INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 7, Issue 4, (2017) E-ISSN: 2222-6990

Examining Highland Youth Farmers' Adaptation Ability towards Climate Change Impacts

[1]Mohd. Fauzi B Fadzil, [1,2]Khairuddin Idris, [1,2]Bahaman Abu Samah, [1,3]Asnarulkhadi Abu Samah & [1]Hayrol Azril Mohamed Shaffril

[1]Institute for Social Science Studies, Universiti Putra Malaysia
[2]Faculty of Educational Studies, Universiti Putra Malaysia
[3]Faculty of Human Ecology, Universiti Putra Malaysia

DOI Link: http://dx.doi.org/10.6007/IJARBSS/v7-i4/2826

Published Date: 15 April 2017

Abstract

This paper examines the highland youth farmers' ability to adapt to climate change impacts. This research applied a cross sectional survey involving 184 highland youth farmers from Cameron Highland, Lojing, Moyog and Kundasang. Respondents had a high adaptation level in relation to cognitive (M=3.79). Furthermore, the study concluded a high adaptation level in relation to practice among the respondents (M= 3.89). Interestingly, the respondents used creative initiatives in adapting towards climate change. The study stresses on the need for highland youth farmers to be proactive in strengthening their adaptation ability.

Keywords: Youth, Highland Farmers, Climate Change, Adaptation Ability, Sustainable Agriculture.

Introduction

Agriculture plays an important role for the socio-economic development of a country like Malaysia. As the number of Malaysian population keeps increasing, agriculture sectors plays prominent roles to ensure adequate food supply for the community. Furthermore, agriculture sector provides solution for unemployment especially for those in the rural areas. Up to date, drawing on Department of Agriculture booklets (2015), there are 172, 230 farmers from several agriculture industries in Malaysia. In terms of economic contribution, in 2013, total exports of agriculture productivities exceeded RM106 millions Ringgit Malaysia (Department of Agriculture Malaysia, 2015).

Similar to other industries, Agriculture in Malaysia is facing several critical problems and among the prominent one is the climate change impacts. A numbers of climate change symptoms such as rising temperature and unstable rain patterns were detected by local scholars (Kwan et al., 2011; Wan Azli, 2010; Wai et al., 2005). These symptoms are found to result in difficulties for community especially for farmers who rely heavily on weather stability for conducting their socio-economic routine. First, the climate change impacts result in a

reduction of farming yields and productivity gains. Rising temperature for example can cause drought. While warmer temperature is good for some crops, the similar things are not happening to other crops, grain for example, is affected by rising temperature as it prolongs the duration of seed growth and maturity (Holzkämper et al., 2015). Unstable rain pattern on the other hand, result in natural disaster such as flood. In 2015, Kelantan (a state in Peninsular Malaysia) was hit by flood and it caused a total of 105 million Ringgit Malaysia loss for agriculture sector (Utusan Malaysia, 2015). Plus, unstable rain patterns causes landslide which increase the risks associated with farming activities. Rising temperature and unstable rain pattern are affecting farmers' health as these changes are connected to disease such as dengue and health problems related to heart, skin and asthma expected to affect farmers' health (Van Lieshout et al. 2004; Confalonieri et al. 2007; Pinto et al., 2011).

The backup generation in the farming community – the youths, are expected to suffer as the impacts of climate change is expected to worsen in the future. In a study completed by Intergovernmental Panel on Climate Change (IPCC) (2014), across Southeast Asia, temperature is consistently increasing at a rate of 0.14°C to 0.20°C per decade since the 1960s. Moreover, the similar study concluded that Southeast Asia region experiences annual total wet-day rainfall increase of 22 mm per decade, while rainfall from extreme rain days has increased by 10 mm per decade.

Having this situation drives towards a need for adaptation towards climate change especially among the youth farmers who are expected to experience the worsening impacts of climate change. Climate change adaptation can be understood as

> *Actions that were taken to help communities and ecosystem cope with actual or expected impacts of climate change* (Ministry of Natural Resources and Environment Malaysia, 2009)

Up to date, although there is a mounting need for understanding youth farmers' adaptation ability, nevertheless, the existing number is still frustrating. Although there are some local studies conducted such as by Kwan et al. (2011), Wan Azli (2010), Wai et al. (2005), Shaffril et al (2013), Shaffril et al. (2015), most of these studies are focusing on the scientific based results and other community groups such small scale fishermen, housewives, government servants and coastal community. This results in lacking of studies related to social aspects and youth farmers. The main aim of this study is to examine youth farmers' adaptation ability towards climate change. The study is expected to produce new knowledge on strengths and weaknesses of youth farmers in facing the climate change impacts.

