第 48 卷第 8 期
2021 年 8 月

湖南大学学报（自然科学版）
Journal of Hunan University（Natural Sciences）

Vol. 48. No. 8.
August 2021

Open Access Article

FARMERS' LITERACY LEVEL AND PRACTICES IN PESTICIDE'S USE: AN ETHNOGRAPHIC STUDY ON HAZARDS IN FARMING

Muhammad Rashid Hafeez
Assistant Professor, Department of English, GC Women University Sialkot, Pakistan
m.rashid@gcwus.edu.pk

Muhammad Shahbaz
Assistant Professor, Department of English, GC Women University Sialkot, Pakistan
m.shahbaz@gcwus.edu.pk

Ali Ahmad
Assistant Professor, Department of Humanities, COMSATS University Islamabad, Vehari Campus, aliahmad@ciitvehari.edu.pk

Raja Muhammad Ishtiaq Khan
Lecturer in English, Department of Common First Year, Majmaah University, Saudi Arabia
r.khan@mu.edu.sa

Imran Khan
Lecturer in English, Department of Education, Majmaah University, Saudi Arabia
imkk2010@gmail.com

Abstract

Farmers' literacy is significant in diverse features like selection of human and environment friendly pesticides to enhance healthy production of crops and to avoid tangible and intangible potential hazards emerging from mishandling of pesticides and leading towards diverse forms of aquatic, atmospheric and anthropogenic pollutions. We conducted an ethnographic qualitative research on a population sample of 54 working farmers in a multilingual Pakistani context with the premise to check their literacy level in selection and use of pesticides. We found a significant positive role of language used in pesticides users' manuals lacking better communication skills due to either adopting intricate English language specific registers usage or selection of the obsolete words of Urdu language difficult to comprehend compelling farmers to use folk wisdom and heresies contributing to hazards and pollution. Complex language of user manuals is hazardous, and lack of awareness holds diverse threats for the users as well as for the consumers of the products. Onsite education and literacy both of the retailers and farmers will be helpful in better cultivation of healthy crops along with alleviating the potentially fatal hazards emerging from misuse of pesticides. Revision of user manuals and rewriting in modern English and local languages is suggested.

Received: June 28, 2021 / Revised: July 27, 2021 / Accepted: August 13, 2021 / Published: August 31, 2021
About the authors: Muhammad Rashid Hafeez
Corresponding author- m.rashid@gcwus.edu.pk

Keywords: Pesticides, Farmers' literacy, farm hazards

抽象的

农民的文化素养在多种特征方面具有重要意义，例如选择对人类和环境友好的农药，以促进作物的健康生产，避免因农药处理不当而导致各种形式的水生、大气和人为污染的有形和无形潜在危害。我们在多语种巴基斯坦环境中对 **54 名工作**农民的人口样本进行了民族志定性研究，前提是检查他们在选择和使用杀虫剂方面的识字水平。我们发现农药用户手册中使用的语言具有显着的积极作用，缺乏更好的沟通技巧，因为要么采用复杂的英语特定语域用法，要么选择难以理解的乌尔都语过时词，迫使农民使用民间智慧和异端危害和污染。用户手册的复杂语言是危险的，缺乏意识对用户和产品的消费者都有不同的威胁。零售商和农民的现场教育和扫盲将有助于更好地种植健康作物，同时减轻因滥用杀虫剂而产生的潜在致命危害。建议用现代英语和当地语言修改用户手册和重写。

关键词：农药、农民素养、农场危害

Introduction:

In an age of technological advancement and cyberspace, the importance of literacy can be hardly overemphasized. Being literate broadens one's vision and affords one with chances to excel in one's particular field. Language plays an essential role in communication (Shahbaz & Khan, 2017; Khan et al; 2018,2020, 2021; Shahbaz et al, 2016) Farming is no exception. Illiterate farmers are not only unable to keep pace with the changes in agricultural technology (Sirisha, Babu & Gowthami, 2016) but are also prone to hazards in the fields. One such hazard emerges in the use of pesticides as the use of pesticides is inevitable in present day farming and hundreds of pesticides are used all over the world to control botanic diseases, insects attack and growth of weeds. The use of these pesticides has seen a gradual increase since 1990s Blair, Ritz, Wesseling, & Freeman, 2015). However, some of these pesticides might prove to be hazardous if not administered with due caution. Adenekan & Johnson (2019) say that a growing body of research confirms the hazardous effects of pesticides on humans. This raises an important issue of public health especially in the countries with low levels of literacy. The pharmaceutical companies provide instructions for use on the pesticides' labels to assist farmers avoiding hazards, but sometimes, these instructions are either in English or in national and local languages.

