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Gayakwad VS
Assistant Professor, Agricultural Extension Education, Late R G Deshmukh College of Agriculture, Tiwasa, Maharashtra, India

Deshmukh AN
Head, Department of Agricultural extension education, Shri Shivaji Agriculture College, Amravati, Maharashtra, India

Lade AH
Assistant Professor, Agricultural extension education, G H Raisoni University, Saikheda, Madhya Pradesh, India

Corresponding Author:
Gayakwad VS
Assistant Professor, Agricultural Extension Education, Late R G Deshmukh College of Agriculture, Tiwasa, Maharashtra, India

Awareness of farmers about agricultural pollution

Gayakwad VS, Deshmukh AN and Lade AH

Abstract
The present study was conducted in Amravati district of Vidarbha region of Maharashtra state. The study "Awareness of farmers about agricultural pollution" was conducted in Amravati and Teosa Talukas of Amravati district, from this talukas ten villages selected and from each village eight respondents were selected, 80 respondents were purposively selected for study. Exploratory research design was used for the research study. It was noticed that, eighty five percent (85.00%) of the respondents were aware about excessive use of herbicide had adverse effect on population of soil microorganism, more than eighty percent (81.25%) of the respondents were aware that use of chemical fertilizer in agriculture is potential source of water pollution, slightly more than ninety percent (91.25%) of the respondents were high noise causes rapid heart beating, ninety percent (90.00%) of the respondents were aware that open burning of harvest waste is bad management practice, more than three fourth (80.00%) of the respondents were aware that livestock waste spread inflectional diseases in human being, more than seventy five percent (78.75%) of the respondents were aware that sewage water affects the germination of seeds, more than three fourth (77.50%) of the respondents were aware that waterlogged condition affects the plant growth by irrigation water, respectively.

Keywords: Agricultural pollution, awareness

Introduction
In India after green revolution use of agricultural chemicals got momentum and rose by many folds. It is the period when agriculture in India improved due to the adoption of novel methods and technology in agriculture. As these were used more unscientifically, they started showing negative impact on the soil, water, and as whole on the environment, which otherwise could be termed as pollution. The report of workshop on climate change and sustainable agriculture have opined that the green revolution has done more harm than good to the agriculture sector in the country from a long-term perspective (Anonymous, 2009) [1]. They suggested that farmers return to traditional practices in farming in order to make the vacation sustainable future. In other word agriculture pollution is defined as the phenomenon of damage, contamination and degradation of environment and ecosystem and health hazard due to the by-products of farming practices. Some forms of agriculture pollution would be excess fertilizer run off, polluted streams also polluting ground water. Pollution with some pesticides, air pollution causes due to dust, burning of field harvest waste. Livestock waste is responsible for greenhouse gas emission, some air pollution with odour from feeding flocks and large chicken houses. With this some agricultural practices like use of sewage water for irrigation purpose affects the P^H of soil. Throwing of dead animal near the residential area or in the water resources causes pollution. Farm mechanisation also contributes to this in the form of noise pollution, oil toxins from farm equipment makes soil unfertile, and excessive use of heavy machineries for farm operation causes soil compaction, with this there are also other agricultural pollutants.

Specific objectives of the study
To study the extent of awareness of farmers about agricultural pollutants and practices causing pollution

Materials and Methods
The exploratory research design of social research was used for the present investigation. The present study was undertaken in Amravati district of Vidarbha in Maharashtra state. Total 80 farmers were selected from two taluka Amravati and Teosa randomly.

Data were collected by personally interviewing the respondents with the help of pretested and structured interview schedule. The data collected were tabulated and the statistical tools namely mean, standard deviation, percentage, frequency were employed for interpretation of the findings.

Result and Discussion

The findings of the study as well as relevant discussion have been summarized under the following heads.

1. Awareness of respondents about agricultural pollution caused by Pesticide

The distribution of the respondents according to their responses to pesticide as source of agricultural pollution presented in Table 1.

