



Agricultural Pollution: A Burning Issue

V S Tekale¹, M K Khairnar² and S D Sarnaik^{*1}

¹Department of Extension Education,

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola - 444 104, Maharashtra, India

²Section of Extension Education, College of Agriculture, Nagpur - 440 001, Maharashtra, India

Received: 13 July 2020; Revised accepted: 01 September 2020

A B S T R A C T

The article mainly examined the awareness among the farmers about the agricultural pollution caused due to pesticides, fertilizer, harvest waste, sewage water and irrigation water. Data were collected from 120 randomly selected respondents from Nagpur and Kampthee tahasil of the Nagpur district through personal interview method. The overall awareness index about agricultural pollution caused by different practices of crop production indicated low level of awareness among 51.67 per cent of the respondents. The findings of the study further revealed that 59.17 per cent of the farmers were aware about the harmful effects of pesticides on human health, as well as high application of pesticides can contaminate water sources was known to 51.67 per cent of the respondents. Awareness was also noticed among the (48.33%) respondents, due to excessive application of fertilizers it affects the soil properties. 55.83 per cent of the respondents were aware the fact that salt and silt could be deposited in soil due excessive irrigation and 52.00 per cent respondents were aware about waterlogged condition affects the plant growth. Improper disposal of harvest waste can create favorable condition for various diseases in succeeding crops were known to the 47.50 per cent of the respondents. The respondents were not aware about excessive use of pesticides causes leaching of poisonous chemicals into ground water and pesticides had residual effect on food grain, vegetable and fruits (62.50%), saline water affects physio-chemical properties of soil and it effects crop growth (78.33%) and burning of harvest waste emits carbon dioxide, carbon monoxide and methane in the atmosphere (73.33%), respectively.

Key words: Awareness, Agricultural pollution, Farmers

Environmental pollution has existed for centuries but with the industrial revolution after 19th century the researchers noticed the drastic impact of the same on the environment. Agriculture is source of economic development and livelihood of the majority of the population in India. Unscientific and improper farming operations can lead to number of environmental and health hazards. Agricultural pollution is the phenomena of damage, contamination and degradation of environment and ecosystem, and health hazards due to the byproducts of farming practices. Agricultural production is largely

dependent upon the environmental factors on the other hand agricultural practices also effects upon the environment. The fragmentation of cultivable land, urbanization, industrialization, low per capita land holding were some of the reasons for deforestations which create enormous threat of agricultural pollution in the country.

To feed up the vast growing population, Government of India had initiated steps to increase the food production. Grow More Food Campaign, Green Revolution were the major programmes initiated during the 1960's. India has achieved a remarkable growth in agriculture, increasing food grain production from 83 mt in 1960-61 to about 252.7 mt in 2014-15. Fertilizer consumption likewise has been showing a continuous upward trend, with consumption from less than 1 million tons of total nutrients in the mid-sixties to almost 25.6 million tons in 2014-15 (Chaudhary 2017). By the year 2025, India need about 300 MT food grain to feed its

***Corresponding author:** Dr. Shailesh D. Sarnaik, Senior Research Assistant, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola - 444 104, Maharashtra

e-mail: shaileshsarnaik@pdkv.ac.in | **Contact:** +91- 99700 58875

teeming millions. In the year 2014-15, pesticide consumption was 0.29 kg/ha (GCA), which is roughly 50 per cent higher than the use in 2009-10 (Subhah *et al.* 2017). The recent increase in pesticides, herbicides and other chemicals has risen due to increase in agricultural wages as well as low availability of labours during the cropping season (FICCI 2015).

The enormous increase in use of chemicals, fertilizers, unscientific method of irrigation as well as other cropping methods leads to disturb the environmental balance. The cropping practices, irrigation methods, use of fertilizers, insecticides, etc. need to be scrutinize for the sustainable development of agricultural sector. Keeping this in mind the present research endeavor was ascertained with objectives in mind to study the awareness among farmers about agricultural pollutants and practices causing pollution.

MATERIALS AND METHODS

The research endeavor was attempted to study the awareness among farmers about agricultural pollution was carried out in Nagpur district of Maharashtra State. The district is comprising of 14 talukas out of which Nagpur (Rural) and Kamptee were selected purposively as these talukas are more chances of agricultural pollution due to their vicinity to Nagpur city. Exploratory research design of

the social research was utilized. Ten villages from each taluka and six farmers from each village were randomly selected as the respondents of the study. The structured interview schedule was used for data collection. The respondents were personally contacted during the research work, their responses and opinions were recorded. The collected data were tabulated and analyzed by utilizing appropriate statistical methods.