Research suggests that there is a positive correlation between the ability to read pesticide labels with knowledge, attitudes, and perceptions of pesticide use (Bagheri et al, 2019). Lack of literacy skills naturally results in dependence on those who are literate. Since the farmers are not literate, and are unaware of the hazards involved in the use of pesticides, the choices are determined by the retailers (Wang, et al, 2015). Khan and Damalas (2016) reported that a dominant majority of Pakistani farmers does not read pesticides' labels. In fact, 90 percent of these farmers think that there is no need to get such information. Mubushar et al (2019)

complain about prevalence of illiteracy among Pakistani farmers. Their study also informs us about unsafe use of pesticides. However, there has been no study to find out whether or not these farmers have the necessary literacy skills required to read and understand the safety measures printed on the pesticides. The present study was carried out to fill the same gap.

Hazards in Farming

Like any other profession, farming has its own hazards. Research shows that farmers are exposed to different types of poisonous materials and toxins causing diverse ailments ranging from dermal to ocular and respiratory diseases (Sosan, & Akingbohungbe, 2009). Risks and hazards ultimately result in low yield (Saqib, Ahmad, Panezai & Rana, 2016). One such hazard emanates from use of pesticides. Hazard from pesticides is not confined to exposure alone; in fact, there have been studies that prove that pesticide residue in crops are also a hazard to humans (Grewal, Grewal, Singla, Kamboj, & Dua, 2017). A lot of farmers in Pakistan have been reported to have suffered from pesticide poisoning (Azmi et al, 2006). It has been found that farmers lack the necessary information with regard to safe handling when it comes to pesticides among Pakistani farmers (Khan, Mahmood & Damalas, 2015).

Literacy

Generally speaking, literacy is the ability to read and write, with understanding, "a simple statement on everyday life" (UNESCO, 2008, p. 18). A person is "functionally literate who can engage in all those activities in which literacy is required for effective functioning of his/her group and community and also for enabling him/her to continue to use reading, writing and calculation for his/her own and the community's development" (ibid). This definition is quite broad and takes into its ambit all the activities in a person's life that presuppose use of reading, writing and calculation. Not only that, literacy is functional in nature as it relates to the ability to read and write in a particular context to achieve a certain goal. Hence, a person may not be practically literate even if s/he can read certain isolated words and phrases in a language.

However, literacy is much more than phonemic awareness, fluency, and comprehension (Perry, 2012). It can help reduce risks and hazards to life (Smith, Jackson, Kobayashi & Steptoe, 2018) while also adding up to agriculture yield (Jallow, Awadh, Albaho, Devi & Thomas, 2017). It is true that literacy alone cannot ensure safety of farmers; however, these are certainly helpful in creating awareness about the hazards involved (Arcury, Estrada & Quandt, 2010).

Method

We employed ethnography as a primary research method. It is a qualitative method where researchers observe and/or interact with a study's participants in their real-life environment. The method is helpful in recording the participants' day-to-day interactions and approaches in dealing with the issues that come their way (Hammersley, 2018). Ethnographic research is especially useful in agricultural research for diagnosing complex problems and arriving at desirable solutions to issues (Owusu-Daaku & Onzere, 2019).

In addition to ethnographic research, the researchers also relied upon textual analysis of the labels provided with pesticides. Furthermore, it was also important to find out whether or not farmers understood the terms and signs on the

pesticides' labels. This triangulation of data was useful not only to complement but also to verify data collected from farmers and retailers in the course of ethnographic research.

The researchers spent a month with the cotton growers in Malsi and wheat growers in Khushab.

Results:

The data collected in this study includes certain demographic variables including age of the respondents and their literacy levels.

