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**To Link this Article:** http://dx.doi.org/10.6007/IJARBSS/v8-i16/5137 DOI: 10.6007/IJARBSS/v8-i16/5137

Received: 22 Sept 2018, Revised: 17 Oct 2018, Accepted: 29 Nov 2018

Published Online: 23 Dec 2018

In-Text Citation: (Gani, Mahdzar, & Razak, 2018)

**To Cite this Article:** Gani, A. A., Mahdzar, M., & Razak, I. R. A. (2018). Local Community's Opinions on Public Participation Practices at Kuala Gandah Elephant Sanctuary, Pahang. *International Journal of Academic Research in Business and Social Sciences*, *8*(16), 356–366.

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Special Issue: Tourism Way Forward: Addressing Trends and Issues, 2018, Pg. 356 - 366

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# Local Community's Opinions on Public Participation Practices at Kuala Gandah Elephant Sanctuary, Pahang

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## Abstract

Malaysia's richness of biodiversity has become one of the valuable tourism products which has able to attract millions of visitors each year. Owing to this overwhelming demand for nature types of tourism, the Malaysian government has initiated various sustainable development agendas to ensure conservation of Malaysia's natural and cultural heritage. Specifically mentioned in the agendas and initiatives is the enforcement of public participation at planning and development plans. Despite this requirement, the practices is not carried out properly, in Kuala Gandah Elephant Sanctuary. There are lacking of formal public participation practices being recorded. Thus, this study attempt to first; explore the local community's opinions on the public participation practices and second; to identify the weaknesses of the current practice. A total of 366 local community were randomly selected, from 4 types of villages in the Lanchang district. Results were tabulated Findings revealed that the practices is currently descriptive statistic; count and percentage. ineffective, the approach used is not suitable for the locals and practices were done basically to satisfy some obligatory requirements and failed to address the main reason of true and effective public participation process. The findings calls for an urgent attention to improve the practices to ensure sustainable tourism development in the area.

**Keywords**: Sustainable Tourism, Public Participation, Protected Areas, Local Community, Tourism Planning.

## Introduction

The history on the establishment of protected areas goes way back to the Renaissance period when the European kings and other national rulers set special areas for cultural and resources use (UNEP, 2012). It was used as royal hunting grounds and regarded as cultural artifacts but then slowly opened to public and allowed for leisure and recreational visitation. This ultimately encouraging tourism to emerge. United Nations has categorized 6 types of protected areas; Strict Nature Reserve, Wilderness Area, National Park, National Monument of Feature, Habitat/Species Management Area,

Protected Landscape/ Seascape and Protected area with sustainable use of natural resources (UN, 2018). These protected areas are managed in such a way that their natural resources and biodiversity values are kept well monitored, maintained and conserved but at the same time, allows certain kind of human visitation either for research or leisure and tourism purposes. The interaction between tourism and conservation can have both benefits like recreation and cause problems such as environmental degradation. Therefore, the management of protected areas must use appropriate approaches in planning to ensure success of their establishments and right practice to promote sustainable use and tourism in protected areas. This is particularly relevant following the emergence of the concept of sustainable developments, which call for new ways of thinking about goals and objectives of protected areas and parks in many of the world's nation (Fletcher, 1990).

#### Sustainable tourism planning in protected areas

Forest resource management nowadays, not only meant managing the resource for timber or agricultural but also orient to plan recreation and tourism. This is because, recreation and tourism bring many benefits to a human being and at the same time has able to increase people's interests and awareness on nature conservation issues. It was argued that tourism in protected areas represents a highly significant opportunity to educate visitors and tourism operators about the values and the great importance of biodiversity to us all (Bushell and Bricker, 2017; Bushell and McCool, 2007).

