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Knowledge level of farmers about management of saline soils

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Abstract
The study was an *"expost-facto"* research carried out in Belagavi district of Karnataka State during the year 2017- 18. In Belagavi district, three taluks were selected based on the highest area under salinity. The total sample size was 150. The results revealed that majority (61.33%) of the farmers were having high knowledge on application of Farmyard Manure and 38.67 percent of farmers were having low knowledge. More than two third (68.00%) of farmers were having low knowledge on green manure and 32.00 percent of farmers were having high knowledge. The overall knowledge of farmers about management of saline soils showed that 41.33 percent of the respondents belonged to medium level of knowledge on management of saline soils followed by low (34.67%) and high (24.00%). The probable reasons might be that more number of farmers had primary and middle school education, which might have prompted these farmers to acquire more knowledge, their varying degree of interaction with extension workers and exposure to mass media might have helped the farmers to acquire knowledge about management of saline soils. Hence, awareness has to be created among the farming community through various extension tools like literature, magazines and demonstrations.

Keywords: Salinity, drainage, irrigation management, green manure, farmyard manure

Introduction
Soil plays a vital role in sustaining life on the planet. Nearly all of the food that humans consume, except for what is harvested from marine environments, is grown on the earth's soils. The role of soils in the Agriculture has been appreciated since time immemorial. This is evident even today from the concentration of population in the relatively productive areas in the world. The farmer looks upon the soil as habitat for plants, since it provides physical anchorage to crops besides serving as reservoir of nutrients and water needed for growth and development.

The increase in irrigated area as envisaged would lead to secondary salinization consequentially leading to estimated 16.2 million ha salt affected area by 2050 without technological interventions, compared to the current estimate of 6.74 million ha. Thus, preventing productive lands to turn into saline lands would be the key to sustain irrigated agriculture. Intensive integrated efforts for prevention, reclamation and management would be needed in the fields of salt affected soils and poor quality waters for irrigation. Strategies involving technological interventions, development of high yield varieties, efficient use of surface and ground water, application of sprinkler and drip irrigation, drainage of waterlogged saline soils particularly vertisols, utilization of treated waste water, increased use of bio-fertilizers are the important management practices to control salinity.

Salinization in irrigation commands develops whenever soil and hydrological condition favour accumulation of soluble salts at root zone. Rise in water table mobilizes salts present in the soil profile and groundwater. Once the groundwater rises, it contributes substantially to evaporation from soil surface. The upward flux of water due to evaporation and water uptake by plants results in gradual building up of salts in root zone.

A highly disturbing situation is created in the command areas in view of the increasing areas that are going out of cultivation due to intense degradation. Soil degradation due to excessive use of water has been recognized as one of the significant factors in recent times. It is often claimed that soil degradation caused due to over irrigation is further accelerated by intensive use of fertilizers to increase agricultural production. A considerable attention to increase production was promoted by favourable environment that encouraged inappropriate land use and injudicious input use, especially excessive irrigation, trade policies, output price policies and input subsidies all have contributed to the degradation of agricultural land (Datta *et al.* 2002) [2]. The possible adverse effects of irrigation have been largely unnoticed.

Water related degraded soils differ considerably in distribution. Among the states, the highest area affected by salinity are Gujarat (16.80 lakh ha) followed by West Bengal (4.4 lakh ha), Rajasthan (1.9 lakh ha), Maharashtra (1.84 lakh ha) and Orissa (1.47 lakh ha).

To prepare effective reclamation plans, we need to have good inventories of salt affected soils, waterlogged soils and poor quality waters besides documenting their characteristics, distribution and use potentials. Excellent inventories of the extent of lands damaged by salinity and water logging in irrigation commands updated at least every five years are very much needed. It should be backed up by a strong mechanism of information dissemination in the form of readily available text, maps, graphs, and associated data base to multi users.

