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Use of various pesticides and opinion of green chilli growers about green chilli growing in Amravati and Buldana district

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Abstract
The present research was undertaken on topic 'Perception of green chilli growers regarding environmental risk in use of pesticides in Vidarbha region of Maharashtra state' conducted purposively in two district viz, Amravati and Buldana as it considered as a progressive agricultural belt, best suited climate, soil, irrigation facilities, skill and intensive cultivation practices adopted by the green chilli farmers and maximum area under green chilli crop. Ex-post facto research design was used for the present research. Out of two districts, two talukas and 20 villages had maximum area under green chilli were selected i.e Total 300 green chilli growers constitute the sample size. The findings of the research study revealed that Majority of the green chilli growers (50.33%) were found in the middle age group, followed by (26.33%) in young age group and rest (23.34%) of green chilli growers in old age group whereas Higher percentage of the green chilli growers (31.00%) had educated up to higher secondary level, large majority (63.33 %) of the green chilli growers had medium level of knowledge regarding different areas of pesticides, 19.33 of the green chilli growers had low level of knowledge regarding different areas of pesticides, followed by 17.34 per cent of green chilli growershad highlevel of knowledge regarding different areas of pesticides. (49.00%) of the green chilli growers followed recommended doses of Dr. PDKV, Akola module, while 51.00 per cent of the green chilli growers used higher doses without Dr. PDKV, Akola module i.e other type of pesticides for sprying on green chilli crop in their field. Majority (93.00%) of the green chilli growers had expressed that growing of green chilli crop is profitable enterprise, 83.00 per cent expressed that growing of green chilli that is laborious job followed by (67.00%) green chilli growers had expressed growing of chilli crop is easy in cultivation than other crop.

Keywords: Profile, opinion, use of pesticide, green Chilli

Introduction
With the growing demand for enhancing food grain production to feed more than 121 crore people at one end and increasing yield losses due to pest infestation on the other, the farmers of India till recently have been relying on pesticides and chemical fertilizers. It is estimated that about thirty percent of the potential of food production is lost due to insect pests, diseases, weeds, rodents and birds. In terms of money, it is estimated that every year crops worth Rs.6000 crore are lost due to pests. India, being a predominantly agricultural country, the foundation for the prosperity lies on agricultural production. Since, the task of feeding the large population, which is growing at phenomenal rate of 2.3 per year, is main problems of Indian agriculture to maintain per capita net availability of food grains which is admittedly inadequate. On the other hand there is huge loss of food grains due to damage caused by insect-pests, diseases and rodents. In India, the annual loss in food products by insect pests was estimated to the tune of 50 per cent amounting Rs. 90,000 crores. (Dureja & Gupta, 2009) [6]. In the light of this, it is evident that the yield of crop can be increased significantly by adopting integrated pest management approaches. Technologically, chemical control is still the most effective method of controlling most of the insect pests, diseases and weeds, despite intensive researches into alternative methods and is still remain the powerful tools for pest management in spite of recent popular pressure to control and limit their use (Smith and Pimentel, 1978) [14]. Exposure to pesticides both occupationally and environmentally causes a range of human health problems. It is estimated that nearly 10,000 deaths annually due to use of chemical pesticide worldwide, with about three-fourths of these occurring in developing

countries. Horrigan, *et al*. (2006) [7]. Chilli is one of the most valuable crop of India. Pungency in chillies is due to the active constituent "Capsaicin", an alkaloid, is extracted from chillies and is used to medicine. The fruit is actually called 'Chilli' and is used as a spice in a variety of cuisines all over the world in different forms as green chilli, dried red chilli (Jagtap-2012) [8].But, now a days farmer are using excessive amount of pesticides in a wrong manner with disproportionate dosage, which leads to higher cost of cultivation as well as ecological imbalance. Hence, reducing the hazards arising due to pesticides needs, immediate action to be taken by the environmentalists and all other concerned to mitigate the health hazards to the enormous human population. In a country like India where farming is a family affair, the problem of reaching the target group gets further compounded. The farming family as a whole needs to be educated, then only the damages could be checked or at least minimized to a safe level. Only when they start to understand and appreciate the risks involved in the use of pesticides, then only changes can take place in the desired direction i.e. IPM.

