

The Post-flood Impacts on Farmers, Agricultural Sector and Food Security in Kelantan

Hazran, Z., *Norsida. M., Nitty Hirawaty. K., Nolila. M. N.

Department of Agribusiness and Bioresource Economics, Faculty of Agriculture, Universiti Putra
Malaysia, 43300 Serdang, Malaysia

Email: norsida@upm.edu.my, norupi45@yahoo.com

DOI: 10.6007/IJARBSS/v7-i9/3316 URL: <http://dx.doi.org/10.6007/IJARBSS/v7-i9/3316>

ABSTRACT

Similar to other countries across the globe, Malaysia experiences climate change and this phenomenon has caused natural disasters such as flood. The objective of this paper is to analyse the perception level toward the impacts of flood on the farming community. A total of 371 farmers in Kelantan who were victims of the flood disaster in 2014 were selected as respondents. The findings confirmed that majority of the respondents (42.9%) had individually suffered losses worth RM 4,001 or more because of the disaster. The flood had negatively affected the flood victims as most of them were low income earners. Majority of the respondents would need two to five months to recover emotionally and psychologically, that is, the same duration needed to resume their normal farming activities.

Keywords: Post-flood Impacts, Kelantan, Agriculture Sector, Food Security

1.0 Introduction

Agriculture is an important economic source in many parts across the globe. Consistent supply of agricultural products such as staple food and meat is needed to feed seven billion people in the world. Failure to do so would result in starvation and may lead to chaos. Lack of food security may lead to disasters which would cause instability to the human population and socio-economy of a nation. In Malaysia, the agricultural sector acts as the third engine of growth. Currently, the level of food self-sufficiency in Malaysia is showing a declining pattern. The stability of food security, which is solely based on the agricultural sector, is highly vulnerable to disasters. Parker (1997) has noted that Malaysia is often hit by floods, droughts, landslides, haze, tsunami and human-made disasters even though Malaysia is away from the Pacific Ring of Fire. FAO (2007) has stated that the croplands, pasture and forests which occupy 60% of the earth's surface are progressively being exposed to threats from increased climatic variability and, in the long run, they become vulnerable to climate change. Abnormal changes in air temperature and heavy rainfall have increased the frequency and the intensity of flood disasters. According to the OECD (2002) definition, the impact of flood disasters can be categorized into positive and negative, primary and secondary long-term effects produced by a development intervention which could be directly or indirectly, intended or unintended. Flood disasters will have an impact on the psychology of the victims, the socio-economy and also food security.

1) Impact on Psychology

A psychological impact entails the recognition of multiple meanings and cultural narratives associated with climate change (Hulme, 2009). According to Tuan Pah Rokiah (2011), the psychological impact suffered by flood victims is not only profound and prolonged, but its effects are worse than those of the economic impact. As the rainy season comes every year, it makes the flood victims in Kelantan feel uneasy and unsafe. Even though flood is accepted as normal by the people who live in Kelantan, this normalcy may become abnormally disastrous as it did in the 2014 flood disaster, which was unexpectedly unusual. Ahmad (2015) observed that Kelantan flood in 2014 had exposed multiple risks to the Kelantan's people which were impacted physically, socially, economically and psychologically. In similar vein, Paranjonthy et al. (2011) have noted that that flood may lead to a wide range of psychosocial and mental health impacts, including distress, anxiety, depression and post-traumatic stress disorder.

2) Impact on Socio-economy

According to Vinet (2008), the impacts of flood include damages to homes, shops and industries, especially the agricultural sector. In addition, from the perspective of economy, floods have caused losses worth billions to Malaysia (Low & Ahmad Jamaluddin, 2001). These floods impacts need to be minimised by enhancing the post-flood management system, risk management and adaptation strategies.

3) Impact on Food Security

During flood, food security will be an issue because the affected areas are destroyed. According to FAO (1983), food security is defined as the assurance that all people at all times have both physical and economic access to the basic food that they need. Flood may affect the access condition of food during and after flood.

The farmers in Kelantan face difficulties and damages in terms of disrupted agricultural activities, lack of road accessibility, food insufficiency and losses of properties each time flood disaster strikes. Floods have given negative impact on the agricultural sector in Kelantan. Flood will cause slow viability growth in agricultural sectors, food security, emotional effects and economic growth. The objective of this paper is to analyse the perception level toward the impacts of flood on agriculture and food security and identify the socio economic profile of respondents among flood victims. The results can be used for policy makers and agricultural agencies to formulate plans and strategies to ensure the development of agriculture sectors especially in Kelantan.

