

PRELIMINARY SURVEY ON PESTICIDE USE IN CROP CULTIVATION AND IT'S IMPACT ON LOCAL FARMERS IN HINTHADA TOWNSHIP

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Abstract

Hinthada Township is one of the townships located in deltaic area and large amount of rural people depend on agriculture especially paddy and black gram cultivation which is needed to use pesticide. Area of le land is 138382acres (56002.4 hectare) (73% of total cultivated land) and it supports paddy and black gram cultivation. Pests are one of the major problems in black gram cultivation and to get higher economic income from cultivation, pesticides are widely used. But, farmers' unsystematic pesticide use is dangerous on human health and environment. Local farmers do not know right information on pesticide uses and they suffer immediate illness and severe disease. Objectives of the paper are to present situation of agriculture of Hinthada Township, to explore pesticide use in agriculture of Hinthada Township, to examine the consequences of pesticide uses in Hinthada Township and to predict future prospect of pesticide uses in Hinthada Township. To present the paper, qualitative quantitative mixed method and GIS were applied.

Keywords: pesticides, unsystematic uses, human health and environment, immediate illness and severe disease

Introduction

Agriculture is one of the major economic activities and it support 70% of the population, and accounts for nearly 30% of national gross domestic product(GDP), 42% of GDP and it plays important role in poverty reduction (World Bank, 2019). Ayeyarwady Region is known as Myanmar's Granary due to fertile deltaic region. Double cropping area is large and paddy is mainly cultivated in the rainy season and black gram or summer paddy is cultivated in the cool dry period as double cropping. Because of double cropping, pests are common in pesticides are used in crop cultivation.

Pesticides were extensively used last many years ago. More than 18,000 pesticide products were licensed for use, and about 2 billion pounds of pesticides are used every year (Environmental Protection Agency 2002). Occupational exposure to pesticides caused incidence of nearly 20 cases of illness for every 100,000 workers in the US (Calvert et al. 2004). Mandour (2012) stated ground water is polluted with pesticides and Mahmoud et al., 2013 pointed that pesticide residues caused damage to livers and kidneys of animals used in agriculture.

In Hinthada Township, 81 percent of the farmers lived in the area practice paddy pulses system in which paddy is cultivated in the rainy season and black gram in cool dry period and the rest cultivate paddy only in which both monsoon paddy and summer paddy are cultivated (Myint Thida et al, 2018). Strategies for increased rice production include pesticide use and pesticides have been used widely in paddy cultivation (Huan et al. 2008). Pests are one of the major problems in Black gram cultivation and Lal and Sachan, 1987 said that 60 insect species are known to attack black gram crop at different stages of crop growth.

Aspelin (1997) said the global consumption of pesticides¹ has reached 2.6 million metric tons. Although the largest volume of pesticide use is in developed countries, its use in developing

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countries increased (World Resources Institute (WRI), 1998). In Hinthada Township, Continuous and use of pesticides has resulted in harm to the environment, caused human ill-health, negatively impacted on production and reduced sustainability (Pimentel, 1997). Therefore, to present pesticide use in crop cultivation and its impact on local farmers, Hinthada Township was selected.

Study Area

Among the 26 townships of Ayeyarwady Region, Hinthada included high population density in Ayeyarwady Region. Hinthada Township occupies the northern part of Ayeyarwady Region on the western bank of the Ayeyarwady River. Agriculture is major pillar of the economy of the area because of deltaic area. Like other agriculture region, local people living in the study area use pesticide widely to remove the pest for the purpose of getting high yield and greater economic return.