Material and Methods

Locale of the study

The present study was undertaken in purposively selected, Amravati and Buldana district*s* of Vidarbha region of Maharashtra state. Total two talukas namely Morshi and Chikhali were purposively selected for this study. For this study,Ex-post-facto research design was applied. Thus, from two talukas and 20 villages' 300 green chilli growers constitute the sample size.

Selection of respondents

The green chilli growers were selected from the list obtained from Taluka Agriculture Officer of Morshi and Chikhli taluka of Amravati and Buldana district. The farmers, who cultivated chilli crops for consecutive last three years, using pesticides and having minimum area 0.40 ha. under chilli cultivation, 15 green chilli growers were selected from each selected village randomly by lottery method of random sampling. Thus, from two talukas and 20 villages' 300 green chilli growers constitute the sample size. The whole sample was considered as respondents and they were interviewed for collection of data.

Measurement of profile of green chilli growers

To describe the green chilli growers according to their personal, socio-economic and psychological characteristics they were grouped into various categories on the basis of available data as under:

Table 1: Profile along with technique used for measurement

Sr.	Name of the Variables	Measurement Technique
1	Age	Chronological age of the respondents
2	Education	The standards of formal education accomplished by green chilli growers considered as a score.
3	Experience in farming	No. of years of experience
4	Size of family	It refers to number of members in the family of green chilli growers.
5	Land holding	Total hectare of land possessed
6	Area under chilli crop	The actual area grown under green chilli crop by the chilli growers
7	Annual income	Income in rupees received by the green chilli growers and his family member derived from all sources in a year was considered as a score.
8	Source of information	All probable source of information about pesticide application will be listed out and chilli grower's responses to them will be elicited on three point continuum: always, sometime and never.
9	Risk orientation	Scale developed by Patel,2008 was used
10	Economic motivation	Scale developed by Supe,1969 was used
11	Cropping pattern	Structured schedule was used.
12	Irrigation facilities	The categorization and scoring procedure developed by Koshti, 2013 was used.
13	Availability of labour	Structured schedule was used.
14	Knowledge regarding different areas of pesticide	Teacher made knowledge test, structured schedule was used.
15	Attitude towards pesticide use	Scale developed by Patel.1994, with certain modification was used

Results and Discussion

The results obtained from the present study as well as discussions have been summarized under following heads

Profile of green chilli growers

The study of personal, socio-economic and psychological characteristics was made with reference to age, education, experience in farming, family size, land holding, area under chilli crop, annual income, sources of information, risk orientation, economic motivation, cropping pattern, irrigation facility, availability of labour, knowledge regarding different areas of pesticide and attitude towards pesticide use etc, were selected and studied. The findings have been tabulated, analyzed and presented under the following sub heads