RESULTS AND DISCUSSION

Overall awareness of respondents about agricultural pollution due to different sources

The awareness of the respondent farmers with regard to agricultural pollution caused due to different practices were ascertained and the findings of the same depicted in (Table 1). The low-level awareness about agricultural pollution caused due to different sources was noticed among majority of respondents (51.67%) whereas 38.33 per cent and 10.00 per cent had reported medium and high level of awareness about the agricultural pollution caused due to different crop production practices, respectively. Excessive utilization of pesticides, fertilizers, irrigation practices were major crop production practices which are harmful for the environment and responsible for agricultural pollution.

Table 1 Distribution of respondents according to their overall awareness about agricultural pollution

Awareness index	Respondents (n=120)	
	Frequency	Percentage
Low (up to 33.33)	62	51.67
Medium (33.34 to 66.67)	46	38.33
High (Above 66.67)	12	10.00
Total	120	100.00

Table 2 Awareness of respondents about agricultural pollution caused by pesticide

Statement	Awareness (n=120)	
	Yes	No
	Freq. (%)	Freq. (%)
Excessive use of pesticide and herbicide affects adversely on environment.	55 (45.84)	65 (54.16)
Excessive use of pesticides causes leaching of poisonous chemicals into ground water.	45 (37.50)	75 (62.50)
Pesticide affects adversely on farm friendly insect.	53 (44.16)	67 (55.84)
Some pesticide having long term residual effect vegetables and fruits.	47 (39.17)	73 (60.83)
Excessive use of herbicide had adverse effect on population of soil microorganism.	47 (39.17)	73 (60.83)
Pesticide pollution may cause asthma and other illness in human being.	71 (59.17)	49 (40.83)
Pesticide had residual effect in food grain, vegetable and fruits	45 (37.50)	75 (62.50)
While spraying extremely toxic pesticides and herbicides not wearing of mask and without necessary safety measures sometimes causes death.	61 (50.83)	59 (49.17)
Washing of spray pump/pesticide/weedicide containers near source of water contaminate water with their residue and causes water pollution.	62 (51.67)	58 (48.33)

*Figures in parentheses indicate percentage

Practice wise awareness about agricultural pollution

Agricultural pollution due to excessive use of pesticides:
The distribution of the respondents according to their responses to pesticide as source of agricultural pollution presented in (Table 2). It was observed from (Table 2) that majority of the respondents (59.17%) were aware about pesticide pollution had hazardous effects on human health

and leads asthma and other illness, followed by 51.67 per cent were aware about washing of spray pump/pesticide container near source of water contaminate water with their residue and causes water pollution. The half of the respondents (50.83%) were aware spraying toxic pesticide and herbicide without wearing of mask and without necessary safety measures can be harmful and sometimes

causes death. Followed by respondents were also aware about excessive use of pesticide and herbicide affects adversely on environment (45.84%), pesticides also affect adversely on farm friendly insects (44.16%), respectively.

The 62.50 per cent of the respondents had reported unawareness about excessive use of pesticides resulted into leaching of poisonous chemicals into ground water and pesticide residual effect on food grain, vegetable and fruits while 60.83 per cent of the respondents had unknown about long term residual effects of pesticides application on vegetables and other crop kinds and also same percentage of respondents were showed their unawareness towards adverse effect on population of soil microorganism due to excessive use of herbicide.

Agricultural pollution due to excessive use of fertilizers

The distribution of the respondents according to their

awareness about agricultural pollution caused by fertilizer was presented in (Table 2). It was observed from the (Table 2) that high proportion of the respondents (48.33%) were aware that excessive use of fertilizer adversely affected to soil properties, followed by 40.84 per cent of the respondents who were aware that use of chemical fertilizer in agriculture is potential source of water pollution. The majority of the respondents (73.33%) were ignorant about residues of nitrogenous fertilizers in human diet affect adversely on nerve system of human being, followed by 60.83 per cent of the respondents were reported their unawareness about nitrate concentration in potable water increased due to leaching of fertilizer. The same per cent of the respondents (60.00%) were found ignorant about high doses of fertilizers affect microbial activities of soil which leads to decrease in the productivity of soil if excessive use persistent for few years.

