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## AN EVALUATION OF RISK ADAPTATION PRACTICES BY FARMERS IN MALAYSIA

Muhammad Ali<sup>1,2</sup>, Norsida Man<sup>2\*</sup>, Farrah Melissa Muharam<sup>2</sup>

<sup>1</sup>Department of Agricultural Extension, PMAS-Arid Agriculture University Rawalpindi, Pakistan

<sup>2</sup>Department of Agriculture Technology, Universiti Putra Malaysia, Malaysia  
Email: norsida@upm.edu.my (\*corresponding author)

*Climate change is not only affecting agricultural sector but also driving farmers to manage agricultural risks through various adaptation practices at global level. Farming community of Malaysia is also facing climate threats and taking different adaptation measures to manage the risks. Therefore, quantitative research was conducted in four zones of states in which 360 farmers were randomly selected. The findings showed that main adaptation measures mentioned by farmers were advance savings, diversification of income and agricultural sources and weather advisories. The study recommends that farm insurance as adaptation measure should be promoted by public and private sectors exclusively by agricultural extension personnel to minimize risk on account of climate changes in Malaysia.*

**Keywords:** agricultural risk, adaptation, climate change, agricultural extension, Malaysia.

### Introduction

Climate change has brought changes in the agricultural sector and grabbed attention of various stakeholders to handle the issue through various adaptation techniques. Although, many of the adaptation technique except high technology based interventions are old and have been used throughout the globe. Niles et al. [19] highlighted that various adaptation measures are significant for farming community to handle climate changes. Alam et al. [1] also stressed the importance of awareness about adaptation techniques among farmers which could help planning of advance preparation. According to Castells-Quintana et al. [10], areas and farmers who are financially or agriculturally marginal and are exposed to higher risk might depict maladaptation. So, there are always physical and psychological impediments in the adoption and implementation of adaptation techniques.

In reality, climate change has started ruining agricultural resources, livelihood of farmers, and pushed farmers towards vicious cycle of poverty that is why farmers might implement less effective adaptation measures [11]. In this context, Ampaire et al. [3] suggested that hurdles in the execution of adaptation or adaptation policy may be reduced through development of active linkages among important stakeholders and their involvement.

According to Masud et al. [18], there is absence of exact adaptation policy or guidelines for farming community in Malaysia. However, it was assumed

that farmers would be involved in execution of various adaptation measures to tackle climate change issue even the clear guidelines or policy do not exist. Cutting it short, the research was designed to evaluate various adaptation techniques used by farmers in the current scenario.

### Data and Methods

The research was conducted through survey in four areas of Malaysia namely Pahang, Terengganu, Johor and Kedah. Although data were collected from 400 respondents, however, 40 questionnaires were excluded due to incomplete responses. So, multi stage cluster technique was used to gather data from 360 farmers. The respondents were told about the main objective of the research and their personal information would not be shared. The local enumerators assisted in data collection. Moreover, questionnaire was designed with the consultation of experts who made significant contribution. Later, the questionnaire was further refined by pre testing in the field situation by collecting data from 50 respondents. These farmers were not repeated for data collection in the final data collection stage. Furthermore, the Statistical Package for Social Sciences (Version 21) was used to analyze the data.

### Results and Discussion

Climate change has not only changed the landscape of the world but also forced farming community to tackle the issue by adapting various measures. According to Brown et al. [9], farmers adopt an adapta-

tion technique if they witness the potential advantage from the pragmatic lens. The results of research in table depict that farmers were using different adaptation techniques to manage the agricultural risks on account of climate changes. Based on the results, most of the farmers were using advance savings as reported by 223 (61.9%) farmers. In this regard, Freeman et al. [13] stated that savings adapted by an individual act as anticipatory kind of adaptation. For example, the savings may help farmers to install blocks or any other hindrance to stop flood being enter into the farmers' field. The farmers may also use savings to buy agricultural inputs after natural catastrophe when the financial aid by public or development sector (NGO) may take time to receive by the farmers. The savings may also assist them to buy food or for medical emergencies. Thus, savings may act as precautionary adaptation measure.

Farmers also used diversification of income sources as adaptation measure as mentioned by 155 (43.1%) farmers. They took this measure as alternative source of income in case the crop has been failed, attacked by the insect/pest, drought condition, severe damage by the flood or land sliding or any other reason. Additionally, farmers get involve in off farm activities as adaptation strategy in order to cope with the natural threats [4]. So, diversification of income acts as effective adaptation measure for victims of natural disasters [6, 12, 14].

