
Research Article**The Communities Understandings on the Roles of Government in Mitigating Trans boundary Haze Pollution in Sarawak Malaysia****Ahi Sarok¹, Mohd Nashriq Bin Nizam²**

Abstract: This study examines the communities understandings on the disaster risk management, government actions in the legislation and enforcement and the role of ASEAN's in dealing with trans boundary haze pollution in the Sri Aman, Sarawak. Data collection methods was based on the interview schedule. The analysis was constructed on one hundred (100) respondents. A five-point Likert Scale is used which consist of five main constructs that us related to the objectives of the study namely, the community's understanding of the haze issue, the awareness of the Disaster Risk Management on haze, government's action in addressing the haze issue, ASEAN's role in dealing with trans boundary haze pollution and the impact of haze on community's livelihood. The study's result shows that community in Sri Aman are generally agree with understanding on the haze issue with the mean of 4.39 and standard deviation of 0.81. Besides, the community are also aware on the Disaster Risk Management towards haze with the respondent's feedback that shows that almost 70.0 percent agreed as their feedback. Majority of the respondents (93.86%) with the mean of ranging from 4.26 to 4.83 and standard deviation from 0.38 to 0.91 are agree and support the action from government. The construct on ASEAN's role in dealing with trans boundary haze pollution has a positive result with mean of 4.20 and standard deviation of 0.77. While, the impact of haze towards their livelihood shows that most of the respondents understand with the value mean of 4.29. The communities in Sri Aman understand the Disaster Risk Management, a government's action on the legislation and enforcement and the ASEAN's role when dealing with trans boundary haze. However the community need to be exposed with Disaster Risk Management Training and adopt it is because it will help them to analyse and learn from their experience on the disaster. Eventually it will enhance the communities understanding on risk posed by trans boundary haze.

ABSTRAK : Kajian ini mengkaji pemahaman komuniti mengenai Pengurusan Risiko Bencana, tindakan kerajaan dalam undang-undang dan penguatkuasaan serta peranan ASEAN dalam menangani pencemaran jerebu rentas sempadan. Kajian ini telah dijalankan di Sri Aman, Sarawak. Kaedah pengumpulan data adalah berdasarkan kepada jadual temuduga. Analisis ini telah dilakukan ke atas satu ratus (100) responden. Lima mata skala Likert telah digunakan yang terdiri daripada lima teras utama yang berkaitan dengan objektif kajian iaitu pemahaman komuniti mengenai isu jerebu, kesedaran mengenai Pengurusan Risiko Bencana terhadap jerebu, tindakan kerajaan dalam menangani masalah jerebu, peranan ASEAN dalam menangani pencemaran jerebu rentas sempadan dan kesan jerebu terhadap kehidupan komuniti. Ujian Alpha Cronbach telah digunakan untuk menentukan konsistensi dalaman dan kebolehpercayaan data dengan keputusan keseluruhan konstruk berada di atas paras 0.76. Keputusan daripada Explanatory Factor Analysis (EFA) menunjukkan bahawa Ujian Kaiser-Mayer-Olkin (KMO) untuk keseluruhan ialah diantara 0.72 hingga 0.92 yang merekodkan nilai Eigen diantara 3.82 hingga 4.92. Hasil kajian mendapati bahawa komuniti di Sri Aman secara umumnya bersetuju dengan pemahaman mengenai isu jerebu dengan purata min 4.39 dan sisihan piawai 0.81. Selain itu, komuniti juga menyedari mengenai Pengurusan Risiko Bencana terhadap jerebu dengan maklum balas responden yang menunjukkan bahawa hampir 70.0 peratus memilih bersetuju sebagai maklum balas mereka. Majoriti responden (93.86%) dengan min antara 4.26 hingga 4.83 dan sisihan piawai dari 0.38 hingga 0.91 bersetuju dan menyokong tindakan dari kerajaan. Konstruk mengenai peranan ASEAN dalam menangani pencemaran jerebu rentas sempadan mempunyai hasil positif dengan min 4.20 dan sisihan piawai 0.77. Walaupun, kesan jerebu terhadap kehidupan mereka menunjukkan bahawa kebanyakan responden memahami dengan nilai min 4.29. Oleh itu, komuniti di Sri Aman dapat memahami mengenai Pengurusan Risiko Bencana, tindakan pemerintah terhadap undang-undang dan penguatkuasaan dan peranan ASEAN ketika menangani pencemaran jerebu rentas sempadan. Hasil daripada dapatan dan perbincangan, komuniti perlu didedahkan dengan Latihan Pengurusan Risiko Bencana yang disarankan untuk diterima pakai kerana ia akan membantu mereka untuk menganalisis dan belajar dari pengalaman mereka terhadap bencana tersebut. Ini akan meningkatkan pemahaman komuniti mengenai risiko pencemaran jerebu rentas sempadan.

Key Words: community's understanding, legislation, enforcement, transboundary haze pollution, livelihood.**Kata kunci:** pemahaman masyarakat, perundangan, penguatkuasaan, pencemaran jerebu rentas sempadan, mata pencarian

Introduction

Environmental issues began to be a concern in Southeast Asia, especially among ASEAN countries since the late 1970s. ASEAN countries viewed seriously the haze pollution that is occurring in region as these pollutions can cause deterioration in the health of the people and threaten their country's economy. Due to that, the various approaches had been done by ASEAN to address these trans boundary haze pollutions. According to ASEAN Secretariat (1995), the Agreement on the Conservation of Nature and Natural Resources is focused on a specific reference to air pollution and 'trans frontier environmental effects' which was a follow up of the 1990's Kuala Lumpur Accord on Environment and Development, the 1992's Singapore Resolution on Environment and Development and the Workshop on Trans boundary Pollution and Haze in ASEAN Countries in Balikpapan, Indonesia in September 1992. As a result ASEAN environmental ministers decided to coordinate policy directions and established operational and technical cooperation with special reference to haze (Tay, 2008).

The first informal ASEAN Ministerial Meeting on the Environment was held in Kuching, Sarawak in 1994 which marked the foundations of a more visible effort by the ASEAN member countries to report the non-stop problem of the haze. According to Yahaya (2000), the ministers had agreed to boost cooperation to manage natural resources and control trans boundary pollution within ASEAN, to improve an early warning and response system, and to advance the capacity of member countries in these areas. Efforts and determination to address the Southeast Asian haze originated from the ASEAN level and the regional collaboration over the haze (Elliott, 2003).

