

Behavior of Rice Farmers in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency in 2024**Nasrullah**Department Of Environmental Health, Poltekkes, Ministry Of Health, Aceh
nasrullah@poltekkesaceh.ac.id**Junaidi**

Department Of Environmental Health, Poltekkes, Ministry Of Health, Aceh

Kartini

Department Of Environmental Health, Poltekkes, Ministry Of Health, Aceh

Syahrizal

Department Of Environmental Health, Poltekkes, Ministry Of Health, Aceh

*Submitted: 07/06/2025**Accepted: 12/06/2025**Published: 15/06/2025***ABSTRACT**

Unsafe use of pesticides without personal protective equipment (PPE) can cause negative impacts on farmers' health, including the risk of acute and chronic poisoning. Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency is one of the agricultural areas where the use of pesticides by rice farmers still does not fully meet occupational safety standards. This study aims to determine the behavior of rice farmers in the use of personal protective equipment during compounding and spraying pesticides, reviewed from the aspects of knowledge, attitudes, and actions. This study is a quantitative descriptive study with a total sampling technique on the entire population consisting of 30 rice farmers. Data was collected through a questionnaire that measured farmers' knowledge, attitudes, and actions towards the use of PPE. The research was carried out from January to February 2024 in Meunasah Tuha Village. The results of the study showed that 60% of farmers had good knowledge, 80% showed good attitudes, but only 40% showed good actions in the use of PPE. In addition, only 40% of farmers use PPE when mixing and spraying pesticides, while the other 60% do not use PPE completely. The conclusion shows that although farmers' knowledge and attitudes towards the use of PPE are relatively good, real actions in the field are still low. This shows the need for further education and supervision of the practice of safe use of pesticides among farmers.

Keywords : Pesticides, Personal Protective Equipment (PPE), Rice Farmers, Farmer Behaviour, Occupational Health

INTRODUCTION

Most of Indonesia's population, a developing country known for its agriculture, works as farmers. Progress in agricultural production is expected to encourage the achievement of national development, given the country's enormous agricultural potential. Various techniques are used to increase agricultural yields to achieve this goal. To eradicate pests on plants, fertilizers and insecticides are also used. This is because the use of pesticides is considered more practical and gives better results than not using them.¹

Farmers are the largest group of workers in Indonesia, and despite the decline, the proportion of workers working in the agricultural sector is still around 31.86% of the total workforce.²

The use of pesticides that do not meet the set standards can have negative health impacts, especially poisoning that naturally impacts the body, including the circulatory, respiratory, and skin systems. It can even lead to death.³

According to data from the National Poisoning Information Center (SIKerNas), pesticides were responsible for about 2.5% of poisoning incidents in 2017.⁴

Regulation of the Ministry of Manpower and Immigration of the Republic of Indonesia No. 08/MEN/VII/2010 defines personal protective equipment (PPE) that can protect people while working and protect workers from isolated dangers while working.

Pesticides can enter the human body through various ways, namely through the skin (dermal contamination), inhalation into the respiratory tract (inhalation), and the entry of food and the gastrointestinal tract through the mouth (oral).⁵

The immediate risks associated with pesticide use can arise not only from spraying but also from mixing to after spraying. One of the most dangerous problems that occurs when farmers use pesticides without using personal protective equipment (PPE) is poisoning.⁶

When applying pesticides, some farmers only wear long-sleeved shirts and hats, and others stir the product with their bare hands instead of gloves. Farmers reported experiencing symptoms such as hot skin, sore eyes, itching, irritation, shortness of breath, dizziness, and nausea after the use of pesticides. However, this is often thought of as an effect of post-work burnout.⁷

Farmers are required to wear PPE at all times to prevent potential hazards when handling pesticides. PPE includes the use of respirators, special clothing, goggles, hard hats, or similar devices that, if worn correctly, will reduce the risk of injury or illness from such hazards.⁸

Preliminary investigations showed that some farmers in Meunasah Tuha Village, Sukamakkul District, Aceh Besar Province, did not use personal protective equipment (PPE) in accordance with the provisions of the national contract. Regulations when mixing and spraying pesticides. This will certainly have a bad impact on farmers and have an impact on their health such as: nausea, vomiting, diarrhea, difficulty breathing, dermatitis, cancer, and most severely, death.

From these problems, the author wants to conduct a research in Meunasah Tuha Village, Sukamakkul District, Aceh Besar Regency with the title "Behavior of Rice Farmers in the Use of Personal Protective Equipment During Compounding and Spraying of Pesticides in Meunasah Tuha Village, Sukamakkul District, Aceh Besar Regency in 2024."