Objectives

Objectives of the paper are:

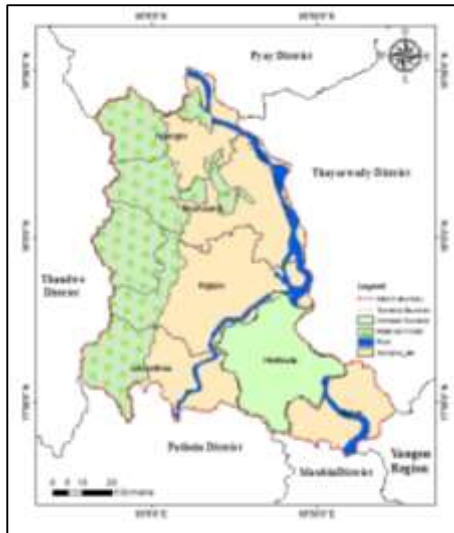
- To present the current situation of agriculture in Hinthada Township
- To explore pesticide use in agriculture of Hinthada Township
- To examine the consequences of pesticide uses in Hinthada Township
- To predict future prospect of pesticide uses in Hinthada Township

Data and Methodology

In primary data collection, 10 village tracts: Ywathit (north), Kawzan, Hpayargone, Kanhla, Chaungphar, Ywathargone, Tharsi, Ohnpinkwin, Natmaw, and Shwetaungytharya were selected as sample villages in which monsoon paddy, summer paddy and black gram are grown. 10 paddy- paddy farmers and 10 paddy-black gram farmers were selected from each village tract and 200 questionnaires were distributed to them. 10 farmers were interviewed to get information on amount, application of pesticides, types and perception of farmers on health-related risk were collected through field observation, interviews and questionnaires. Literature review was thoroughly done. Secondary data were also applied and qualitative quantitative mixed method was applied in doing the research work and GIS tools were applied in drawing maps.

Background of Study Area

Hinthada Township is located in the northern portion of Ayeyarwady Region. It is situated between Ayeyarwady River and Ngawun River.



Source: MIMU

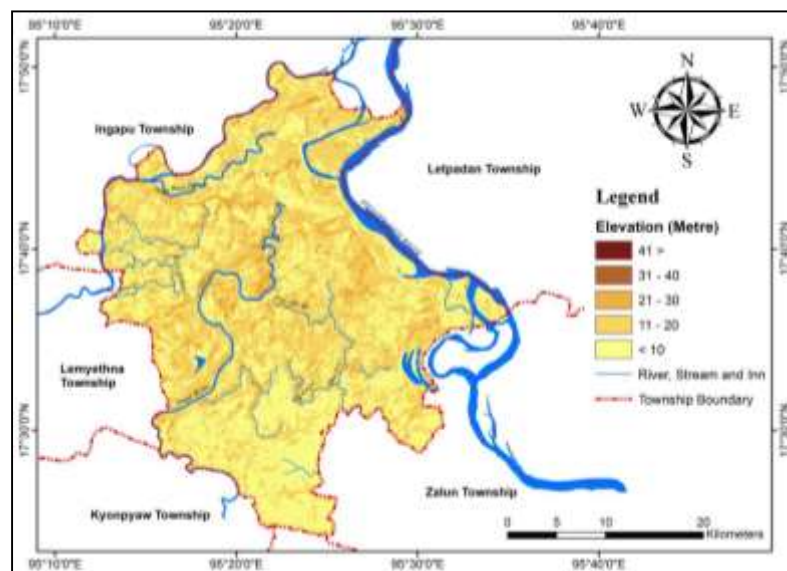
Figure 1 Hinthada Township of Ayeyarwady Region



