

Integrated soil salinity management in rice-based systems of the Senegal River Valley (ISSM4RICE)

The challenge

Soil salinization, the most prevalent form of soil degradation in the Senegal River Valley, severely limits rice yields. Salinity affects 1.7 out of the 3.8 million hectares of cultivable land of Senegal, leading to rice yield losses of 40 to 90% depending on cultivar, water management, and other issues including poor irrigation management and high evapotranspiration. Soil salinity undermines agricultural productivity, devalues land, and threatens Senegal's food sovereignty, yet mitigative measures to counter salinity in irrigated rice systems are so far not widespread and are not perceived as cost-effective.



Salt-affected soil; white crystals are visible at the surface

Our approach

Building on the Africa Rice Center's (AfricaRice) extensive expertise in adaptive trials, this initiative focused on joint learning to raise awareness and strengthen capacity on cost-effective farm solutions for salinity. AfricaRice, a pan-African Center of Excellence headquartered in Senegal, is dedicated to rice research, development, and capacity building.

Since the 1990s, AfricaRice has advanced research in the Sahel region on salinity tolerance, water management, and soil fertility. This has led to the development of salinity-tolerant rice varieties and salinity management technologies, which have benefitted rural households through improved seeds, farming practices, policy recommendations, and capacity development. Complementing these efforts, GOPA MetaMeta brings an engagement in water and land management on a global scale.

Project name	Integrated soil salinity management in rice-based systems of the Senegal River Valley (ISSMRICE)
Project region	Senegal
Financed by	The Netherlands Food Partnership (NFP)
Implemented by	GOPA MetaMeta
Duration	07/2024 – 12/2024
Partners	Africa Rice (lead)

As part of ISSM4RICE, pilot tests and demonstration plots were established using salt-tolerant varieties coupled with nutrient inputs supporting the mitigation soils affected by salinity. Those pilots tests were further complemented by a theoretical training exploring the range of existing options to mitigate soil salinity through the adequate management of local resources of the farms systems. Those insights were confronted to local realities, with the identification of barriers and leverage points for a comprehensive and integrative approach.



Training session on the use of Gypsum and Zinc in reclaiming salt-affected soils

The goal

Initial results showed that agronomic options, such as nutrient management (introducing potassium, gypsum, and/or zinc) and using different varieties, both increase yield up to 2.0 t/ha and 0.6 t/ha respectively and are profitable for farmers. This was documented with ongoing co-creative research on other options. ISSM4RICE formulated its expected outcomes through three work packages:

1. Strengthened capacity of farmers and extension staff, leading to reduced burden of salinity and increased value of land
2. Co-created knowledge product on preventive, mitigative, and adaptive measures, and wide-spread dissemination during and after project
3. Strengthened cooperation between Dutch and Senegalese water and agrifood sectors and fertile ground for follow-up.

Key highlights

- ✓ Pilot tests of salt-tolerant rice varieties
- ✓ Demonstration at Farmer Field Schools and field excursions
- ✓ Knowledge co-creation and dissemination
- ✓ Capacity strengthening
- ✓ Theoretical training covering six modules:
 - Salinity – definition and causes
 - Effect of salinity – impact on agriculture & soil health
 - Assessment methods – soil testing & water monitoring
 - Management strategies – irrigation practices, soil amendments, drainage
 - Salt-tolerant varieties – the choice for crops adapted to saline conditions
 - Agricultural diagnosis – identification of local farms conditions & formulation of salinity mitigation practices

Key outcomes of the project:

- ✓ Demonstration of salt-tolerant rice varieties & nutrient management strategies in Farmer Field Schools over four villages (Ndiaye, Thilène, Ngao and Mboundoum)
- ✓ Engagement of 261 farmers and 90 extension agents across nine field visits to Farmers Field Schools
- ✓ Development of comprehensive knowledge product, consisting of eight manuals covering salinity evaluation, prevention, mitigation and adaptation strategies (available in both French and English).
- ✓ Capacity strengthening of farmers and extension agents with tools to diagnose, manage and adapt to soil salinization



Field visit at booting stage