

RESEARCH PAPER

Awareness of pesticide label claims among soybean growers of Vidarbha

N. M. KALE, D. M. MANKAR, P. P. BHOPLE AND P. P. WANKHADE

Department of Extension Education
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola- 444104, Maharashtra, India
E-mail: nmkale1964@gmail.com

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Abstract: A systematic survey of 150 soybean growers was conducted in Akola, Buldana, Washim, Amravati, and Yavatmal districts of Vidarbha during 2015-16 as University Research Review Committee Project. The main objective of the study was to study the awareness level of the selected soybean growers, extension functionaries and proprietor of Krushi Seva Kendras about the pesticides label claims. The key findings revealed that 96.67 per cent soybean farmers and 62.50 per cent selected extension workers were observed in low awareness level group about the pesticides label claims. This study also clears that majority 77.50 per cent proprietors of Krushi Seva Kendras have high level of awareness about the label claim of pesticides. But it was noted that they were not using these awareness for promoting the uses of pesticides having label claims of CIB & RC among the farming community. They ignored the CIB & RC recommendations while selling the pesticides to farmers. The results regarding the adoption status of pesticides revealed that large number of the selected farmers using insecticides and fungicides without label claim (Have not approved by CIB&RC). That means these pesticides were registered for other crops by CIB&RC, but farmers using these for soybean crops. Hence this study clears that there is a need to create the awareness among the farming community and extension functionaries about the label claims of pesticides. It will help to improve the adoption status of pesticides having label claim for specific crop and specific purpose approved by the CIB&RC. It will also help to make uniformity in the recommendations made by the Central Insecticide Board and other institutions for betterment of farming community. Secondly it will also help to either set the MRLs of a pesticide for appropriate food commodities or to monitor pesticide residues for food safety.

Key words: Fungicides, Herbicides, Insecticides, Label claims, Pesticides

Introduction

Many of the farmers recently using the pesticides including herbicides, insecticides, and fungicides in all major field crops in India (Anon., 2013). Pesticide labels contain detailed information on how to use the product correctly and legally. Pesticide use in India is regulated by the Central Insecticides Board and Registration Committee (CIB & RC) and the Food Safety and Standards Authority of India (FSSAI). The CIB & RC registers pesticides for crops while the FSSAI sets the maximum residue limits (MRL) of pesticides for the crops it has been registered for (Anon., 2013). If a food has a higher level of residue than the MRL, it means that the food is not safe to eat. A residue above the MRL may show that the farmer has not used the pesticide properly (Anon., 2010b). As per the Sharma (2013) uses of spurious and non-recommended pesticides by the Central Insecticides Board and Registration Committee i.e. without approved label claims are the reasons of pesticide residues in food commodities.

A one-day workshop on "Approved Uses of Pesticides in Agriculture" was organized on August 30, 2010 by Department of Agriculture & Co-operation (DAC), Ministry of Agriculture at NASC Complex, Pusa, New Delhi under the Chairmanship of Joint Secretary (Plant Protection). Secretary, Central Insecticides Board & Registration Committee (CIB&RC) stated that use of pesticides is a hazardous sector and unless pesticides are used as approved by the Registration Committee, the whole environment could be at risk. Assistant Director General (Plant Protection), ICAR emphasized there have been issues country-

wide about the inadequate knowledge about the label claims and their utilization. About 90% of usage of pesticides is without approved label claims. These lead to presence of residues of those pesticides, which are not approved for use on particular crops. State Governments should ensure that the molecule recommended for use on one commodity and banned on another should not juxtapose each other (Anon., 2010a).

Recently non availability of labourers coupled with more cost is a very severe problem with the majority of the farmers (Kale, *et al.*, 2011 and Kale, *et al.*, 2013). Under such situation post-emergence herbicides remain the only viable option for an effective and economical method of weed control (Kumar *et al.*, 2003, Jha *et al.*, 2014, Dhaker, *et al.*, 2015 and Nandini Devi *et al.*, 2016). Secondly maximum number of farmers using various insecticides and fungicides in soybean crop in Vidarbha. Pesticide Companies registered its products as per the Insecticide Act 1968 and claimed that the registered products are for management of certain weed/ pest/disease in particular crop(s) only as per the written, printed or graphic label on the container approved by the government regulatory agencies i.e., Central Insecticides Board & Registration Committee (CIB&RC). When the farmers using the pesticides as per the crops specified on label approved by the CIB & RC, then we can say that farmers using the pesticides as per the label claim. But it was observed that farmers were unaware about the pesticides label claims and they mostly using the agricultural pesticides as the input dealers recommended them. Hence, the

present research study was planned with the main objective to study the awareness and adoption status of the pesticides as per the label claims by the soybean growers, extension functionaries and input dealers in Vidarbha .