As the result of the trans boundary haze pollution, the Department of Environment (DOE) (2001) reported that, the air quality worsened during 1997 in several places in Sarawak namely Kuching, Sri Aman and Sib. Consequently, Haze Emergency had to be declared for 10 days from 19th to 28th September 1997 when the Air Pollutant Index (API) had reached above the 500 level. This API had exceeded the Malaysian Air Quality Guideline which was beyond the highly dangerous levels of the Malaysian API. In 2005, after eight years of trans boundary haze pollution hit across the ASEAN region, the Haze Emergency was proclaimed again after the API readings in Selangor and also Sarawak had recorded a highest API which is more than 200. In 2006, 2009 and 2014, the State of Sarawak, especially Bandar Sri Aman, which recorded the highest API readings of more than 201. As a result, many schools in the affected areas were closed. According to DOE (2016), the primary cause of trans boundary haze pollution was caused by the slash and burn practices used to clear land for agriculture purposes in Riau, Sumatra and Kalimantan, Indonesia. For example, NOAA 12 satellite has detected about 202 hot spots in Riau, and North Sumatra while NOAA 16 satellite detected about 109 hot spots in several areas in Sarawak and Kalimantan (DOE, 2005). ASEAN

Institute of Forest Management (1997) mentioned that, a total of 161,700 ha from 24,900 ha of natural forests, 107,500 hectares of replanted areas and 29,400 ha of forest plantations were also destroyed due to the fire activities. There are three main factors that cause forest fires in Indonesia which are firstly, due to ignorance and human negligence; secondly, due to fire activities and thirdly due to the 418 ha coal seams in Bukit Soeharto (ASEAN Institute of Forest Management, 1997).

Because of that, all the ASEAN member states except Laos and Myanmar take seriously on the haze pollution because these two countries are not affected by the haze. ASEAN is an organization whose membership comprises Southeast Asian countries they have been pushing for efforts to curb the haze problem from continuing and encourage the governments of every country to take action against "criminals" which who were responsible for the haze outbreak through agreements signed at the ASEAN Summit in 2015, called the ASEAN Agreement on Trans boundary Haze Pollution. Apart from the ASEAN Agreement on the trans boundary Haze Pollution, the United Nation General Assembly (2003) also introduced the Disaster Risk Management (DRM). The DRM strategies enacted the community level of understanding has been strongly favoured and increasingly endorsed over the last twenty years, taking up on, and developing ideas and notions. Over the last two decades there has been increasing demands to relate such local and community schemes to development and poverty alleviation goals and objectives. The objectives to use the DRM strategies is because the communities will be expose to a different form of vulnerability and immediate response when disaster hit like haze. Thus, DRM strategies will give an impact and understanding towards the communities, local authorities and at the international level to cope with disaster before, during and after occurrence. Although what appears to be a clear relationship between DRM and household livelihood security, very little inclusive analysis has been undertaken to examine the relationship, or non-relationship, as well as the strategies, conditions, and factors that support or work against it. Therefore, DRM strategies provides analysis of some of the aspects of the disaster which are household livelihood security links and the community's understanding towards this strategy. In 2015 the issue of trans boundary haze pollution was discussed among Southeast Asian countries and the model was developed by Food and Agriculture Organisation of the United Nation (FAO) to determine the understanding and response the community needs to understand about the preparedness measures when deal with haze issue. Based on the model in **Figure 1** below, there are four elements on the disaster preparedness for the effectiveness response when a disaster happens. Preparedness planning goals is to establish a permanent capability to act to a range of different situations that may affect a country or region by setting in place an extensive set of readiness methods by including the early warning systems, ongoing risk and vulnerability assessment, capacity building, the creation and protection of stand-by capacities and the storing of humanitarian supplies which will

help in the designing, testing and accomplishment of response actions.

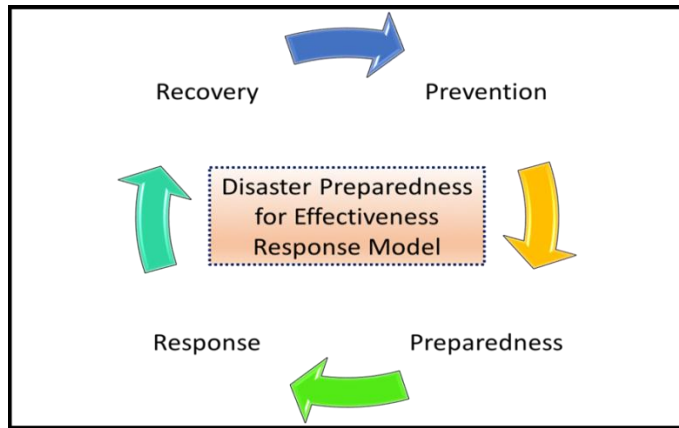


Figure 1 The Community’s Understanding on the Disaster Preparedness for Effectiveness Response Model towards the Haze (Source: FAO, 2008)

At the national level, the National Disaster Management Agency (NADMA) was established to coordinate the National Disaster Management and is responsible for establishing and ensuring the policies and mechanisms of the National Disaster Management complied with and implemented at all levels of disaster management. Disaster Management is controlled by the three levels of management as follows: Central Disaster Management Committee (JPBP); State Disaster Management Committee (JPBN) and District Disaster Management Committee (DTCP). Among the responsibilities of NADMA in disaster management are: issuing strategies, directions, action plans, directions and policies in disaster management; ensuring the acceptance and implementation of policies and disaster management mechanism is running smoothly; coordinate disaster management drill control and search and rescue from time to time; and, monitor and ensure the implementation of Disaster Risk Management measures to prevent or mitigate the impact of disasters conducted by Government agencies.

Meanwhile, at the State level, State Disaster Management Committee (JPBN) chaired by YB Datuk Amar Douglas Uggah, Sarawak Deputy Chief Minister, cum Minister of Modernization of Agriculture, Indigenous Lands and Regional Development, while the Deputy Chairman was Y.Bhg Datu Jaul Samion, Deputy State Secretary (Rural Transformation) as shown in **Figure 2** below.

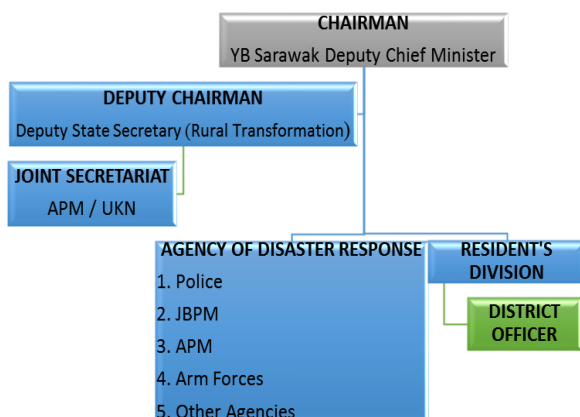


Figure 2: State Disaster Management Committee (Source: SDMC)

The State Disaster Management Committee (SDMC) had come out with four steps for disaster risk management as shown in **Figure 3** below



Figure 3: State’s Disaster Risk Management Model (Source: JPBN)

Based on the Community's Understanding on the Effectiveness of Disaster Preparedness for Response towards the Haze Model as shown in **Figure 2** and the State’s Disaster Risk Management model (**Figure 3**) we can conclude that, there is a similarities and almost same between this two model which can be applied or used in any disaster across the country and state especially for trans boundary haze pollution.