Literature Review

In a qualitative study done by Hamdan et al. (2014) focused highland farmers in Cameron Highland. Via a number of Focus Group Discussion, they concluded a moderate adaptation towards climate change among highland farmers. The farmers admitted the changes and among the obvious one are heavy rain and rising temperature and consequently, it affects their agriculture productivity. Moreover, they also concerned on the climate change impacts on the agro-tourism industry at their place.

In another study done by Alam et al. (2011) looked into the instability and exposure of farmers towards climate change. Furthermore, their study focused on the responses of farmers towards these changes. Alam et al. (2011) concluded uncertainty among farmers with regard to climate change. A total of 41% of them didn't know what is climate change, and most of them are adapting towards climate change based on their instinct. Their adaptation are

different based on their perception, knowledge, location, sources, type of crops and level of exposure towards climate change.

A quantitative study done by Woods et al. (2017) focused on farmers' perceptions of climate change and their likely responses in Danish agriculture. Based on survey method, they managed to get responses from 1053 farmers in selected locations in Denmark. Woods et al. (2011) concluded climate change belief makes farmers more willing to adapt to positive impacts while the climate change concern makes farmers more willing to adapt to negative impacts. Furthermore, their study concluded farmers are more opportunistic than risk-averse regarding climate change.

METHODOLOGY

This study is quantitative in nature (cross sectional survey). The instrument was developed based on the document analysis and series of meetings. Originally the instrument consist of five sections, nevertheless, the present study focuses only on four main sections namely demographic, cognitive, practice and structure. The instrument for this study have been presented to a community development expert for validation after number of improvements made based on the pre-test findings (if item deleted analysis). In demographic section, the respondents were given either open-ended or closed ended type of answers while in cognitive, practice and structure sections, the respondents were given a five likert-like scale option of answer ranging from 1 (strongly disagree) to 5 (strongly agree).

Via a simple random sampling, a total of 184 youths from Cameron Highland, Lojing, Moyog and Kundasang were selected as respondents. Trained and experienced enumerators were hired while the research team member monitored the data collection process. It took between 20 to 35 minutes to complete each survey session. The data were then analyzed via descriptive (frequency, percentage, mean score) and inferential analyses (independent t-test, ANOVA, Pearson correlation).

To determine the level of adaptation for the respondents, the common measurement used is the range of score calculation. It is gained by this calculation

$$\frac{\text{Maximum mean score (5.0)} - \text{minimum mean score (1.0)}}{\text{Number of categories (3 – low, moderate and high).}}$$

This resulted in the range of 1.33 for each category and therefore, those recorded mean score ranges between 1.00-2.63 are included in low category, those recorded mean score ranges between 2.64-3.67 are included in moderate category and those recorded mean score ranges between 3.68 -5.00 are included in high category.

RESULT

Table 1 demonstrates the demographic data of highland youth farmers. A total of 67.8% of them are male while a huge majority of highland youth farmers were lower education (80.3%). More than half of them (59.6%) were married and most of them (45.9%) have 4 to 6 household members. Furthermore, total 86.3% of them were full-time farmers while the remaining (13.7%) are having part time job, mostly in tourism related activities.

Table 1: Demographic Of Highland Youth Farmers

Factor	Frequency	Percentage/%	Mean score
Gender			
Male	124	67.8	

Female	59	32.2
Education achievement		
Never been to school	12	6.6
Primary school	23	12.6
Lower secondary school	26	14.2
Upper secondary school	86	47.0
Tertiary	36	19.7
Household member (People)		
1-3	23	12.6
4-6	84	45.9
>7	76	41.5
Marital status		
Single	73	39.9
Married	109	59.6
Divorced	1	.5
Status		
Full time farmers	158	86.3
Part timer	25	13.7
Area		
Cameron Highland	44	24.0
Lojing	44	24.0
Moyog	60	32.8
Kundasang	35	19.2

Table 2 demonstrates the farming background of highland youth farmers. On average, these highland youth farmers managed to earn RM2883.06 per month. They also spend 24.5 days on average for farming activities in a month. The majority of highland youth farmers planted vegetables (90.2%), while most of them were still new in the highland farming industry as 39.3% of them have less than 5 years of experience as a highland farmers.

