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Study the level of knowledge of vegetable growers regarding plant protection measures

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Abstract
Vegetables are good source of income and employment. The contribution of vegetables has been (59–61%) In horticulture crop production over the last five years. During 2017-18, the area under vegetables is estimated at 10.3 million hectares with a production of 179.7 million tonnes in India. In this period the total vegetable production was highest in case of Uttar Pradesh i.e. 28.22 Million Tonnes from 14.38 million hectares area followed by West Bengal i.e. 25.90 Million Tonnes from 13.93 million hectares area. In India it is impossible to completely avoid pesticides use in agriculture. Farmers are forced to use pesticides at different crop stages from planting to harvesting due to various biotic stresses. A large amount of pesticides are applied annually, however less than 5 per cent are estimated to reach the initial target, with the remainder being dumped in soil, water, plants, animals and human beings. Intensification of agriculture through massive adoption of high yielding varieties, increased use of synthetic inputs like chemical fertilizers and pesticides, greater exploitation of irrigation potentiality of surface and groundwater resources and farm mechanization have largely been responsible for a spectacular achievement in the food grain production that we have achieved over last three decades. Higher use of pesticides has emerged as a potential source of danger to sustainability of environment that endangers the existence of all forms of life on this planet. Perils and pitfalls of pesticides have been well evidenced due to their residual toxicity in our food chain (Verma *et al*. 2013). Meantime, the risks of using pesticides are serious as well (Pimentel, 2009). Most pesticides are not spontaneously generated. Most of them are high toxic to humans and the environment. Pesticides and their degraded products would flow into the atmosphere, soils and rivers, resulting in the accumulation of toxic substances and thus threatening human health and the environment.

Keywords: Pesticide, environment, sustainability, vegetables, soil

Research Methodology
Uttar Pradesh is the second largest producer of vegetables and first in consuming pesticide there by subjected to more use of chemicals for raising the production of vegetables. The Western Uttar Pradesh was selected as purposively for investigation. Meerut and Hapur district were selected for investigation on the basis of maximum area, production and productivity of the vegetables. From Meerut district Daurala and Kharkhonda blocks and from Hapur district Dhaulana and Hapur blocks were purposively selected on the basis of vegetable production. From each block four villages were selected randomly. Thus total sixteen villages were selected for study. From each village ten vegetable growers was selected randomly. Thus total sample size was of 160 vegetable growers for the investigation.

Result and Discussion
The data presented in Table 1 indicates that the majority of 63.75 percent vegetable growers were partially known about banned pesticides followed by 25.00 percent vegetable growers were fully known about banned pesticides and the remaining 11.25 percent vegetable growers had unknown about banned pesticides. The data also presented in section IInd Table 1 obvious that the majority of 92.50 percent vegetable growers were fully known that higher dose of pesticides cause poising, pollution and harm to beneficial insect followed by 4.40 percent vegetable growers were partially known that higher dose of pesticides cause poising, pollution and harm to beneficial insect and the remaining 3.10 percent vegetable growers had unknown about that higher dose of pesticides cause poising, pollution and harm to beneficial insect. It is also evident from Table 1 parameter IIIrd reveals that the majority of 82.50 percent vegetable growers were fully known about the proper storage of pesticides at home in lock or beyond the reach of children followed by 11.25 percent vegetable growers were partially known about proper storage of pesticides at home in lock or beyond the reach of children and remaining

6.25 percent vegetable growers were unknown about storage of pesticides at home in lock or beyond the reach of children. The IVth aspect related to disposal of empty container in Table 1 and which indicated that the majority of 90.62 percent vegetable growers were unknown about integrated pest management followed by 6.25 percent vegetable growers were partially aware about integrated pest management and the remaining 3.13 percent vegetable growers were fully known about integrated pest management. Table 1 parameter Vth depicted that 100.00 percent vegetable growers were unknown about technical methods for application of pesticides. The data presented in parameter VIth Table 1 obvious that the majority of 61.25 percent vegetable growers were fully known about the spray of pesticides should be done early in the morning or afternoon followed by 20.00 percent vegetable growers were partially known and the remaining 18.75 percent vegetable growers unknown that about the spray of pesticides either early in the morning or afternoon. Table 1 parameter VIIth reveals that the majority of 56.25 percent vegetable growers were fully known about recommended pesticides for vegetables crops followed by 30.00 percent vegetable growers were partially known about the recommended pesticides for vegetable crops and the remaining 13.75 percent vegetable growers were unknown about the recommended pesticides for vegetable crops. The data presented in parameter VIIIth Table 1 obvious that the majority of 52.50 percent vegetable growers were fully known about the recommended dose of pesticides followed by 25.00 percent vegetable growers were unknown about the recommended dose of pesticides and the remaining 22.50 percent vegetable growers were partially known about the recommended dose of pesticides. The data indicates in Table 1 of parameter IXth depicted that 100.00 percent vegetable growers were fully aware that spray of pesticide should be done opposite side of wind directions.