Besides, Manning (1999) stated that recreation use of forest resources also contributed towards employment opportunity and economic growth of the local community. In addition, recreation use of forest resources also has the capacity to contribute towards ecological awareness among residents and develop sound conservation ethic (Perez-Verdin, Lee & Chavez, 2004). It is highly discussed that tourism and visitation to protected areas can cause both positive and negative environmental, economic and social impacts (McCool, 2006; Mitchell and Ashley, 2010; Snyman, 2014, Spenceley and Snyman, 2017). It is important to note that any uncontrolled exploitation of natural areas will lead to overuse of the resources which in the long run could possess significant threats to the environment. This is especially a major concern in protected areas, because it involves fragile environment, natural habitats and wildlife. Not to exclude, the living conditions of the local community residing near and within the area. Furthermore, it is a shocked to learn that, in a recent research claimed that only 21% of the protected areas around the world have management practices in place consistent with biodiversity conservation objectives (Bushell and Bricker, 2017; (Leverington , Hockins and Costa, 2008). This entails further investigation into understanding the complex and messy protected area planning and management, so that a more approachable and suitable methods of protected areas management can be recommended.

On the other hand, sustainable development stresses the need for informed participation of all relevant stakeholders, as well as political leaderships to ensure wide participation and consensus building (WTO, 2004). It is essential that in demand for tourism to be sustainable, all the relevant key players including the local community must share the same understanding on the goals and objectives of the planning. This is crucial since it is difficult to achieve something when the participants are not in agreement on what need to be achieved. Managing tourism especially in

fragile areas such as parks and protected areas requires a more robust approach. In tourism especially, the concept of sustainable is crucial because obviously there is a need to recognize the importance of ensuring that tourism will not compromise natural and human resources (Jackson & Morpeth, 1999) and also help to provide a context to guide choices, bring stakeholders together to common interest in tourism matters and support decision makers to balance between positive and negative impacts from tourism (UN, 2014).

## The Protected Areas in Malaysia

The Department of Wildlife and National Parks (DWNP) also known as PERHILITAN is the organization responsible for the management of national parks and wildlife reserves in Peninsular Malaysia. DWNP is responsible for the planning and implementation of various activities, which contribute to the long-term conservation of protected areas and at the same time mitigating the conflicts between human and the environment. To date, there are 15 protected areas under the jurisdiction of DWNP (DWNP, 2018). In relation to wildlife and nature's protection, the Wildlife Conservation Act (2010) Act 716 is enforced. The acts govern the jurisdiction of the Department of Wildlife and National Parks on matters related to poaching, permits as well as increase as in penalties and jail terms for various offenses. Other than that, Malaysia is very serious in implementing sustainable development and has formulated a separate plan for sustainable ecotourism development in the country. The plan contribute towards producing a more distinctive Malaysian tourism image and identity and contribute towards direct involvement of local populations, enhanced training, interagency and inter-sectoral cooperation and, most importantly, fostering environmental protection and preservation (Yasak, 1996). One of the important enforcement outlined in the plan is the need to include public in the planning process. It is important for the development of tourism in protected areas to follow the policies and carry out necessary activities (such as public participation process) as indicated. Despite the many barriers or obstacles foreseen, the pursuit of a true and effective public participation is necessary in order to ensure the concept of sustainable development and tourism is achieved.

The Ministry of Culture, Arts and Tourism (MOTAC) has formulated The Malaysian National Ecotourism Plan which ensures conservation of Malaysia's natural and cultural heritage and applies to all designated sites recognized as ecotourism attraction such as the Kuala Gandah Elephant Sanctuary in Pahang. The Kuala Gandah Elephant Sanctuary has the functions to locate, subdued and translocate problem elephants from areas where their habitats are being encroached by development. Over the past 30 years, the Centre has resolved human-elephant conflicts and minimized the economic losses caused by such conflicts by relocating more than 700 wild elephants (DWNP, 2012). In addition, the Centre also carries out public awareness activities related to the conservation issues of elephants and become an active research center for elephant's studies in Malaysia. Since 2000, the Centre is open to public, allowing tourist to visit and also creating programs for the visitors. Under the DWNP management, the center is recognized as an eco-tourism site by Tourism Malaysia.

The flood of visitors to the site ever since 2000 can be seen as a positive enhancement to the place, however it draws a worry to how much development can the sites' contain and whether the

approach in planning used nowadays does promotes sustainable tourism development. Further, the center is located is the homeland for Chewong Tribes, an indigenous tribe who lives at the fringe of the Centre. The development projects around the forested land in Kuala Gandah have tremendously impacted the Chewong tribe (Lillegraven, 2006; Abdul Razak, Ismail, Md. Isa and Mustaffa, 2012) when the forested land they used to thrived are taken away and ever since this has resulted in the resettlement of the tribes.