Table 1: Distribution of respondents according to their Awareness about Pesticide as a source of agricultural pollution

Sr. No.	Statement	Awareness (n=80)	
A	**Statements regarding Pesticides pollution**		
1	Pesticide affects adversely on farm friendly insect	60 (75.00)	20 (25.00)
2	Excessive use of pesticides causes leaching of poisonous chemicals into ground water	52 (65.00)	28 (15.00)
3	Excessive use of pesticide and herbicide affects adversely on environment.	65 (81.25)	15 (18.75)
4	Some pesticide having long time residual effect.	62 (77.50)	18 (22.50)
5	Excessive use of herbicide had adverse effect on population of soil microorganism.	68 (85.00)	12 (15.00)
6	Pesticide pollution may cause asthma and other illness in human being.	67 (83.75)	13 (16.25)
7	Pesticide residual effect in food grain, vegetable, fruits etc.	59 (73.75)	21 (26.25)
8	While spraying extremely toxic pesticide and herbicide not wearing mask sometimes causes death.	53 (66.25)	27 (33.75)
9	Other	32 (40.00)	48 (60.00)

(*Figures in parenthesis indicate percentage)

It was observed from Table 1 that, eighty five percent (85.00%) of the respondents were aware about excessive use of herbicide had adverse effect on population of soil microorganism followed by 83.75 percent of the respondents were aware about pesticide pollution cause asthma and other illness in human being, more than eighty percent (81.25%) respondents were aware that excessive use of pesticide and herbicide affects adversely on environment, two third (66.25%) respondents aware that while spraying of extremely toxic pesticide and herbicide not wearing of mask sometimes causes death, sixty five percent (65.00%) of the respondents were aware about excessive use of pesticides causes leaching of poisonous chemicals into ground water.

Three fourth of the respondents (33.75%) were not aware about that while spraying extremely toxic pesticide and herbicide not wearing mask sometimes causes death, followed by slightly more than twenty five percent (26.50%) of the respondents that residual effect of pesticide into food grain, vegetable and fruits, 22.50 percent of the respondents who were not aware about some pesticide having long time residual effect and 18.75 percent of the respondents were not aware about excessive use of herbicide had adverse effect on environment.

2. Awareness of respondents about agricultural pollution caused by Fertilizer

The distribution of the respondents according to their awareness about agricultural pollution caused by fertilizer was presented in Table 2.

Table 2: Distribution of the respondents according their awareness about fertilizer as a source of agricultural pollution

Sr. No.	Statements	Awareness (n=80)	
B	**Statements regarding fertilizer pollution**		
1	High doses of chemical fertilizer affect microbial activities of soil.	47 (58.75)	33 (41.25)
2	Use of chemical fertilizer in agriculture is potential source of water pollution.	65 (81.25)	15 (18.75)
3	Excessive use of fertilizer causes harm to soil properties.	52 (65.00)	28 (35.00)
4	Due to leaching of fertilizer, nitrate concentration increases in potable water.	51 (63.75)	29 (36.25)
5	Nitrogen dioxide is emitted into the atmosphere from nitrogenous fertilizer application.	57 (71.25)	23 (28.75)
6	Residues of nitrogenous chemicals in diet effect adversely on nerve system of human being.	58 (72.50)	22 (27.50)
7	Other	40 (50.00)	40 (50.00)

(*Figures in parenthesis indicate percentage)

It was observed from the Table 2 that, more than eighty percent (81.25%) of the respondents were aware that use of chemical fertilizer in agriculture is potential source of water pollution, slightly more than seventy percent (71.25%) of the respondents who were aware that nitrogen dioxide is emitted into the atmosphere from nitrogenous fertilizer application, more than half (52.00%) of the respondents aware about that excessive use of fertilizer causes harm to soil properties.
Slightly more than forty percent (41.25%) of the respondents were not aware about high doses of chemical fertilizer affect microbial activities of soil, more than three fourth (35.00%) of the respondents not aware excessive use of fertilizer causes harm to soil properties and 27.50 percent aware that residues of nitrogenous chemicals in diet effect adversely on nerve system of human being.

3. Awareness of respondents about Noise pollution caused by various agricultural practices
The distribution of the respondents according to their responses to noise pollution caused by various agricultural practices presented in Table 3.

Table 3: Distribution of the respondents according their awareness about Noise pollution caused by agricultural practice

Sr. No.	Statement	Awareness (n=80)	
		Yes	No
C	Noise pollution		
1	Human system if exposed to a very high noise, it is harmful.	61 (76.25)	19 (23.75)
2	Highly mechanized farming causes noise pollution.	59 (73.75)	21 (26.25)
3	High noise causes rapid heart beating.	73 (91.25)	07 (08.75)
4	Use of diesel run water pump engine created noise pollution.	24 (30.00)	56 (70.00)
5	Other	35 (43.75)	45 (56.25)

(*Figures in parenthesis indicate percentage)

It is evident from Table 3 that, ninety percent (91.25%) of the respondents were high noise causes rapid heart beating, more than three fourth (76.25%) of the respondent aware that human system if exposed to a very high noise, it is harmful. slightly less than three fourth (73.75) of the respondents were aware that highly mechanized farming causes noise pollution and Seventy percent (70.00%) of the respondents were not aware about that use of diesel run water pump engine created noise pollution.

