Indian Journal of Extension Education
Vol. 52, No. 1 & 2, 2016 (61-64)

Farmers Perception About Salt Tolerant Wheat Varieties in Saline Areas of Gujarat

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ABSTRACT

Salinity has been a major factor constraining agriculture in Gujarat. Use of salt tolerant varieties is considered as one of economic and ecological approach to overcome this. Attempt was made to demonstrate potential of salt tolerant wheat varieties (KRL 210 and KRL 19) in salt affected Vertisols of Bara tract area of Gujarat. Study was conducted with 53 farmers from Bharuch district of Gujarat. Data were collected using personal interview of the farmers using a well structured interview schedule. Study found that in economic benefits, all farmers agreed that cultivation of salt tolerant varieties in salt affected areas helped in increasing the income of the farmers. In terms of social benefits, about 76 per cent farmers agreed that cultivation of salt tolerant varieties in saline areas helped in upliftment of small and marginal farmers and achieving food security of the household. In terms of environmental benefits, 96 per cent farmers agreed that saline land and moderate saline ground water could be effectively used for cultivation of salt tolerant varieties. For agronomic practices majority of farmers agreed that salt tolerant varieties had more number of tillers (96%) and less lodging and shattering tendency (92%). Under quality of output, all farmers agreed that eating quality of salt tolerant wheat varieties was good. Thus farmers' response to salt tolerant wheat varieties was good, which helped them in increasing their income; bringing their saline land under cultivation, securing household food security. However, there is need to create awareness among farmers in salt affected areas of Gujarat about presence and potential of such varieties which would help in increasing productivity and prosperity of these farmers.

Key words: salinity, salt tolerant varieties, wheat, perception

INTRODUCTION

Salinity of soil affects plant growth and productivity; along with the economic welfare, environmental health and agricultural production (Win, 2011; Rengasamy, 2006). Globally around 1.2 billion ha land is affected by the problem of salinity and sodicity (FAO, 2007), while in India, total 6.73 Mha of land is affected by salinity (Mandal *et al.*, 2009) where problems of low productivity and poverty are common. In Gujarat state alone about 2.22 Mha of land is affected by salinity (CSSRI, 2016) which remains either barren or possesses some native hardy bushes and coarse grasses. This problem of salinity intensifies because of some physicochemical characteristics of black soil which is prevalent in the state like low infiltration rates, high clay content, and narrow workable moisture range.

Food production in salt affected areas can be increased through proper technological interventions like improving condition of the soil and adopting crop varieties which are tolerant to salinity (Shahbaz *et al.,* 2012). Use of salt tolerant varieties is one of the best, biological and ecological approaches as adaptive measures by the farmers to cope up the problem of salinity (Gautam *et al.,* 2010; Ismail, 2009). ICAR-Central Soil Salinity Research Institute (ICAR- CSSRI), Karnal, Haryana, India, has developed and released salt tolerant wheat varieties like KRL 1-4, KRL 210, KRL 213, KRL 19 etc. which are popular in parts of north India (Hollington, 2000, Sankar *et al.* 2011). In 2011 salt tolerant wheat varieties occupied 193 thousand hectare area in country and during the period of 2001 to 2011, national level production from these varieties was 0.48 million tones.(Tripathi *et al.,* 2011).

Salt tolerant wheat varieties KRL 210 and KRL 19 were introduced in the Gujarat state by Regional Research Station, CSSRI Bharuch with the help of different NGO partners, CSPC Ahmedabad and KVK Chaswad; to demonstrate the prospects of cultivating salt tolerant wheat varieties to overcome problem of salinity in the

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state. Therefore, a study was conducted aiming at knowing the perception of farmers about these varieties.

METHODOLOGY

Study area

Study was carried out in Jambusar, Amod, Vagra, Hansot and Bharuch taluka of Bharuch district. This area experiences hot sub tropical type of climate. Soil of the region is mix of black cotton soil and sandy soil and area is characterized by presence of sub surface salinity. Ground water is mostly saline, and in most of the part irrigation is provided by canals.

Study approach and sampling methods

Ex post facto method was used. Extensive field surveys were carried out during 2014 and 2015. From five talukas of the Bharuch district, 53 farmers were selected purposively who were growing salt tolerant wheat varieties KRL 210 and KRL 19. A well structured interview schedule was developed and data was collected by personal interview of the farmers.

Data collection and analysis

Statements related to various aspects viz. economic, social, environmental benefits, agronomic practices, and improvement in quality of output were enlisted. Farmer's response was elicited using Likert's five point scale with reference to each statement. Score of 1, 2, 3, 4, 5 was given to response strongly disagree, disagree, not decided, agree and strongly agree respectively. Mean score was obtained by dividing total score of a statement by number of respondents.

