



Critical Analysis of Farmers' Footfall at Krishi Vigyan Kendra for Assessment of Technological Problems

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ABSTRACT

Identifying location specific problems of the farmers is of utmost importance. A new approach involving a critical and quantitative analyses of farmers' footfall at Krishi Vigyan Kendra (KVK) was applied for assessing the technological problems of the farmers in south-western Punjab. Of the total farmers' footfall for scientific advisory, 11.3 per cent of farmers approached for weed management and ~21.9 per cent for different nutrient management problems. Farmers' footfall for insect-pest and disease management was highest and comprised ~56.5 per cent of total annual footfall for scientific advisory. About 10.7 per cent total footfall for scientific advisory was related to the infestation of whitefly in Bt-Cotton only. For disease/physiological disorder (para-wilt in Bt-cotton and sheath blight in rice) management farmers' footfall was mainly observed during July to October. Annually ~10 farmers (0.9% of total footfall for scientific advisory) approach KVK for phyto-toxicity/ injury induced on plants due to faulty spray practice.

Key Words: Advisory, Farmers' footfall, Insect-pest, Management, Nutrient, Weed management.

INTRODUCTION

Identification of location specific technological problems to assess training needs help organizations to accomplish their goals and objectives in efficient and effective manner. Insect-pest attack, disease infestation, nutrient deficiencies, weed infestation and chemical toxicity are major causes for yield decline. Even at farms having similar production situations, yield variation is due to difference in management practices followed (Singh *et al*, 2017). Assessment of region specific problems help identifying training needs and enables accurate assessment of the level of existing situation based on opinion of individuals. Training bridges technological gap through scientific knowledge and skills of trainees by encouraging them to build and enhance their capabilities (Lynton and Pareek, 1990). For an effective and efficient execution of trainings, each training program must be started after a needs assessment (Davis *et al*, 2007). Information for training need assessment and problem identification is generally gathered through surveys, individual interviews/counseling's, questionnaires, group

discussions, field observations and analysis of existing secondary data (Pholonngoe and Richard, 1995). In this study, a different method of farmers' footfall at Krishi Vigyan Kendra (KVK) was used as a diagnostic tool to prioritize technological problems faced by farmers of the district. Since KVKs are farmers' training institutes at district level, problem diagnosis and prioritization thereof is crucial for preparing action plan of short-, vocational- and in-service trainings in view existing problems in agriculture. The present study was therefore, conducted to use the existing long-term database of farmers' footfall at KVKs for assessment of technological problems and training needs of farming community, and for effective execution of training plan to disseminate the innovative scientific knowledge.

MATERIALS AND METHODS

Details of study area

Mansa district is the south-western parts of Punjab (India) and this area is usually arid and sub-tropical with hot and dry summers and cold

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winters. The district extends between longitudes of 29° 59' and latitude of 75° 23' (212 m above mean sea level) and having a total geographical area of ~2.2 lakh ha. Mansa district ranges in agro-eco-sub-region (AES)-1, AES-2 and AES-3. Soils in the region are light textured (sandy loam to loamy sand texture) with low soil organic carbon. Tube-well and canal water are the main source of irrigation as annual rainfall ranges between 300-450 mm. There has been a problem of sodicity with pH>8.5 (Singh *et al*, 2017). The rainfall (~80-85%) is mainly received during monsoon season from mid of July to end of September month.

Crops and cropping systems

Wheat (*Triticum aestivum* L.) and mustard are the main *rabi* season crops while Bt-Cotton (*Gossypium hirsutum* L.) and rice (*Oryza sativa* L.) are the main summer season crops. Gram, barley, summer *moong* and guar are other minor crops in the district.

Data collection and analysis

The data used in the present study pertains to five years period from 2014-2018. Data on farmer's visit to KVK were recorded in visitor register maintained at KVK office. The data on date of visit, reason for visit and address of the visiting farmer was used for identification of problems and assessment of training needs. Data analysis was done in Microsoft Excel spread sheets. Data were analyzed month-wise and problem-wise to identify major problems or training needs at peak period of problem.

RESULTS AND DISCUSSION

Distribution pattern of farmers' footfall for scientific advisory services

Farmers' footfall was bifurcated among six major advisory services *viz.* weed management, nutrient management, insect management, disease management, chemical toxicity and physiological disorders. Analysis showed that of the total agriculture associated technical problems, 40.5 per

cent were related to insect-pest attack, followed by 21.9 per cent to nutrient deficiency, 15.9 per cent to diseases, 11.3 per cent to weeds and 9.3 per cent to physiological disorder (Table 1).