Hence, for the haze issue, community’s understanding is important in this process in order for a plan to be effective which also will include participation at the local, national and international levels. Coordinated participation will help to work out problems when a disaster occurs. Then, it will lead to an improved community’s understanding that finally leads to protection lives and livelihoods. In addition, the process of evolving a national or state preparedness capability should bring together as well as information, communication systems, legislation, enforcement, contingency and response plans. The plan is a product to enable improved the community’s understanding.

The problem of trans boundary haze leads to the assessment and strong desire to know how the community’s responds and do they understand the actions or legislation taken by the government to minimize the haze issues that have brought the significant impacts to the community livelihood strategies before, during and after the haze. In addition, do the community has any knowledge about the trans boundary haze pollution and how they been reminded and exposed to safety measures and reminders when haze occurs. Meanwhile, the problems also give some assumptions based on the livelihoods framework which often pay attention to the evolution or strategic changes in livelihood assets - natural, physical, financial, human and social capital assets (Scoones, 1998). This study aims to assess what types of measures are being taken by the government or agencies and type of legislations

enforced in Malaysia to address this transboundary haze especially amongst the communities in Sri Aman town and to ascertain their understanding on the role of ASEAN in dealing with transboundary haze when Sarawak was engulfed by massive haze lately.

Literature Review

Some researchers and agencies have accepted ASEAN haze mitigation or improvement efforts like the United Nations Environment Programme (UNEP) welcomed the ASEAN Way of haze co-operation (preserving sovereignty and non-interference) as an original accomplishment that could become a global model for the undertaking of transboundary issues (Severino, 2006). Meaning to say, it was intended that there would be an increasing importance of cooperative measures instead of sanctions and strict state responsibility (sticks) as guidance devices for actions among other regions and in other international environmental regimes in the future. Nevertheless, scholars had argued that soft law agreements as is predominant in ASEAN haze initiatives saved time, as ASEAN was able to directly get the cooperation of Indonesia, which would have been unlikely under the threat of sanctions (Cotton, 1999; Florano, 2004). Solingen (2005) stated that such informal agreements could better facilitate cooperation because they make fewer informational demands on the parties, can be negotiated quickly and rapidly improved as conditions change. In addition, other scholars said that it has been useful in attracting funding and technical assistance as once a regional machinery is recognised based on local volunteerism, contributions from the international community would be expected to pour in (Florano, 2004; Mayer, 2006). Malaysia has experienced transboundary haze pollution caused by fires from Sumatra and Kalimantan, Indonesia in 1997 (Rafia Afroz, 2003). Sarawak is badly affected by transboundary haze pollution from Indonesia due to its geographical proximity to Kalimantan, Indonesia.

According to Mwangi (2013), the community in Laikipia North District, Kenya needs to understand the importance of Disaster Risk Reduction (DRR) Approach so that they are always alert and prepared in case of any disaster. The goal is to decrease socioeconomic weaknesses to disaster as well as dealing with the environmental and other hazards that cause them. DRR is an importance because it authorises the community with sustainable skills and knowledge to overcome disaster risks which in turn helps them overwhelmed poverty and suffering which otherwise not assumed the impact of disasters on community's livelihoods would not be tackled. Except one considers how disaster risk reduction can reduce communities' vulnerabilities to disasters, the work to strengthen livelihoods could be seriously destabilised or worse, actively contribute to increased vulnerability in the future. Moreover, the study also was to determine how disaster risks reduction, mitigation, preparedness, response and recovery influenced livelihoods of households in that area. The results show that, when community tried to understand on how to cope the DRR, they were able to improve their lifestyles since

they had access to food and water; their health becomes stable since disasters affect human and animal health. Reducing disaster risk also helped households save cash for the future which would have otherwise been used to replace what has been destroyed by disasters.

Whereas, in 2013, Denis Tan Wei Han from the University of Singapore conducted a study on A Contribution to Understanding the Impact of Transboundary Haze 2013 on Singapore. Moreover, the survey is made from 421 households for the research access to analyse their understanding the impact of haze. Through this study, the researcher also had found that an economic analysis of transboundary haze is conducted to provide an analytical framework from which policy makers can approach the problem. Besides, a comprehensive study on the impact of the 2013 haze episode is also presented which adds new knowledge to the field. Then, policy implications relevant for Singapore are also drawn from the findings.

Tim Forsyth with his study in 2014 examined on a comparison of Indonesia, Singapore and Malaysia towards public understanding or concerns on transboundary haze pollution. Besides, this study has shown the implication of understanding on public concerns about environmental problems which generate narrative structures that effect policy by allocating roles of blame, responsibility, and appropriate behaviour. Due to that, the researcher also had found an study on newspaper about public worries on transboundary haze resulting from forest fires in Indonesia, Singapore, and Malaysia for crises experienced in 1997, 2005 and 2013. Moreover, the news or tabloid reporting about haze has slanted from a dispute of the possible health and economic impacts of fires resulting partly obviously from El Nino-induced droughts towards an rising belittling of Indonesia for not passing the 2002 Association of South East Asian Nations (ASEAN) Agreement on Transboundary Haze Pollution and censure of Singaporean and Malaysian companies capitalising in palm oil plantations, and ASEAN. Lastly, the newspaper also mentioned and argued that analysis of the public concerns, despite political influences on the press, offers insights into how public's understanding and criticism is voiced in these countries, and how perceived concern for action is varying.

World Vision Uganda (2009) had conducted a study on the Gulu Area Development Programme (ADP) Community Disaster Preparedness Plan in which to create or establish effective institutional mechanisms for Disaster Preparedness and Management as well as to promote and ensure integration of disaster preparedness and management into the ADP socio-economic development planning process towards the community in Gulu District, Northern Uganda that has been affected by a number of disasters including but not limited to Civil Wars, drought, HIV/AIDs, famine and Epidemics. The aim of this community disaster preparedness also is to contribute to the enhancement of the community's capacity or understanding to respond to emergencies and also will coordinate with its community resourceful partners in order to increase on their capabilities while reducing and eliminating on

the vulnerabilities.