Table 2: Distribution of green chilli growers according to their sub heads n=300

S.N	Category	Level	Frequency	Percentage
1	Age			
	Young	(Up to 35 years)	79	26.33
	Middle	(36 to 50 years)	151	50.33
	Old	(Above 50 years)	70	23.34
2	Education			
	Illiterate	No schooling	03	01.00
	Primary School)	(1^{st} to 4^{th} standard	44	14.67
	Middle School	(5^{th} to 7^{th} standard)	40	13.33
	High School	(8^{th} to 10^{th} standard)	53	17.67
	Higher secondary	(11^{th} to 12^{th} standard)	93	31.00
	Graduate College	(Above 12^{th} standard)	67	22.33
3	Experience in farming			
	Low	(Up to 12 years)	99	33.00
	Medium	(13 to 31 years)	143	47.66
	High	(Above 31 years	58	19.34
4	Family Size			
	Small size	(Up to 5 members)	128	42.67
	Large size	(More than 5 members)	172	57.33
5	Land holding			
	Marginal	(Up to 1.00 ha.)	10	3.33
	Small	(1.01 to 2.00 ha.)	68	22.67
	Semi medium	(2.01 to 4.00 ha)	143	47.67
	Medium	(4.01 to10.00 ha)	71	23.67
	Large	(Above 10.00 ha.)	08	2.66
6	Area under chilli crop			
	Less	(Up to 0.80 ha)	264	88.00
	Medium	(0.81 to 1.60 ha)	24	08.00
	Large	(Above 1.60 ha)	12	04.00
7	Annual income			
	Low	Up to Rs. 2,00,000/-	55	18.33
	Medium	Rs. 2,00,001/- to 4,00,000/-	147	49.00
	High	Above 4,00,000/-	98	32.67
8	Source of information			
	Low	(Up to 10.12)	68	22.67
	Medium	(10.13 to 20.36)	165	55.00
	High	(Above 20.36)	67	22.33
9	Risk orientation			
	Low	(Up to 29.13)	26	8.67
	Medium	(29.14 to 35.21)	224	74.66
	High	(Above 35.21)	50	16.67
10	Economic motivation			
	Low	(Up to 19.33)	41	13.67
	Medium	(19.34 to 24.41)	222	74.00
	High	(Above 24.41)	37	12.33
11	Cropping pattern			
	Mono-cropping	(1)	169	56.33
	Double cropping	(2)	95	31.67
	Multiple cropping	(3)	36	12.00
12	Irrigation facility			
	None / rainfed	0	0	0.00
	River	1	27	9.00
	Well / tube well/ farm pond	2	240	80.00
	Canal	3	18	6.00
	Canal+ river/ well/ farm pond	4	15	5.00
13	Labour availability			
	Family Members	1	81	27.00
	Hired Labour	2	180	60.00
	Skilled labour	3	39	13.00
14	Knowledge regarding different areas of pesticides			
	Low	(Up to 43.19)	58	19.33
	Medium	(43.20 to 69.31)	190	63.33
	High	(Above 69.31)	52	17. 34
15	Attitude of farmers towards pesticide application			
	Strongly unfavorable	(Up to 43.14)	60	20.00
	Unfavorable	(43.15 to 47.44)	22	07.33
	Moderately Favourable	(47.45 to 56.04)	92	30.67
	Favorable	(56.05 to 60.33)	69	23.00
	Strongly favorable	(Above 60.33)	57	19.00

Major findings

1. Majority of the green chilli growers (50.33%) were found in the middle age group, followed by (26.33%) in young age group and rest (23.34%) of green chilli growers in old age group.
2. Higher percentage of the green chilli growers (31.00%) had educated up to higher secondary level, followed by (22.33%) of graduate college level of education, 17.67 and 13.33 per cent of them had high school and middle school level respectively, 14.67 percent had primary level of education. And only three green chilli growers (1.00%) were found illiterate.
3. Near fifty percent of the green chilli growers (47.66%) had medium level of experience in chilli farming, while 33.00 and 19.34 per cent of them had low and high level of experience in chilli farming, respectively.
4. Majority (57.33%) of green chilli growers were found in large size of family i.e. more than 5 members and rest 42.67 per cent of green chilli growers had small size of family.
5. About (47.67%) of the green chilli growers were in semi-medium, followed by 23.67, 22.67, 3.33 and 2.66 per cent of them who had medium, small, marginal and large size of land holding, respectively.
6. Majority of the green chilli growers(88.00%) had less area under chilli crop followed by (8.00%) of them who had medium area under green chilli crop and the meager of the green chilli growers(4.00%) were found to have large area under green chilli crop.
7. Around the green chilli growers (49.00%) were found with medium annual income i.e. Rs 2, 00,001 to 4, 00,000/-, followed by 32.17 and 18.33 per cent of them with high and low annual income, respectively.
8. Majority of the green chilli growers (55.00%) were utilizing the sources of information to the medium level, it was followed by (22.67%) of the green chilli growers who were in low level of utilization of information sources and 22.33 per cent of the green chilli growers were in high category for utilization of information sources about pesticide use.
9. Majority (74.66%) of the green chilli growers had medium level of risk orientation, followed by high and low risk orientation with 16.67 per cent and 8.67 per cent, respectively.
10. Majority (74.00%) of green chilli growers belongs to medium economic motivation category. Whereas, 13.67 per cent and 12.33 per cent of them had low and high level of economic motivation, respectively.
11. Majority of the green chilli growers (56.33%) were following mono- cropping pattern, followed by (31.67%) of the green chilli growers with double- cropping pattern and 12.00 per cent of the green chilli growers were found in multiple cropping pattern.
12. Majority of the green chilli growers (80.00%) were having well and tube well water as source of irrigation. Nine per cent of the green chilli growers (9.00%) were having the river water as source of irrigation, followed by six per cent of the green chilli growers (6.00%) who use canal water for irrigation and five per cent green chilli growers who had farm pond as source of water for protective irrigation for chilli crop.
13. Majority of the green chilli growers(60.00%) hired labour as labour source were engaged for growing chilli crops, whereas to the (27.00%) and 13..00 percent of the green chilli growers the source of labour availability was family members and Skilled labour respectively
14. Majority (63.34%) of the green chilli growers had medium level of knowledge regarding different areas of pesticides, while 19.33 and 17.33 per cent of green chilli growers had low and high level of knowledge regarding different areas of pesticides, respectively.
15. Less than one third (30.67%) of green chilli growers had moderately favorable attitude towards pesticide application, followed by favorable attitude (23.00%), strongly unfavorable attitude (20.00%),strongly favorable attitude (19.00%) and unfavorable attitude only (7.33%) towards pesticide application.