The next adaptation measure was agricultural diversification as pointed out by 147 (40.8%) of the farmers. According to Azam-Ali [7] and Kandulu et al. [15], agricultural diversification is the blend of various crop and livestock activities and viewed as commonly used and effective adaptation measure to reduce impacts of natural disasters. Additionally, these kinds of strategies help farmers feel secure and resilient [16]. Another adaptation practice disclosed by 110 numbers of farmers (30.6%) was weather updates. It could be worthy to mention that appropriate piece of information at the proper time in the form of meteorological update assist farming community to make good decision and good adaptation strategy [17]. According to Boansi et al. [8], proper skills, some knowledge and awareness are required by farmers to use adaptation strategy. They added that extension service providers empower and assist farming community to remain updated about climate changes, tackling agricultural risks and enhancing agricultural production in an efficient manner.

Involvement in low risk based agriculture as an adaptation practice was also unveiled by 26.1% (94) of the farmers. It actually shows risky attitude of

farmers to stay away from involvement in high risk based agricultural activities. In this regard, Aslam et al. [5] conducted research in South Punjab of Pakistan and found that farmers adhered with livestock farming were exposed to higher risk on account of flood and droughts. Furthermore, the other adaptation techniques adopted were crop sharing, agriculture value addition, integrated farming, village level networks by 53 (14.7%), 52 (14.4%), 46 (12.8%) and 41 (11.4%) of farmers respectively. Although crop sharing as adaptation measure is not common yet in the research area but in the long run farmers could start it at mass level if, extension service providers promote and facilitate in this regard at national, regional and international level. Some of the farmers had adapted value addition of their products as precautionary measure. This exercise may be good if propagated properly among the farming community. Moreover, value addition is based on various activities which support agriculture value chain but the dilemma is that it is being threatened by climate changes.

The less common adaptation measures were pre harvesting strategies, agriculture insurance and sowing of traditional varieties with frequency and percentage of 18 (5%), 12 (3.3%) and 08 (2.2%) respectively. It would be important to mention that insurance of crops or and farms as well as growing of recommended varieties are effective adaptation measures. Similarly, some of the farmers (6.4%) were involved in other types of adaptation techniques such as alteration of agronomic practices (like sowing time, change of entire crop or crop variety), temporary migration and start of short term new business are name a few. On the other side of the coin, there were 70 (19.4%) farmers who were not using any adaptation technique in the research area. There could be many reasons for non-adoption of adaptation measures like less frequent extension services, none or less favorable attitude towards adaptation measures, high frequency or intensity of risk, previous bad experience or fear of failure. Therefore, the extension service providers should change behavior of farmers towards adoption of adaptation strategies as extension workers are considered as "agent of change".

Tun Oo et al. [21] stated that farmers pick adaptation measure on the basis of their socio-economic condition, ease of application in actual field and timely encouragement from agricultural extension staff. Importantly, Ali et al. [2] highlighted that there is a challenge for agricultural extension service providers to not only equipped for tackling climate change but also required to assist farmers in timely addressing the issue. Additionally, findings of research by Ombo-

Table  
Risk adaptation practices in Malasia

Practices	Frequen- cy (*)	Per- centage
Advance savings	223	61.90
Diversification of income sources	155	43.10
Agriculture diversification	147	40.80
Through weather updates	110	30.6
Chosen low risk agriculture activities	94	26.10
Crop sharing	53	14.70
Agriculture value addition	52	14.40
Integrated farming	46	12.80
Through village level networks	41	11.40
Pre harvesting strategies	18	5.00
Farm insurance	12	3.30
Using traditional varieties	08	2.20
No methods being used	70	19.40
Any other	23	6.40

(\*) More than one answer

goh et al. [20] in Africa (Kenya and Uganda) revealed that collective action has also become instrumental in the selection of adaptation measure. All in all, Malaysian as well as global farmers had adopted various adaptation measures in order to cope with the natural disasters.

#### Conclusion and Recommendations

The research was formulated to assess adaptation practices being practiced by farmers. The findings show that farmers used various adaptation techniques to tackle risk originated through climate changes. The main measures were advance savings, diversification of income sources and agriculture and weather updates. The important but less common adaptation techniques were insurance and changes in agronomic practices. Therefore, it is recommended that efforts are required to promote insurance at farmers' level particularly resource poor and resident of far flung areas by government and private financial institutions. Additionally, agricultural extension staff should actively participate to assist farmers in the insurance process. Lastly, extension staff as agent of change should bring more adaptation techniques in

the knowledge of farmers which could help in minimizing impacts of climate changes.

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