Academic background of the farmers:

Most of the farmers (n=54) were illiterate. They did not know how to read or write anything. Hence, there was no chance of them being able to read the pesticide labels. The second largest stratum was the one who enrolled, and got some kind of education, in schools. There were 29 such farmers. These farmers could naturally read simple texts. Those who completed school came next in line. These were 15. Meanwhile, only two farmers had a university degree. It was these farmers who could read labels both in Urdu and English. It has been found that there is a direct relationship between formal education and awareness of pesticides' hazards (Rios Gonzalez et al, 2013).

Insert figure 1

Farmers' Information Sources:

A large number of farmers (n=39) relied on folk wisdom to get information about hazards emanating from pesticides. The next in line are those farmers (n=24) who get information from the retailers. However, interviews with the retailers show that most of the retailers believe that farmers are aware of the risks involved in pesticide use. Out of ten, there were only two retailers that claimed that farmers asked them about risks involved in the use of pesticides. There were others (n=17) who said that knowledge of pesticide hazards was passed on to them by their elders. However, they were not sure if their elders had used the same pesticides that they were using. The rest of the farmers received information from neighbors (n=8), pesticides literature (3) and FM radio broadcasts. These findings confirm those by Mengistie, Mol & Oosterveer (2017) who reported that everyday context of the farmers in Ethiopia decided their pesticide-handling practices.

Insert figure 2

Ability to Read Certain Words, Phrases or Sentences on the Labels

The researchers identified certain words, phrases and sentences from the labels and asked the farmers to read and explain these. The researchers made sure that only those words, phrases or sentences are selected that are most commonly used on all the pesticides. Since most of the farmers do not claim any literacy skill to speak of, the researchers collected this data from only those who have got some kind of education at school or university level.

The farmers were unable to grasp the words like محلول، [solution] انتباہ [warning]. In fact, some of the farmers demonstrated understanding of these words' English alternatives. They were familiar with the word, warning, but completely unaware with its Urdu alternative انتباہ which was published on the pesticide labels. Such ambiguity creates further hazards for the farmers instead of helping them in avoiding these. However, words like بواڑ (musty or modly smell) are easily understood by the farmers because such words have a Punjabi origin. Even those farmers who had received

negligible amount of school education were eager to explain this word to researchers.

Insert Figure 3

Labels on the pesticides:

There were a few pesticides that did not contain any information with regard to the hazards caused by their uses. There were a few others that contained very brief information in this regard. One of these, used for eradication of weeds in the crops, simply stated, "*Enter the field at least four days after spraying. No particular antidote; treat when symptoms appear*." The label does not instruct the farmer to visit a physician in case there are symptoms. In addition, there is no information available with regard to gravity of symptoms.

Manuals are mostly published in English and Urdu. However, the researchers came across an interesting phenomenon in that there were a few labels that contained Punjabi words or expressions to explain the hazards involved in pesticides use. As explained earlier, one of these words was "ہواڑ". The word does not seem to have any alternative in Urdu.

Use of graphics and sketches to highlight the hazards is completely missing on most of the pesticides. There are sketches and signs on some of the pesticides. The signs represented long protective shoes, face mask, glasses, disposing, exposure to animals, and disposing off the empty bottle. All the farmers could identify signs like protective shoes, face masks and glasses while majority of them could understand the signs about disposal and exposure to animals.

Insert figure 4

There is a vast body of socio-semiotic research which suggests that signs and symbols can be effectively used to convey the message especially when there are language barriers as visual literacy is as important as verbal literacy. Farmers are more likely to appreciate the use of "hazard signs to warn workers of known hazards" (Salazar et al, 2004).

The retailers claimed that the language written on the products is clear and precise. However, clarity and precision are relative terms and their definition varies from person to person. For a literate retailer, it might be easy to comprehend the language written on the labels but the same language might be ambiguous and incomprehensible for the farmer. The same was observed during the study.

Information on some of the labels was provided solely in Urdu. However, there were others that contained words and sentences in English. Nevertheless, it is not clear what formula was employed to decide when to use English. For instance, on one of the labels, all the precautions were clearly written in Urdu. However, there was a sentence at the end, which stated, "Keep out of the reach of children." When asked to read the label, 80 percent of the farmers were unable to read it. This shows that the pesticide producers do not demonstrate the requisite level of sensitivity when it comes to informing the farmers about hazards of pesticides. This fact was endorsed by an incident that was narrated by one of the farmers, who reported that his child opened a spray bottle and drank it, mistaking it as frizzy drink.