Heil and Goldammer (2001) in their article review on what had been reported in The Jakarta Post on 2nd September 1997, estimated that almost 80% of the land and forest fire were caused by plantation companies which cleared vast average of land for palm oil plantation. This data shows that the main cause is neither geographic location, farmers' ignorance about proper way to clear land, nor traditional practices, such as slash and burn and shifting cultivation, which exist thus far, but the primary cause is company's decision to burn forest for land clearing. Land clearing by means of fire takes place yearly in Indonesia during the dry season to practise agricultural land. According to Tacconi (2003), both small-scale subsistence farmers, mid-scale commercial agriculturalists, and large-scale oil palm and timber concession holders are responsible. Simorangkir (2006) also states that, even in 2006, the farmers burned their farms during the dry season after they have yield trees and cleared the undergrowth and forest because it is the most privately cost effective strategies for large-scale land clearing strategy in the Riau of Indonesia.

Eko Teguh Paripurno (2003) on his study about community strengthening on disaster management in Indonesia, a case study on volcano eruption, mass movement and flood prone area. The community's understanding on strengthening or community empowering is a part of education that devoted to build internal mechanism within the community in facing their problem wisely. This is because, participatory and facilitative approaches are important tools in order to make community understand about the strengthening program. Besides that, disaster management is stimulating topic because nowadays disaster seems become our daily "menu". Meaning to say, as social phenomena disaster could disturb the normal pattern of life, harmful to human kind, damages the social structure, lead to a sharp increase in need. In the context of disaster management, disaster is perceived as a part of the cycle of disaster management disaster likes an emergency relief, rehabilitation, reconstruction, development, prevention, mitigation, and preparedness action.

In 2016, Maizatun Mustafa and Mohd Hazmi has made a study on the position of environmental law in Malaysia in dealing with domestic and regional air pollution problems. The main intentions of this research are to lay down current law valid to protect air quality from various pollution sources, and to highlight one type of air pollution problem challenged by Malaysia yearly, specifically that of transboundary haze pollution. The findings have found that for Malaysia, the increasing of understanding on people's attentiveness and economic activities in urban and sub-urban areas, as well as the growing numbers of agricultural areas, industries and vehicle fleet have contributed to the problem of air pollution in the country. Meaning to say, since causes of air pollution are diverse, different legal approaches are required and used to regulate or control various sources of air pollution. However, related with other sources of air pollution, the control of haze is more complex as it can derive both domestically and from abroad. If such haze derived beyond Malaysia's boundary,

international efforts would then be obligatory to regulate it. Due to that, the study had pursued to identify the position of law in Malaysia in controlling haze across border and to identify gaps in the law that require improvement.

The research conducted in 2015 by Hanim Kamaruddin from Universiti Kebangsaan Malaysia and Cecep Aminuddin from Bandung Institute of Technology, Indonesia entitled Transboundary Haze polluters and Accountability: The Legal Landscape in Indonesia and Malaysia. According to them, the implementation and changes in domestic laws of Indonesia and Malaysia since the 1997 haze incidence had showed to be quite challenging in dealing with issues of local burning and prevention thereof. Furthermore, the enforcement to penalise foreign based companies in Indonesia and Malaysia is slow and overwhelmed with issues related to unproven cronyism and corruption, lack of awareness and education, weaknesses in institutional framework and lack of political will. In addition, the penalties imposed are too low that it is insufficient to daunt further acts of environmental pollution by these companies. At the same time as these boundaries delays effective enforcement in both countries, incidences of forest fires leading to transboundary haze pollution becomes more looming particularly between March to October each year. It is good to conclude that domestic laws have been insufficient to control and prevent transboundary haze from activities by foreign vested agricultural companies in Indonesia or Malaysia. Meaning to say, as these companies have Indonesian or Malaysian attentions that carry out agricultural activities in either countries, an external regulation should be discovered to accompaniment and support internal guideline in each country to ensure that the activities of these transnational companies are undertaken within the confines of environmental standards and ASEAN notion of cooperation. Therefore, a legitimate legislative framework to impose and enforce internationally environmental standards recognised under human rights responsibilities upon the overseas activities of the plantation corporations incorporate within the host state's territory may be feasible to imposing accountability to haze polluters in Indonesia and Malaysia.

Methodology

Both qualitative and quantitative research design were used to collect data from the respondents who are local communities residing in the Sri Aman Division, Sarawak, Malaysia. A total 100 respondents were selected by using the purposive sampling techniques and they were interviewed by using the interview schedule. In addition, a series of in depth interviews were held with the various stakeholders such as officials from Department of Environment (DOE), Natural Resources Environment Board (NREB) and the State Disaster Committee. Quantitative data were analysed using SPSS while the qualitative data were transcribed and reported accordingly based on the findings.

Findings and Discussions

The respondents' perceptions on community's understanding on the haze issues were evaluated through various constructs.

Namely communities understandings on disaster risk management on haze, the importance of mitigation on haze in enhancing community's livelihood strategies, Risk Identification and Vulnerability Assessment, Contingency Planning Role in Mitigating Transboundary Haze, Awareness of the Disaster Risk Management on Haze, Education for Disaster Risk Management on Haze and ASEAN's Role in dealing with Transboundary Haze Pollution

Communities Understandings on the Disaster Risk Management on Haze

There are six items in this construct. When this construct is analysed using Exploratory Factor Analysis (EFA), the results shown the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is at 0.830 indicating the sampling adequacy of greater than 0.5 for a satisfactory factor analysis to be accepted. The total percentage of cumulative explained at 63.69 supported with Eigen Value at 3.82, which shows that all of the items in the construct are valid and reliable. On the other hand, the descriptive analyses indicates mean scored for the entire construct ranges from 4.15 to 4.59 with standard deviation range from 0.67 to 0.96 respectively which are skewed toward positive feedback. The finding shows that two items recorded positive feedback more than 65.0 percent of the respondents strongly agreed with the statement. The statement saying that "I take precautionary measures when API readings are at an unhealthy level" scored the highest mean valued at 4.59 and positive feedback at 90.0 percent and "The source of information on haze are accurate and reliable" with the mean valued at 4.46 and positive feedback at 84.0 percent compared to the others items in this section. The items on "I understand the reading of the Malaysia's Air Pollutant Index (API)" also shows a positive feedback at 90.0 percent. Besides, they also have positive feedbacks at 87.0 percent on items "I often read and access information on the haze issue" and 80.0 percent on items "community understand with the guidelines from the Ministry of Health Malaysia regarding on precautionary measures on the occurrence of haze". In addition, the last items also recorded positive feedback which mean intensely agree at 74.0 percent on items "I understand about the Disaster Risk Management on haze from the State Disaster Management Committee (JPBN)". Therefore, most of the respondents strongly agree with the understanding to the haze issue.