Table 3 Awareness of respondents about agricultural pollution caused by fertilizer

Statement	Awareness (n=120)	
	Yes	No
	Freq. (%)	Freq. (%)
Excessive use of fertilizer causes harm to soil properties.	58(48.33)	62 (51.67)
High doses of chemical fertilizer affect microbial activities of soil.	48 (40.00)	72 (60.00)
Use of chemical fertilizer in agriculture is potential source of water pollution.	49 (40.84)	71 (59.16)
Due to leaching of fertilizer, nitrate concentration increases in potable water.	47 (39.17)	73 (60.83)
Nitrogen dioxide is emitted into the atmosphere from nitrogenous fertilizer application.	48 (40.00)	72 (60.00)
Residues of nitrogenous chemicals in diet effect adversely on nerve system of human being.	32 (26.67)	88 (73.33)

*Figures in parentheses indicate percentage

Agricultural pollution due to excessive use of irrigation water

The distribution of the respondents according to their awareness about agricultural pollution caused by irrigation water was presented in (Table 3). It is evident from (Table 3) that, majority of the respondents i.e. 55.83 per cent were aware that salt and silt deposited on fertile soil through excessive irrigation followed by 52.50 per cent of the respondents were aware about continuous waterlogged conditions in field drastically affect the plant growth. The

majority of the respondents i.e. 78.33 per cent were reported they were unawareness about use of saline water for irrigation can adversely affects the physio-chemical properties of soil and leads towards low productivity from the agricultural land followed by 55.84 per cent of the respondents were ignorant about continuous use of improper water for irrigation water resulted into infertility of soil and 54.17 per cent of the respondents reported their unawareness about quality of water had significant effect on crop production.

Table 4 Awareness of respondents about agricultural pollution caused by irrigation water

Statement	Awareness (n=120)	
	Yes	No
	Freq. (%)	Freq. (%)
Salt and silt deposited on fertile soil through irrigation water.	67 (55.83)	53 (44.17)
Bad quality of irrigation water makes soil infertile.	53 (44.17)	67 (55.83)
Saline water affects the physio-chemical properties of soil thus affects the crop growth.	26 (21.67)	94 (78.33)
Crop production is affected by quality of water.	55 (45.83)	65 (54.17)
Waterlogged condition affects the plant growth.	63 (52.50)	57 (47.50)

*Figures in parenthesis indicate percentage

Agricultural pollution due to harvest waste

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

The awareness of the respondents were examined about agricultural pollution due to harvest waste, it was observed

that, high proportion of the respondents (47.50%) were aware that improper disposal of harvest waste creates favourable condition for various diseases in succeeding crop, while 45.83 per cent of the respondents were found aware about disadvantages of open burning of harvest waste on human health. On the contrary majority of the

respondents i.e. 73.33 per cent were unaware about burning of harvest waste emits carbon dioxide, carbon monoxide and methane in the atmosphere, followed by 67.50 of the respondents were recorded their unawareness about open

burning of harvest waste is bad management practice while 65.83 per cent respondents reported open burning of harvest waste adversely affect the soil quality was not known to them.

Table 5 Awareness of respondents about agricultural pollution caused by harvest waste

Statement	Awareness (n=120)	
	Yes	No
	Freq. (%)	Freq. (%)
Open burning of harvest waste is bad management practice.	39 (32.50)	81 (67.50)
Burning of harvest waste emits carbon dioxide, carbon monoxide and methane in the atmosphere.	32 (26.67)	88 (73.33)
Open burning of harvest waste leads to black cloud which can cause suffocation to human being.	55 (45.83)	65 (54.17)
Improper disposal of harvest waste creates favourable condition for emergence of various diseases in succeeding crop.	57 (47.50)	63 (52.50)
Open burning of harvest waste affects adversely on soil quality.	41 (34.17)	79 (65.83)

*Figures in parenthesis indicate percentage

In the pursuit of the findings, observations and pragmatic opinions of the respondents reported in the research endeavor, this article concluded that there is an urgent need of increasing farmer's awareness on environmental as well as ecological hazards due to excessive application of pesticides, fertilizers as well as other chemicals. The improper and unscientific cropping practices

and methods which leads towards the low productivity and production need to be corrected by the proper guidance and research recommendation on different crop kinds by the researchers along with the extension personnel. The extension personnel required to make aware the farmers about the drastic impact of unscientific crop cultivation practices on environmental pollution.

LITERATURE CITED

- Chaudhary D. 2017. The green revolution in India: Impact and path ahead. 6th International Conference on Recent Development in Engineering, Science, Humanities and Management. www.conferenceworld.in.
- FICCI. 2015. Ushering in the 2nd green revolution: Role of crop protection chemicals. Federation of Indian Chambers of Commerce and Industry, New Delhi.
- <http://www.ipsnews.net/2010/03/developing-countries-need-green-revolution>.
- Subhash S P, Chand P and Balaji S L. 2017. Pesticide use in Indian agriculture: Trends, market structure and policy issues. Policy Brief, ICAR – National Institute of Agricultural Economics and Policy Research, December, 2017.