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Knowledge of sericulture extension workers about soil health cards

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Abstract

Imbalanced application of chemical fertilizers is widely blamed for poor soil fertility status in India. To address the issue Government of India has come up with initiatives to inculcate among the farmers judicious use of manures, organic and inorganic fertilizers based on the soil health status. One of the recent initiatives has been Soil Health Cards scheme. A soil health card is a single page document which along with farmers basic information, contains nutrient status, physical and chemical properties along with recommendations for integrated nutrient management. The study reported here was to determine the knowledge level of sericulture extension workers (Mulberry man, nursery man, watcher) regarding soil health cards, so that the effectiveness of training programmes provided by CSR&TI Pampore to sericulture workers could be improved. Forty sericulture extension workers of sericulture development department, Kashmir were selected purposively. A schedule comprising of twenty four questions was administered to determine the knowledge of the extension workers regarding soil health cards. The results revealed that knowledge regarding how to take soil samples (78%), the precautions to be taken while taking soil samples (70%), availability of SHC details on the SHC portal (68%), information required to open the soil health details on web portal (60%), macro nutrient status display Nitrogen (68%), Phosphorus (68%), Potassium (63%) on soil health was responded positively by majority of the respondents. The knowledge regarding cost of soil sample (0%), year of launching of the scheme (25%) the state where it was launched first (10%), micro nutrients status of soil, soil physical and chemical properties (50%), calculation of fertilizer dose for mulberry based on SHC report (38%) was very less among the respondents. From these results it can be inferred that sericulture extension workers have good knowledge about soil sampling, sampling precautions, macronutrients, accessing soil health through web portal but the information regarding micronutrients, soil chemical and physical properties, calculation of fertiliser dose and other relevant parameters needs to be further upgraded by specially designed training programmes for these extension workers, so that the information contained in the cards could be delivered to the farmers field, who eventually apply these recommendations in their field. Further, importance of micronutrients along with nutrient composition of different organic manures should be included in training programmes and Soil Health Card document to inculcate the importance of these two for optimum utilization of resources by the farmers to achieve yield levels on sustainable basis.

Keywords: knowledge, nutrient status, physical properties, integrated nutrient management

Introduction

Soil Testing is well recognized as a sound scientific tool to assess fertility of soil ^[9]. Soil testing in India was initiated during 1955 by setting up of 16 soil testing laboratories ^[6]. Testing soil for its physical (water holding capacity, aeration, plasticity, texture, structure, density and colour etc.) chemical (mineralogical composition and the content of the type of mineral such as Kaolinite, illite and montmorillonite, base saturation, humus and organic matter content) and biological properties gives full picture of soil fertility and production potential ^[4]. A soil that is able to optimally sustain its native/acquired productivity potential and render ecological services is said to be in good health ^[13]. As imbalanced application of chemical fertilizers in India is widely blamed for poor soil health ^[12, 19]. To address the issue, the Government of India has been regularly investing in large-scale, programmes of individualized soil testing and customized fertilizer recommendations, with the hope that scientific information will lead farmers to optimize the fertilizer mix ^[8].

Among these interventions one recent initiative is the soil health card (SHC) scheme in which soil health data on physical and chemical properties is provided as a ready reckoner for integrated nutrient management by the farmers ^[20, 23]. This scheme was launched by Government of India in February 2015 with an aim of promoting soil test based and balanced

use of fertilisers to enable farmers realise higher yields at lower cost. One more important aspect related with this scheme is the digitalisation of soil health data which can be assessed by the farmers at their doorsteps provided they have the smart phones and skill to assess the internet. The farmers through these cards are advised to apply nutrients based on recommendations given in Soil Health Card [16].

In order to reach out to the farmers with new technologies, techniques, innovations, extension plays a vital role in establishing link between farmers and research institutes, where in extension needs regular influx of knowledge and skills so as to remain up to date with the features and applicability of these technologies, techniques and innovation. For this regular updation of knowledge and skills proper scientific guidance, well-organised training programmes, advisory services and on farm demonstrations are important for extension agents of not only sericulture but also other allied sectors of agriculture [2].