In a semi-structured interviews (SSIs) with other respondents, they claimed that the 1.0 to 21.0 percent (Rating Percentage) for the understanding to the haze issue were not fully understood. One of the reasons that contribute to this percentage is age factor of the respondents. This is because most respondents are above 56 years old and they are not really aware or understand with the Disaster Risk Management on haze from the State Disaster Management Committee (JPBN) and also with the guidelines from the Ministry of Health Malaysia regarding the precautionary measures on the occurrence of haze. It was found out that the respondents only listen to the advice and instructions regarding the haze from their family members and the people around them.

The Importance of Mitigation on Haze in Enhancing Community's Livelihood Security

Disaster Risk Management (DRM) is not a totally new concept, but is a valuable way of studying humanitarian, development and advocacy programmes to improve their quality and effectiveness in targeting the most vulnerable people. DRM is the concept and practice of reducing disaster risks especially haze pollution through systematic efforts to analyse or manage the causal effects of disasters, including through reduced exposure to risks, reduced vulnerability of community and property, wise management of land, the environment and improved preparedness for adverse events. Disaster mitigation can be defined as the decreasing or limitation of the adverse impacts of haze and it encompasses the community's awareness, improved the policies and hazard resistant construction (UNISDR, 2003). The effects on haze cannot be stopped totally but their scale of severity can be significantly reduced by various strategies and actions.

Risk Identification and Vulnerability Assessment

According to Land (2008), disaster risk identification and vulnerability assessment and analysis is the process of gathering all relevant data about the community and its individual members and use it to control the nature and extent of risk by studying the characteristics of hazards, the degree of vulnerability and the capability of the community or individuals to cope.

Thus, it is done on the community in the Sri Aman since the haze affects their livelihood. Interview schedule is used for effective community participation and make them better understanding towards the disaster risk management on haze. Based on the interview schedule, there are a few importance elements that be highlighted and focused such as the disaster risk management for community prone to haze and vulnerability or capacity valuation for the haze hit community. This will contribute to the community's understanding and awareness on haze and enables them to define their action to reduce the haze risk. Besides, it is also an essential precursor for decision-making in disaster risk management, as well as the formulation of development on legislation and enforcement, strategies, plans and programmes from the government.

Contingency Planning Role in Mitigating Transboundary Haze

Barton et al. (2001) stated that, the Contingency Plan involves an analysis of specific events or emerging hazard situations that might intimidate the community or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses. The Contingency Plan provides communities with a guide to what their operational needs are, and the actions needed to manage the hazard events to ensure that they do not turn into disasters. The programme seeks to address policies and functions of the government to reinforce their planning and rapid intervention capacities to protect vulnerable populations in case of disaster. The pre-positioning of resources or emergency relief support from the government

or NGO's such as free health checks, treatment assistance or medication and free face masks is a resourceful support or aid. This also will develop an efficient communication and addresses information between government and citizens in Sri Aman including cross-border relationships or to avoid tensions between communities resulting from the scarcity of resources. The participation of both government with communities at all levels of project implementation like preparedness on haze programme is a must to encourage sustainability and enable local government to provide or receive relevant information to and from the community to ensure that the community will understand on the plan contingency measures on haze. Therefore, the contingency plan is for community systems and structures to save more lives and reduce the damage (health problems) due to haze.

Awareness of the Disaster Risk Management on Haze

The finding on the community's awareness of the disaster risk management on haze is reported in this section. An Exploratory Factor Analysis (EFA) was conducted to gauge the reliability and validity of the six items in this construct. The result of the EFA analysis shows that KMO is at 0.72, Cronbach's Alpha value of 0.76 and the Eigen value of 4.73 supported by total percentage of cumulative explained at 78.77 percent which indicates that all of the items in the construct are valid and reliable. In addition, all the items in the construct were analysed using inferential statistic such as percentage, mean, standard deviation, and the result is shown in Table 4.5 below.

Respondent's feedback shows that overall the mean value scored is ranging from 4.08 to 4.75 for the entire items, as shown in Table 4.5. The highest mean scored was for the item which stated "Community hit by haze will be able to protect their lives and livelihood when they comply with the Disaster Risk Management on haze" with the standard deviation of 0.50. Detail analysis found that almost all of the respondents or more than 70.0 percent chose agree and strongly agree as their feedback. This indicated that the respondent is aware on the disaster risk management on haze.

Most respondents gave positive feedback in which 97.0 percent are aware of "Community hit by haze will be able to protect their lives and livelihood when they comply with the Disaster Risk Management on haze" as against 3.0 percent who are unaware. Most of them are also aware of "Community hit by haze should adhere to the JPBN's Disaster Risk Management on haze" at 95.0 percent as against 5.0 percent who are unaware. The respondent's awareness level on the "Community's involvement with the government or agency is needed to ensure that the Disaster Risk Management is successfully implemented" are also gave positive feedback at 94.5 percent of the respondents shows that they are totally agree as against 6.0 percent who are unaware. The items on "I am aware of the State Disaster Management Committee (JPBN) Disaster Risk Management on haze" shows a high positive feedback of 77.0 percent against 23.0 percent who are not agree or fully aware.

In addition, the respondents thought that the Disaster Risk Management on haze is very effective and systematic with the percentage of 73.0 who are aware. Then, 72.0 percent of the respondents read and understand the explanation on Disaster Risk Management on haze from JPBN. Meaning to say, the information regarding disaster risk management on haze is very clear to the respondents.

The findings of the analysis of cross-tabulation between awareness of the Disaster Risk Management on haze with geographical location indicates that 77.0 percent of respondents from Sri Aman, Lubuk Antu, Engkilili and Pantu are aware and agreed with the item of "I am aware of the State Disaster Management (JPBN) Disaster Risk Management on haze". Only 18.0 percent neutral, 4.0 percent disagree and 1.0 percent strongly disagree. For the item of "I have read and understand the explanation on Disaster Risk Management on haze from JPBN", the analysis shows that only 5.0% of the respondents disagree which is from Sri Aman. While, 23.0% of the respondents are neutral (18.0% from Sri Aman and 5.0% from Lubuk Antu). This is due to the age factor, education level and lack of understanding and explanation from the authorities to enlighten to them on the importance of Disaster Risk Management on haze. 73.0 percent of the respondents have agreed with the item of "The Disaster Risk Management on haze is very effective and systematic" which indicates 39.0 percent from Sri Aman, 14.0 percent from Lubuk Antu, 10.0 percent from Engkilili and 10.0 percent from Pantu. The three items have a positive feedback from all location which means the respondents has agreed with the items such as the item of "Community's involvement with the government or agency is needed to ensure that the Disaster Risk Management is successfully implemented" got 94.0 percent, item of "Community hit by haze should adhere to the JPBN's Disaster Risk Management on haze" got 95.0 percent and the last item "Community hit by haze will be able to protect their lives and livelihood when they comply with the Disaster Risk Management on haze" got 97.0 percent.