Source: Agriculture Land Management Statistics

Figure 2 Hinthada Township of Ayeyarwady Region

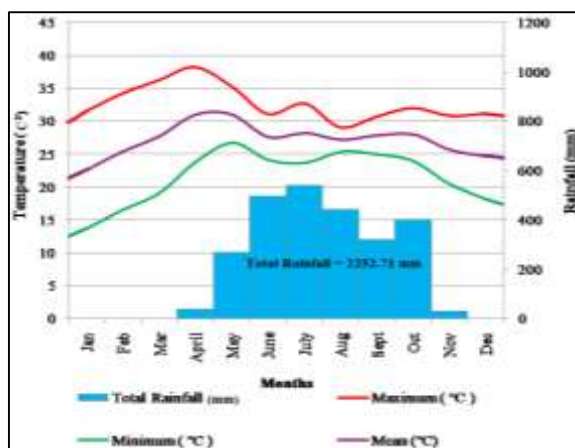
Hinthada Township is the second largest township in Hinthada District and its relief is characterized by low lying flat alluvial plain that is one of the supporting factors for paddy and pulses cultivation. The Ayeyarwady River is the most important river in this township, followed by Ngawun River. Other small streams are Natmaw and Daga and these rivers and stream support irrigated water for summer paddy cultivation.



Source: DEM

Figure 3 Reliefs and Drainage of Hinthada Township

April is the hottest month and January is the coldest month. April, maximum temperature is 38.25°C and minimum temperature 13.75°C in January, thus the range of temperature is 24.5°C. The average total rainfall is 2252.71 mm.

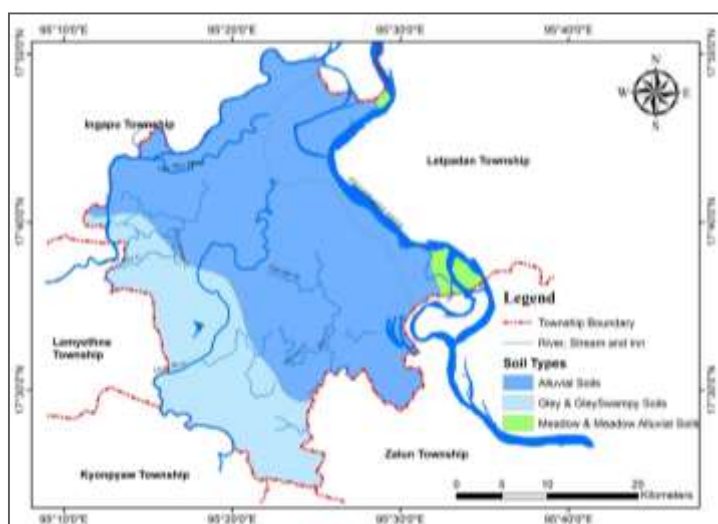


Source: Meteorology and Hydrology Department

Figure 4 Climograph of Hinthada Township (2010-2019)

Therefore Hinthada Township has Tropical Monsoon climate (Am) according to Koppen's system of climate classification.

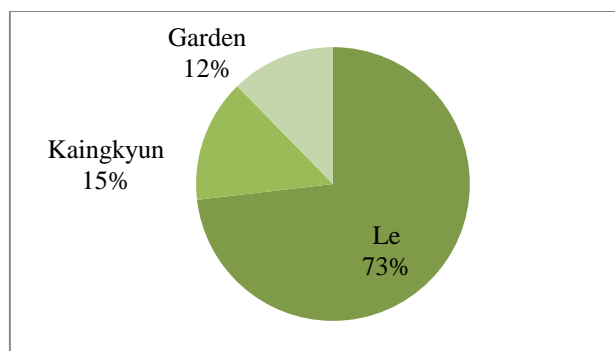
Three soil types: Alluvial Soils (Fluvisols), Gley and Gley Swampy Soils (Humic Gleysols), and Meadow and Meadow Alluvial Soils (Gleysols) are found in Hinthada Township. These soils are favourable for paddy and black gram cultivation.



Source: Meteorology and Hydrology Department

Figure 5 Soils of Hinthada Township

Population has been increasing and 72 % of the population lives in rural area. Rural population depends on paddy and black gram cultivation. The land has an area of 138382 acres (56002.4 hectare) (73% of total cultivated land) and it supports paddy and black gram cultivation.