RESEARCH METHODS

This study is a descriptive study that aims to determine the behavior of rice farmers in the use of personal protective equipment (PPE) during compounding and spraying pesticides in Meunasah Tuha Village, Sukamakkul District, Aceh Besar Regency in 2024. The population in this study is all rice farmers who compound and spray pesticides in the village, which amounts to 30 people. Because the population is relatively small, the sampling technique used is total sampling, so that the number of samples is equal to the number of population, which is 30 farmers.

This research was carried out from January to February 2024 with the research location in Meunasah Tuha Village, Sukamakkul District, Aceh Besar Regency. The instrument used in this study is a questionnaire designed to measure farmers' knowledge, attitudes, and actions towards the use of personal protective equipment when carrying out compounding and pesticide spraying activities.

RESULTS AND DISCUSSION

Result

1. The Level of Knowledge of Rice Farmers in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakkul District, Aceh Besar Regency in 2024

Table 1
Frequency Distribution of Rice Farmers' Knowledge Level in the Use of Tools Personal Protection During Compounding and Spraying Pesticides in Meunasah Village Tuha, Sukamakkul District, Aceh Besar Regency in 2024

Knowledge	Frequency	Percentage (%)
Good	18	60
Enough	6	20
Less	6	20
Sum	30	100%

From the table above, it can be seen that the knowledge of farmers in Meunasah Tuha Village is good, reaching 60% or 18 farmers.

2. Attitude of Rice Farmers in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakkul District, Aceh Besar Regency in 2024

Table 2
Frequency Distribution of Rice Farmers' Attitudes in the Use of Personal Protective Equipment During Compounding and Spraying of Pesticides in Meunasah Tuha Village Sukamakkul District, Aceh Besar Regency in 2024.

Attitude	Frequency	Percentage (%)
Good	24	80
Less	6	20
Sum	30	100%

From the table above, we can know that the attitude of farmers in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency is good, reaching 80% or 24 farmers.

3. Actions of Rice Farmers in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency in 2024

Table 3

Distribution of the Frequency of Actions of Rice Farmers in the Use of Protective Equipment Self During Compounding and Spraying Pesticides in Meunasah Village Tuha, Sukamakmur District, Aceh Besar Regency in 2024.

Action	Frequency	Percentage (%)
Good	12	40
Enough	15	50
Less	3	10
Sum	30	100%

From the table above, we can know that the actions of farmers in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency are sufficient, which reaches 50% or 15 farmers.

4. The Use of Personal Protective Equipment for Rice Farmers in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency in 2024

Table 4

Distribution of the frequency of the level of use of personal protective equipment in rice farmers in the use of personal protective equipment during compounding and spraying of pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency in 2024.

Use of Personal Protective Equipment	Frequency	Percentage (%)
Using	12	40
Not Using	18	60
Sum	30	100%

From the table above, it can be seen that the level of use of personal protective equipment by rice farmers in Meunasah Tuha Village is not using, which reaches 60% or 18 farmers.

Discussion

1. Farmers' Knowledge in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency

Farmer knowledge refers to everything that farmers know about the use of pesticides and PPE, including their definition, types, functions, risks, and roles.

Based on research conducted on 30 farmers, 18 farmers (60%) have good knowledge and 6 farmers (20%) have sufficient knowledge and 6 farmers (20%) have insufficient knowledge.

When the author visits farmers directly and asks, many farmers do not know what personal protective equipment (PPE) is or how to use it properly and correctly when mixing and spraying pesticides. Please refer to the instructions on the pesticide packaging for information on the use of pesticides and recommendations for proper and proper storage of pesticides. This is also due to the lack of institutional support to educate and advise farmers on the use of pesticides and the importance of personal protective equipment.

The problem that arises for farmers in Meunasa Tuha village is that even though they use pesticides, they do not realize that they have a negative impact on the environment around farmers and

also still have a negative impact on the health of the farmers there.

Therefore, farmers need to be given good education about mixing and spraying PPE and pesticides so that their health status is not affected. For example, by contacting health workers, agricultural extension institutions, and other related organizations directly. Farmers should first read and understand the instructions and contents of the pesticide packaging they use.

2. Farmers' Attitudes in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency

The attitude in question is the reaction or response of farmers to the use of personal protective equipment when mixing and spraying pesticides, including the use of mixing, spraying, cleaning, application and personal protective equipment when mixing and spraying pesticides.

Based on research conducted on 30 farmers, 24 farmers (80%) have a good attitude and 6 farmers (20%) have a poor attitude.

The problem of farmers in Meunasah Tuha Village is that although farmers have a good attitude when filling out questionnaires, when the author directly reviews the farmers' employment, there are still many farmers who do not use personal protective equipment such as masks, gloves, glasses, boots and hats when mixing and spraying pesticides, some even wear clothes with many folds and shorts.

According to farmers, this is because acute pesticide poisoning has not been proven to occur in farmers who use pesticides.