Material and methods

The present investigation was carried out in Akola, Buldana, Washim, Amravati, and Yavatmal districts of Vidarbha region of Maharashtra by using the exploratory design of social research with multistage sampling method. From each district one Tahsil was selected where soybean crop cultivated by the majority farmers during 2015-16. From each selected tahsil 3 villages were selected randomly and from each selected village 10 farmers were interviewed with the help of structured interview schedule. Thus this investigation was confined to a sample of 150 farmers having soybean crops during the year 2015-16. A teacher made awareness test was developed to measure the awareness of an individual respondents about the label claims of pesticides, responses of the respondents were taken on two point continuum i.e. yes/no and numerical score of 1 and 0 was assigned respectively. Obtained awareness raw score were converted into awareness index by using following formula.

$$\text{Awareness index (\%)} = \frac{\text{Awareness score actually obtained}}{\text{Maximum obtainable awareness score}} \times 100$$

The respondents were categorized according to obtained awareness index score with equal interval method as low (Upto 33.33), medium (33.34 to 66.66) and high (Above 66.66) level of awareness regarding pesticide label claims. For studying the adoption status of pesticides researchers have consider the list of pesticides Registered under the Insecticides Act, 1968 for soybean crops up to 31.08.2015 available at CIB & RC website (Anon., 2016).

Results and discussion

Awareness of selected farmers about the pesticide label claims

Total 8 important statements about the pesticides label claims have been considered for accessing the awareness of selected farmers about the label claims. The results regarding the awareness of the selected respondents about the pesticides label claims have been presented in Table 1.

It was observed from Table 1 that each of the majority (97.00%) selected farmers were found to be unaware about Central Insecticide act 1968, Central insecticide Board and Registration Committee (CIB&RC), what the label claim of pesticides is and whether pesticides having label claim for the particular pest/disease/weed for particular crop. Whereas, 94.00% farmers were unaware about the doses of pesticides, quantity of water to be use for mixing the pesticide, waiting period of pesticides is given on the label of the pesticides container and their importance with seriousness.

Overall awareness level of farmers about the pesticides label claims

Overall knowledge level of selected farmers about selected eight statements about the pesticides label claims has been computed in the form of index and respondents have been distributed in three categories by equal distribution method as given in Table 2.

It was observed from the data depicted in Table 2 that majority (96.67%) farmers were found in low awareness level group, this group of farmers have heard the world label claims of pesticides first time during the interview by the researcher and only 3.33 per cent respondents have high level of awareness about the pesticides label claims. These groups of farmers were having either input shop or close contact with the input dealers. Hence have awareness about the pesticides label claims.

Awareness level of extension functionaries about the pesticides label claims

In addition to the soybean growers researchers have taken the representative sample of 40 Extension functionaries from the selected districts and tested their awareness about the label claims of pesticides. The data regarding the educational level of the selected extension functionaries and their awareness about the pesticides label claims are presented in Table 3 and 4 as follows.

It was observed from Table 3 that all selected extension functionaries were learned persons, out of the selected 57.50 per cent were Agricultural Diploma holders and remaining 42.50 per cent were agricultural graduates and post graduates.