Education for Disaster Risk Management on Haze

Education on disaster risk management towards haze is an interactive process of mutual learning for community's understanding. It covers more than formal education at schools, universities and in training courses which involves the local knowledge to It involves the use of traditional wisdom and local knowledge to protect against natural hazards as well as the active and informed participation of the mass media. Based on the results in Chapter 4, most of the respondent get the daily's access of information from radio, television and newspaper on haze. The Health Department also provide a brochure or pamphlets to the community in Sri Aman on the preventive measures during the occurrence of haze also help to educate the community about the risks of haze. Then, the education give community better understanding on the disaster risk management. The effects of haze can substantially be reduced if policymakers, the plantation industries, mass media and the community are well informed and motivated towards a

culture of disaster prevention and resilience. This requires sustained efforts to educate the community that are vulnerable to the disastrous effects of haze and to teach awareness about haze risks or dangerous needs to start in early education so that the community will understand about the disaster risk management on haze. Therefore, the diverse dimensions of disaster risk management within a community can be addressed and continuously reinforced and passed between generations through formal education programmes and professional training, which is part of knowledge management.

The Significance of Response on Haze in the Enhancement of Community's Livelihood Security

Community' understanding on responding before, during and after haze is vital in order to save lives, reduces health impacts, ensure public safety and meet the basic subsistence needs of the community's affected. The response is focused on direct and short-term needs which is called emergency relief support. For example, government agencies like the State Disaster Management Committee (JPBN), Department of Environment (DOE), Health Department, Resident or District Office and as well as NGO's will proved an emergency relief support to the community. In Sri Aman, based on the interview schedule, all the respondents get the emergency relief from the government agencies such as free health checks, medication, free face masks and all the respondents are satisfied with the aid provided to them. In fact, some response action may extend until the recovery stage.

Early and late responses are undertaken to ensure survival at all the time during haze. Food and other aid economics of resilience are still needed to ensure that the community's affected will survive. However, based on the interview schedule and semi-structured interview with the respondents in Sri Aman. Despite the severe haze, communities still carry out their normal daily routine for the survival of their livelihood. For example, the traders in the Pasar Tamu still continue to run their business daily even though t their income decline or drop during haze. They also take precautionary measures by wearing a face masks and will go straight to the nearest hospital or clinic if they get any symptoms of haze.

Government's Action in addressing the Haze Issue

For this section, the researcher seeks to determine the government's action in addressing the haze issue. An EFA was conducted to gauge the reliability and validity of the seven items in this construct. The result of the EFA analysis shows that KMO is at 0.86, Cronbach's Alpha value of 0.88 and the Eigen value of 4.20 supported by total percentage of cumulative is at 60.00 percent which indicates that all of the items in the construct are valid and reliable. The descriptive analysis for the entire items in this construct is shown in Table 4.7 below.

The result of the analysis also shows that the mean scored for the entire statements were ranging from 4.26 to 4.83 with standard deviation from 0.38 to 0.91 respectively. The majority of the respondents (93.86 %) are agree and support with the action from government. The item of "I support the

government's actions to combat all the activities that lead to air pollution" scored the highest percentage response of 100.0 percent with the mean at 4.83 respectively. The majority of the respondents (99.0%) also gave positive feedbacks regarding their responsibilities in addressing the haze issue. This means that, the community and government play an important role on the haze issue.

The respondents are mostly agreed with the government that is serious about handling haze issues. This variable scored the means of 4.66 and having 98.0 percent of respondents totally agree. The item of "Various efforts were made by the government to deal with the haze issue" scored the mean of 4.64 and 97.0 percent of agreed respondents. The study also denotes that respondents are also agreed with the fine and penalties which are able to create awareness and educate the public not to pollute the environment at 92.0 percent. However, during interviews with some respondents, about 8.0 percent are not agreed with the fine and penalties. This is because respondents felt that penalties and fines imposed on individuals causing the haze are inadequate which not indirectly giving them awareness. For the respondent, the government should be firm in punishing the perpetrators of the environment.

The mean score at 4.34 with standard deviation at 0.89 for item saying that "Malaysia law are capable to restrict and prevent activities that pollute air quality" which is 54.0 percent were strongly agree and 33.0 percent for agree. It means majority of them are agree with the Malaysia law regarding the environment specifically on air quality against 13.0 percent is not agree with the statement. The item of "The Environmental Quality Act 1974 (Act 127) is able to regulate and provide rules to a person from carrying out activities that pollute air quality" recorded the total score of positive feedback at 84.0 percent as against of 16.0 percent respectively who are not agree.

The statistical analysis using cross-tabulation as shown in Table 4.8 below is needed to determine the differences between government's action in addressing the haze issue with age. The first item of "Everyone is responsible and play an important role in addressing the haze issue" show that most of the respondents have agreed with the statement which indicates 28.0% of the respondents are at the age of 56 years and above, followed by 20.0% of the respondents at the age of 36 to 35 years old, 21.0% at the age of 46-55 years old and 15.0% at the age of 25 years and below and 26 to 35 years old. All of the respondents have agreed with the second item of "I support the government's actions to combat all the activities that lead to air pollution". The respondents know that, the capability of the government action to fight and will do its best to arrest the environmental criminals that lead to the haze problem or air pollution. 98.0 percent of the respondents agreed with the third item of "The government is serious about handling haze issues" which indicates 28.0 percent at the age of 56 years and above, 22.0 percent at the age of 46 to 55 years old, 20.0 percent at the age of 36 to 45 years old and 14.0 percent are at the age of 25 years and below and 26 to 35 years old. Only 2.0 percent of the respondents are neutral with the statements. For