RESULTS AND DISCUSSION

Results of the study are presented and discussed using various aspects viz. economic, social, environmental benefits, agronomic practices, and improvement in quality of output.

Economic benefits

Farmers perceived input cost of salt tolerant varieties lower than other varieties (Table 1) as evident from the fact that 20 per cent respondents strongly agreed to the statement (mean score 3.84). Farmers told that this low price of inputs was mainly because of less number of irrigations required for salt tolerant varieties (these varieties could give better yield with three irrigations also). This reduction in cost helped in lowering the cost of cultivation of the wheat as 16 per cent farmers strongly agreed to this statement. About 52 per cent farmers agreed that salt tolerant varieties requires less number of labours and hence saves labour cost. However, in case of plant protection cost (76 %) and weed management cost (56 %) farmers seems to remain indifferent about the benefits of salt tolerant varieties as compared to other varieties. This may be attributed to the fact that most of the farmers were not using any weed management and plant protection measure for wheat crop in the studied district. About 84 per cent farmers agreed to the statement that cultivation of salt tolerant varieties helps in increasing income of the farmers. Yield of these varieties was higher than locally cultivated varieties by the farmers, which had led to increase in income of the farmers.

Table 1: Perception of the farmers about economic benefits of salt tolerant varieties

Statements	SD*	D*	U*	A*	SA*	Mean score	SDv	SEM
Input cost for STV is low as compared to other varieties	0	0	36	44	20	3.84	0.75	0.16
Cost of cultivation of STV is low as compared to other varieties	0	0	28	56	16	3.88	0.67	0.15
Plant protection cost of STV is low	0	0	76	24	0	3.24	0.44	0.10
STV requires less number of labour hence saves labour cost	0	0	40	52	8	3.68	0.63	0.14
Weed infestation and management cost is less	0	0	56	44	0	3.44	0.51	0.11
Cultivation of STV in salt affected areas helps in increasing income of the farmers	0	0	0	84	16	4.16	0.37	0.08

SD-Strongly disagree, D-disagree, U- undecided, A-agree, SA- strobgly agree, SDv-standard deviation, SEM- standard error of mean. *figures in parenthesis indicates farmers response in per cent.

Social benefits

In social benefits, 76 per cent farmers agreed that salt tolerant varieties helped in meeting food security of the household with mean score of 4.04. (Table 2). Salt tolerant varieties gave better yield in saline soils also, encouraging farmers to grow wheat in the field not used for wheat cultivation because of high salt content. About 48 per cent farmers agreed that cultivation of salt tolerant varieties helps in increasing standard of living of farmers in salt affected areas.

This is linked to the income of the farmers, which increases with cultivation of salt tolerant wheat varieties. Majority of (76 %) farmers agreed that cultivation of salt tolerant varieties helps in upliftment of small and marginal farmers in saline areas.

Table 2: Perception of the farmers about social benefits of salt tolerant varieties

Statements	SD*	D*	U*	A*	SA*	Mean score	SDv	SEM
Cultivation of STV increase in standard of living of farmers in salt affected areas	0	0	52	24	24	3.72	0.84	0.18
Increase in social participation	0	0	48	52	0	3.52	0.51	0.11
Food security of the household	0	0	24	48	28	4.04	0.73	0.16
Upliftment of small and marginal farmers in saline areas	0	0	24	60	16	4.05	0.58	0.13

SD-Strongly disagree, D-disagree, U- undecided, A-agree, SA- strobgly agree, SDv-standard deviation, SEM- standard error of mean. *figures in parenthesis indicates farmers response in per cent.

Environmental benefits

Almost all (96%) farmers agreed that salinity affected areas can be effectively brought under cultivation using salt tolerant varieties in their region. Rabbani *et al.* (2013) in their study in coastal Bangladesh found that use of salt tolerant varieties was the most widely used adopted measure by the farmers. In our study, some farmers from Hansot taluka reported that because of high salinity in their field, no other variety was able to germinate in the field; however salt tolerant varieties could germinate in the same field and gave satisfactory yield. Same response was obtained for the statement related to the saline ground water (96 % agreed). Similarly, high tolerance to salt by these varieties was also reported by Mishra *et al.* (2003) and Gautam *et al.* (2010). The studied area is characterized by highly saline groundwater, leaving farmers depend on canal water for the irrigation. However, areas where ground water is moderately saline, salt tolerant varieties were grown by farmers using conjunctive use of ground water with the canal water. Majority (88%) farmers agreed that use of salt tolerant variety is ecological approach for management of salt affected soils.