The farmers reported that since the children and women do not get firsthand information about the hazards associated with pesticides, there have been cases where women and children have mistaken these pesticides for drugs to be consumed by humans.

Conclusion:

The researchers conclude that despite the fact that most of the pesticides contain precautionary notes on using pesticides, several words appear to be ambiguous. Even the literate farmers were unable to decode the language on some of the labels. Ambiguity cannot ensure safety. There is a need to create mass awareness among the farmers with regard to interaction with the pesticides so that they can avoid harm. Farmers' knowledge of pesticides and the risks involved in interaction are mostly based on folk wisdom or knowledge passed on to them by other community members. This study has found out that there are issues not only of farmers' literacy but also of adequate and proper warning on the pesticide labels. As majority of the farmers are illiterate, there is a need on the part of pesticide producers to provide signs and images on the labels to help the farmers in avoiding hazards. There is a clear mismatch between farmers' literacy level and warnings on the pesticide labels. Since farmers lack the desired literacy skills, they are unable to differentiate between the high-risk and moderate-risk pesticides. Hence, they treat the two in the same manner. The researchers recommend that appropriate signs, images and symbols should be used on pesticide labels to ensure that desired level of awareness about pesticides hazards is developed among even the illiterate and moderately literate farmers

In summary, the adverse ecological effects from pesticides occur at all levels of biological organization. The effects can be global or local, temporary or permanent, or short-lived (acute) or long-term (chronic). The most serious effects involve loss in production, changes in growth, development and/ or behavior, altered diversity or community structure, changes in system processes (such as nutrient cycling), and losses of valuable species. These ecological losses in turn may be economically or socially important. Hence, ecological effects are of serious concern in regulating pesticides use and a variety of tests have been devised to help evaluate the potential for adverse ecological effects of pesticides. Developing an understanding of how these tests and other information can be used to prevent environmental problems caused by pesticides is the basis for ecological risk assessment research. Many of the chemicals used in pesticides are persistent soil contaminants, whose impact may endure for decades and adversely affect soil conservation. The use of pesticides decreases the general biodiversity in the soil. Not using the chemicals results in higher soil quality (Johnson, 1986), with the additional effect that more organic matter in the soil allows for higher water retention. This helps increase yields for farms in drought years, when organic farms have had yields 20-40% higher than their conventional counterparts. A smaller content of organic matter in the soil increases the amount of pesticide that will leave the area of application, because organic matter binds to and helps break down pesticides (Lotter, et al, 2003). Some natural pollinators, such as honeybees and butterflies, are very sensitive to pesticides. Pesticides can kill bees and are strongly implicated in pollinator decline, the loss of species that pollinate plants, including through the mechanism of Colony Collapse Disorder (Hackenberg, 2007), in which worker bees from a beehive or Western honey bee colony abruptly disappear. Application of pesticides to crops that are in bloom can kill honeybees, which act as pollinators. The USDA and USFWS estimate that US farmers lose at least $200 million a year from reduced crop pollination because pesticides applied to fields

eliminate about a fifth of honeybee colonies in the US and harm an additional 15% (Miller, 2004).

The primary objective of using pesticides in the fields and the environment in general is to achieve a control of crop pests and disease vectors. This has been a deliberate human effort in a search for increasing agricultural yields and improving public health (Helweg, 2003). Pesticides applied to the environment have shown to have long term residual effects while others have shown to have acute fatal effects when not properly handled. Organochlorine pesticides for example have shown to be persistent in the environment, the result of which find their way to contaminate ground water, surface water, food products, air, soil and may affect human being through direct contact. Pesticides exposure to humans have been well documented to be the root cause of some diseases such as cancer, respiratory diseases, skin diseases, endocrine disruption, and reproduction disorders. It is this aspect of pesticide in the environment that has raised concern among environmental scientists to study their behaviour in the environment and then come out with a sound alternative so as to rescue the human population from their adverse effects.