A natural site like Kuala Gandah will require a correct approach to ensure sustainable development of the entire areas. A collaboration between the public and the authority in this matter is crucial so that the resources is being utilized sustainably. However, according to the recent report, there are very limited public participation occurs and mostly are not related to the planning and development of the site as tourism attraction (PKGK, 2011). With the increasing popularity of the site as one of the must-see-must-visit ecotourism sites in Malaysia, this should not be taken lightly. Rising popularity will create pressure on its resources and impact the local community beyond imagination. Thus, this research is conducted to evaluate the current public participation practices and to assess the aspects of the planning process that need to be improved.

## Methodology

Surveys were conducted at four types of villages around Kuala Gandah Elephant Sanctuary; Malay villages, indigenous people settlements, Chinese village and FELDA settlement. In total, 6 Malay villages, 2 indigenous villages and one each representing Chinese village and FELDA settlement were selected as sample for the study. A three- stage Stratified random sampling were employed to select the units of analysis. In this three-stage stratified random sampling, the sample is selected at the stage where the sampling units are sub-samples of the larger units previously chosen. Population was divided into three stages and randomly selected at each stage to draw the sample. In total 351 responses were found usable for analyses. Respondents were presented with a set of questionnaire which aimed to identify respondent's opinions on the current approach and practices of public participation, how well they think it is being managed, and also if the current approaches has been successful in practicing true participation. The development of these questions were based on in depth review of the researcher on the subject and on information derived from previous studies (Dola & Dolbani, 2006; Marzuki, 2009; Omar & Leh, 2009; Sharina, Hood & Mustafa, 2011).

## **Results and Findings**

## Respondents' Background

The survey recorded that majority of the respondents were male (63%) and female (37%), with Malay respondents represent the majority as well (73.5%), followed by indigenous people (15.7%), Chinese (9.7%) and Indian (1.1%). Majority of this respondents belongs to age group of less than 35 years old (50.4%), 35-40 years old (13.4%) and 50-55 years old (10.3%). The remaining age group only represents less than 8% each. 61.3% of the respondents finished secondary school while 17.1% finished primary school. This entails that majority of the respondents for the survey have at least passed minimum education requirements in Malaysia. 14.6% of the remaining respondent have achieved higher education qualification either college diplomas or university degrees and postgraduates. Respondents were asked about their experiences and perceptions towards public

participation efforts made by the management of Kuala Gandah Elephant Sanctuary, either formally or informally. Majority of them have not participated (58.4%), participated 1-2 times (27.7%) and participated 3-4 times (13.9%). Even the majority of the respondents have not possess any kind of experience in participating, their opinions were still included in the study in an effort to give them chances to point their expectations for a proper direction of true public participation in their perspectives.

The first question asked about respondents' opinion on the current public participation practice in Kuala Gandah.

## Respondents' Opinion on Current Public Participation

The respondents were asked to select the statement(s) best presenting their opinion on the current practice of public participation in Kuala Gandah. A five sets of extents of public participation were presented to them; the overall practice, the promotion and methods used, the information sharing, opportunity given and influence on decision making.

No	Extent of public participation	Count	Total Response (%)
1	Overall practice of public participation		
	i. not effective	34	34 (7.5)
	ii. moderate	77	77 (17.1)
	iii. failed	25	25 (5.6)
	iv. encourage authorities presence	144	144 (31.9)
	v. not true practice	96	96 (21.3)
	vi. formality	75	75 (16.6)
	N		451 (100.00)
2.	Promotion and methods		
	i. Banners not effective	43	43 (9.8)
	<i>ii. Effective publicity</i>	55	55 (12.6)
	iii. Lack of technical advise	133	133 (30.0)
	iv. Workshops are effective	93	93 (21.8)
	v. Allows for dialogue and feedback	113	113 (25.8)
	N		437 (100.00)
3.	Information sharing		
	i. Not enough information	34	34 (6.7)
	ii. Not comprehensive	44	44 (8.7)
	iii. Lack information on environmental	26	26 (5.1)
	issues		
	iv. Easy to understand	30	30 (5.9)
	v. Not specific	59	59 (11.6)
	vi. Allow viewing and feedback	113	113 (22.3)