Materials and Methods

The Belagavi district comprises of ten taluks among these Athani, Ramdurg and Saundatti taluks were purposely selected based on highest area under salinity. From each taluk five villages were selected. From each village ten respondents were selected randomly.

Hence, the study covered 15 villages from 3 taluks of Belagavi district to form a sample of 150 respondents. A pre-tested structured interview schedule was used to collect the data from the respondents by personal interview method. The data collected from respondents were tabulated and analyzed using appropriate statistical tools such as frequency, percentage mean and standard deviation.

Knowledge items were framed by referring package of practices and also, in consultation with Soil Science experts of University of Agricultural Sciences (UAS), Dharwad. Totally eight knowledge items on management of saline soils were selected, under each practice three knowledge questions were included. The questions covered irrigation management, drainage, farm yard manure, green manure, soil testing *etc.* Finally 24 knowledge questions were administered to respondents, where multiple choice question method was used. The answers to the question were quantified by giving one score to correct answer and zero score to incorrect answer.

Knowledge index = [(Number of correct response / Total number of knowledge items x 100)]

Based on the response obtained, the respondents were classified into low, medium and high categories using mean and standard deviation as a measure of check.

Category	Score
Low	Less than (Mean – 0.425 SD)
Medium	Between (Mean $\pm$ 0.425 SD)
High	More than (Mean + 0.425 SD)

Further frequency and percentage were calculated to present the data.

Results and Discussion

Knowledge of farmers on management of saline soils

The results in the Table 1 indicated that, more than two third (68.00%) of the farmers were having low knowledge on green manure and 32.00 percent of farmers were having high knowledge. The reason might be that, green manure is a new technology in saline soils management. Further the farmers had low extension contact. The findings are in conformity with the findings of the study conducted by Lallatendu and Kameshwari (2014) [6].

Nearly two third (64.67%) of the farmers were having low knowledge on ill effects of chemicals fertilizers and use of bio- fertilizers and 35.33 percent of farmers were having high knowledge. The probable reason might be that farmers were concentrated only on yield rather than ill effects of chemical fertilizers on soil. And neighboring farmers were also extensively using the chemical fertilizers. So there was a lack of information to the farmers about the ill effects of chemical fertilizers. In case of bio-fertilizers, farmers might have not acquired the perception in use of new technology. This also might be due to traditional thinking of farmers in management of saline soils. Good extension contact might have helped the farmers to overcome these problems. The results are in line with the findings reported by Suman (2012) [9].

Table 1: Knowledge of farmers about management practices of saline soils (n=150)

Saline soil management practices	Knowledge index	f	%
Irrigation management			
Low < 1.72	31.77	64	42.66
High > 1.72	76.74	86	57.34
Salinity			
Low < 1.78	28.75	51	34.00
High > 1.78	75.08	99	66.00
Drainage			
Low < 1.40	20.25	79	52.67
High > 1.40	76.05	71	47.33
Farm Yard Manure			
Low < 2.44	52.29	58	38.67
High > 2.44	100.00	92	61.33
Green Manure			
Low < 1.02	12.41	102	68.00
High > 1.02	79.86	48	32.00
Soil testing			
Low < 1.29	12.15	85	56.67
High > 1.29	83.58	65	43.33
Ill effects of chemical fertilizers and use of bio-fertilizers			
Low < 1.14	21.30	97	64.67
High > 1.14	69.18	53	35.33
Cultural practices			
Low < 2.18	57.29	96	64.00
High > 2.18	100.00	54	36.00

Majority (64.00%) of farmers were having low knowledge and 36.00 percent of farmers were having high knowledge on cultural practices. This might be due to difficulty in understanding process involved in land levelling which results in low knowledge among farmers. Mulching is a new technology about which farmers do not have more information regarding this practice. The results are in line with the findings reported by Nirmal (2015) [7].