References:

- Adenekan, M. O., & Johnson, H. B. (2019). Changing Attitude in Agricultural Practices: Benefits and Hazards of Pesticides in Agriculture. East African Scholars Journal of Agriculture and Life Sciences. 2 (7).
- Arcury, T. A., Estrada, J. M., & Quandt, S. A. (2010). Overcoming language and literacy barriers in safety and health training of agricultural workers. *Journal of Agromedicine*, 15(3), 236-248.
- Azmi M.A., Naqvi S.N.H., Azmi M.A., and Aslam M. Effect of pesticide residues on health and different enzyme levels in the blood of farm workers from Gadap (rural area) Karachi-Pakistan. *Chemosphere* 2006: 64 (10): 1739–1744.
- Bagheri, A., Emami, N., Damalas, C. A., & Allahyari, M. S. (2019). Farmers' knowledge, attitudes, and perceptions of pesticide use in apple farms of northern Iran: impact on safety behavior. *Environmental Science and Pollution Research*, 1-9.
- Blair, A., Ritz, B., Wesseling, C., & Freeman, L. B. (2015). Pesticides and human health. *Occupational and Environmental Medicine* 72 (2). 81-82
- Grewal, A. S., Grewal, A. S., Singla, A., Kamboj, P., & Dua, J. S. (2017). Pesticide residues in food grains, vegetables and fruits: a hazard to human health. Journal of Medicinal Chemistry and Toxicology, 2(1), 40-46.
- Hammersley, M. (2018) What is ethnography? Can it survive? Should it?, *Ethnography and Education*, 13:1, 1-17, DOI: 10.1080/17457823.2017.1298458
- Jallow, M., Awadh, D., Albaho, M., Devi, V., & Thomas, B. (2017). Pesticide knowledge and safety practices among farm workers in Kuwait: Results of a survey. *International Journal of Environmental Research and Public Health*, 14(4), 340.
- Helweg, C. et al (2003). Fate of pesticides in surface waters, Laboratory and Field Experiments; Ministry of Environment,

Danish Environmental Protection Agency,. Pesticides Research No. 68.

- Khan, R. M. I., Radzuan, N. R. M., Shahbaz, M., Ibrahim, A. H., & Mustafa, G. (2018). The role of vocabulary knowledge in speaking development of Saudi EFL learners. *Arab World English Journal (AWEJ) Volume*, *9*.
- Khan, R. M. I., Shahbaz, M., Kumar, T., & Khan, I. (2020). Investigating Reading Challenges Faced by EFL Learners at Elementary Level. *Register Journal*, *13*(2), 277-29
- Khan, R. M. I., Radzun, N., Farooqi, S., Shahbaz, M., & Khan, M. (2021). Learners' Perceptions on WhatsApp Integration as a Learning Tool to Develop EFL Spoken Vocabulary. *International Journal of Language Education*, *5*(2), 1-14.2.
- Khan, R. M. I., Radzuan, N. R. M., Shahbaz, M., & Ibrahim, A. H. (2018). EFL Instructors' Perceptions on the Integration and Implementation of MALL in EFL Classes. *International Journal of Language Education and Applied Linguistics*, 39-50.
- Khan, M., Mahmood, H. Z., & Damalas, C. A. (2015). Pesticide use and risk perceptions among farmers in the cotton belt of Punjab, Pakistan. *Crop Protection*, 67, 184-190.
- Khan, M. & Damalas, C. A. (2015). Factors preventing the adoption of alternatives to chemical pest control among Pakistani cotton farmers. *International Journal of Pest Management* 60 (1). 10.1080/09670874.2014.984257
- Lotter, D. W., Seidel, R., & Liebhardt, W. (2003). The performance of organic and conventional cropping systems in an extreme climate year. *American Journal of Alternative Agriculture*, *18*(3), 146-154.
- Mengistie, B. T., Mol, A. P., & Oosterveer, P. (2017). Pesticide use practices among smallholder vegetable farmers in Ethiopian Central Rift Valley. *Environment, Development and Sustainability*, 19(1), 301-324.
- Miller, G. T. (2004), Sustaining the Earth, 6th edition. Thompson Learning, Inc. Pacific Grove, California, USA
- Mubushar, M., Aldosari, F.O., Baig, M. B., Alotaibi, B.M., & Khan, A.Q. (2019). Assessment of farmers on their knowledge regarding pesticide usage and biosafety. *Saudi Journal of Biological Sciences*. 26. 1903-1910. https://doi.org/10.1016/j.sjbs.2019.03.001
- Owusu-Daaku, K. N., & Onzere, S. N. (2019). Ethnography in agricultural research: a tool for diagnosing problems and sustaining solutions. *African Journal of Food, Agriculture, Nutrition and Development*, 19 (1), 14090-14112.
- Perry, K. (2012). What is Literacy? – A Critical Overview of Sociocultural Perspectives.
- Rios-Gonzalez, A., Jansen, K., Sanchez-Perez, H.J. (2013). Pesticide risk perceptions and the differences between farmers and extensionists: Towards a knowledge-in-context model. Environ. Res. 124. 43–53.
- Salazar, M. K., Napolitano, M., Scherer, J. A., & McCauley, L. A. (2004).