2.0 Methodology

This study was quantitative in nature. A total of 371 farmers who were the victims of flood disaster in 2014 were selected as the respondents. The study location was alongside of Sungai Kelantan which was heavily affected by the disaster. Data collection involved four subsectors of agriculture, namely, the aquaculture, livestock, food crops as well as plantation crops. The

survey adopted a face-to-face approach with guided questionnaire guidance. The questionnaire consisted of four parts: respondents' profile; farm profile; perceptions on the impacts of flood to agriculture, socio-economy, environment and psychology; food security. Data collected were subjected to descriptive statistical analysis. Simple percentages, frequency distribution, means and level of each perception were computed using Statistical Package for Social Sciences (SPSS) Version 21.

3.0 Results and Discussion

1) Demographic Profile of Respondents

Table 1 demonstrates the respondents' demographic data such as age, gender, race, level of education, main occupation, side occupation, years of involvement in the agricultural sector and income. The findings showed that the dominant age of respondents who were active farmers was between 51 and 60 years old (31.8%) and followed by the older group who were aged between 61 and 70 years old (23.5%). The youths who were younger than 30 years old represented 5.9% of the sample, which was only second lowest after the group of respondents who were 70 years old and above. Sample included both male and female although a huge majority of the respondents (84.9%) were male. Three ethnic groups were represented with a vast majority of the respondents (92.7%) being Malay, followed Siamese (5.1%) and Chinese (2.2%). Demographic data analysis also indicated that majority of the respondents were educated up to primary level (37.2%), followed by upper secondary level (26.1%) while only 1.6% and 4.2% respondents received further or higher education with degree, certificate or diploma level qualifications. Most of the respondents (74.9%) were farmers while 14.3% were self-employed. A total of 48.5% of them had been involved in farming for more than 16 years. In terms of economic status, 68.2% of the respondents earned less than RM1000 per month.

Table 1: Demographic Profile of the Respondents (n = 371)

Variable	Category	Frequency	(%)
<i>Age</i>	≤ 30 years	22	5.9
	31-40 years	43	11.6
	41-50 years	83	22.4
	51-60 years	118	31.8
	61-70 years	87	23.5
	≥70 years	18	4.9
<i>Gender</i>	Male	315	84.9
	Female	56	15.1
<i>Ethnicity</i>	Malay	344	92.7
	Chinese	8	2.2
	Others	19	5.1
<i>Level of Education</i>	Never been to School	43	11.6
	Religious School	15	4.0
	Primary School	138	37.2
	Lower Secondary	56	15.1
	Upper Secondary	97	26.1
	Certificate/Diploma	16	4.3
	Degree	6	1.6
<i>Main Occupation</i>	Farmer	278	74.9
	Government/Private	35	9.4
	Self-Working	53	14.3
	Pensioner	5	1.3
<i>Side Occupation</i>	Farmer	99	26.7
	Government/Private	31	8.4
	Self-Working	86	23.2
	No side job	155	41.8
<i>Years of Involvement</i>	1-5 years	84	22.6
	6 -10 years	71	19.1
	11-15 years	36	9.7
	16 years and above	180	48.5
<i>Monthly Income (RM*)</i>	≤ 1000	253	68.2
	1001-2000	76	20.5
	2001-3000	14	3.8
	3001-4000	1	0.3
	4001-5000	5	1.3
	≥5001	22	5.9

*RM = Ringgit Malaysia

3.1 Financial Impact of Flood

Table 2 shows tabulated data of the financial impact of flood on the respondents in terms of losses of and damages to properties, farm facilities and input, farm crops and farm machineries. These variables were calculated to precisely determine the amount of losses and damages in Ringgit Malaysia.

Majority of the respondents (42.9%) suffered individual total loss of RM4,001 and above. However, 32.1% of them merely suffered individual loss worth less than RM1,000. This might be because to their farms had not been affected by the flood because they were planting perennial crops such as rubber and oil palm which were not badly affected.

