. Water quality is deteriorating on a daily basis as a result of a variety of biological, physical, and chemical factors. As a result, research has been conducted to identify several critical water quality factors that can be used to reduce water quality with a low-cost solution. It poses a hazard to agricultural activity and has a significant negative impact on the environment as a whole. In Bangladesh, surface water was emphasized over other water sources. After utilizing water for home purposes, it is also prioritized to utilize water for agriculture in order to extract water from any water-stressed areas. Because surface water was favored over ground water in the coastal area, it should be used for agriculture.

Chemical compounds are present in irrigation fluids, whether they are collected from rivers or pumped from wells. It has the potential to impair agricultural productivity and degrade soil fertility. Irrigation water usually contains chemicals that come from the natural environment or waste products from human operations. Irrigation requires water of sufficient quality and quantity to achieve adequate crop yields. In Bangladesh's coastal waterways, salinity is a regular problem. The severity of salinity in the coastal zone should be monitored, and an integrated strategy should be developed to boost the coastal area's water holding capacity in order to harvest water during the rainy season.

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