Use of various pesticides by green chilli growers

In the present study to knowhow about various type of pesticides use by the green chilli growers. Adequate knowledge regarding use of pesticides is essential to chilli farmers for the efficient and effective type of pesticides for profitable chilli cultivation. It was therefore necessary to obtain information from the green chilli growers about use of various pesticides for the cultivation of green chilli crop. The data regarding use of various pesticides (Dr. PDKV, Akola module and others) by green chilli growers are given in table 3

Table 3: Distribution of green chilli growers according to their use of various pesticides n=300

Sl. No.	Pesticides (Dr. PDKV module)	Frequency	Percentage
1	Dimethoate 30 % EC 10 ml+ Mancozep 20 g or Sulphur 80 % 25 g or Neem extract 5% + COC 25g +10 lit water	147	49.00
2	Dimethoate 30 % EC 10 ml+ Mancozep 20 g or Sulphur 80 % 25 g or Neem extract 5% + COC 25g + Zyrum 80 % 20 g, 10 lit water		
3	Dimethoate 30 % EC 10 ml+ Mancozep 20 g or Sulphur 80 % 25 g or Neem extract 5% + COC 25g + Zyrum 80 % 20 g, 10 lit water		
4	Malathion 50 % 20 ml + Sulphur 80 % 25 g + Mancozep 20 g + 10 lit water		
5	Neem extract 5% + Sulphur 0.25 % 25 g +10 lit water		
6	Dimethoate 30 % EC 10 ml or Methyl Demeton 25 % EC 8 ml + Mancozep 25g + 10 lit water		
7	Sulphur 0.25 % 25 g +10 lit water		
8	Others	153	51.00

The data presented in the table 3, clearly indicated that (49.00%) of the green chilli growers followed recommended doses of Dr. PDKV, Akola module, while 51.00 per cent of the green chilli growers used higher doses without Dr. PDKV, Akola module i.e other type of pesticides for sprying on green chilli crop in their field.

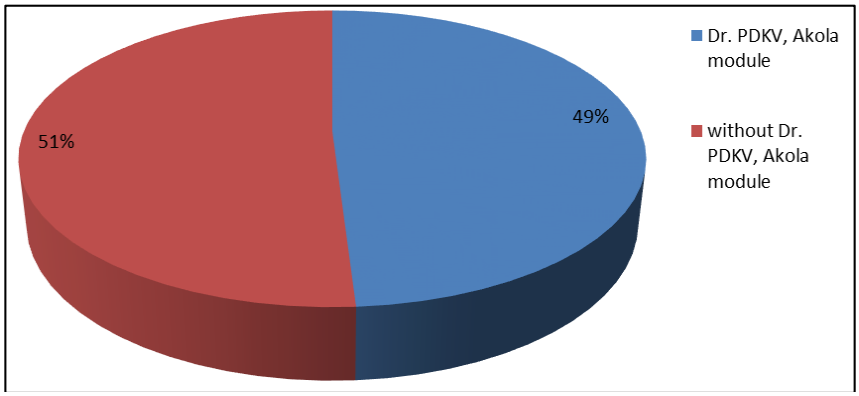

Fig 1: Distribution of green chilli growers according to their use of various pesticides

Number of spray actually taken by green chilli growers in green chilli crop

The number of sprays followed with pest surveillance and as per Economic Threshold Level (ETL) they may play important role for pest control. It is presumed that the green chilli growers who follow the spray schedule as per the recommended module by Dr. PDKV, Akola in scientific way, the quality of green chilli is good and hence it was felt necessary to study the present study. Hence the pattern of spray schedule followed by the green chilli growers was studied and presented in table 4