Source: Department of Agriculture Land Management Statistics

Figure 6 Agricultural Land in Hinthada Township

Results and Findings

All rain fed paddy is medium and short lived varieties because farmers choose to cultivate them to reduce growing period to cultivate second crop after harvesting paddy. Monsoon paddy cultivated area was 54213 ha and productivity is 3.9 ton per ha. Productivity gradually increased in the study area and one of the reasons increase paddy productivity is pesticide uses. Pulses susceptible to pestilence and fungus infection and farmers, therefore, unavoidably use pesticides.

Although Myo Myint, 2014, stated that Pesticides uses are still small compared to countries like Vietnam, Thailand, China and India, Peeters et al, 2015, said that in Myanmar, Banned, unregistered pesticides are widely available and widespread overuse, misuse, mishandling and mismanagement of pesticides are too common. Therefore, Pesticides uses in cultivation become one of the major problems.

Pesticide uses

According to questionnaire survey, eighty two percent of farmers use the pesticide for the purpose of destroying of pests in paddy cultivation and black gram cultivation to increase the productivity. Eighteen percent of farmer does not use pesticide because of low investment and they are smaller holder farmers.

The local farmers use pesticides produced from Shwechinthae (Golden Lion), Myanmar Awbar, Wisara, Armo, Asiphate and Shwenaga (Gold Dragon) Company, Bing Hui Company etc.



Source: Author (28.6.2020)

Plate 1 Pesticide Spraying in Paddy Cultivation



Source: Author (28.6.2020)

Plate 2 Pesticide Use in Paddy Cultivation

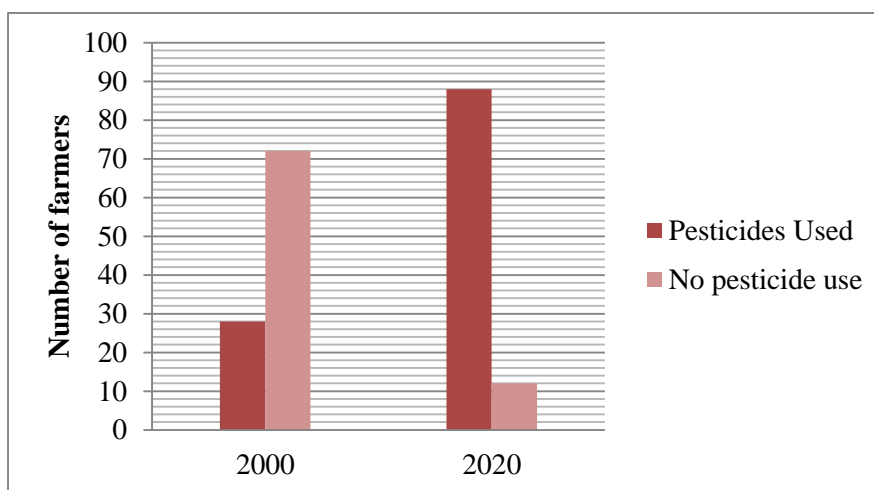


Source: Author (30.6.2020)

Plate 3 Pesticide used in Hinthada Township

According to interview with authorities, at present, pests are common and pest variety increased due to double cropping and climate changes. Therefore, farmers unavoidably use pesticide.

According to questionnaires' result, in 2000, 28 percent of the farmers used pesticides and pesticide used increased. In 2020, 88 percent of the farmers used pesticides. According to questionnaire results, small amount of pests were found in 2000 and a little pesticide were used in crops cultivation.