Hispanic adolescent farmworkers' perceptions associated with pesticide exposure1. Western journal of nursing research, 26(2), 146-166.

- Saqib, S. E., Ahmad, M. M., Panezai, S., & Rana, I. A. (2016). An empirical assessment of farmers' risk attitudes in flood-prone areas of Pakistan. *International Journal of Disaster Risk Reduction*, 18, 107-114.
- Shahbaz, M., Khan, M. S., Khan, R. M. I., & Mustafa, G. (2016). Role of self-perceived communication competence and communication apprehension for willingness to communicate in L1 and L2. *Journal of Educational and Social Research*, *6*(1), 158-158.
- Shahbaz, M., & Khan, R. M. I. (2017). Use of mobile immersion in foreign language teaching to enhance target language vocabulary learning. *MIER Journal of Educational Studies Trends & Practices*, 66-82.
- Smith, S. G., Jackson, S. E., Kobayashi, L. C., & Steptoe, A. (2018). Social isolation, health literacy, and mortality risk: Findings from the English Longitudinal Study of Ageing. *Health Psychology*, 37(2), 160.
- Sosan, M. B., & Akingbohungbe, A. E. (2009). Occupational insecticide exposure and perception of safety measures among cacao farmers in Southwestern Nigeria. *Archives of environmental & occupational health*, 64(3), 185-193.
- UNESCO Institute for Statistics. (2008). International literacy statistics: A review of concepts, methodology, and current data. Montreal, Canada: UNESCO Institute for Statistics
- Wang, Y., Wang, Y., Huo, X., & Zhu, Y. (2015). Why some restricted pesticides are still chosen by some farmers in China? Empirical evidence from a survey of vegetable and apple growers. *Food Control*, *51*, 417-424.
- Zacharia, J. T. (2011). Ecological effects of pesticides. *Pesticides in the modern world-Risks and Benefits, IntechPublisher*, 129-142.