Theoretical framework: Extension is well suited to disseminate information to farmers, but to serve this function well, extension educators must be better informed and trained [21]. Knowledge levels are important predictors for ones behaviour, as they factor into whether a person feels like they are able to accomplish an action, and training is the commonly used method to achieve a direct impact on the knowledge and skills [22]. And technical knowledge is not only valuable as an outcome impact indicator but could also serve as a reasonably reliable predictor of the adoption of management practices, particularly for crops and technologies where there is a relatively long-time lag between adoption and impact [17]. Skill development, capacity building and trainings on a particular subject are essential with the evolution of new tools and techniques. Use of information and communication technologies adds value to the knowledge level and makes dissemination more meaningful. Planning for, giving training and management of human resources within extension

organizations are essential to increase the knowledge, skills and overall effectiveness of extension personnel. Therefore, strong hands-on training network should be made an essential part of the successful soil health management programmes [4]. Grass root extension workers need to be equipped with knowledge of a variety of technological skills so that these skills could be utilized by them for transfer of information through different modes and channels of communication which can eventually have positive impact on diffusion of knowledge and innovations among the target groups for desired outcome of technology [22]. For last 30 years, the CSR & TI, Pampore and its nested units in seven NWI states have been providing training to the line departments of sericulture on different aspects covering mulberry cultivation, silkworm rearing and post cocoon technologies and have played a vital role in development and dissemination of technologies and overall improvement in production and productivity of silk in the region. On the lines of mandate and the services rendered, this study was conducted to assess the knowledge of frontline extension staff during 2018-2019, to include the findings in the training curriculum which was specially designated for sericulture extension workers on soil health cards so that efficiency and effectiveness of the training programme could be improved.

Methodology: Extension staff of sericulture development department in Jammu & Kashmir were considered as the population for the present from which forty members consisting of Mulberry guards, nursery men, watchers were identified as potential participants purposively [7]. A schedule on knowledge about soil health card was prepared with slight modification as used by [20, 24]. Questions used in the schedule were of objective type with "YES" or "NO" option. Initially there were 32 questions but after pilot testing with three respondents, the questions were reduced from 32 to 24 and were numbered from 1 to 24 as shown in Table. 1 consisting of different subsections from A to G.

Table 1: Soil Health Card Knowledge of Extension staff.

#	Knowledge towards soil health card	Answers	
		Yes (%)	No (%)
A.	General information about soil testing		
1	Do you know how soil sample is taken	78	22
2	Do you know the precautions to be taken while taking soil samples	70	30
3	Do you know average cost of soil testing (Rs/sample)	0	100
B.	General information about soil health card scheme		
4	Do you know the ministry under which soil health card scheme has been launched	15	85
5	Do you know when soil health card scheme was started	25	75
6	Do you know which state started soil health cards scheme first	10	90
7	Do you know the agencies which are conducting soil analysis under SHC in your area	10	90
C.	Digitalization of soil health cards		
8	Do you know the soil health card details are available on SHC Portal	68	32
9	Do you know what information is required to open soil health card on SHC portal	60	40
D.	Nutrient information (Macro nutrients) : Among the following which macro nutrient status is displayed in soil health card (SHC)		
10	Nitrogen	68	32
11	Phosphorus	68	32
12	Potash	63	27
E.	Nutrient information (Micro nutrients) : Among the following which micro nutrient status is displayed in soil health card (SHC)		
13	Zinc	45	55
14	Manganese	40	60
15	Iron	55	45
16	Boron	40	60
F.	Physical and chemical properties		
17	Does SHC provides information about soil temperature	13	87

18	Does SHC provides information about available soil moisture	15	85
19	Does SHC provide information about electric conductivity	38	62
20	Does SHC provide information about pH	38	62
21	Does SHC provide information physical, and chemical properties of soil	50	50
G.	Soil health card recommendations		
22	Do you know that SHC provides integrated nutrient management based cropping system	58	42
23	Do you know how to calculate the fertilizers dose for mulberry	38	62
24	Whether any method is provided to calculate dose of fertilizer from the available nutrients.	3	97