More than half (56.67%) of the respondents were having low knowledge in soil testing and 43.33 percent of the farmers were having high knowledge. It might be due to difficulty in understanding soil test reports, lengthy procedure, long delay in getting the test reports and lack of knowledge about soil testing technology. We observed that the farmers with less extension contact were less responsive to the latest technologies and acquire less knowledge about the soil testing aspects. Low information channels and ignorance to know the details of soil sampling were reasons for possession of low knowledge on soil sample test. After the launching of Soil Health Card programme, the awareness about the soil sample test among the farmers has improved. The findings are in conformity with the findings of the study conducted by Lallatendu and Kameshwari (2014) [6].

Majority (52.67%) of the farmers were having low knowledge and 47.33 percent of the farmers were having high knowledge on drainage. The reason might be that, these practices require specific information like depth and type of pipes used for drainage purpose. Continuous contact with extension functionaries was required to periodically update the information about these specific practices. Providing drainage was one of the important measures for management of saline soils. So it was necessary to improve the knowledge of farmers about the drainage practice by providing proper literatures and motivating farmers to build a good rapport with extension workers. The results are in line with the findings of Bagadi *et al.* (2001) [1].

Nearly two third (66.00%) percent of the farmers were having high knowledge on salinity and more than one third (34.00%) of farmers were having low knowledge. The reason might be that, majority of farmers had either medium or high farming experience and also had medium extension contact with extension workers. Due to the severity of salinity problem in that area, the Government of Karnataka and other local authorities organised many programmes to build awareness about salinity management practices. The farmers had medium mass media exposure by which they might have come to know about severity of salinity. Because of these reasons, majority of the farmers had high knowledge about saline soils management practices. The results are in line with the findings of Jadhav *et al.* (2010) [3] and Kale *et al.* (2012) [5].

In case of farm yard manure, 61.33 percent of farmers were having high knowledge and less than two fifth (38.67%) of farmers were having low knowledge. The reason is that, application of farm yard manure is a traditional practice and farmers are practicing it since so many years. It is the best method to maintain the health of soil and also improve the productivity of soils. Another reason might be that, availability of enough information and literature about this practice. Hence, majority of farmers were having high knowledge on farm yard manure. The findings are in conformity with the findings of the study conducted by Kadam *et al.* (2001) [4].

More than half (57.34%) of the farmers were having high knowledge on irrigation management and more than two fifth (42.66%) of the farmers were having low knowledge. The reason might be that, majority of farmers belonged to middle age, high farming experience and mass media exposure. So, they were well aware of ill effects of excess irrigation because improper management of irrigation was the main reason for salinity problem. Due to these reasons considerable number of farmers were aware of irrigation management practices. The results are in line with the findings of Datta *et al.* (2002) [2] and Raghunandan (2004) [8].

Overall knowledge of farmers regarding management practices of saline soils

The results in Table 2 indicated that more than two fifth of farmers (41.33%) had medium knowledge on management of saline soils. While, 34.67 and 24.00 percent of them had low and high knowledge level on management of saline soils, respectively. The probable reasons might be that, more number of farmers were found to have primary and middle school education, which might have prompted these farmers to acquire more knowledge, their varying degree of interaction with extension workers might have helped the farmers to acquire knowledge about saline soils management practices.

Table 2: Overall knowledge of farmers about management practices of saline soils (n=150)

Category	Frequency	Percentage
Low (<11.56)	52	34.67
Medium (11.56-14.42)	62	41.33
High (>14.42)	36	24.00
Mean = 12.99	SD = 3.36	

Conclusion

Rapid growth of population leads to continuous pressure on land resulting in the deterioration of soil fertility. In order to sustainable production and conservation of soil, package of soil health management practices are very necessary to reduce further damage to soil and to conserve the land for further generation.

This study was conducted to know the management of saline soils by the farmers. Overall knowledge of farmers on management of saline soils was found medium. Hence, extension efforts need to be more strengthened to impart knowledge on saline soils management practices like green manure and bio-fertilizers in which farmers lacked knowledge. By providing all the necessary resources, it is possible to improve the knowledge of farmers on management of saline soils.

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