To prevent farmers from poisoning during pesticide spraying and to avoid hazards to farmers' health due to pesticide spraying, personal protective equipment such as masks, gloves, goggles, boots, and hats should be worn when mixing and spraying pesticide equipment is highly recommended. Early or mild symptoms of pesticide poisoning (headache, nausea, vomiting, etc.) are thought to be caused by work fatigue.

3. Farmers' Actions in the Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency

Actions are the embodiment or application of knowledge and attitudes regarding the use of personal protective equipment when mixing and spraying pesticides. These actions include mixing and spraying, securing pesticide residues, using personal protective equipment, and using self-cleaning techniques that are commonly practiced by farmers.

According to a study conducted on thirty farmers, as many as twelve farmers (40%) had good actions, fifteen farmers (50%) had sufficient actions, and three farmers (10%) had poor actions.

According to the results of the study, farmers in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency, still use pesticides and personal protective equipment relatively less. Farmers are still seen smoking when applying pesticides, storing pesticides in the kitchen afterwards, and disposing of old pesticide packaging in various locations.

Likewise, farmers in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency, only a small part of them use personal protective equipment. This is because there are still many farmers who do not use personal protective equipment because they are considered uncomfortable, interfere with work, or feel that they do not need to use all personal protective equipment. If you spray pesticides without using personal protective equipment, it will risk causing adverse health impacts, including poisoning. Food contaminated with pesticides can cause poisoning through the mouth, and the pores of human skin can also cause poisoning. The use of personal protective equipment and maintaining personal hygiene after mixing and spraying pesticides are two behaviors that farmers must pay attention to in an effort to reduce the risk of pesticide poisoning.

Therefore, farmers in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency are urged to use complete personal protective equipment and comply with all applicable laws and regulations as stated in this Regulation in the use of pesticides.

4. The Level of Use of Personal Protective Equipment During Compounding and Spraying Pesticides in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency

Based on research conducted on 30 farmers, there are 12 farmers (40%) who use personal protective equipment, and 18 farmers (60%) who do not use personal protective equipment.

When asking farmers directly about personal protective equipment during compounding and spraying pesticides, many farmers do not use complete personal protective equipment because they are uncomfortable and not free when working. In Meunasah Tuha Village, when the author directly reviewed the type of pesticide in the form of powder or powder in the organophosphate group on rice farmers who were working when the author conducted the research, the rice farmer did not wear personal protective equipment and immediately spread pesticides around his plants directly using his

hands without using personal protective equipment. This can cause toxicity of the organophosphate group pesticides such as nausea, vomiting, headaches, visual impairment, diarrhea, and others.

Usually, farmers do not comply with safety requirements in the use of pesticides because they tend to underestimate the dangers of pesticides. Pesticide poisoning, especially chronic poisoning, often goes unnoticed, the consequences of which are difficult to predict, and can only be considered as a result of work burnout. In addition, farmers usually do not pay attention to the seniority and age of older farmers (over 60 years old), thus leading to inaccurate implementation of agricultural tasks. Therefore, most farmers will tell you that they have been using pesticides in their own way for decades, without complete personal protective equipment and without any doubt. In fact, the current use of pesticides is considered very dangerous for health and the environment.

Regarding the use of pesticides, there are farmers who only use one type of pesticide, there are also those who use two or more types of pesticides because they are effective in controlling plant pests, without considering the risks it poses to the local community, especially farmers around agricultural areas. In fact, when many types of pesticides are used for spraying, the toxicity and concentration are stronger and the side effects are greater, resulting in stronger toxic effects than when one type of pesticide is used.

Farmers can be exposed to pesticides through the skin, lungs, or digestive system. When moving, storing, moving, distributing, and applying concentrates, as well as when cleaning the application equipment they use, farmers can come into contact with pesticides. The risk of chronic poisoning in farmers increases as pesticide exposure increases.

Farmers can experience poisoning for various reasons. This is especially true when using pesticides without wearing all the necessary personal protective equipment, especially when mixing and spraying, which is the easiest job and often results in skin contamination. Washing your face with contaminated hands, sleeves, or gloves can also result in contamination. Farmers do not have adequate knowledge about pesticides, the dangers associated with their application, and how best to apply them wisely.

Therefore, to maintain worker safety, farmers must apply pesticides wisely and appropriately by reading labels on containers, mixing and spraying frequently, and wearing personal protective equipment.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of research on the use of personal protective equipment (PPE) during compounding and spraying of pesticides by farmers in Meunasah Tuha Village, Sukamakmur District, Aceh Besar Regency, it can be concluded that farmers' knowledge of the use of PPE is still uneven. Although most farmers (60%) have good knowledge about pesticides and PPE, there are still farmers who lack knowledge, especially regarding the function of PPE, pesticide risks, and how to use it correctly.