Results and Discussions

1. A. General information about soil testing: Thirty one sericulture extension workers (78%) knew how to take soil sample and nine (22%) didn't know. In case of precautions to be taken, while taking soil samples twenty eight (70%) were aware while as twelve (30%) do not know about precautions. In case of average cost of soil testing none of the extension workers knew the cost incurred for one soil sample. This section, which has examined extension workers knowledge about soil sampling, precautions and cost of soil sample, it reveals that sericulture extension workers are generally knowledgeable about soil sampling process as they are experienced in preparation of mulberry nurseries and raising of mulberry saplings from root grafts, bag grafts and stem cuttings. The present findings are in line with the findings of [10].

2. B. General information about soil health card scheme: Respondents were asked whether they new which ministry launched soil health card scheme, six respondents (15%) knew the ministry and 34 (85%) were unaware. In case of where SHC scheme was launched first, 10 respondents (25%) knew the state and 30 (75%) didn't know. In case of the year of launching 4 respondents (10%) knew the year and 36 (90%) didn't know and in case of whether they know the agencies doing soil analysis in their area, 4 respondents (10%) were aware of the agencies and majority 36 respondents (90%) unaware. This section reveals that as soil health cards are mostly prepared by agencies, labs who do not have direct contacts with the field functionaries of sericulture development department and are passed on to them through top down approach, hence the knowledge or information is low among sericulture extension workers. The present findings are in line with the findings of [5].

3. C. Digitalization of soil health cards: Twenty seven sericulture extension workers (68%) knew SHC details are available on the SHC portal and thirteen (32%) didn't know. While as 24 respondents (60%) knew the information required to open the soil health details on web portal, and 16 respondents (40%) didn't know. The possible reason for agriculture extension functionaries having 'correct knowledge' about availability of soil health portal is the faster outreach of mobile phone technology in far flung areas of country along with mobile internet services available 24 hours at very low cost. The present findings are in line with the findings of [11, 18].

4. D. Nutrient information (Macro nutrients): Twenty seven respondents (68%) knew that soil health card gives information on nitrogen and thirteen (32%) didn't know. In case of Phosphorus twenty seven respondents (68%) knew and thirteen (32%) didn't know. While in case of Potassium twenty five respondents (63%) knew and 15 (37%) didn't know about potassium status available on soil health card. This section, which has examined extension agents

knowledge about macronutrients, reveals that sericulture extension workers have been preparing nurseries for mulberry sapling raisings and for supply of quality mulberry leaf for Chawki as well as to sericulture farmers. In order to keep these saplings healthy nutrient dose only in the form of NPK has been utilised in mulberry nurseries owing to sericulture extensions built up experience and N, P, K popularisation and use in horticulture and agronomic crops. The present findings are in line with the findings of [10].

5. E. Nutrient information (Micro nutrients): Eighteen respondents (45%), knew that soil health card gives information on Zinc and twenty two (55%) didn't know. In case of Manganese sixteen respondents (40%) knew and twenty four (60%) didn't know. In case of iron twenty two respondents (55%) knew and eighteen (45%) didn't know. While in case of Boron sixteen respondents (40%) knew and twenty four (60%) didn't knew about Boron status available on soil health card. This section reveals that knowledge of sericulture extension workers regarding micronutrient management of mulberry plants is still remarkably poor in view of absence of package of practices for micronutrient utilisation as compared to horticultural crops. The present findings are in line with the findings of [3].

6. F. Physical and chemical properties: Five respondents (13%) knew that soil health card gives information about soil temperature while as thirty five (87%) did not know. Six respondents (15%), respondents knew that SHC provides information about soil moisture and thirty four (85%) didn't know. Fifteen respondents (38%) knew that SHC provides information about electric conductivity and twenty five (62%) do not know. Fifteen respondents (38%) knew that SHC provides information about soil pH and (62%) do not know. While twenty respondents (50%), knew that soil health card provides information about physical and chemical properties of soil and remaining twenty respondents (50%) didn't know. Mostly sericulture extension workers are isolated from existing knowledge sources on soil physical and chemical properties, with very few communication links to recognized Research and Development organizations. The research outcomes do not always inform these groups on these properties owing to lab oriented work. Due to this sericulture extension workers are often deficient in their requisite soil knowledge on these properties and possibly lacking confidence in their response or providing erroneous and inferior guidance. The present findings are in line with the findings of [5].