Table 2: Farming Background

Factor	Frequency	Percentage/%	Mean score
Income per month (from agriculture activities)			RM2883.06
<RM750	73	39.9	
RM751-RM1500	35	19.1	
RM1501-RM3500	36	19.7	
>RM3501	39	21.3	
Number of days spent for farming activities in a month (days)			24.5

<15	39	21.3	
16-25	29	15.8	
>26	115	62.8	
Experience as a farmer (years)			9.9
<5	72	39.3	
6-15	68	37.2	
16-25	36	19.7	
>26	7	3.8	
Main crops			
Fruits	3	1.6	
Flowers	13	7.1	
Paddy	2	1.1	
Vegetables	165	90.2	

HIGHLAND YOUTH FARMERS ADAPTATION CAPACITY

Table 3 indicates the cognitive awareness among respondents toward climate change is quite high (M=3.79). A total of 58.5% of the respondents recorded a high level of adaptation ability related to cognitive while only 1.6% of them recorded a low ability.

Table 3: Cognitive Factor of Highland Youth Farmers

Level	Frequency	Percentage	Mean score
			3.79
Low	3	1.6	
Moderate	73	39.9	
High	107	58.5	

Adaptation related to cognitive are related to youth highland farmers sensitivity and awareness towards the impacts of climate change on the environment and their socio-economic routines. Table 4 demonstrates the statements used to measure adaptation ability related to cognitive. The highest mean score was recorded by statement related to unpredictability of current weather (M = 4.65), followed by statement related to the erratic rainy season (M = 4.61) and the warming temperature in their area (M = 4.32). The lowest mean score was recorded by statement related to usage of pesticides to handle pest problems (M = 2.75).

Table 4: Cognitive Statement of Highland Youth Farmers

Statement	Mean score
It's getting hot in your area	4.34
The weather in the highlands increasingly unpredictable	4.65
The rain has become more frequent in this area	3.32
The rainy season has been erratic	4.61
Unpredictable weather has increased the number of pests in my farm / orchard	4.07
Unpredictable weather has increased the type of insect and pests at my farm / orchard	3.76
Landslides often occur in this area	2.98

I find it difficult to go farming at my farm	3.59
Productivity of my crop is decreasing	4.21
The growth of my crops is stunted	3.99
I had to use more fertilizer to double the yields of my crop	3.22
I had to use more pesticides to handle pest problems which are growing in my farm / orchard	2.75

In term of practice, the overall mean score (M = 3.89) indicates a high level of adaptation. Specifically, a total of 69.4% of the respondents recorded a high level of mean score while another 29.5% recorded a moderate level of mean score.

Table 5: Highland Youth Farmers' Practices Mean Score

Level	Frequency	Percentage	Mean score
			3.89
Low	2	1.1	
Moderate	54	29.5	
High	127	69.4	

Adaptation with regard to practice can be understood as the youth highland farmers willingness to modify socio-economic routines as one of their efforts to adapt to the climate change impacts. Table 6 demonstrates the statements used to measure adaptation ability with regard to practices. The highest mean score was recorded by statement related to their ability to diversify crops (M = 4.43). The second highest mean score was recorded by statement related to their preference to extend their crop area (M = 4.40) and this was followed by statement related to their preference to learn new skills agricultural activity (M = 4.27). The lowest mean score was recorded by statement related to their willingness to get job other than farming related activities (M = 2.93).

Table 6: Highland Youth Farmers' Practices Statement

Statement	Mean score
I love to learn new skills related to agricultural activity (e.g.: floriculture, fertigation, landscape)	4.27
I love to learn new skills that are not related to agriculture (e.g.: entrepreneurial, vocational)	3.97
If I want, I can get another job other than farming with the level of education / skills that I have now	2.93
I can diversify crops	4.43
I had no trouble learning to use the latest technology in the field of agriculture	3.93
I would like to extend my crop area to get more results	4.40
I encourage my wife / child worked outside my field of employment to help me increase revenue	3.32

Adaptation related to structure can be referred to availability of supports by local institutions, the government or community-based institution. The overall mean score recorded for this adaptation aspect was 2.30. It denotes a low level of adaptation ability. It is quite concerning

when a majority of them (54.1%) reported a low level of adaptation while only 4.9% of them reported a high level of adaptation related to structure.