Farmers' attitudes towards the use of PPE in general are generally good in theory, as reflected in the filling out of the questionnaire. However, in practice in the field, there are still many farmers who are inconsistent in applying this attitude. They tend to ignore the use of complete PPE such as masks, gloves, glasses, and boots because they feel uncomfortable, do not have the freedom to work, or consider the use of PPE to be not very important because they have never experienced acute poisoning directly.

Farmers' actions in the use of PPE are also still quite low. Only a small percentage of farmers actually implement proper precautions, while most others still exhibit risky habits such as smoking when spraying pesticides, storing pesticides in unsafe places, and littering packaging. The level of complete use of PPE during pesticide compounding and spraying is still low, which is only about 40%, while 60% of farmers do not use PPE as they should. This condition is very worrying because it can increase the risk of acute and chronic poisoning, as well as negatively impact the health of farmers and the surrounding environment.

Suggestion

Seeing these conditions, serious and sustainable efforts are needed to improve farmers' knowledge, attitudes, and actions in the use of personal protective equipment. The government through related agencies, health workers, and agricultural extension institutions are advised to actively provide direct and practical education to farmers about the dangers of pesticides and the importance of the complete use of PPE. This education can be carried out through routine training, field simulations, and the use of visual media that are easy for farmers to understand.

In addition, there is a need for stricter supervision in the field and the implementation of regulations that encourage farmers to comply with occupational safety standards in the use of pesticides. Knowledge of the correct pesticides, including reading and understanding the labels on the packaging, as well as safe storage and disposal, must be continuously disseminated.

Finally, it is also important to build collective awareness among farmers about the long-term risks posed by exposure to pesticides without adequate protection. This can start from a community-based approach, testimonials from other farmers who have experienced health impacts, and the involvement of community leaders or village leaders in occupational safety campaigns in the agricultural sector.

REFERENCES

1. Maranata, R., Chahaya, I. and Santi, D.N. (2014) "Farmer Behavior in the Use of Pesticides and Personal Protective Equipment (PPE) and Farmers' Health Complaints in Suka Julu Village, Barus Jahe District, Karo Regency in 2014", Usu Publication Manuscript [Preprint].
2. Central Statistics Agency, B.P.S. (2017) Publication of the State of the Labor Force in Indonesia.
3. Hayati, R., Kasman, K. and Jannah, R. (2018) "Factors related to the use of personal protective equipment in farmers using pesticides", Promotive: Journal of Public Health, 8(1), pp. 11–17.
4. SIKerNas. (2017). *Annual Report on Poisoning Incidence in 2017*. Jakarta: SIKerNas.
5. Hasanah, N. (2022). *Exposure to Pesticides and Their Impact on Farmers' Health*. Yogyakarta: Andi Publishers.
6. Susanto, B.H. and Wahyuni, I.D. (2020) "Education on the Use of Personal Protective Equipment (PPE) in Pesticide Farmers", in Conference on Innovation And Application Of Science And Technology (Ciastech), pp. 1173–1178.
7. Widianingsih R, Muliawati R, and Mushidah (2020) "Pesticide Use Behavior Is Related to Rice Farmers' Health Complaints.", J Ilm Permas J Ilm Stikes, 10(3), pp. 297–306.
8. Ministry of Manpower and Transmigration. (2010) Regulation of the Minister of Manpower and Transmigration of the Republic of Indonesia Number Per.08/Men/VII/2010
9. World Health Organization. (2018). Prevalence of Nutritional Status of Children Under Five Worldwide in 2020.
10. Bappenas. (2021). National Medium Term Development Plan 2020-2024. 1, editors. Jakarta: Ministry of National Development Planning.
11. Chawla¹, S. et al. (2020) 'Undernutrition and associated factors among children 1-5 years of age in rural areas of Haryana, India: A community based cross-sectional study', Journal of Family Medicine and Primary Care, 9(8), pp.4240–4246. Available at: <https://doi.org/10.4103/jfmpc.jfmpc>.
12. Zeray, A., Kibret, G.D. and Leshargie, C.T. (2019). 'Prevalence and associated factors of undernutrition among under-five children from model and non-model households in east Gojjam zone, Northwest Ethiopia: A comparative cross-sectional study', BMC Nutrition, 5(1), pp.1–10. Available at: <https://doi.org/10.1186/s40795-019-0290-y>.
13. Chandra, A. (2020). Epidemiology of Stunting. 1st printing. Semarang: Diponegoro University.
14. Aridiyah¹, FO, Rohmawati¹, N. and Mury Ririanty² (2015) 'Factors Affecting Stunting on Toddlers in Rural and Urban Areas', e-Jurnal Pustaka Kesehatan , 03(1), pp. 163–170. Available at: <https://doi.org/10.1007/s11746-013-2339-4>.