Weeds related technological problems

Footfalls related to weeds problem constituted 11.3 per cent of total crop related problems. Highest proportion of farmers' footfall (21.8%) occurred in the months of December-January (Table 1), and was concerned to management of *Phalaris minor* in wheat. During these months, farmers approached for their grass and broad leaf weeds related problems in wheat. Of the total annual footfall for weed related problems, ~49 per cent footfall was related to *Phalaris minor* and *Chenopodium album* in wheat alone (Table 2). In rice, *Cyperus rotundus* (deela) plus motha were the major weeds in the area, for which farmer's footfall comprised 12.9 per cent of total footfall for weed related problems. In cotton, *Trianthem amonogyne* (itsit) and *Dactyloctenium aegyptiacum* (madhana/makra) were major weeds

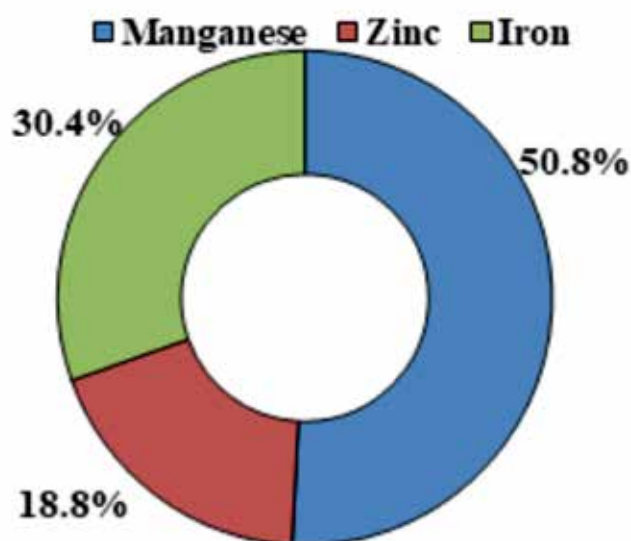


Figure 1. Nutrient deficiency wise distribution (% of total nutrient management related problems) of farmers' footfall in field, fruit and vegetable crops [distribution is based on 5 years (2014-2018) long-term average]

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that together comprised ~17 per cent of total weed related footfall. Farmer's footfall for weed related problems in rice and cotton was confined mainly in the month of June.

Insect-pests and physiological disorders in *kharif* season crops

Farmers' footfall for insect-pest management was highest between second fortnight of July and first fortnight of August and comprised ~40.5 per cent of total annual footfall related to scientific advisory (Table 1). and physiological disorder in *Bt* cotton. assid (2.9%), thrips (2.0%) and CuCLD (1.9%) were the other major insect pest, diseases. Of the total footfall for insect-pest and physiological disorders related problems, 22.9 per cent were related to *Bt*-Cotton and 21.8 per cent to rice (Table 3). Whitefly (*Bemisia tabaci*) was major insect in cotton and account for 46.6 per cent total footfall related to insect-pest related footfall during the *kharif* season and 10.7 per cent of total scientific advisory related footfall during the season. A considerable loss in seed cotton yield due to severe whitefly infestation and even complete crop failure at some fields has been observed in the study area during 2015 and 2016. Farmer's footfall for para-wilt related problem in *Bt*-cotton comprised 14.3 per cent of total insect-pest and physiological disorders related problems in cotton and 3.3 per cent of total scientific advisory related footfall. Similarly, farmer's footfall for jassid (*Amrasca biguttula*), thrips (*Thrips tabaci*) and leaf curl disease (LCV) comprised 2.9, 2.0 and 1.9 per cent of total insect-pest related problems, respectively.

Near about 1/5th farmer's footfall (17.6 %) were related to problem of plant hoppers (*Nilaparvata lugens*) in rice, that constitute 3.8 per cent of total footfall for scientific advisory related problems. Footfall related to problem of leaf folder (*Cnaphalocrocis medinalis*) and stem borer (*Scirpophaga incertulas*) constituted 14.2 and 11.7 per cent of total rice related insect-pest and physiological disorders related problems, respectively. Sheath blight and false smut were

major disease problem in rice, for which total footfall comprised 2.0 and 1.7 per cent of total footfall for scientific advisory related problems. Farmer's footfall for foot rot and neck blast, major diseases of basmati comprised 1.3 and 0.9 per cent of total scientific advisory related footfall. Footfall related to poor grain filling and discoloration of panicle attributed to physiological problems of rice, constituted 1.4 and 1.2 per cent, respectively of the total footfall for scientific advisory related problems in *kharif* season.