7. G. Soil health card recommendations: Twenty three respondents (58%) knew that soil health card provides integrated nutrient management based cropping system and seventeen (42%) didn't know. Fifteen respondents (38%), knew how to calculate fertilizer dose for mulberry and twenty five (62%) didn't know. While in case of method given to calculate fertilizer dose for mulberry on SHC. One respondent

(3%) said yes and thirty nine (97%) said no. This may be as a result of the extension agents having not been well trained through the formal education and lack of exposure during their working periods. The present findings are in line with the findings of [1, 15].

Conclusions

From the results it is clear that those facets of soil knowledge which are also linked to the major industry that is horticulture in Jammu & Kashmir are well known and perceived by the extension staff like soil sampling, precautions, macronutrients. The familiarity with the ICT tools & social networking sites is further strengthening these facets. But on the other side those properties or domains of soil knowledge and requirements of soil which are not directly visible and easily understandable to vast majority of extension staff like pH, electrical conductivity, and micronutrients are a hindrance to the ultimate goal of good soil health. These deficiencies that is to understand the properties of soil and the other requirements of soil knowledge needs to be further fine tuned and inculcated into the trainings and demonstrations carried by specialists as soon as these innovations come out of research institutes or from the originator of this type of information. As soon as these till date invisible properties became part of daily core like macronutrients, soil sampling etc till that time the gap between research extension and farmer cannot be bridged.

Recommendations

In future such type of studies could be taken on a large level involving more number of extension staff along with physical and biological properties of soil, which are not part of soil health card. Further, relevant ministry such as the ministry of agriculture, ministry of textiles at central level and the ministry at state level should take into account the leadership characteristics, competencies of extension workers as well as organizational commitment before any innovation is put up for dissemination in order to upgrade the performance of the innovation among the ultimate stakeholders [14]. Through participatory manner field level extension workers should be updated on new knowledge and information through training programmes and live demonstrations on the provisions of new schemes and programmes launched by government from time to time, so that enough and accurate information reach out to the farmers. Further, different agencies like Agricultural universities, ICAR Research Institutes who are preparing soil health cards for horticultural crops, agronomic crops etc in Jammu & Kashmir state should start coordinating and collaborating with the respective extension departments at least from the time of collection of soil samples from the farmers field.