Table 2: Cost of Losses and Damages Caused by Impact of Flood on Farmers (n = 371)

Cost	Percentage (%)	Frequency (n = 371)
Less than RM1000	32.1	119
RM1001-2000	11.1	41
RM2001-3000	8.4	31
RM3001-4000	3.5	13
RM4001 and above	42.9	159
No Losses	2.2	8

3.2 Perceptions on the Level of Damages and Impacts of Flood on Farmers and Farms

Table 3 presents the results of the respondents' perceptions on the level of damages and impacts of flood on them and their farms in terms of types of damage and impacts which were classified into four levels (not affected, low, medium, high). It can be seen from the table that two variables recorded the highest percentage of high level damage and impact among the variables, namely, *emotion and psychology* and *crops/livestock* variable at with 32.3% and 36.7%, respectively.

The respondents suffered emotionally and psychologically. Some of them turned their attention to off-farm activities as they received little support in relation to motivation and equipment to resume their agricultural activities. Additionally, age was another factor for the considerable lack of interest among farmers to resume their agricultural activities. *Crops/livestock* was a variable that was highly affected as most of the respondents' farms had been damaged by flood disaster and farming activities were therefore disrupted. Food crops and aquaculture were the other subsectors found to be highly affected by the flood. This was because the crops and fish did not have the physical strength to ward off disruption caused by the flood. Food crops such as banana, rice, and vegetables could not withstand the flood. Physically, these crops were morphologically not as strong as the plantation crops such as rubber and oil palm. However, for the aquaculture subsector, the fish cages could not withstand of flood resulting in the destruction of the cage and consequently led to the fish being released into the flood water.

Table 3: Damages and Impacts of Flood on Respondents and their Farms (n = 371)

Variables	Not Affected		Low		Medium		High	
	%	n	%	n	%	n	%	n
Emotion and Psychology	20.2	75	23.7	88	23.7	88	32.3	120
Farm Infrastructures	50.1	186	16.7	62	10.8	40	22.4	83
Farm Tools and Utility	50.9	189	15.6	58	12.9	48	20.5	76
Fertilizer Stock	56.9	211	13.7	51	9.4	35	19.9	74
Farm Store	66.3	246	12.4	46	7.3	27	14.0	52
Drainage & Irrigation	67.4	250	12.7	47	6.2	23	13.7	51
Crops/Livestock	27.2	101	15.6	58	20.5	76	36.7	136
Farm Machinery	67.4	250	12.1	45	7.8	29	12.7	47
Worker	75.5	280	9.7	36	5.4	20	9.4	35

3.3 Time Taken to Resume Farming Activities

Table 4 shows the time taken by respondents to stabilize their farms in the aftermath of the flood. With regard to emotion and psychology, most of respondents had time to stabilize themselves to resume farm operations within two to five months. Within this period, they received support in terms of counselling advice from several non-governmental organisations (NGOs) and government agencies.

Table 4: Time Taken to Stabilize Farm (n = 371)

Variable	Not affected		Less than 1 Month		2-5 Months		6-9 Months		More than 10 Months	
	%	n	%	n	%	n	%	n	%	n
Emotion and Psychology	22.6	84	24.8	92	33.4	124	9.7	36	9.4	35
Farm Infrastructures	54.4	202	10.8	40	19.4	72	8.1	30	7.3	27
Farm Tools and Utility	54.4	202	14.3	53	18.6	69	5.4	20	7.3	27
Fertilizer Stock	57.7	214	11.9	44	17.8	66	6.5	24	6.2	23
Farm Store	69.5	258	7.8	29	12.9	48	5.4	20	4.3	16
Drainage and Irrigation	67.1	249	8.6	32	15.4	57	4.6	17	4.3	16
Crops/Livestock	30.7	114	15.6	58	33.4	124	9.4	35	10.8	40
Farm Machinery	70.4	261	7.5	28	12.9	48	4.9	18	4.3	16
Workers	75.7	281	5.4	20	11.1	41	5.1	19	2.6	10

3.4 Food Security (Accessibility, Availability and Utility)

Table 5 shows respondents' perceptions on food security in terms of food access, food availability and food utility after flood in affected area. The analysis confirmed a moderate level of mean score recorded by the three variables: food availability ($M = 2.412$), food access ($M = 2.436$) and food utility ($M = 2.697$).