Rabi season crops

Table 4 illustrates that of the total *rabi* season footfall related to insect-pest and physiological disorders related problems, 22.9 in *kharif* season footfall was related to pink stem borer (*Sesamia infernce*) attack in wheat. Aphid (*Aphis gossypii*) was the second major insect-pest, accounting for 15.6 in total *rabi* season footfall related to insect-pest and physiological disorders related problems. About 14.6 per cent footfall was related to aphid (*Aphis gossypii*) attack in mustard crop. For rodent attack related problem in wheat, proportion of farmer's approached KVK was 8.3 per cent of total *rabi* season footfall. Footfall related to yellow rust in wheat and white rust in mustard comprised 11.5 per cent of total insect-pest and physiological disorders related problems. As a share of total footfall for scientific advisory related problems, footfall for insect-pest related problems in *rabi* crops was 8.8 per cent.

Nutrient management

About 21.9 per cent of total footfall related to scientific advisory related problems occurred for different nutrient management related problems (Table 1). Highest farmers' footfall for different nutrient management problems occurred in the month of June and December. It could be ascribed to deficiency of iron (Fe) and zinc (Zn) in rice nursery and transplanted crop in June. In the study region, soils under cotton-wheat cropping system are light in texture, compared with soils under rice-wheat cropping system. In light textured,

Table 1. Month-wise distribution of farmers' footfall for different scientific advisory services.

Month	Scientific advisory					
	Weed management	Nutrient management	Insect-pest management	Disease management	Chemical toxicity	Physiological disorders
January	21 (12.3) [†]	32 (18.7)	9 (5.3)	3 (1.8)	1 (0.6)	3 (1.8)
February	6 (3.3)	28 (15.5)	31 (17.1)	20 (11.0)	1 (0.6)	6 (3.3)
March	3 (1.3)	10 (4.5)	32 (14.3)	9 (4.0)	--	10 (4.5)
April	4 (1.3)	1 (0.3)	19 (6.0)	18 (5.7)	--	11 (3.5)
May	8 (1.3)	16 (2.6)	28 (4.5)	2 (0.3)	--	14 (2.2)
June	29 (7.6)	54 (14.1)	59 (15.4)	9 (2.3)	1 (0.3)	5 (1.3)
July	15 (5.6)	25 (9.3)	79 (29.3)	27 (10.0)	4 (1.5)	3 (1.1)
August	6 (2.5)	12 (5.1)	76 (32.2)	37 (15.7)	1 (0.4)	13 (5.5)
September	1(0.5)	--	47 (21.3)	18 (8.1)	1 (0.5)	9 (4.1)
October	1 (0.4)	--	39 (15.8)	28 (11.3)	--	8 (3.2)
November	4 (1.3)	24 (8.1)	7 (2.3)	3 (1.0)	--	16 (5.4)
December	26 (9.5)	38 (13.8)	18 (6.5)	1 (0.4)	1 (0.4)	4 (1.5)
Annual	124	240	444	175	10	102

[†]Values in the parentheses indicate percent of total farmers' footfall at Krishi Vigyan Kendra, Mansa

Table 2. Farmer's annual footfall for weed management related problems in major field crops.

Weeds	Footfall (No.)	Per cent of total weed related footfall	Per cent of total footfall for scientific advisory
<i>Phalaris minor</i>	42	33.9	3.8
<i>Chenopodium album</i>	19	15.3	1.7
<i>Trianthem partulacastrum</i>	12	9.7	1.1
<i>Poa annua</i>	2	1.6	0.2
<i>Fumari aparviflora</i>	4	3.2	0.4
<i>Cyperus rotundus</i>	16	12.9	1.5
<i>Rumex spp</i>	8	6.5	0.7
<i>Eleusine aegypticum</i>	5	4.0	0.5
<i>Arachne racemosa</i>	9	7.3	0.8
Other	7	5.6	0.6
Total	124	-	11.3

calcareous and are low organic carbon soils micro-nutrients particularly Fe and Zn deficiency is adversely affecting the crop production in the study area (Singh *et al*, 2017). In *kharif* 2017 and 2018, several farmers faced moderate to severe Fe deficiency in rice nursery. Figure 1 illustrates that of

the total farmer's footfall for nutrient management related problems, highest footfall occurred for Manganese (Mn, 50.8%) deficiency in *rabi* (wheat and barseem), followed by iron (Fe, 30.4%) in rice, groundnut, fodder maize and fruit crops, and the lowest for zinc (Zn, 18.8%).