the item of “Various efforts were made by the government to deal with the haze issue”, 97.0 percent of the respondents of all ages have agreed with the statement except for 3.0 percent is neutral which indicate from 1.0% at the age of 25 years and below. 87.0 percent of the respondents agreed with the item of “Malaysia law are capable to restrict and prevent activities that pollute air quality” which shows that 26.0 percent at the age of 56 years and above, 21.0 percent at the age of 46 to 55 years old, 20.0 percent at the age of 36 to 45 years old and 15.0 percent at the age of 25 years and below with 26 to 35 years old. However, 6.0 percent of the respondent is not agreed with the items likes 4.0 percent at the age of 25 years and below and 2.0 percent at the age of 26 to 35 years old. The item of “The Environmental Quality Act 1974 (Act 127) is able to regulate and provide rules to a person from carrying out activities that pollute air quality” reveals that 23.0 percent of the respondents at the age of 56 years and above has agreed with the statement, followed by 22.0 percent at the age of 46 to 55 years old, 20.0 percent at the age of 36 to 45 years old, 11.0 percent at the age of 26 to 35 years old and 7.0 percent of the respondent at the age of 25 years and below. While, 5.0 percent is neutral (3.0 percent at the age of 25 years and below and 2.0 percent at the age of 26 to 35 years old). The last item of “Fines and penalties are able to create awareness and educate the public not to pollute the environment” show that only 2.0% of the respondents at the age of 25 years and below has not agreed with the statement while the rest are agreed which indicates 24.0% at the age of 56 years and above, 22.0% at the age of 46 to 55 years old, 20.0% at the age of 36 to 45 years old, 15.0% at the age of 26 to 35 years old and 11.05 at the age of 25 years and below. Only 6.0% is a neutral (2.0 percent at the age of 25 years and below and 4.05 at the age of the 56 years old and above.

Role and Support the Government play in the Disaster Risk Management on Haze

During semi-structured interview with the government agencies the researcher asked the authorities to indicate the role and support played in disaster risk management on haze. The respondents indicated that they educate the community on the precautionary measures on haze. One of the way is by giving the pamphlet or brochure apart from a give an advice talks about preventive measures during haze to the community. This shows that, the government played an important role being the link between the community and the government at the grassroots. In addition, the government have to co-ordinate and mobilized the community's understanding in communicating government policies and the contingency plans to avert disaster like haze. They were also seriously important during emergency disaster relief by co-coordinating the distribution of emergency support relief like free health checks and face masks and treatment or medication assistance.

Disaster on Haze Related Challenges Encountered by the Government

From the semi-structured interview, the researcher asked the government agencies to indicate their disaster on haze related

challenges they encountered in their role as the authority bodies. The respondents indicated they were challenged by disasters of haze, drought, and disease. For example, hospitals and clinics had to be on the alert for 24 hours to ensure that the community receive adequate treatment. The dealers, public or private sector workers and also children in schools who are experiencing symptoms of haze are advised to go to the hospital or clinic immediately to get treatment. In fact, haze remained the major challenges to the community and it affected their livelihoods.

Growing populations and increased economic activity in urban or rural areas at once will increase the amount of exploration of forest land, boosting agricultural activities, the proliferation of industry as well as the increasing number of vehicles on the road will contribute to air pollution problems in Malaysia. Besides, forest fire activities that cause air pollution or haze is also rampant. Hence, various legislative and enforcement approaches are needed to regulate and control the resources that cause the haze problem.

Legislation and enforcement are very important for Malaysia to protect air quality from being contaminated. Due to the haze originating from the neighbouring country which is so difficult to control for Malaysia unless cooperate with international agencies or parties to overcome of what we called transboundary haze pollution. In fact, Malaysia need the inclusive explanation or solution from the political, social and economic perspectives apart from the legal aspect. This is because, there was nothing if only Malaysia vehemently for combating transboundary haze but other countries refused to ratify an international environmental law.

Legislations on Haze Pollution

According to DOE (2013), Malaysia's Air Pollutant Index (API) which is become valid air quality indicator for the haze as well as can measure the level of pollution in the air is similar to the corresponding air quality standards that is recommended by World Health Organisation (WHO). Since its adoption in 1996, DOE always keep constantly monitored the API's parameter such as ozone, carbon monoxide, nitrogen dioxide, sulphur dioxide particulate matter, total suspended particulate and lead which are aimed to protect human health and also the environment.

Due to the occurrence of haze include unrestrained open burning activities, emissions from factories and motor vehicles, the government had amended a specific provision on open burning through section 29A in the Environmental Quality Act 1974 (EQA) that absolutely bans open burning activities and strictly prohibits any person from causing open burning on any premises and land (Maizatun, 2009). Penalties and fines imposed in this section are fine of up to RM500 000, and a jail term for five years or both.

However, section 29AA had provide some exceptions to certain open burning activities in the form of “Declared Activities” as listed in the Environmental Quality (Declared Activities) (Open Burning) Order 2003 such as farming activities, religious rites and activities that involved health and

safety measures as required by certain laws. Even though section 29A allows the open burning activities, the DOE still need to monitor the air quality (DOE, 2016). For example, the exemption will be revoked when the API reading reached at the unhealthy level or be harmful to the environment.

Due to the forest fires and open burning activities in the Indonesia, the transboundary haze pollution had given a huge challenge for Malaysia because the haze has crossed into the country's air space that cause severe air pollution for every year. Thus, this problem had made Malaysia and other ASEAN countries raised a question on legal action that should be imposed on Indonesia for being the cause of transboundary haze pollution. In this case, international law will be applied. Then, Sands et al. (2012) stated that it is impossible for Malaysia to breach the nature of international law or the sovereignty of another country unless that country waives its sovereign immunity willingly. That is why until now Malaysia has not controlled any legal framework on the matter.

Malaysia can take a firm standpoint as implemented by Singapore against a several companies in Indonesia practiced open burning which causes the occurrence of transboundary haze pollution. Besides, Malaysia may enter an agreement with the Indonesia to take the appropriate approach to limit or reduce the transboundary haze pollution. Hence, Malaysia and Indonesia can use the US-Canada Air Quality Agreement 1991 as framework or indicator for addressing transboundary haze pollution and to prevent the deterioration of air quality in both countries.

Bilateral agreement between Malaysia and Indonesia could be interpreted as a two-pronged approach. US-Canada Air Quality Agreement 1991 approach should be applied in this collaboration because this agreement has proved that cooperation between the two countries can lead to environmental improvement, diplomatic relations or employment and this agreement has also shown its relevance or power stage forward continuously as bilateral issues emerging after 18 years.