Specifically, a statement measuring food availability, *'It was difficult to get adequate food supply after flood had ended'*, recorded the highest mean score ($M = 2.822$). It can be concluded that while some respondents received adequate supply of food at their homes, others did not. The lowest mean score was recorded by statement *'My family and I had to endure hunger a few days without food'* ($M = 1.941$). Such results indicated the respondents' ability to get adequate food supply in their area after the flood had ended. In addition, some NGOs across the country were found to proactively offer help to the flood victims.

The item that measured food accessibility factor, *'No repair service for damaged vehicle after flood has added problem to us in getting food outside the village,'* recorded the highest mean score ($M = 2.792$). Understandably, some of the respondents faced problems in getting food supply as their vehicles had been damaged by the flood. During the post-flood period, not too many organizations provided assistance to repair the flood victims' damaged vehicles. This was probably because such assistance would incur high cost. The lowest mean score for food accessibility factor was recorded by the statement *'I did not have money to pay the cost of repair of my vehicle to get food'* ($M = 2.216$).

The respondents waited for help from NGOs and Flood Centres to provide basic equipment and essential supplies for them. Some of the farmers thought about possibility of flood coming back again or they were obscure about things to do after flood. Statement measuring food utility *'Each family was given sufficient cooking utensils'* recorded the highest mean score ($M = 3.132$). Such finding indicated that sufficient basic cooking equipment and utensils such as gas supply, pans and pots were provided to each family after the flood. The lowest mean score for this factor was for the statement *'Cooking was difficult even with existing equipment because of lack of electricity and gas supply'* ($M = 2.504$).

Table 5: Perceptions on Accessibility, Availability and Utility of Food after Flood

Statement	Scale					Mean	S.D.
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)		
Food Availability							
It was difficult to get adequate food supply after flood had ended.	39.9	11.6	2.7	18.1	27.8	2.822	1.726
Raw ingredients for cooking were hard to find around my area.	39.4	12.7	4.0	17.8	26.1	2.787	1.699
Food sources were very limited in my place.	43.7	12.7	4.9	17.5	21.3	2.601	1.658
My family and I had to endure hunger a few days without food.	62.3	11.3	7.0	8.9	10.5	1.941	1.413
My family and I had to fight to get food every day.	49.9	9.2	7.3	14.3	19.4	2.442	1.644
The food supplied did not meet the nutritional needs of my family and I.	48.8	14.3	9.4	14.6	12.9	2.286	1.501
A lot of food given by flood centre ended up wasted.	58.5	11.1	12.4	7.3	10.8	2.008	1.406

Overall Mean						2.412	1.578
Food Accessibility							
It was difficult to get food for my family from the flood centre or other sources because there was no vehicle.	49.3	12.9	9.4	12.4	15.9	2.326	1.554
It was difficult for me to buy food because the road was damaged and not accessible.	42.9	12.9	9.2	12.7	22.4	2.588	1.644
Food aid distribution was not within the reach of my family and me because the road was damaged and not accessible.	49.3	12.9	8.6	11.1	18.1	2.356	1.590
The vehicle that my family and I used was damaged and unusable thus preventing us from getting our food.	49.6	12.7	9.2	11.3	17.3	2.340	1.576
I did not have money to pay the cost of repair of my vehicle to get food.	51.8	11.1	14.0	10.2	12.9	2.216	1.480
No repair service for damaged vehicle after flood has added problem to us in getting food outside the village.	41.2	7.0	12.7	9.4	29.6	2.792	1.722
Overall Mean						2.436	1.594
Food Utility							
Daily cooking was difficult because my kitchen appliances had either been damaged or lost.	48.5	9.7	4.9	11.3	25.6	2.558	1.729
Basic equipment for cooking was hard to get.	47.4	9.7	7.5	13.2	22.1	2.528	1.672
Flood centre provided adequate cooking utensils to me and members in my community.	41.2	6.2	11.1	18.1	23.5	2.763	1.668
Each family was given sufficient cooking utensils.	33.2	5.7	8.9	19.4	32.9	3.132	1.698
Cooking was difficult even with existing equipment because of lack of electricity and gas supply.	46.6	11.9	8.4	10.8	22.4	2.504	1.658
Overall mean						2.697	1.685

Note: 1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree

Table 6 shows the respondents' levels of perceptions on food access, food availability and food utility in the affected area. All of these factors indicated moderate levels of perception.