Figure 1. Farmers' academic background

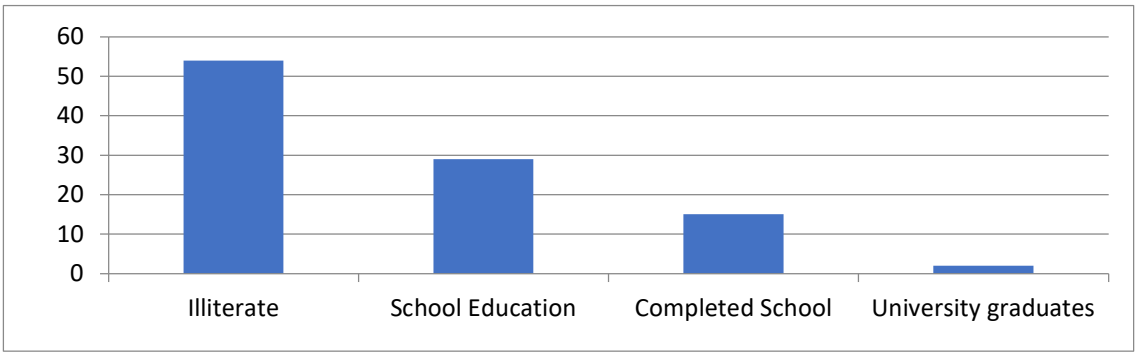


Figure 2. Farmers' Information source

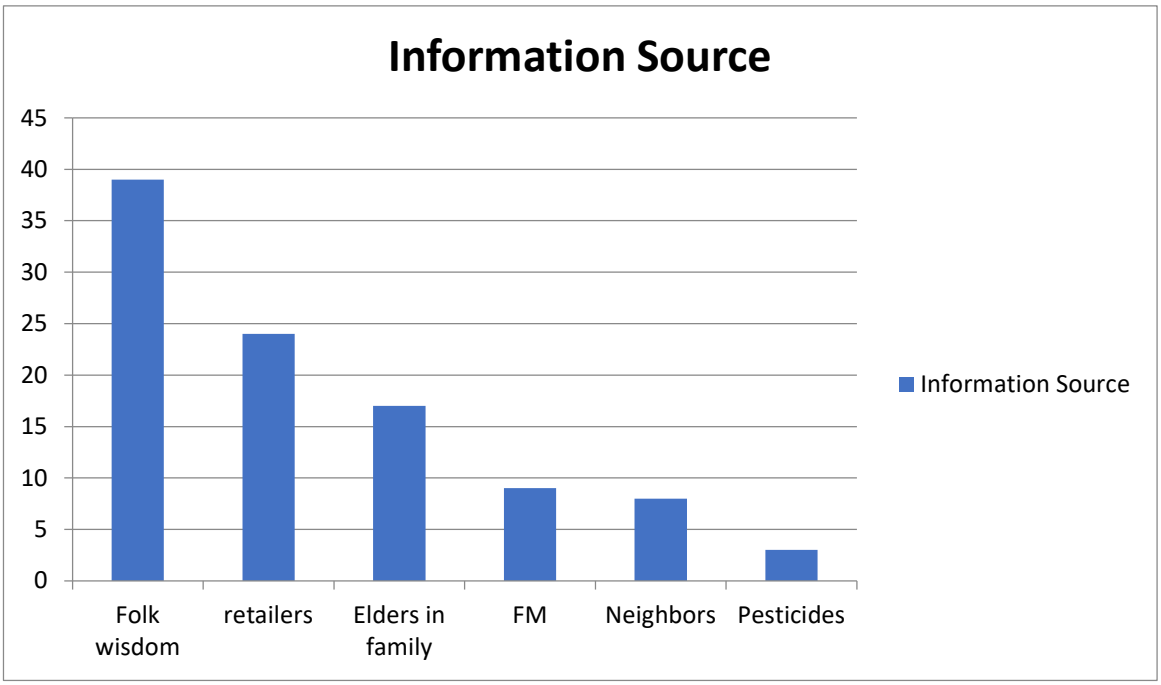


Figure 3: Percentage of Farmers aware of Urdu script/meaning of different words as provided on labels

