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A PACKAGE OF PRACTICES FOR THE CULTIVATION OF SALT-TOLERANT RICE VARIETIES UNDER SALT-AFFECTED SOILS OF THE WEST COAST REGION FOR IMPROVED PRODUCTIVITY AND INCOME

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PROBLEM AND RESEARCH GAP

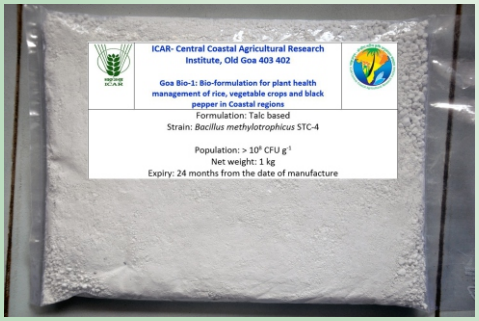
The salt-water intrusion and flooding due to climate change-induced mean sea level rise fuel the soil salinization and cause the loss of good agricultural lands. It is estimated that the surface temperature to increase gradually with an average temperature of 4.8 °C by the end of the century due to climate change as greenhouse gas emissions by anthropogenic activities (IPCC, 2013). It will further aggravate the problem of soil salinization in coastal regions. Under salt-affected soils of the coastal region, monocropping of rice is prevalent and productivity levels are very low. Fallowing and abandonment of agriculture by growers have been observed recent past. Besides soil salinity, poor soil biological activity, imbalanced use of fertilizers and poor crop establishment also reduce productivity and farmers' income. Thus, suitable practices for improving the productivity and income of farmers under salt-affected coastal soils are required to utilize it for sustainable agricultural production.

PARTICULARS AND SALIENT FINDINGS

A package of practices on the crop establishment methods (broadcasting and transplanting) and integrated nutrient management for improving productivity and income through the cultivation of the salt-tolerant rice varieties (Goa Dhan 1, Goa Dhan 2 and Goa Dhan 3) on salt-affected soils of the west coast region was standardized and developed. The package of practice comprised of a method of seed treatment of the seeds of salt-tolerant rice varieties with Goa Bio - 1 (a talc-based & salt-tolerant bioformulation of *Bacillus methylotrophicus* STC-4) at 40 g/kg seed, nursery treatment of the seedling at 50 g/m² and transplanting of 35-days old seedlings, application of revised and modified fertilizer recommendations of 120:30:0:4:2 N:P_2O_5:K_2O:Zn:B kg ha^{-1} (omission of K to reduce the cost of fertilizer) and its split application and other plant production practices. The package improved the grain yield, straw yield, net income and benefit-to-cost ratio over the farmer's practice of cultivation. Significantly higher grain (2.87 t ha^{-1}), straw yield (4.52 t ha^{-1}), net income (Rs. 33427 ha^{-1}) and benefit-to-cost ratio (2.04) were achieved with the transplanting 35-days old Goa Bio-1 nursery treated seedling than the broadcasting (2.44 t ha^{-1}, 3.11 t ha^{-1}, Rs. 27679 ha^{-1} and 1.98). The variety, Goa Dhan 3, outperformed Goa Dhan 1 and Goa Dhan 2 with the highest grain yield (3.51 t ha^{-1}), net income (Rs. 48727 ha^{-1}) and benefit-to-cost ratio (2.56). The performance with respect to the net income and benefit-to-cost ratio of the order was observed as Goa Dhan 3 > Goa Dhan 2 > Goa Dhan 1. A package of the practice of transplanting of 35-day-old Goa Bio 1 nursery-treated seedling of an improved salt-tolerant rice variety with with integrated nutrient management has been identified to improve the productivity and income for paddy cultivation under salt-affected soils of the coastal region.

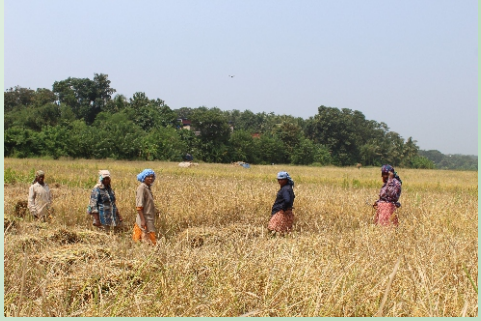
IMPACT

These improved practices for crop establishment and nutrient management were validated and demonstrated under coastal saline soils as well as under normal soil conditions in an area of 29 hectares covering 35 farm families of Dulape village, Tiswadi, North Goa, for two consecutive years. The annual net income from the farmers' practice was Rs. 32,862/ha, whereas the improved practices yielded a net income of Rs. 45,275/ha, which amounted to an additional income Rs. 12,413/ha, 38% higher than the farmers' practice. Improved crop establishment using Goa Bio-1 is an eco-friendly, economically viable technology that is sustainable in the long term. The technology has the potential to generate an additional net income of about Rs. 22 crores annually by covering 18,000 hectares of coastal saline soils in the state of Goa alone. These successful demonstrations would encourage farmers in coastal regions to adopt these improved practices to boost productivity, enhance income levels, and improve their livelihood security.



Goa Bio 1


Nursery application of Goa Bio 1


Field validation of the package of practise

REFERENCES

- Mahajan GR, Ramesh R (2022). ICAR-CCARI/Success story 2022-1
- Annual Report 2019, ICAR CCARI Goa, pp-15.