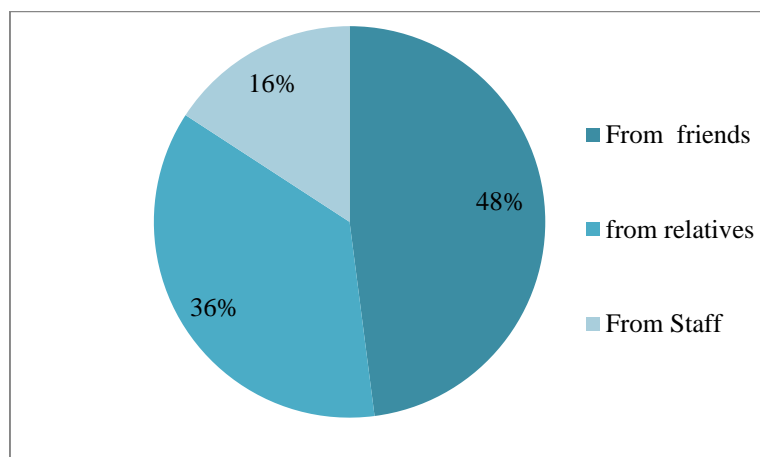
Source: Questionnaires' Results

Figure 7 Pesticide uses in Hinthada Township

In the study area, 28 percent of the monsoon paddy farmers use pesticide in monsoon paddy cultivation, 76 percent of summer paddy farmer and 87 percent in black gram farmer use pesticides.

According to interview, although pesticides are used in monsoon paddy, summer paddy and black gram cultivation, more pesticides are used in black gram cultivation because of high risks and high economic return.

Farmers in the area get information on pesticide uses from relatives, friends and staff of agriculture department. According to questionnaires' result, 36% (71 farmers) get information from relatives, 48% (94 farmers) from friends and 31% (16 farmers) from staff of agriculture department.



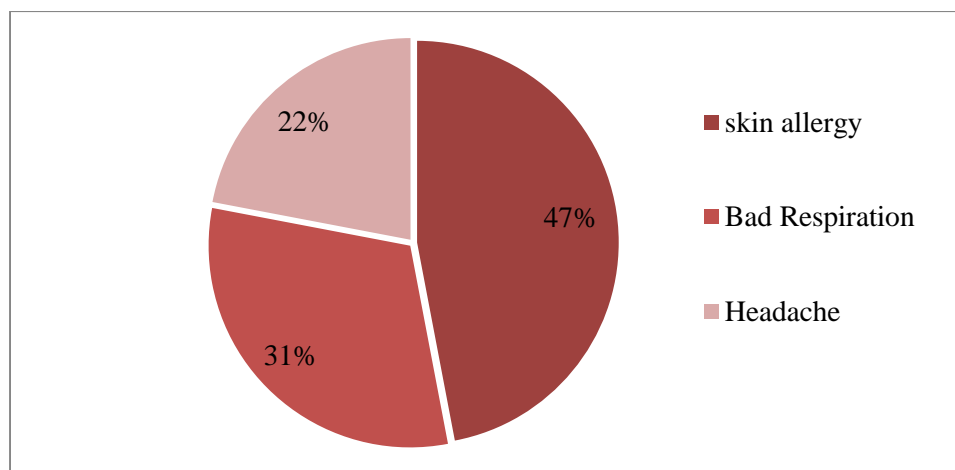
Source: Questionnaires' Results

Figure 8 Information Availability on Pesticide Uses in Hinthada Township

Pesticides are purchased from pesticide shops in Hinthada Town. Therefore, they use pesticide according to instruction of owners of pesticide shops. According to interviews with farmers, they read the instruction on the bottle and on the packs and practice according to this instruction.

In pesticide spraying, manual labours are still used in Hinthada Township. They are daily wage earners and they get 4000 ks per day or 5000 ks per day. They do not have much knowledge and the owners of the land led and give instruction. Therefore, they do not apply pesticide systematically and 36 percent (71 labours) use glove and masks but remaining pesticide sprayers do not use any glove and masks.

According to Ministry of Agriculture and Irrigation (2009), there are significant problems with low quality pesticides in the market. There are public health and environmental problems in Myanmar due to the adverse effects of pesticides.