Table 4: Distribution of green chilli growers according to number of spray taken on green chilli crop

Sl. No.	Number of sprays	Respondents (n=300)	
		Frequency	Percentage
1	Up to 7	24	08.00
2	8 to 14	48	16.00
3	15 to 21	90	30.00
4	Above 21	138	46.00
	Total	300	100.00

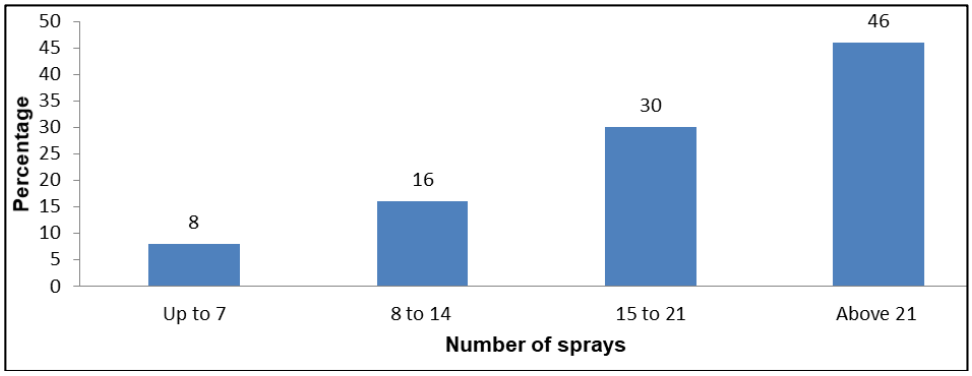

Fig 2: Distribution of green chilli growers according to number of spray taken on green chilli crop

It is observed from the table-4 that, about (46.00%) green chilli growers were using more than 21 number of sprays in green chilli crop, 30.00 per cent green chilli growers using 15 to 21 number of sprays, it was followed by (16.00%) of the green chilli growers had used 8 to 14 number of sprays in chilli crop. Meager percentile (8.00%) of the green chilli growers had used up to 7 numbers of sprays in chilli crop. Similar finding was also reported by Jeyanthi and Kombairaju (2005), Abang (2013), Amle (2016) [1] and Indury Venkata Reddy (2017)

2 Awareness about label claim in insecticide/pesticides

To know the level of awareness among the green chilli growers in relation to label claim for application of specific and recommended insecticides/ pesticides for chilli crop was also ascertained and the results obtained are presented in table 5

Table 5: Distribution of the green chilli growers according level of awareness among the respondents about label claim in insecticide/ pesticides

Awareness/Knowledge about label claim	Respondents(n=300)	
	Frequency	Percentage
Aware about "Label Claim" for application of specific and recommended of insecticide / Pesticides / Fungicides / Herbicides in chilli crops.	09	03.00
Not aware about label Claim	291	97.00

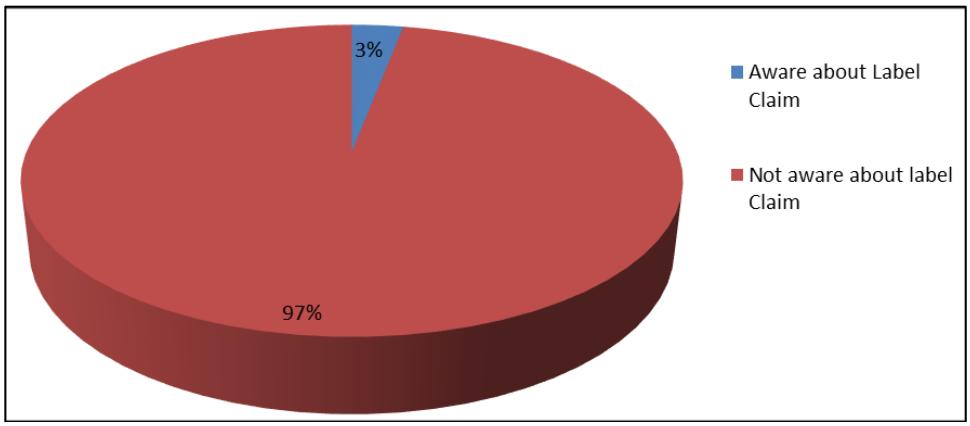

Fig 3: Distribution of the green chilli growers according level of awareness among the respondents about label claim in insecticide/ pesticides