Table 1: Distribution of vegetable growers according to their knowledge level regarding plant protection measures

S. No.	Parameters/Statements	Fully Known		Partially known		Unknown	
		F	P	F	P	F	P
1.	Do you know about banned agricultural pesticides?	40	25.00	102	63.75	18	11.25
2.	Do know that higher dose of pesticide cause poising, pollution and harm to beneficial insect?	148	92.50	07	4.40	05	3.10
3.	Do you know that storage of pesticides at home in lock or beyond the reach of children?	132	82.50	18	11.25	10	6.25
4.	Do you know about IPM (Integrated Pest Management)	05	3.13	10	6.25	145	90.62
5.	Do you know technical method for application of pesticides?	00	00	00	00	160	100
6.	Do you know that application of pesticide should be done early in the morning or afternoon?	98	61.25	32	20.00	30	18.75
7.	Do you know about recommended pesticide for vegetable crops?	90	56.25	48	30.00	22	13.75
8.	Do you know about recommended dose of pesticide for vegetable crops?	84	52.50	36	22.50	40	25.00
9.	Do you know that spray of pesticide should be done opposite side of wind direction?	156	100	00	00	00	00
10.	Do you know that keep children and animal away from concentration of pesticide?	160	100	00	00	00	00
11.	Do you know that there should not allow children, animals and non workers to enter the sprayed area for at least 24 hours after spraying?	134	83.75	20	12.50	06	3.75
12.	Do you know that never mix or apply pesticide near wellheads, storm water drains, or bodies of water?	126	78.76	19	11.86	15	9.38
13.	Do you know that always dispose waste water on the field?	157	98.13	03	1.87	00	00
14.	Do you know that wearing protective clothes and gloves during pesticides application?	92	57.50	18	11.25	50	31.25
15.	Do you know that there should not drinking, eating and smoking during application of pesticides?	144	90.00	10	6.25	06	3.75
16.	Do you know that reading and following instructions mentioned on label of pesticides container/bottle?	30	18.75	12	7.50	118	73.75
17.	Do you know that washing hand and body after pesticide application?	154	96.25	04	2.50	02	1.25
18.	Do you know that after application of pesticides washing clothes separately?	152	95.00	05	3.12	03	1.88
19.	Do you know that there should be proper disposal of pesticide containers?	22	13.75	20	12.50	118	73.75
20.	Do you know that wash all equipments' after use?	85	53.13	55	34.37	20	12.50

F= Frequency, P= Percentage

The data shows in parameter Xth Table 1 reveals that 100 percent vegetable growers were fully known that keep children and animals away from mixing area and pesticide container. In Table 1 the XIth parameter indicated that majority of 83.75 percent vegetable growers fully known that never allow children's, animals and non workers to enter the sprayed area for at least 24 hours after spraying followed by 12.50 percent vegetable growers known partially that not allow children's, animals and non workers to enter the sprayed area for at least 24 hours after spraying sometimes and the remaining 3.75 percent vegetable growers had unknown that not allow children's, animals and non workers to enter the sprayed area for at least 24 hours after spraying always. The Parameter XIIth revealed in the Table 1 that majority of 78.76 percent vegetable growers were never mix or apply pesticide near wellheads, storm water drains, or bodies of water while 11.86 percent vegetable growers were known partially that never mix or apply pesticide near wellheads, storm water drains, or bodies of water sometimes and remaining 9.38 percent vegetable growers were unknown that never mix or apply pesticide near wellheads, storm water drains, or bodies of water. The date presented in Table 1 parameter XIIIth obvious that majority of 98.13 percent vegetable growers were fully aware about always dispose waste water on the field followed by 1.87 percent vegetable growers were partially known that about dispose waste water on the field. The data shows in parameter XIVth Table 1 depicted that majority of 57.50 percent vegetable growers were fully aware that wearing protective clothes and gloves followed by 11.25 percent vegetable growers were partially known about wearing protective clothes and gloves and remaining 31.25 percent vegetable growers were unknown

about wearing protective clothes and gloves. The data presented in parameter XV[th] Table 1 shows that majority of 90.00 percent vegetable growers were fully known that there should not drinking, eating, and smoking during application of pesticides followed by 6.25 percent vegetable growers were known partially that there should not drinking, eating, and smoking during application of pesticides and remaining 3.75 percent vegetable growers were unknown about that there should not drinking, eating, and smoking during application of pesticides. The data indicated in parameter XVI[th] Table 1 shows that majority of 73.25 percent vegetable growers were unknown that reading and following label instructions of pesticide containers followed by 18.75 percent vegetable growers were fully known about the reading and following pesticide label instructions and the remaining 7.50 percent vegetable growers were partially known about reading and following pesticide label instructions. The Parameter XVII[th] revealed in the Table 1 that majority of 96.25 percent vegetable growers were fully known that washing hand and body after pesticide application while 2.50 percent vegetable growers were partially known and the remaining 1.25 percent unknown that washing hand and body after pesticide application.