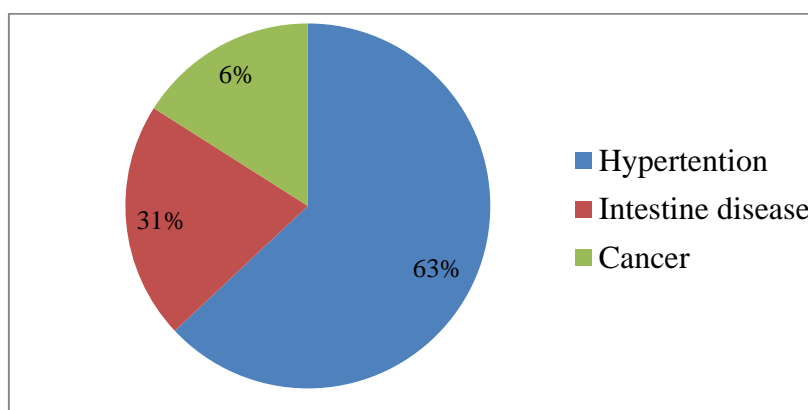
Source: Questionnaires' Results

Figure 9 Immediate illnesses on Pesticide Uses in Hinthada Township

Farmers do not exactly know the pesticide use and adverse effects of pesticides. But they know immediate effects of pesticide uses in cultivation. According to interview with sprayers, 47 percent of the sprayer suffer slight skin allergy, 31 percent bad respiration and 22 percent head ache.

Right information on pesticide uses is due to Lack of agriculture education. According to interview, they do not know that the threat of pest is highest in cool dry period due to double cropping.

Global New light of Myanmar, 2015, stated that Children are at greater risk of pesticide exposure than most adults. Pesticide uses affect human health such as nervous system, lung damage, reproductive dysfunction, and possibly dysfunction of hormone and immune systems, etc. According to questionnaires' result, 63 percent of the family household suffer hypertension, 31 percent intestine disease and 6 percent cancer.



Source: Questionnaires' Results

Figure 10 Human Diseases found in Hinthada Township

Chemical pesticides are unavoidably used in crop cultivation due to less awareness on pesticide and lack of agriculture education programmers. According to interviews, they do not know organic pesticide up till now.

There is no guarantee on pesticide use in Myanmar and it is dangerous for human as well as environment. According to interviews, growers use increasing dosages of pesticides or combine several chemicals to get more intense toxic mixtures. As a result, although even more pesticides were killed, resistance increased and human health and the environment are more affected by danger of pesticides.

Future Prospect

Myanmar's farmers is trying to get higher crop production by using pesticide in crop cultivation to get higher economic return and to meet the basic food need for increasing population. On the other hand, they do not have sufficient knowledge on agriculture education and environmental as well as health knowledge on pesticide uses.

Therefore, pesticides will be the major cause of environmental pollution that affects health of the local people. Farmers will suffer negative health impacts as Most farmers do not use protective clothing while they spray pesticides. According to interviews, traders sell pesticide containers of varying sizes, and that are restricted as they can seriously harm the health and the environment. It is dangerous for environment as well as human being.

Farmers in Hinthada Township are lack of awareness on environment and health, They dispose the used pesticide bottles and various size of containers, toxic are seeping into the ground and reach water bodies when it rains. This leads to extinction of fishes as well as other organism.

Therefore, in the future, problems caused by pesticide uses will be surely increased and the local people will encounter health problems concerning environmental pollution cause caused by pesticide uses.

Conclusion

The increase yield, higher yield and large economic benefit are usually short term. Pesticides' effects on local people' health and on the environment are long term and sometimes permanent. Even advantages of pesticide uses outweigh the disadvantages of applying agricultural pesticides at present, in the future disadvantages of pesticide uses outweigh its advantages. It is therefore needed to educate farmers, household members as well as authorities in the village on pesticide use. The role of the policy is critical for protecting environment and local people and it is needed to take actions on systematic pesticide use and disposing used pesticide bottles and tin. On the other hand, it is strictly needed to action for selling banned pesticide and unregistered pesticide. It is needed to support to farmers regarding best practices in sustainable pest management and pesticide use.

On the other hand, it is necessary to do further researches on environmental pollution, human health, soil deterioration, etc caused by pesticide uses in crop cultivation to be sustainable for new generations.

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