Table 7: Highland Youth Farmers' Structure Mean Score

Level	Frequency	Percentage	Mean score
			2.30
Low	99	54.1	
Moderate	75	41.0	
High	9	4.9	

Table 8 demonstrates the statements used to measure adaptation ability related to structure. The highest mean score was recorded by statement related to availability of other employment opportunities (related to agriculture activities) in their area (M = 3.92), followed by statement related to organizations that can assist farmers to diversify their crops (M = 2.54) and statement related to availability of other employment opportunities (not related to agriculture) (M = 2.53).

Table 8: Highland Youth Farmers' Structure Statement

Statement	**Mean score**
Government agencies in this area provide information about the weather to farmers.	1.62
In this area the government agencies provide advice to farmers about the effects of climate change on their crops	1.71
There are many other employment opportunities (related to agriculture) in this area	3.92
There are many other employment opportunities (which are NOT related to agricultural activity) in this area	2.53
When there are disaster caused by climate change, disaster relief will be distributed evenly to farmers	1.96
Government agencies have provided loans to farmers repairing infrastructure/ equipment affected by climate change	2.27
In this area there are many organizations that can help farmers diversify their economic resources	2.54
Community development planning for farmers in order to face climate change has been carried out by government agencies.	2.02
Often the decisions made by government agencies are parallel with the will and the ability of the farmers.	2.18

DISCUSSION

This research displays the overview of the respondents' cognitive statement towards climate change, this research found the principle idea of cognitive perception among the respondents revolve around weather. Shaffril et al. (2013) and Shaffril et al. (2015) suggested local environmental knowledge is highly connected to one's experience. This paper sees a high possibility of connecting respondents' high cognitive perception with their experience as farmers and the process of learning on climate change. More than half of the respondents have more than five years of farming experience which might developed their high cognitive resistance towards the process of climate change.

The respondents noticed the occurrence of climate change in their area and agreed with unpredictability of local climate, warming temperature and recurrence of erratic rainfalls. The

changes in climate made the respondents noticed the increased number of pests in their farm /orchard, which resulted in a decrease of crop productivity. Regardless this fact, the respondents manage to earn an average of RM2883.06 income per month. This fact demonstrates respondents' high cognitive awareness to local environmental knowledge and helped their adaptation process towards climate change.

The study concluded high adaptation practices among highland youth farmers were resulted from their efforts to learn new knowledge and this in line with a study done Shaffril et al. (2013). Highland youth farmers' willingness to learn new knowledge was not limited to farming but also in other disciplines of agriculture activities. It helps them to learn new skills and diversify their crops. Experience taught them to use technology to combat weather instability. They adapted skills to operate the latest technology in the field of agriculture and strengthen their adaptation ability with regard to practice.

Generally, there are rooms for improvement to further strengthen the structure supports among youth highland farmers. Alam et al. (2011) and Siwar et al. (2009) suggested policy makers need to focus on the determinants of adaptive capacity and need to be proactive and start to have adaptation plan that benefits the highland youth farmers. The current findings are not in line with Alam et al. (2011) and Siwar et al. (2009) as the roles played by the government in providing information, advice, employment, relief, infrastructure/ equipment, economic resources, development planning and decisions making opportunity are still ambiguous among youth highland farmers.

RECOMMENDATIONS AND CONCLUSION

Agriculture is one of the sectors threatened by the climate change impacts. As the impacts are expected to worsen in the future, the farming backup generation, the youth highland farmers are expected to suffer. This paper aims to examine highland youth farmers' adaptation ability towards the climate change impacts. The results concluded high adaptation ability among youth farmers with regard to cognitive and practice. Nevertheless, their adaptation ability related to structure is weak. The study found that youth highland farmers depend on their own ability to survive as support from outside agencies and the government is very limited. The data demonstrate the need for highland youth farmers to be proactive in solving issues and problem associated with climate change impacts.