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Table 3. Footfall for insect-pest and physiological disorders problems in major *kharif* crops.

Paddy/basmati	Footfall (No.)	Per cent of total insect-pest related to <i>kharif</i> crops	Per cent of total footfall for scientific advisory	<i>Bt</i> -Cotton	Footfalls (No.)	Per cent of total insect-pest related to <i>kharif</i> crops	Per cent of total footfall for scientific advisory
Plant hoppers	42	17.6	3.8	Whitefly	117	46.6	10.7
Leaf folder	34	14.2	3.1	Para-wilt	36	14.3	3.3
Stem borer	28	11.7	2.6	Jassid	32	12.7	2.9
Sheath blight	22	9.2	2.0	Thrips	22	8.8	2.0
False smut	19	7.9	1.7	CLCuV	21	8.4	1.9
Burning of leaf tips	15	6.3	1.4	BLB	7	2.8	0.6
Problem in grain filling	15	6.3	1.4	Mealy bug	6	2.4	0.5
Foot rot	14	5.9	1.3	Others	10	4.0	0.9
Discoloration of panicles	13	5.4	1.2				
Termite	12	5.0	1.1				
Neck blast	10	4.2	0.9				
Others	15	6.3	1.4				
Total	239	100.0	21.8	Total	251	-	22.9

Table 4. Footfall for insect-pest and physiological disorders related problems in *rabi* crops.

Wheat and mustard	Footfall (No.)	Per cent of total insect-pest related to <i>rabi</i> crops	Per cent of total footfall for scientific advisory
Pink stem borer in wheat	22	22.9	2.0
Aphid in wheat	15	15.6	1.4
Aphid in mustard	14	14.6	1.3
Termite in wheat	11	11.5	1.0
Rodent problem in wheat	8	8.3	0.7
Yellow rust in wheat	6	6.3	0.5
White rust in raya mustard	5	5.2	0.5
Hairy caterpillar in mustard	4	4.2	0.4
Others	11	11.5	1.0
Total	96	-	8.8

Table 5. Footfalls related to problems in horticulture and other important crops of Mansa district.

Footfall related to	Footfall (No.)	Per cent of total footfall for scientific advisory
Problems in fruits and vegetable crops	66	6.0
Problems in other important crops	53	4.8
Problems with honey bees	16	1.5

In December, ~13.8 per cent of total footfall was ascribed to severe Mn deficiency in wheat and barseem (Table 1). Manganese deficiency in wheat has been observed immediately after first irrigation to wheat. In wheat sown on light textured soils, Mn deficiency has also been observed at ear emergence stage in end February to first week of March. This has been the probable reason for high farmers' footfall in January (18.7% of total footfall) and in February (15.5% of total footfall). Of the total average farmers' footfall for scientific advisory related to nutrient management problems, 50.8 per cent was associated to Mn deficiency, followed by Fe (30.4%) and the lowest for Zn (18.8%) (Figure 5). In light textured soils, Mn deficiency is encountered in both the timely and late sown wheat varieties under irrigated and rainfed, resulting in yield loss (Singh *et al*, 2017 and 2018). In the study region, Singh *et al* (2017) reported that in Mn deficient soils, foliar application of manganese sulphate ($\text{MnSO}_4 \cdot 7 \text{H}_2\text{O}$) significantly ($p < 0.05$) increase in wheat grain yield compared with control (no-Mn application).

Horticulture and other crops

Farmers' footfall for different problems (insect-pest, diseases and physiological disorders) in fruits, vegetables and other important crops in Mansa district constituted 6.0 per cent of total footfall for scientific advisory related problems (Table 5). About 4.8 per cent footfall was related to problems in other important crops of the area viz. summer moong, fodder crops etc. Singh and Sharma (2017) also studied problem of varroa mite, robbing and colony collapse in honey bees. Kaur (2016) has reported that farmer's approach for problems related to insect-pest, diseases and nutrient deficiency related problems in fruits and vegetable crops.

CONCLUSION

Assessment of technological problems indicates the need of strengthening training component particularly focused on insect-pest and disease and nutrient management and weed management. In addition, short-duration training courses focused on weed management, amelioration of micro-nutrients (Fe, Zn and Mn) deficiency, insect-pests especially whitefly in *Bt*-Cotton and disease management (sheath blight, foot rot, neck blast) needs to be organized for enhancing knowledge of the farmers. Trainings on balanced and integrated nutrient management should be planned for efficient nutrient management in view of poor quality irrigation water and salt affected soils.

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