Table 6: Perception Level toward Food Access, Availability and Utility in Affected Area

Food Access Level	Frequency	Percentage	Mean	S.D.
High (3.67-5.0)	79	21.3%	2.434	1.594
Moderate (2.34-3.66)	89	24.0%		
Low (1-2.33)	203	54.7%		
Total	371	100.0%		

Food Availability Level	Frequency	Percentage	Mean	S.D.
High (3.67-5.0)	75	20.2%	2.412	1.578
Moderate (2.34-3.66)	100	27.0%		
Low (1-2.33)	196	52.8%		
Total	371	100.0%		

Food Utility Level	Frequency	Percentage	Mean	S.D.
High (3.67-5.0)	97	26.1%	2.697	1.685
Moderate (2.34-3.66)	124	33.4%		
Low (1-2.33)	150	40.4%		
Total	371	100.0%		

4.0 Recommendations

Based on the findings, this study recommends that there is a critical need to strengthen the social adaptation of farmers towards flood impacts and climate change. Key strategies suggested are: (1) encourage the farmers to practice good preparation operation such as preparation to free livestock during flood; and, (2) ensure that farmers have proper flood-resistant storage to reduce the impacts of flood. Other than that, extension program and activities could help the farmers to redevelop their farms after the flood. Besides, agricultural agencies should introduce alternative crops that could regenerate income temporarily before the farmers could resume their normal farming activities.

5.0 Conclusions

The results have shown that the agricultural sector had been affected by flood and this led to negative impacts on the farming community members who were either directly or indirectly involved in this sector. In terms of cost, majority of the respondents suffered individual loss of more than RM4,001. This indicated that the impacts of flood on respondents were very severe because majority of them only earned less than RM1000 per month. Because they were low income earners, it took majority of the respondents approximately two to five months to stabilize their emotions psychologically before resuming their farming activities.

References

Ahmad, W. I. W. and Abdurahman, S. M. (2015). Kelantan Flood 2014: Reflections from Relief Aid Mission to Kampung Kemubu, Kelantan. *Mediterranean Journal of Social Sciences*, 6(3 S2), 340.

- FAO (2007). The State of Food and Agriculture 2007. FAO Agriculture Series. Retrieved from: <http://www.fao.org/docrep/010/a1200e/a1200e00.htm>.
- FAO (1983). World Food Security: a Reappraisal of the Concepts and Approaches. Director Generals Report, Rome
- Hulme, M. (2009). Why we disagree about climate change: understanding controversy, inaction and opportunity. Cambridge University Press.
- Low, K. S. and Ahmad Jamaluddin, S. (2001). Assessment of the impacts of climate change on key economic sectors in Malaysia: Water resources. In Chong, A.L. and Mathew, P. (eds): *Malaysia national response strategies to climate change*. Ministry of Science, Technology and Environment.
- OECD (2002). Glossary of Key Terms in Evaluation and Results Based Management. Available at: <http://bit.ly/1KG9WUk>
- Paranjothy, S., Gallacher, J., Amlôt, R., Rubin, G. J., Page, L., Baxter, T. and Palmer, S. R. (2011). Psychosocial impact of the summer 2007 floods in England. *BMC public health*, 11(1), 1.
- Parker, D. J., Islam, N. and Chan, N. W. (1997). 'Chapter 3: Reducing Vulnerability Following Flood Disaster: Issues and Practices', in Awotona, A. (ed.) *Reconstruction After Disaster*. London: Avebury, pp.23-44.
- Tuan Pah Rokiah. (2011). Implication of Flood Hazard on the Socioeconomics of Residence in Lembangan Kelantan, Persidangan Kebangsaan Ekonomi Malaysia ke VI (PERKEM VI), Ekonomi Berpendapatan Tinggi: Transformasi ke Arah Peningkatan Inovasi, Produktiviti dan Kualiti Hidup, Melaka Bandaraya Bersejarah, 5 – 7 Jun 2011 PROSIDING PERKEM VI, JILID 1 (2011) 377 – 388, ISSN: 2231-962X.
- Vinet, F. (2008). Geographical analysis of damage due to flash floods in southern France: The cases of 12–13 November 1999 and 8–9 September 2002. *Applied Geography*, 28(4), 323-336.