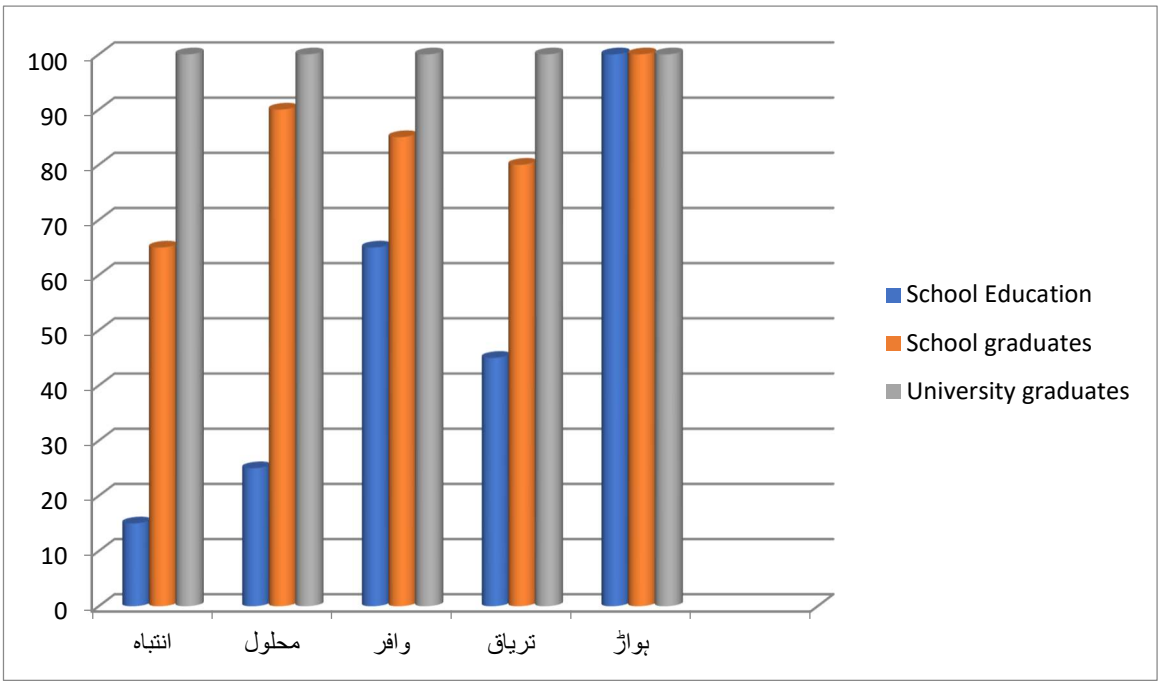
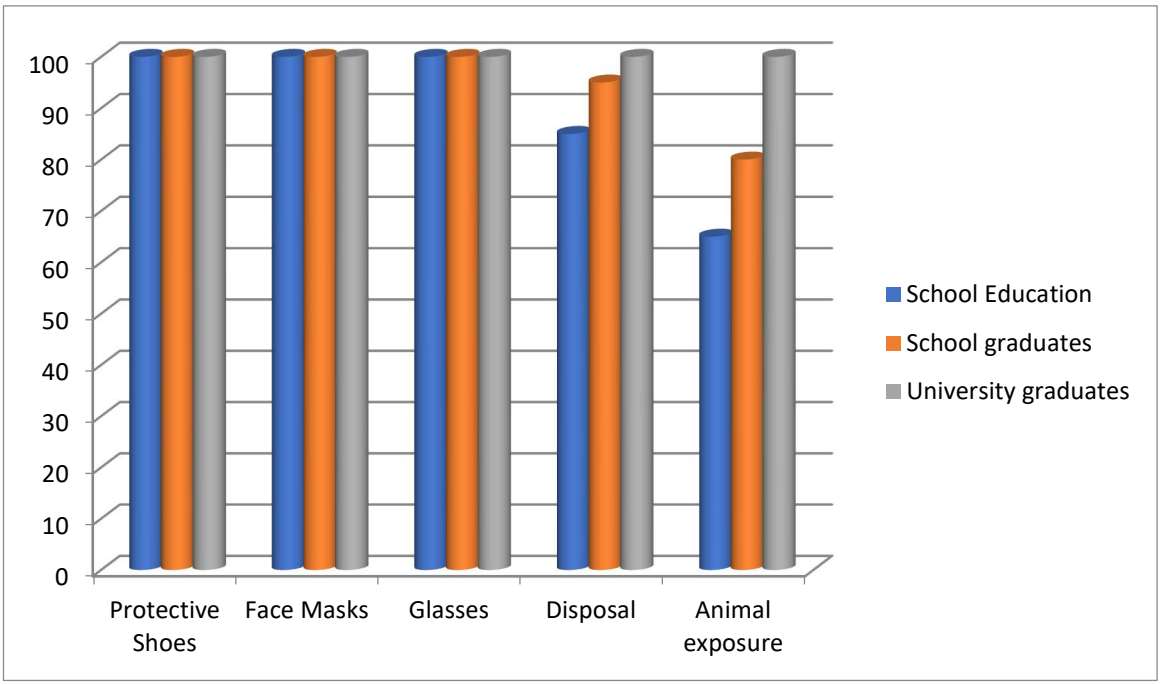


Figure 4: Percentage of protective equipment used by the farmers


100
90
80
70
60
50
40
30
20
10
0
Protective Shoes
Face Masks
Glasses
Disposal
Animal exposure
School Education
School graduates
University graduates