4. Awareness of respondents about agricultural pollution caused by Harvest waste: The distribution of the respondents according to their awareness about agricultural pollution caused by harvest waste was presented in Table 4.

Table 4: Distribution of the respondents according their awareness about harvest waste as a source of agricultural pollution

Sr. No.	Statement	Awareness (n=80)	
		Yes	No
D	Statements regarding Pollution from harvest waste		
1	Open burning of harvest waste leads to black cloud which can cause suffocation to human being.	56 (70.00)	24 (30.00)
2	Burning of harvest waste emits carbon dioxide, carbon monoxide and methane in the atmosphere.	67 (83.75)	13 (16.25)
3	Open burning of harvest waste is bad management practice.	72 (90.00)	08 (10.00)
4	If proper disposal of harvest waste is not done it creates favourable condition for emergence of various diseases in succeeding crop.	71 (88.75)	09 (11.25)
5	Other	45 (56.25)	35 (43.75)

(*Figures in parenthesis indicate percentage)

It was observed from Table 4 that, ninety percent (90.00%) of the respondents were aware that open burning of harvest waste is bad management practice, followed by 88.50 percent aware that if proper disposal of harvest waste is not done it creates favorable condition for emergence of various diseases in succeeding crop, 70.00% of the respondents who were aware that open burning of harvest waste leads to black cloud which can cause suffocation to human being, 16.25% of the respondents were not aware that burning of harvest waste emits carbon dioxide, carbon monoxide and methane in the atmosphere.

5. Awareness of respondents about agricultural pollution caused by Livestock waste
The distribution of the respondents according to their awareness about agricultural pollution caused by livestock waste was presented in Table 5.

Table 5: Distribution of the respondents according their awareness about agricultural pollution caused by livestock waste

Sr. No.	Statement	Awareness (n=80)	
		Yes	No
E	**Statements regarding Pollution from livestock waste**		
1	Livestock waste causes pollution.	62 (77.50)	18 (22.50)
2	Greenhouse gas like methane and nitrous oxide emits from livestock waste.	40 (50.00)	40 (50.00)
3	Livestock waste spread infection and diseases in human being.	64 (80.00)	16 (20.00)
4	Ammonia is common by-product of livestock waste.	46 (57.50)	34 (42.50)
5	Chemicals from waste material of cattle and poultry shed affects adversely on quality of surface and ground water.	59 (73.75)	21 (26.25)
6	Other	55 (68.75)	25 (31.25)

(*Figures in parenthesis indicate percentage)

It is observed from the Table 5 that, more than three fourth (80.00%) of the respondents were aware that livestock waste spread infectional diseases in human being, followed by more than seventy five percent (77.50%) of the respondents aware that livestock waste causes pollution, 73.75% aware about chemicals from waste material of cattle and poultry shed affects adversely on quality of surface and ground water. Half (50.00%) of the respondents were not aware about greenhouse gas like methane and nitrous oxide emits from livestock waste, 42.50 of the respondents were not aware about ammonia is common by-product of livestock waste and 26.50 percent not aware that chemicals from waste material of cattle and poultry shed affects adversely on quality of surface and ground water.

6. Awareness of respondents about agricultural pollution caused by Sewage water: The distribution of the respondents according to their awareness about agricultural pollution caused by sewage water was presented in Table 6.

Table 6: Distribution of the respondents according their awareness about sewage water pollution

Sr. No.	Statement	Awareness (n=80)	
		Yes	No
F	**Statements regarding pollution from Sewage water**		
1	Sewage water contains heavy metal like mercury, cadmium, copper, lead, etc.	62 (77.50)	18 (22.50)
2	Soil properties get adversely affected if untreated sewage water uses for irrigation purpose.	56 (70.00)	24 (30.00)
3	Sewage water affects the germination ability of seed.	63 (78.75)	17 (21.25)
4	Sewage water badly effect on availability of nutrients into soil and their uptake by plants.	62 (77.50)	18 (22.50)
5	Heavy metals from sewage water reaches to our body through food grains and vegetables.	57 (71.25)	23 (28.75)
6	Other	60 (75.00)	20 (25.00)

(*Figures in parenthesis indicate percentage)

