SPEAKER

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Farmers Coping Strategies to Manage Salt Affected Soils for Sustainable Rice Farming in the face of Climate Change in Tanzania

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Introduction

Salt-affected soils is a global challenge, affecting 1 billion ha of land, with 200 million ha found in Africa (Mmanga et al., 2023).

Tanzania has been reported to have total of 3.64 Mha of salt affected soils (FAO, 2000) where 83% were saline and 16% were sodic (Mnkeni 1996).

Kashenge et al., 2016, reported 7–15 percent of the rice schemes had salt-affected soils and about 2–10 percent of rice fields were abandoned.

Increased soil salinity has led to significant problems such as reduced plant growth, plant water stress and nutrient imbalance, and soil degradation.

The average yield losses reported in Tanzania ranged from 5 to 70 percent while in extreme cases the yield losses were up to 100 percent (Kashenge et al., 2016)

At the same time climate change is posing challenges in farmers' livelihood and agricultural farming.

Figure 1: Salt affected rice farms in Tanzania

Methodology

The study employed the PRISMA (Preferred Reporting Items for Systematic Reviews and meta-Analyses) guidelines to systematically review peer-reviewed literature.

The PRISMA method is often used in the environmental field. We opted for this approach because it (i) identifies inclusion and exclusion criteria and (ii) defines research questions that permit systematic research (Shaffril et al., 2018;Magesa et al: 2023).

A peer review articles on farmers coping strategies to manage the salt affected soils in Tanzania were collected from the two worlds leading citation journal database, scopus and web of science(WoS) for thirty four years from 1990 -2024.

We used different search keywords to test which could provide a significant number of articles to include our literature search

Overall objective: This study reviewed the farmers coping strategies in managing salt affected soils for sustainable rice farming in the face of climate Tanzania

Three types of salt-affected soils recorded in Tanzania are (saline, sodic, and saline–sodic) with extreme salinity (4–15 dSm^{-1}), sodicity (10–34 Sodium adsorption ratio—SAR), and high soil pH (up to 10). Saline–sodic soil was the most common problem, followed by sodic soils(Kashenge et al ., 2016)

Figure 2: Salt affected rice farm in Tanzania

Results and Discussion

The findings revealed that farmers in Tanzania have been using the following coping strategies; irrigation/flushing the soil, planting drought-tolerant varieties, planting early maturing rice varieties, farm yard manure, cowdung manure, gypsum, rice husk, biochar and their intergration.

A study by Makoi and Ndakidemi, 2007 found application of intergrated FYM: 25 t ha^{-1} Gypsum and 12.5 t ha^{-1} improve sodic soils.

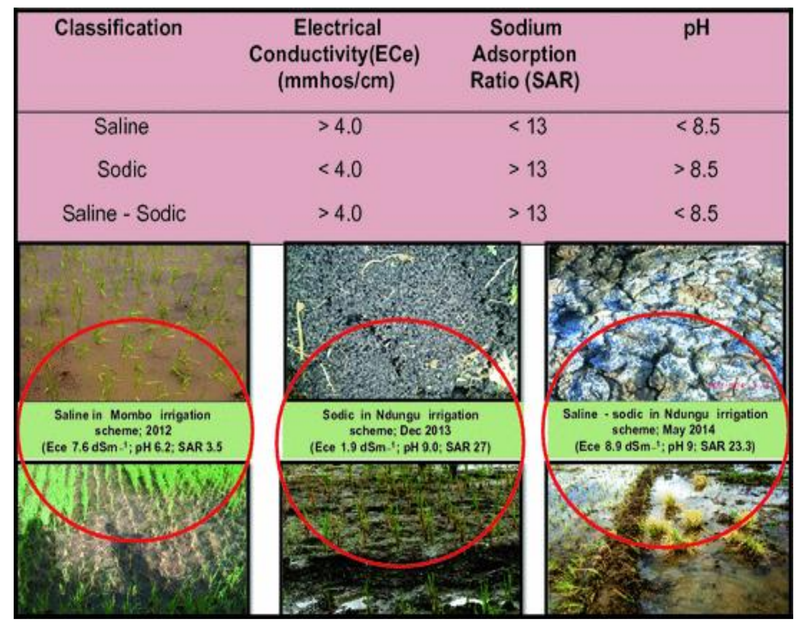

Figure 3: Types of salt affected soils in Tanzania

Conclusions

Some of coping strategies might not be effective during times of more extreme climate changes in the coming decades.

Hence, more transformative changes, such as building more improved/rehabilitating infrastructures for irrigation, promoting crop insurance, using salt tolerant varieties, and increasing opportunities for livelihood diversification, implementation of salt soil management options, should be considered in addition to the existing adaptation strategies and potentially contributes towards SDG 1 (No Poverty) and 2 (Zero Hunger).

References

[1] Omar, M. M., Shitindi, M. J., Massawe, B. H. J., Fue, K. G., Meliyo, J. L., & Pedersen, O. (2023). Salt-affected soils in Tanzanian agricultural lands: Type of soils and extent of the problem. *Sustainable Environment*, *9*(1). https://doi.org/10.1080/27658511.2023.2205731

[2]. Meliyo, Joel L., Sophia Kashenge-Killenga, Kongo M. Victor, Benjamin Mfupe, Samwel Hiza, Ashura L. Kihupi, Brian J. Boman, and Warren Dick. "Evaluation of salt affected soils for rice (oryza sativa) production in ndungu irrigation scheme same district, Tanzania." *Sustainable Agriculture Research* 6, no. 1 (2016): 24-38.

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International Network of Salt-Affected Soils

Salt-affected soils: threats and potenti