Table 1. Distribution of the selected farmers according to awareness about the pesticides label claims

Awareness test statements about the pesticides label claims	Awareness (N=150)	
	Yes	No
Do you know about insecticide act 1968 ?	5 (3.33)	145 (97.00)
Do you know about the central insecticide Board and Registration Committee (CIB&RC)?	5 (3.33)	145 (97.00)
Do you know what the pesticides label claims is ?	5 (3.33)	145 (97.00)
While purchasing the pesticide do you ensure whether is having label claim for the pest/weed you want to control	5 (3.33)	145 (97.00)
Prior to spraying of pesticides do you read the instructions given on the label of pesticides?	5 (3.33)	145 (97.00)
While spraying pesticide do you spray as per the label claim dosages and against particular crop pest?	5 (3.33)	145 (97.00)
Do you know the pesticides doses should be mixed thoroughly in prescribed quantity of water as per label claim?	9 (6.00)	141 (94.00)
Do you know the waiting period of pesticide?	9 (6.00)	141 (94.00)

Table 2. Distribution of the respondents according to their level of knowledge about the pesticides label claims

Knowledge level	Respondents	Percentage
Low (Upto 33.33)	145	96.67
Medium (33.34 to 66.66)	0	00.00
High (Above 66.67)	05	3.33
Total	150	100.00

Table 3. Distribution of the selected extension functionaries according to their educational level

Educational level	Frequency	Percentage
Agri. Diploma	23	57.50
B.Sc. (Agri)/ M.Sc. (Agri)	17	42.50
Total	40	100.00

The results regarding the awareness of the extension functionaries about the pesticides label claims clears from Table 4 that 72.50 per cent extension workers of the state department of agriculture do not aware about the CIB and RC, followed by 65.00 per cent extension workers do not know about the insecticides act 1968. Whereas 55.00 per cent extension workers have awareness knowledge about the label claims of pesticides, awareness about to be read the pesticides label before advice to the farmers and 45.00 per cent extension functionaries know about the waiting period of pesticides in study area. The overall awareness level of selected extension functionaries about selected five statements about the label claims of pesticides has been computed in the form of index and respondents has

been distributed in three categories by equal distribution method as given in Table 5.

It was observed from Table 5 that 62.50 per cent selected extension functionaries were observed in low level of overall awareness about the selected five statements of pesticides label claims. It was followed by 20.00 per cent falls in medium category and remaining 17.50 per cent observed in high awareness level about the label claims of pesticides. Hence this study clears that awareness knowledge of the extension functionaries should have to be enhanced through the training programmes by the State Department of Agriculture and KVKs.

Awareness level of proprietors of Krushi Seva Kendras

In addition to the soybean growers and extension functionaries of study area researchers have taken the representative sample of 40 input dealers from the selected districts and tested their awareness about the label claims of pesticides. The data regarding this have been presented in Table 6 as follows.

Awareness of proprietors of Krushi Seva Kendras about the label claim of pesticides have been studied and the results were depicted in Table 6 clears that majority (92.50%) of the input dealers (Proprietors of Krushi Seva Kendras) were aware about the label claims statements constructed by the researchers. The overall awareness has been also computed in the form of awareness index and results are presented in Table 7 as follows.

Table 4. Distribution of the extension functionaries according to awareness about the pesticides label claims

Awareness test statements about the pesticides label claims	Awareness (N=40)	
	Yes	No
Do you know about the insecticide act 1968?	14 (35.00)	26 (65.00)
Do you know about the Central Insecticide Board and Registration Committee (CIB&RC)?	11 (27.50)	29 (72.50)
Do you know what the pesticides label claims are?	22 (55.00)	18 (45.00)
Do you know prior to giving advice to the farmers every extension personnel have to read the label of pesticides and give advice as per the label claims?	21 (52.50)	19 (47.50)
Do you have knowledge about the waiting period of pesticides?	18 (45.00)	22 (55.00)

Table 5. Distribution of the selected extension functionaries according to their overall awareness level about pesticides label claims

Awareness level	Respondents	Percentage
Low (Upto 33.33)	25	62.50
Medium (33.34 to 66.66)	08	20.00
High (Above 66.66)	07	17.50

It was noted from the results depicted in Table 7 that majority 77.50 per cent proprietors of Krushi Seva Kendras were aware about the pesticides label claims, followed by 17.50 per cent have medium level of awareness and remaining 5.00 per cent falls in low level category of awareness about the pesticides label claims in study area. But it was noted that they were not

Table 6. Distribution of the selected Proprietors of Krushi Seva Kendra according to knowledge about pesticides label claims