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References

- Balasubramanian V, Bell M, Sombilla M. Yield, profit and knowledge gaps in rice farming: Causes and development of mitigation measures. Paper presented at the expert consultation on "Bridging the rice yield gap in Asia and the Pacific" held in Bangkok, Thailand, 5-7 October, 1999, 163-177.
- Baruah B, Choudhury NP, Bokado K. Impact and Utilization of Soil Health Card in Kharif Paddy in the State of Assam. *International Journal of Pure and Applied Biosciences*. 2018; 6(5):943-948.
- Brown PH. Chapter 11 Micronutrient Use in Agriculture in the United States of America Current Practices, Trends and Constraints. B. J. Alloway (ed.), *Micronutrient Deficiencies in Global Crop Production*. 267-286. Springer Science + Business Media B.V. 2008
- Chaudhari SK. Soil Health in India: Retrospective and Perspective. *Bulletin of the Indian Society of Soil Science*. 2016; 30:34-52.
- De Bruyn LL, Jenkins A, Liebig SS. Lessons Learnt: Sharing Soil Knowledge to Improve Land Management and Sustainable Soil Use. *Soil Science Society of America Journal*. 2017; 81:427-438.
- Dey P. Soil Health Management. *Bulletin of the Indian Society of Soil Science* 2016; 30:79-97.
- Fatima K. Trends in cocoon and silk production in Jammu and Kashmir state-a case of concern. *International Journal of Recent Scientific Research*. 2013; 4(11):1826-1830.
- Fishman R, Kishore A, Patrick YR, Ward S, Jha S, Singh RKP. Can Information Help Reduce Imbalanced Application of Fertilizers in India. IFPRI Discussion Paper 01517; South Asia Office, Environment and Production Technology Division, 2016.
- Goyal G. A study on Effectiveness of Issuing Soil Health Cards to Farmers across India. A book chapter in the book, *Agriculture: Towards a New Paradigm of Sustainability*, (Dr.) Govind Chandra Mishra, Excellent Publishing House, Kishangarh, Vasant Kunj, New Delhi – 2014, 67-71, ISBN: 978-93-83083-64-0
- Ingram J, Morris C. The knowledge challenge within the transition towards sustainable soil management: an analysis of agricultural advisors in England. *Land Use Policy*. 2007; 24(1):100-117.
- James DJ, Lakshminaraya MT. Knowledge of Agriculture Extension Functionaries Regarding Information and Communication Technology Tools. *Asian Journal of Agricultural Extension, Economics & Sociology*. 2018; 24(3):1-7.
- Kalita RR, Das MD, Bora S. Knowledge, Attitude and Practices of Farmers towards Vermiculture Technology. *Indian Research Journal of Extension Education*. 2017; 17(4):78-82.
- Katyal JC, Datta SP, Golui D. Global Review on State of Soil Health. *Bulletin of the Indian Society of Soil Science* 2016; 30:1-33.
- Khalil ALO, Ismail M, Suandi T, Silong AD. Extension worker as a leader to farmers: influence of extension leadership competencies and organisational commitment on extension workers' performance in Yemen. *The Journal of International Social Research*. 2008; 1(4):368-387.
- Macharia JM. Stakeholders knowledge levels and training needs in soil fertility management technologies in the central highlands of Kenya. A Thesis submitted in partial fulfilment for the Degree of Master of Environmental Studies (Environmental Education) of Kenyatta University, 2012.
- Makadia JJ, Mistry HH, Kuthe SB. Impact of Soil Health Card on Fertilizer Consumption and Yield of Sugarcane and Kharif Paddy in Gujarat State. *Economic Affairs* 2017; 62(1):61-66.

17. Mansingh JP, Bayissa DD. Knowledge on Improved Practices of Teff by Smallholder Farmers in Ethiopia. *Journal of Extension Education*. 2017; 29 (4):5937-5944.
18. Muchai SWK, Mugwe JN, Muna MM, Mairura FS, Mugendi DN. Influence of education levels on dissemination of soil fertility management information in the central highlands of Kenya. *Journal of Agriculture and Rural Development in the Tropics and Subtropics* 2012; 113(2):89-99.
19. Pandya AM, Timbadia CK. Attitude of farmers about soil health card programme. *Gujarat Journal of Extension Education*. 2016; 27(1):102-104
20. Patel JK, Chauhan NB. Attitude of farmers towards soil health card (SHC) programme. *An Asian Journal of Soil Science*. 2012; 7(1):114-116.
21. Prokopy LS, Carlton JS, Arbuckle JG, Haigh T, Lemos MC, Mase AS *et al.* (2015). Extension's role in disseminating information about climate change to agricultural stakeholders in the United States. *Climatic Change*. 2015; 130(2):261-272.
22. Yadav DS, Sood P, Thakur SK, Choudhary AK. Assessing the training needs of agricultural extension workers about organic farming in the North-Western Himalayas. *Journal of Organic Systems*. 2013; 8(1):17-27.
23. Yadav VPS, Raman RS, Kumar R. Knowledge and attitude of farmers towards soil testing practices. *Indian Research Journal of Extension Education*. 2006; 6(3):1-3.
24. Dubey M. Impact assessment of soil health card scheme on income and nutrient management practices in major crops among the farmers of Raisen district in Madhya Pradesh. A Thesis submitted in partial fulfilment for the Degree of Master of Science in Agriculture (Agricultural extension) to Indira Gandhi Krishi Vishwavidyalaya, Raipur, 2018.