

Better resilience of wheat

KRL 210: A boom for salt-affected ecologies

**Parvender Sheoran^{1*}, Arvind Kumar², Raman Sharma³, Mansukh Singh¹,
Kailash Parjapat², Ranjay K Singh¹, P C Sharma⁴ and V P Chahal⁵**

ICAR–Central Soil Salinity Research Institute, Karnal, Haryana 132 001

Properly managing the crops and getting desirable yields in salt-affected ecologies is often a challenging task for the growers. When underground water is of poor (alkali) quality and the climate is too variable, the compounding vulnerability becomes devastating especially for the resource-limited small landholding farmers. To cope up such stressful conditions, salt tolerant wheat variety 'KRL 210', having better resilience and adaptive capacity in degraded farm situations showed tremendous potential in countering the yield reduction and harnessing the potential of high RSC water irrigated sodic soils. Emerging successful adoption of such appropriate technology can make a real change in transforming the business-as-usual farming into an ecologically sustainable and profitable venture.

Key words: Ghaghar Basin, Salt-affected ecologies, Small landholding farmers, Sodic soils, Wheat KRL 210

Target domain

Rice-wheat is the dominating cropping system and crop production alone contributes ~64% of the total household income and farmers' livelihood. Two-third of the total farmers belong to small and marginal category (<2 ha land). Presence of sodic soils (soil pH₂ >8.5), high residual alkalinity in irrigation water (RSC_{iw} >2.5 me/L, 90% area) and water stagnation for a pronged

period due to intense rains (February–March) limits wheat production to a greater extent in more than 3,200 ha of land area in 5 villages (Mundri, Geong, Kathwar, Sampli Kheri and Bhaini Majra) of Kaithal District representing sodicity-affected Ghaghar Basin of Haryana. These compounded vulnerabilities along with lack of technical know-how have made agriculture simply a subsistence venture in this region.

Approach and Intervention

Taking into consideration, the area-specific agro-ecological situations, a team of scientists from ICAR-CSSRI, Karnal visited the selected sites and identified these villages as 'Farmer FIRST Adopted Villages' under the Farmer FIRST Programmer (FFP). The concerned farmers were kept in a centric role for problem identification, prioritization and conduct of field trials in



Fig. 1. Introduction of salt tolerant wheat variety KRL 210 in 5 villages of Kaithal district, Haryana under ICAR-CSSRI Farmer FIRST Programme

participatory research mode. The bottom-up approach was followed to showcase the potential of identified technological interventions in bridging the yield gaps and gain first-hand experience through learning by doing to the participating farmers targeting faster adoption and dissemination. If required, need-based refinements were also done accordingly.

Enhanced farmers–scientists interface meetings and focused group discussions with the local farmers revealed that cultivation of traditional wheat varieties in the area provides relatively lower yields and sometimes unexpected rains in January–February causes prolonged water stagnation, resulting in complete crop failure in waterlogged sodic soils. Targeting such vulnerable situations, ICAR-CSSRI had developed a short stature, medium duration, bold seeded wheat variety ‘KRL 210’, having better resilience and adaptive capacity in stress prone environments. In this backdrop, to showcase the productivity potential of salt-tolerant wheat variety ‘KRL 210’ in such degraded/problematic areas, a total of 20 fields demonstrations were initially carried out in 2016-17 (Fig. 1).

Farm Adoption and Outcome

Initially, the concerned farmers were reluctant to accept this variety but within a short time span of 3 years, KRL 210 has gained momentum owing to better adaptability/tolerance to multiple stressors (ecology, climate and other socio-economic factors). The results documented that the farmers are now harvesting reasonable crop yields ranging from 35-52 quintals per ha as against the earlier average of 25-30 quintals per ha and somewhere even lesser due to poor crop establishment and climatic vulnerabilities. Nearly two-third of the recipient farmers were of the opinion that during the period of high-intensity rains and continued water stagnation, KRL 210 performed relatively better than



Fig. 2. Actual sites visual demonstration of technology under real farm situation.

other locally adapted varieties. The farmers also opinioned that KRL 210 requires lesser (10-15%) nitrogenous fertilizer and matures 5-7 days earlier; curtailing fertilizer cost to some extent and also an indicator of higher per day productivity.

Earlier, majority of the farmers were sowing their wheat crop simply by broadcasting 15-30% higher seed and mixing it in the surface layer by ploughing with tractor drawn rotavator. The uneven seed placement at deeper depths not only led to poor crop germination but also receives higher amounts of irrigation (poor quality) water at the time of first irrigation leading to seedling mortality, poor plant stand and ultimately lower crop yields. The farmers were asked to adopt the Zero tillage method of crop establishment to ensure better seed placement, desired crop stand and ease in handling the intercultural operation. This concept paved way and become a fruitful intervention mainly because of lesser soil disturbance, desired application of irrigation water, lower incidence of weeds particularly *Phalaris minor* along with reduction in input costs.

Popularization

The farmers were taken to the actual sites to visualize the impact of demonstrated technology (Fig. 2).

Actual sites visual demonstration of technology under real farm situations. They were quite impressed with the performance of KRL 210 in enhancing the land productivity which otherwise had become less productive or even unsustainable. In addition, the field days and farmers’ *goshthies* were also organized to create awareness among the participating/neighbouring farmers.

Impact assessment and Scope

More than 1,000 farming families have been directly and indirectly benefitted with Farmer FIRST Programme covering additional 400 ha of land with cultivation of KRL 210 variety in the study domain and neighbouring villages. The adaptive attributes of KRL 210 have made the farmers to form their own formal networks of seed exchange, informal marketing to maintain seed supply chain and combat location specific ecological vulnerability. With this 3 years experience, the farmers intended to grow KRL 210 on a still larger scale in the ensuing seasons and would like to encourage other fellow farmers to further expand the area under its cultivation.

¹Principal Scientist, ²Scientist, ³Ph D Scholar, ⁴Director, ⁵ADG (Agril. Extension).
Corresponding author email: parvender.sheoran@icar.gov.in

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