



# ADAPTING RICE TO SALTIER CONDITIONS

This brief outlines the approach of using indigenous varieties of rice to develop salt tolerant crops for areas where soil salinity is an increasing problem.

## Introduction

Rice is the principle cereal crop and forms a part of staple diet in many developing countries. Several rice growing countries face a major problem of high soil salinity. There is a growing interest in using indigenous rice varieties and adopting organic farming practices to improve the land conditions and cope with high soil salinity. This brief focuses on this practice in Asia.



Figure 1: Traditional rice variety in Sri Lanka. Photo credit: Practical Action.

## Why use indigenous crops and adopt organic farming?

Saline stress is one of the major factors limiting crop production in the world, especially in the developing countries. Although salinity is widespread in coastal areas, it occurs in rain-fed and irrigated environments as well. Long term use of inorganic fertilisers and pesticides could severely affect the soil properties, exacerbating the existing problem of salinity stress. Organic farming, in the long-term, is a promising option for rural communities. This approach is less resource consuming, productive, economically viable, and environment friendly.

Traditional rice varieties can offer a home grown solution to the increasing soil salinity and farmers can benefit by increasing their harvest in salt affected lands. Increased food production in the fields with zero or low productivity will not only improve the economy and well-being of the farmers, but will also create the employment opportunities for the local people. The improved varieties are not always suitable in the long run as the environment is also subject to change. Few case studies point out that certain traditional rice varieties have greater tolerance level for salinity stress and if incorporated with organic farming, have great relevance in land improvement.

The study carried out in India (Bhonsle and Krishnan, 2010) observed that the traditionally cultivated salt tolerant varieties showed good grain quality characteristics, sold for a higher price and had the potential for consumer's preferences.

## Land preparation process

Saline paddy lands can be rehabilitated by using short term, medium term and long term strategies proposed by the [Soil Science Society](#) of Sri Lanka.

## Short term strategies

The reclamation of saline soil is a key step and involves soluble salt content to a level at which the salts will not seriously interfere with the plant growth. The only practical way of removing salt from soil is by leaching, a process that involves washing out the salt with water.

The concentration of salt is increased due to evaporation and therefore draining the paddy lands immediately could prove significant. This can be done by following practices such as cleaning the drainage channels and removing the sand and other debris from the paddy fields. This is followed by removing excess salts through flushing, leaching or through subsurface drainage. Clean water to leach the salts and soil amendments such as Gypsum could be used to make the reclamation faster. Assistance from the soil scientists could help at this stage.

### **Medium term strategies**

Farmers need to be trained to monitor the field salinity levels and the methods used to reduce salinity levels. Involve farmers in the variety selection process (Participatory Variety Selection) to determine the acceptability of and the preferences for the traditional varieties. This will help develop the capacity of farmers in variety selection according to the local conditions and helps them in future decision making on their farming. Choose the most hardy, saline tolerant, productive varieties and promote them through farmer organisations, e.g. Hambantota District case study.

### **Long term strategies**

Farmers must be advised and trained to maintain and clean drainage channels. Practices (under proper supervision) such as flooding the fields, ploughing and draining can be used to displace the sodium ions.

## **Practical Action case study: Saline tolerant traditional rice variety selection at Hambantota District, Sri Lanka**

The improved varieties which are frequently introduced by the research stations are not always suitable in the long run and have their own limitations in certain levels of salinity. To overcome the problems associated with the improved varieties, organic farming practices were adopted and Participatory Variety Selection (PVS) was conducted to determine the acceptability of and the preferences for the traditional varieties under saline conditions in Hambantota District in Sri Lanka. The local knowledge was used and farmers were involved in the process during the study. The approach helped develop farmer's capacities in variety selection according to the local condition.

### **Methodology**

The variety selection was conducted by local farmers in their fields during 2005 *Yala* (dry) season at Manajjawa of Ambalantota Divisional secretariat of Hambantota District. Initially, sixteen progressive farmers were involved in the variety selection. Based on farmer's preferences, the varieties were selected from ten traditional varieties by scoring from 1 to 10.

Highly preferred variety was scored '1' while the very low preference was scored '10'. The criteria of selection were the plant height, duration, grain quality, grain colour, saline tolerance, and the grain yield. Farmers were allowed to select the varieties on their own. They selected varieties based on the field, their perception of the variety, the characters and the historical performance of those varieties.

Farmers continuously observed the growth and the changes of the plants up to harvesting. They planted the seed paddy up to 3- 5 kg per variety in the saline affected areas of their paddy fields. Two farmers out of sixteen cultivated all 10 varieties while the rest cultivated 3-4 variety based on their preferences.

During the crop growth, other farmers in the surrounding area who cultivated lands affected by the salinity were invited to the field to observe and discuss with the farmers involved in the trial. The process helped in sharing the knowledge gained during field trial with the farmers in the other saline affected areas of Hambantota District.

### **Results**

Participatory Variety Selection covered the way for need based selection of paddy varieties by the farmers and thereby helps promote quicker adaptation of useful varieties in the farming

community. As the variety selection was done to find out the best performing variety in the saline affected areas of the paddy lands, qualitative characters given the priority. Farmers in other areas affected by the salinity gained knowledge from the trial and started cultivating best performing varieties in their fields.

## Conclusion

Organic farming practices together with the use of traditional rice varieties could bring a new lease of life to the barren fields and economic benefits to the farmers.

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