To strengthen the adaptation ability of youth farmers, a periodical assessment is needed. Via this assessment, things that are needed by youth farmers can be assessed and this offer help to the concerned parties in constructing adaptation strategies that are in line with their need, interest and ability. Furthermore, there is a need now for highland youth farmers have to learn new skills and knowledge especially one related to vocational and entrepreneurship as both are not affected by the climate change. Lastly, there is a need to empower the extension agents at the highland areas. In order to know the actual problems related to the climate change faced by the youth farmers, they need to be proactive and be part of the farming community.

REFERENCES

Alam, M.M., Siwar, C., Toriman, M.E., Molla, R.I., & Talib, B. (2011). Climate Change Induced Adaptation By Paddy Farmers In Malaysia. Mitig Adapt Strateg Glob Change, 17:173–186.

Confalonieri, U., Menne, B., Akhtar, R., Ebi, K.L., Hauengue, M., Kovats, R.S., Revich, B., & Woodward, A. (2007). Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the

Intergovernmental Panel on Climate Change, Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., Hanson, C.E. Eds., Cambridge University Press, Cambridge, UK, 391-431.
Department of Agriculture Malaysia (2015). Booklet Statistik Pertanian. Retrieved on 18 January 2017, from: http://pertanian.kedah.gov.my/images/pdf/Booklet_Statistik_Tanaman_Sub-sektor_Tanaman_Makanan_2015.pdf
Hamdan, M.E., Man, N., Yassin, S.M., D'Silva, J.L., & Shaffril, H.A.M. (2014). Farmers sensitivity towards changing climate in Cameron Highland. Agricultural Journal, 9 (2), 120-126.
Holzkamper, A., Calanca, P., Honti, M., & Fuhrer, J. (2015). Projecting climate change impacts on grain maize based on three different crop model approaches. Agriculture and Forest Meteorology, 15, 214-215.
Intergovernmental Panel on Climate Change (2014). Climate change 2014 synthesis report. Retrieved on 18 January 2017, from: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf
Kwan, M. S., Tanggang, F. T., & Juneng, L. (2011). Projected changes of future climate extremes in Malaysia. Paper presented at National Symposium on Climate Change Adaptation. Putrajaya, Malaysia.
Ministry of Natural Resources and Environment Malaysia. (2010). National policy on climate change. Putrajaya, Malaysia.
Pinto, E., Coelho, M., Oliver, L., & Massad, E. (2011).The influence of climate variables on dengue in Singapore. International Journal of Environmental Health Research, 21 (6), 415-426.
Shaffril, H.A.M., Abu Samah, B., D'Silva, J.L., & Yassin, S.M. (2013). The process of social adaptation towards climate change among Malaysian fishermen. International Journal of Climate Change Strategies and Management, 5 (1), 38-53.
Shaffril, H.A.M., D'Silva, J.L., Kamaruddin, N., Omar, S.Z., & Bolong, J. (2015). The coastal community awareness towards the climate change in Malaysia. International Journal of Climate Change Strategies and Management, 7 (4), 516 – 533.
Siwar, C., Alam, Md, M.M., Murad, W., & Al-Amin, A.Q (2009). A Review of the Linkages between climate change, agricultural sustainability and poverty in Malaysia. International Review of Business Research Papers, Vol. 5, No. 6, November 2009, Pp.309- 321.
Utusan Malaysia (2015). Banjir: Sektor pertanian Kelantan rugi RM105 juta. Retrieved on 18 January 2017, from: http://www.utusan.com.my/berita/nasional/banjir-sektor-pertanian-kelantan-rugi-rm105-juta-1.49642
Van Lieshout, M., Kovats, R.S., Livermore, M.T.J., & Martens, P. (2004). Climate change and malaria: analysis of the SRES climate and socio-economic scenarios. Global Environment Change, 14, 87-99.
Wai, N.M., Carmelengo, A., & Ahmad Khairi, A.W. (2005). A study of global warming in Malaysia. Technology, 42 (June), 1–10.
Wan Azli, W.H. (2010). Influence of climate change on Malaysia weather pattern. Paper presented at Malaysia Green Forum 2010 (MGF2010), 26–27 April, Putrajaya, Malaysia.
Woods, B.A., Nielsen, H.O., Pedersen, A.B., & Kristofersson, D. (2017). Farmers' perceptions of climate change and their likely responses in Danish agriculture. Land Use Policy, 65, 109-120.