Table 3: Perception of the farmers about environmental benefits of salt tolerant varieties

Statements	SD*	D*	U*	A*	SA*	Mean score	SDv	SEM
Land affected by salinity can be effectively brought under cultivation with the help of STV in your region.	0	0	4	72	24	4.20	0.50	0.11
STV grows well in moderately saline ground water	0	0	4	76	20	4.16	0.47	0.10
Compatibility of STV is high for changing climate situation	0	0	32	52	16	3.84	0.69	0.15
Cultivation of STV is an ecofriendly approach for management of salt affected land	0	0	12	64	24	4.12	0.60	0.13

SD-Strongly disagree, D-disagree, U- undecided, A-agree, SA- strobgly agree, SDv-standard deviation, SEM- standard error of mean. *figures in parenthesis indicates farmers response in per cent.

Agronomic practices and crop characteristics

About 72 per cent farmers remained undecided about benefits of salt tolerant varieties in terms of less fertilizer requirement while 64 per cent farmers remained undecided about benefits in terms of less weed management. All respondents agreed that irrigation requirement of salt tolerant wheat varieties was less. About 64 per cent farmers strongly agreed that number of tillers in case of salt tolerant varieties were more and salt tolerant varieties had less lodging and grain shattering tendency. Hollington (2000) also reported that this variety performed well in saline soils of Northern India and because of its low height (85 cm) it has less lodging and grain shattering tendency. About 84 per cent farmers agreed that salt tolerant varieties mature earlier than their counterpart locally cultivated varieties. With exception of 4 per cent farmers, all farmers agreed that salt tolerant varieties had long ear head.

Table 4: Perception of the farmers about agronomic practices and crop characteristics of salt tolerant varieties

Statements	SD*	D*	U*	A*	SA*	Mean score	SDv	SEM
Fertilizers requirement for STV is less than other varieties	0	0	72	20	8	3.48	0.82	0.18
STV requires less weed management	0	0	64	28	8	3.44	0.65	0.14
Irrigation requirement for STV is less	0	0	0	60	40	4.40	0.50	0.11
Numbers of tillers in STV varieties are more.	0	0	4	32	64	4.60	0.58	0.13
Less lodging and grain shattering	0	0	8	28	64	4.56	0.65	0.14
Early maturity	0	0	16	28	56	4.40	0.76	0.17
Long ear head	0	0	4	92	4	4.00	0.29	0.06

-agree, SA- strobgly agree, SDv-standard deviation, SEM- standard error of mean.
*figures in parenthesis indicates farmers response in per cent.

Quality of output and marketing

About 84 per cent farmers agreed that grains of salt tolerant varieties had more shining, 88 per cent agreed that these varieties had more bold grains. Over 92 per cent farmers realized better price for their produce in the market. Noteworthy thing here was that all farmers agreed and 80 per cent strongly agreed about good eating quality of the salt tolerant varieties with mean score of 4.80 on five point scale.

Table 5: Perception of the farmers about quality of output and marketing of salt tolerant varieties

Statements	SD*	D*	U*	A*	SA*	Mean score	SDv	SEM
Grain have more shining	0	0	16	72	12	3.96	0.54	0.12
More bold grains	0	0	12	84	4	3.92	0.40	0.09
Good straw quality	0	0	4	88	8	4.04	0.35	0.08
Fetches good price in the market	0	0	8	68	24	4.16	0.55	0.12
Eating quality is good	0	0	0	20	80	4.80	0.41	0.09

SD-Strongly disagree, D-disagree, U- undecided, A-agree, SA- strobgly agree, SDv-standard deviation, SEM- standard error of mean. *figures in parenthesis indicates farmers response in per cent.

CONCLUSION

Study on perception of farmers about salt tolerant varieties revealed that all farmers agreed that cultivation of salt tolerant varieties in salt affected areas helps in increasing the income of the farmers with mean score of 4.16 on five point scale. In terms of social benefits, about 76 per cent farmers perceived that such varieties would help in upliftment of small and marginal farmers. About 96 per cent farmers were positive about use of salt tolerant varieties in saline soil with moderate saline ground water. For agronomic practices more number of tillers (96%) and less lodging and shattering tendency (92%) were the major benefits perceived by the farmers. All farmers agreed that eating quality of salt tolerant wheat varieties was good. This clearly shows overwhelming response by the farmers for salt tolerant wheat varieties in saline areas. Thus ecofriendly and economic technological intervention like salt tolerant varieties would help in managing problems of salinity and low productivity in these areas for the betterment of farming community.

Paper received on : Oct. 05, 2015
Accepted on : Oct. 15,2015

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