It is very clear from table 5 that, majority (97.00%) of the green chilli growers were completely unaware about use of pesticides according to label claim, meager percentage (03.00%) of green chilli growers told that they have heard about use of insecticide/pesticides according to label claim**.** Similar finding was also reported by Jeyanthi and Kombairaju (2005), Kale (2016) and Amle (2016) [1]

Opinion of green chilli growers about green chilli growing.
To know the opinion about chilli growing of the green chilli growers rating was ascertained and the results obtained are presented in table 6.

Table 6: Distribution of green chilli growers according to their opinion in chilli growing

Sl. No.	Opinion	Respondents(n=300)	
		Yes	No
1	Do you feel that green chill growing is profitable	279 (93.00)	21 (07.00)
2	Do you feel that green chilli growing is laborious job	249 (83.00)	51 (17.00)
3	Do you feel that green chill growing is easy in cultivation than other crop	201 (67.00)	99 (33.00)

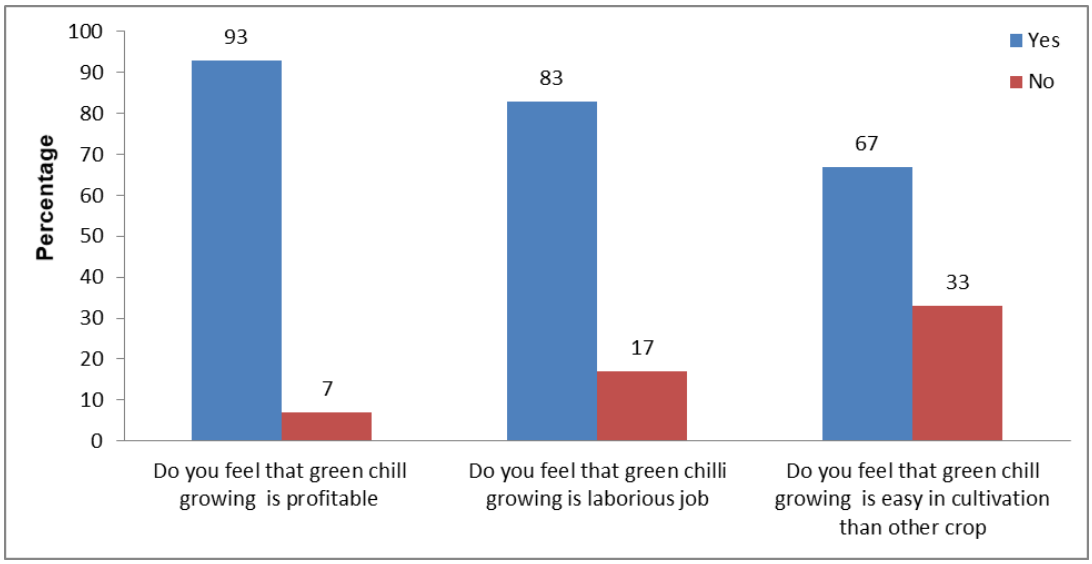

Fig. 29: Distribution of green chilli growers according to their opinion in chilli growing

The expression of the green chilli growers precise in table 6 that, majority (93.00%) of the green chilli growers had expressed that growing of green chilli crop is profitable enterprise, 83.00 per cent expressed that growing of green chilli that is laborious job followed by (67.00%) green chilli growers had expressed growing of chilli crop is easy in cultivation than other crop.

Conclusion

Thus, it is concluded that nearly half of the green chilli growers (46.00%) were using more than 21 numbers of sprays for control of insect and pests. The probable reason for taking more number of sprays might be the less infestation of pest and diseases of chilli crop whereas majority of the green chilli growers (97.00%) who were not at all aware about use of pesticides for chilli crop according to label claim. In fact it is very imperative to make aware the green chilli growers through the concerned department/agencies to make aware the farmers and to impart the knowledge about label claim, so that not only the chilli growers but also all crop growers will use the proper insecticides/pesticides as per the label claim to avoid future consequences.

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