In case of the sewage water pollution it was noted from Table 6 that, more than three fourth (78.75%) of the respondents were aware that sewage water affects the germination of seeds, 77.50 percent aware about sewage water contains some heavy metals like mercury, cadmium, copper, lead, etc. Followed by 70.00 percent of the respondents were aware about soil properties get adversely affected if untreated sewage water was use for irrigation purpose. slightly less than one third (30.00%) of the respondents were not aware about soil properties get adversely affected if untreated sewage water used for irrigation, followed by 28.75 percent not aware heavy metals from sewage water reaches to our body through food grains and vegetable and 22.50 percent not aware about sewage water badly effect on availability of nutrients into soil and their uptake by plants.

7. Awareness of respondents about agricultural pollution caused by Irrigation water

The distribution of the respondents according to their awareness about agricultural pollution caused by irrigation water was presented in Table 7.

Table 7: Distribution of the respondents according their awareness about irrigation water as a source of agricultural pollution

Sr. No.	Statement	Awareness (n=80)	
		Yes	No
G	**Statements regarding Irrigation water pollution**		
1	Salt and silt deposited on fertile soil through irrigation water.	57 (71.25)	23 (28.75)
2	Bad quality of irrigation water makes soil infertile.	55 (68.75)	25 31.25)
3	Crop production is affected by quality of water.	56 (70.00)	24 (30.00)
4	Waterlogged condition affects the plant growth.	64 (77.50)	16 (22.50)

(*Figures in parenthesis indicate percentage)

It is indicated from Table 7 that, more than three fourth (77.50%) of the respondents were aware that waterlogged condition affects the plant growth by irrigation water, followed by 70.00 percent of the respondents were aware about crop production is affected by quality of water. slightly less than one third (31.25%) of the respondents were unaware about bad quality of irrigation water makes soil infertile, 28.75 percent of the respondents were not aware about salt and silt deposited on fertile soil through irrigation water. The large number of the respondents were aware about waterlogged condition affects the plant growth.

8. Awareness of respondents about agricultural pollution caused by Dead farm animal

The distribution of the respondents according to their awareness about agricultural pollution caused by Dead farm animal was presented in Table 8.

Table 8: Distribution of the respondents according their awareness about dead animal as a source of agricultural pollution.

Sr. No.	Statement	Awareness (n=80)	
		Yes	No
F	Statements regarding pollution from Dead animals		
1	Dead animal causes environment pollution.	35 (43.75)	45 (56.25)
2	Quality of water from tank or well is deteriorated if dead animal thrown in water bodies.	50 (62.50)	30 (37.50)
3	Foul odour from dead animals makes environment unpleasant.	58 (72.50)	22 (37.50)
4	Microbes spread from dead animals can causes diseases to other healthy Animals.	35 (43.75)	45 (56.25)
5	Other	29 (36.25)	51 (63.75)

(*Figures in parenthesis indicate percentage)

It is observed from the Table 8 that, more than seventy percent (72.50%) of the respondents were aware about that foul odour from dead animals make environment unpleasant followed by 62.50 percent of the respondents who were aware that quality of water from tank or well is deteriorate if dead animal thrown in water bodies, 72.50 percent of the respondents were aware about that foul odour from dead animals make environment unpleasant, 62.50 percent of the respondents who were aware that quality of water from tank or well is deteriorate if dead animal thrown in water bodies. More than half (56.25%) of the respondents were unaware about dead animal causes environment pollution and same percent of the respondents who were not aware about microbes spread from dead animal can causes disease to healthy animals.

9. Overall awareness of respondent farmers about agricultural Pollution and practices causing pollution

Table 9: Distribution of respondents according to their Overall awareness about agricultural pollution and practices causing pollution.

Sr. No.	Awareness	Respondents (n=80)	
		Frequency	Percentage
1	Low (upto 33.33)	03	03.75
2	Medium (33.34 to 66.67)	40	50.00
3	High (Above 66.67)	37	46.25
Total		80	100.00

It was noted from the Table 9 that, half (50.00%) of the respondents had overall medium awareness about agricultural pollution and practices causing pollution whereas 46.25 percent respondents had overall high awareness. Only 03.75 percent of respondents had low awareness about agricultural pollution and practices causing pollution. These findings were supported by the findings of Vaidya (2004) and Chaudhari (2013) [3].

Conclusion

Half of the respondents had overall medium awareness about agricultural pollution and practices causing pollution followed by low and high awareness about agricultural pollution and practices causing pollution among the respondents

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