It is clear that the main objective of the agreement between Malaysia and Indonesia should emphasize the quality of the air as it can control transboundary haze pollution between the two countries as well as to carry out an environmental assessment. In addition, any new policy in the country which has its implication on the environment should be notified to other countries and must agree to share their research or technology. For example, the countries involved in the issue of transboundary haze need to negotiate on projects or changes to laws or policies to avoid disputes over the interpretation of the proposed agreement. If this approach fails, the affected countries may submit the dispute to the Regional Joint Commission to be established under the agreement. The role and responsibility of the Regional Joint Commission is similar to the International Joint Commission established under the US-Canada Air Quality Agreement (Roelofs, 1993). Malaysia and Indonesia need to rely on its excellent cooperation and support for resolution and the appropriate mechanism to implement the objectives of the agreement.

Therefore, due to the haze problem in 1997-1998 and its impact involving Brunei Darussalam, Singapore and other ASEAN countries, the proposed Air Quality Agreement is not limited to bilateral agreements, but may be extended to tripartite agreements or multi-party agreements as seen in the managing of the Straits of Melaka shared by Malaysia, Indonesia and Singapore.

ASEAN's Role in dealing with Transboundary Haze Pollution
The validity and reliability of the six items regarding ASEAN's role in dealing with transboundary haze pollution were tested using EFA. The result of the EFA analysis shows that KMO is at 0.92, total value of Cronbach's Alpha is at 0.96, with Eigen value of 4.92 supported by total percentage of cumulative explained at 84.91 which indicates that all of the items in the construct are valid and reliable. For this study, respondents were asked about their understanding on six items ASEAN's role in dealing with transboundary haze pollution. Their feedback on the items is summarised in Table 4.9 below.

The main value scored for the entire statements ranging from 4.16 to 4.21 with standard deviation from 0.74 to 0.80 respectively. The item saying "Various initiatives and strategies undertaken by ASEAN in dealing with transboundary haze pollution" scored the highest mean valued at 4.21 and has a highest positive feedback of 81.0 percent. The item "The implementation of AATHP can reduce health and environmental risks, and protect the global environment" also shows the mean at 4.21 and positive feedback of 80.0 percent. The data collected on these constructs shows that majority of the respondents are understand and aware of ASEAN's initiative in dealing with transboundary haze pollution.

The result of the analysis above also shown that the "To make Transboundary Haze-Free ASEAN by 2020, all ASEAN members must cooperate and work together" has mean value at 4.20 and standard deviation of 0.77. Thus, 79.0 percent of the respondents claimed positively on this construct. Therefore, it is found that majority of the respondents are agreed that all ASEAN member should cooperate to achieve the vision and mission which is to make ASEAN transboundary free haze by 2020.

Respondents also are agreed with the other item such as the implementation of AATHP can also enhance public awareness on transboundary haze pollution. The score of means value for the above constructs is at 4.10 and positive feedback of 79.0 percent. The positive feedback score on "The AATHP helps to monitor and act as an early step to response on haze" is higher at 77.0 percent with the mean value of 4.21 and standard deviation at 0.80. The last item in this construct which is "ASEAN Agreement on Transboundary Haze Pollution (AATHP)'s initiatives and strategies can decrease the potential of transboundary haze pollution to reoccur" has a mean value of 4.16 and has a positive feedback at 75.0 percent. From this perspective, 78.5 percent of the respondents are agreed with the ASEAN's initiative.

However, through the interviews schedules session, not all respondents are agreed with the items in the construct. A total of 21.5 percent of the respondents do not understand and are

not being explained in detailed on the role of ASEAN in the context of transboundary haze pollution. Age factors are one of the reasons they do not understand. Most of them are above 56 years old and did not get a better education. Due to that, they know that only the government is taking the initiative regarding the haze issue. Fortunately, when researcher explain the role and objectives of ASEAN in this regard, some respondents begun to understand the ASEAN's role in addressing the haze issue.

A cross-tabulation between ASEAN's role in dealing with transboundary haze pollution and educational level. The education level consists of five level namely "No Schooling", "Primary School", "Lower Secondary School", "Upper Secondary School" and "Tertiary Level". It is about 78.5 percent of the respondents at all level of education has agreed with the six items such as "Various initiatives and strategies undertaken by ASEAN in dealing with transboundary haze pollution", "To make Transboundary Haze-Free ASEAN by 2020, all ASEAN members must cooperate and work together", "ASEAN Agreement on Transboundary Haze Pollution (AATHP)'s initiatives and strategies can decrease the potential of transboundary haze pollution to reoccur", "The AATHP helps to monitor and act as an early step to response on haze", "The implementation of AATHP can reduce health and environmental risks, and protect the global environment" and "The implementation of AATHP can also enhance public awareness on transboundary haze pollution". Only 21.5 percent of the respondents at all level of education is a neutral. The votes for the neutral does not means that they did not know or disagree, but they actually did not receive any proper education and information regarding the role of ASEAN.

Conclusions

The haze problem should be holistically addressed because every country involved is obliged to believe that any action taken against the environment will ultimately affect not only the country, but also to all other entities nearby. The attitude of courtesy must be practiced because of the adverse effects of wrong and unethical actions will ultimately give a negative result to others. This is because the application of ethical values to the environment is essential for realizing sustainable development.

In addition, uncontrolled logging and combustion activities will cause pollution that negatively affect the individuals and communities and also will cause economic and political activities of a country disrupted. However, the vibrancy of a country's governance journey will be retarded due to the erosion of this holistic courtesy. If this happens, sustainable development will be difficult to realize. (Abdullah, 1999).

Therefore, transboundary haze pollution has become a problem not only at national level but has reached a global issue. Malaysia, in particular, should be more diligent in addressing this diplomacy issue without compromising existing diplomatic relations with other countries that contribute to the occurrence of transboundary haze pollution. Every country involved should have the responsibility to ensure that all activities are

not problematic not only to the country, but also to neighbouring countries as any damage will be inherited by the next generation and the environmental preservation mission certainly will not be achieved. the study focused on the community's understanding on Disaster Risk Management towards haze in which emphasised the importance of mitigation on haze in enhancing community's livelihood security, risk identification and vulnerability assessment, contingency planning role in mitigate the haze, the significance of response on haze in the enhancement of community's livelihood security, education for Disaster Risk Management on haze, role and support by the government play in the Disaster Risk Management on haze and disaster on haze related challenges encountered by the government. Besides that, this chapter also explained the five capitals on the sustainability livelihood on community's in Sri Aman towards haze such as natural, human, economic or financial, physical and social capitals. While, adaptive and coping strategies and community's resilience on haze also had been elaborated knowledgeable. Apart from the community's understanding on risk, the researcher also has a look on the position of Malaysia's legislation and enforcement, law on haze pollution, working towards a bilateral agreement and holistic approach in dealing with transboundary haze pollution. Last but not least, ASEAN's way and efforts, response on fire ad haze, regional cooperation and haze action plan's objectives also has been given an extensive attention in this study.

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