The data indicates in Table 1 of parameter XVIII[th depicts] that majority of 95.00 percent vegetable growers were fully known that after application of pesticides washing clothes separately followed by 3.12 percent vegetable growers known partially that after application of pesticides washing clothes separately and remaining 1.88 percent unknown about that after application of pesticides washing clothes separately. The data shows in Table 1 of parameter XIX[th] revealed that majority of 73.75 percent vegetable growers were unknown about proper disposal of pesticide containers followed by 13.75 percent vegetable growers were fully known about the proper disposal of pesticide containers and the remaining 12.50 percent vegetable growers partially known about the proper disposal of pesticide containers. The Parameter XX[th] revealed in the Table 1 that majority of 65.62 percent vegetable growers were fully known about wash all equipments after use followed by 18.75 percent vegetable growers were partially known abou t wash all equipments after use and the remaining 15.63 percent had unknown about wash all equipments after use. On the basis of findings it may be concluded that most of the vegetable growers were having partially and fully knowledge about safe use of plant protection measures but maximum of the not aware about the integrated pest management and disposal of pesticides containers.

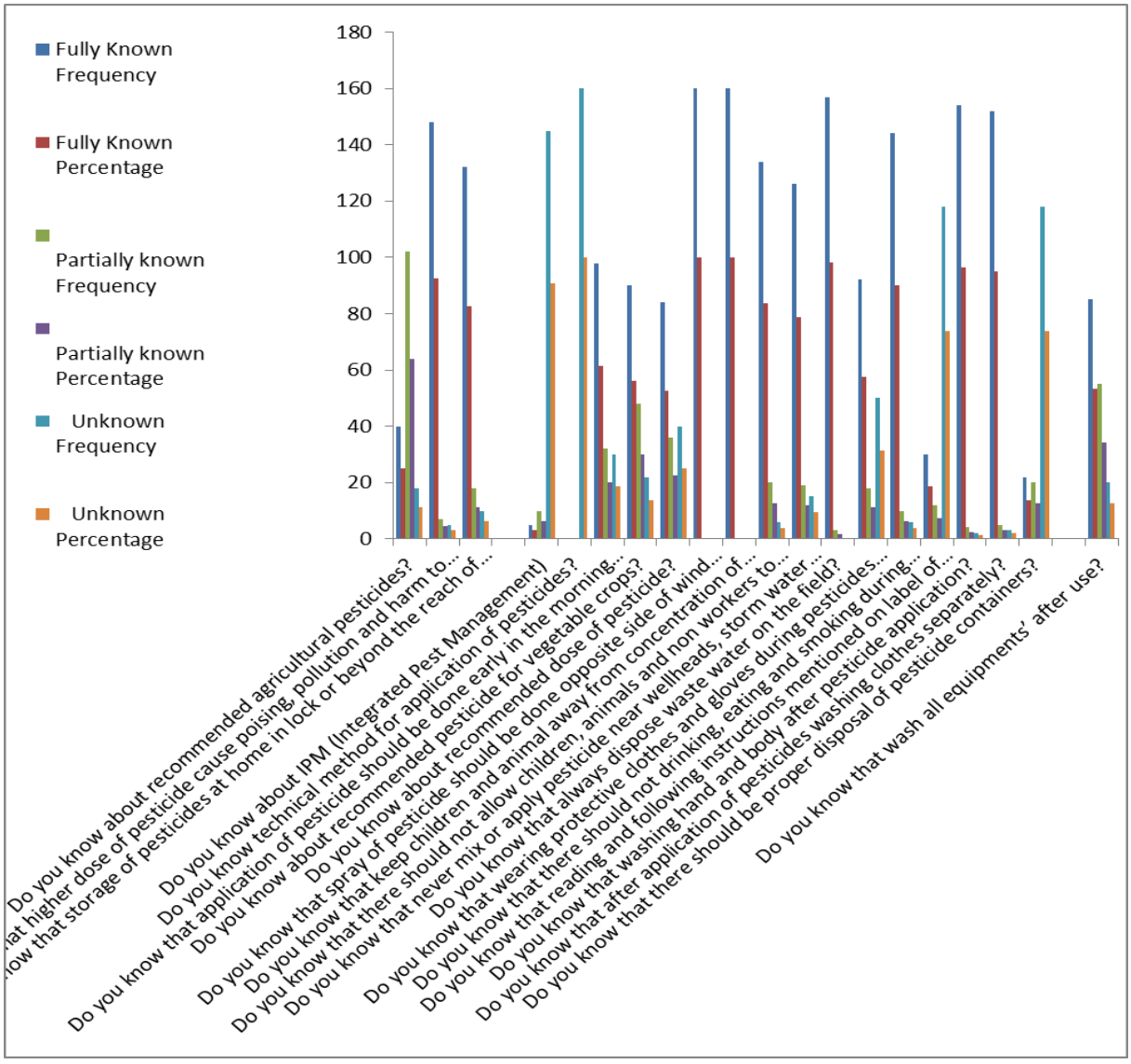

Fig 1: Distribution of vegetable growers according to their knowledge level

Conclusion

On the basis of findings it may be concluded that most of the vegetable growers were having partially and fully knowledge about safe use of plant protection measures but maximum of the not aware about the integrated pest management and disposal of pesticides containers.

The knowledge of the vegetable growers on plant protection measures especially pertaining to the use of chemical insecticides, herbicides is still need to be improved.

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