Awareness test statements about the label claim	Knowledge (N=40)	
	Yes	No
Do you know about insecticide act 1968 ?	31 (77.50)	09 (22.50)
Do you know about the central insecticide Board and Registration Committee ?	27 (67.50)	13 (32.50)
Do you know what the pesticides label claims are?	37 (92.50)	03 (07.50)
Do you know prior to selling of pesticides you have read the instructions given on the label of pesticides?	37 (92.50)	03 (07.50)
Do you know while selling the pesticide to ensure whether is having label claim for the specific purpose and for specific crop.	38 (95.00)	02 (05.00)
Do you know while recommending pesticide dosages you have to give the advice to the farmers as per the dosages mentioned on label claim?	37 (92.50)	03 (07.50)

Table 7. Distribution of the selected proprietors of Krushi Seva Kendra according to their level of awareness about pesticides label claims

Awareness level	Respondents	Percentage
Low (Upto 33.33)	02	5.00
Medium (33.34 to 66.66)	07	17.50
High (Above 66.67)	31	77.50
Total	40	100.00

using these awareness knowledge for promoting the uses of pesticides having label claims of CIB & RC among the farming community. They ignored the CIB & RC recommendations while selling the pesticides to farmers. These may lead to presence of residues of those pesticides, which are not approved for use on particular crops.

Adoption status of herbicides as per the label claims

Herbicide use frequency of selected soybean growers during 2015-16 have been studied and the results regarding the herbicide use frequency and herbicide adoption status as per label claims and not as per label claims by the soybean growers have been presented in Table 8 and 9 respectively as follows.

It was observed from Table 8 that 46.00 per cent soybean growers have not applied the herbicides during the 2015-16; it might be due to the non availability of sufficient moisture in soil due to long gap in monsoon rains after sowing. More than fifty (54.00%) per cent soybean farmers have applied herbicides once in crop duration.

It was noted from Table 9 that all the selected soybean farmers have used the herbicides as registered (Approved uses) by CIBRC for soybean crop and majority (88.89%) soybean growers have used imazethapyr 10% SL.

Table 8. Distribution of the soybean growers according to the herbicide use frequency

Herbicide use frequency	Respondents	Percentage
Not applied	69	46.00
Once in crop duration	81	54.00
Total	150	100.00

Table 9. Herbicide adoption status as per label claim by the soybean growers

Name of Herbicides used	No of farmers N=81	% over adopters	Whether registered by CIBRC for the Soybean crop
Imazethapyr 10% SL	72	88.89	Registered for soybean crop
Imazamox 35% + Imazethapyr 35% WG	8	9.88	Registered for soybean crop
Propanil 10% EC	3	3.7	Registered for soybean crop
Quizalofop-ethyl 10% EC	1	1.23	Registered for soybean crop

Table 10. Distribution of the soybean growers according to the insecticides use frequency

Insecticides use frequency	Respondents	Percentage
One Sprays	32	21.33
Two Sprays	75	50.00
Three Sprays	34	22.67
Four Sprays	8	05.33
Not applied	1	00.67
Total	150	100.00

Adoption status of insecticides as per the label claims

Insecticides use frequency of selected soybean growers during 2015-16 have been studied and the results regarding the insecticides use frequency and insecticides adoption status as per label claims and not as per label claims by the soybean growers have been presented in Table 10 and 11 respectively as follows.

It was observed from Table 10 that near about cent per cent (99.33%) soybean farmer have applied the insecticides on soybean crop. Results' regarding insecticides use frequency of soybean growers during 2015-16 clears that exactly fifty (50.00%) per cent soybean growers have applied two sprays during crop duration followed by three sprays (22.67%) and single spray (21.33%). Insecticides registered for soybean by CIBRC and used by the selected soybean growers along with insecticides not registered for soybean by CIBRC but used by the selected soybean growers have been depicted in Table 11.

The data presented in Table 11 clears that only three insecticides having label claims of CIB&RC for soybean crop those are used by the soybean growers and rest of the insecticides that have been used not have the label claims for soybean crop. The list of these insecticides is presented in Table 11. It was found from Table 11 that large numbers of farmers have used insecticides on soybean crop which was not registered for soybean crop by CIB & RC but used by the selected soybean growers.

Adoption status of fungicides as per the label claims

Fungicide use frequency of selected soybean growers during 2015-16 and adoption status of fungicides as per the label claims have been studied and the results regarding the fungicides use frequency and fungicides adoption status as per label claims and not as per label claims by the soybean growers have been presented in Table 12 and 13 respectively as follows.

It was noted from Table 12 that 62.67 per cent soybean growers have not applied any fungicides on soybean crop during 2015-16. Whereas, 22.67 per cent soybean growers have

applied one spray and 14.66 per cent applied two sprays during crop duration. Fungicides registered for soybean by CIBRC and used by the selected soybean growers along with fungicides not registered for soybean by CIBRC but used by the selected soybean growers have been depicted in Table 13.

It was from Table 13 that large numbers of farmers have used fungicides on soybean crop which were not registered for

Table 11. Insecticides used by the soybean growers

1. Insecticides used as per label claim	No of farmers N=149	% Over adopters
Chlorantraniliprole 18.5% SC (Coragen)	54	36.24
Triazophos 40%EC	45	30.2
Profenofos 50%EC	16	10.74
2. Insecticides used but not as per label claims	No of farmers N=149	% Over adopters
Profenofos 40% + Cypermethrin 4% EC	40	26.85
Flubendiamide 39.35 % m/m SC	37	24.83
Emamectin Benzoate 5% SG	26	17.45
Chlorpyrifos 20% EC	26	17.45
Monocrotophos 36% SL	12	8.05
Diamethoate 30%	10	6.71
Acephate 75% SP	9	6.04
Quinalphos 20% AF	8	5.37
Acetamiprid 20% SP	6	4.03
Lambda-cyhalothrin 4.9% CS	3	2.01
Indoxacarb 14.5% SC	2	1.34
Chlorpyrifos 16% + Alphacypermethrin 1%	2	1.34
Biological Insecticides		
Dextrose + Media 51.50% + Neurospora		
Crassa 10%	6	4.03
NPV of Helicoverpa Armigera 0.5% AS	2	1.34
Metarhizium anisopliae 1.5% WP	2	1.34
Azadirachtin 0.03% 300PPM	2	1.34

soybean crop by CIBRC but used by the selected soybean growers. These are Carbendazim 12% + Mancozeb 63% WP (41.07%) followed by Carbendazim 50% WP (7.14%), Mancozeb 75% WP (5.36%) and Thiophanate Methyl 70% WP (3.57%).

Conclusion

In selected five district of Vidarbha 96.67 per cent farmers and 62.50 per cent selected extension workers were observed in low awareness level group about the pesticides label claims. Whereas, majority (77.50%) proprietors of Krushi Seva Kendras have high level awareness about the label claim of pesticides, but they are not using these awareness knowledge for promoting the uses of pesticides having label claims of CIB & RC among the farming community. They ignored the CIB & RC

Table 12. Distribution of the soybean growers according to the Fungicides use frequency

Fungicides use frequency	Respondents	Percentage
One sprays	34	22.67
Two sprays	22	14.66
Not applied	94	62.67
Total	150	100.00

Table 13. Fungicides used by the soybean growers

1. Fungicides used as per label claim	No of farmers N=56	% Over adopters
Propiconazole 25% EC (Tilt)	18	32.14
Pyraclostrobin 20% WG (Headline)	27	48.21
2. Fungicides not as per label claims	No of farmers (N=56)	% Over adopters
Carbendazim 12% + Mancozeb 63% WP (Saaf, Sprint)	23	41.07
Carbendazim 50% WP	4	7.14
Mancozeb 75% WP	3	5.36
Thiophanate Methyl 70% WP	2	3.57

recommendations while selling the pesticides to farmers. The results regarding the adoption status of pesticides revealed that large number of the selected farmers has used the insecticides and fungicides without label claim (Have not approved by CIB&RC). That means these pesticides were registered for other crops by CIB&RC, but farmers using these for soybean crops. Hence this study clears that there is a need to create the awareness knowledge among the farming community and extension functionaries about the pesticide label claims. Similarly make mandatory to all input dealers to sale the pesticides as per the pesticides label claims for improving the adoption status of pesticides having label claim for specific crop and specific purpose approved by the CIB & RC to make uniformity in the recommendations made by the Central Insecticide Board and all other government institutions for betterment of farming community. Secondly it will also help to set the minimum residual limits (MRLs) of a pesticide for appropriate food commodities and to monitor pesticide residues for food safety.

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