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	vii. Sufficient time	12	12 (2.4)
	viii. Public education is constraint	107	107 (21.1)
	ix. Information is elaborate	82	82 (16.2)
	N		507 (100.00)
4.	Opportunity given		
	i. Allow to share views	144	144 (35.9)
	ii. Establish trust and credibility	120	120 (29.9)
	iii. No equal rights	66	66 (16.5)
	iv. Lack active discussions	71	71 (17.7)
	Ν		401 (100.00)
5	Influences in decision making		
	i. Not taken seriously	50	50 (13.2)
	ii. Management decision is dominant	51	51 (13.4)
	iii. Public did not influence decisions	105	105 (27.3)
	iv. not receive satisfactory feedback	176	176 (46.1)
	Ν		382 (100.00)

Vol. 8, No. 16, Special Issue: Tourism Way Forward: Addressing Trends and Issues, 2018, E-ISSN: 2222-6990 © 2018 HRMARS

The results indicated that majority of the respondents felt that the practice of public participation did encourage the presence of authorities at the meetings (31.9%). However, they still felt that the participation is just formality (16.6%) as designated in the planning requirements. This makes further significant portion of the respondents (21.3%) thinks that it is not a true public participation and is just moderately done (17.1%). It can be concluded that the local community feels the presence of authorities were only to fulfill requirements in the planning procedures.

In terms of methods used to promote and conduct public participation, majority of the respondents (30.0) thinks that there were lacking in terms of technical advice to suffice their understanding on the matters discussed or issues concerned. Nonetheless, they think that the practice did allow for dialogue and feedback (25.8%) among the participants. They also agreed that workshops were effective (21.8%) to conduct participation. Apart from that, 9.8% of the respondents felt that promotion such as banners were not effective to convey messages for public participation in the area.

Based on the statements pertaining to delivery of information to the public, majority of the respondents agreed that the practices done allow for public to view the information and make give feedback (22.3%). However, they also felt that the level of education often becoming the barrier for the public to understand or churn these information (21.1%). The information given were found to be elaborative and they were informed (16.2%) but thinks that some may be not specific (11.6%), not comprehensive (8.7%), not enough (6.7%) and lacking in terms of environmental issues (5.1%). In terms of time allocated, only a small number thinks they were given ample time to view the information on the plans (2.4%). It can be concluded that majority of them selected the negative

statements pertaining this aspect of the practice. The local community were not happy and possess negative opinions on information management and dissemination process in the current practice.

The current approach were perceived to allow public to share their views (35.9%) and that the practice helps to establish trust and credibility among the participants (29.9%). However, the local community felt that despite good benefits of the practices, they still have no equal rights, which probably in terms of intended outcome of the plan (16.5%). They also felt that there were lacking of active discussions during the participation practice (17.7%). The approach employed currently is seen as appropriate, however the problem may lies in the process and implementation of the approach. The local community were not happy with less active involvement in the process.

The respondents were asked about their opinion on the level of consideration given in decision making. Majority of them (46.1%) felt that they did not received satisfactory feedback on the opinions and views in decision making. They also felt that their view or opinion did not influence the decision by the management (27.3%). 13.4% of the respondents agreed that management decision is dominant despite the effort done to include the public in the decision making process. Another 13.2% of the respondents also thinks that the management did not take their opinion seriously.

## **Discussion and Conclusion**

The primary information from the key respondents such as employed in this study is crucial to strategically pointing what extent and how the current public participation is being practiced. Such knowledge may substantiate any existence of obstructions in coordinating a true and effective public participation, for sustainable planning and development of sensitive and fragile areas like Kuala Gandah. The findings revealed that public participation for such intention is not successful, drawing from the same results from prior studies elsewhere in Malaysia (Dola & Dolbani, 2006; Sharina et al., 2011; Muhammad, Masron & Abd Majid, 2015). The practices is currently found to be ineffective to exercise true public participation. Attention is needed to ensure that practices done is not only to satisfy requirements, but must be meaningful to address issues pertaining the local community. While such practice may encourage presence of authorities and local community representatives, the approach used is exorbitantly in need of up-turn for more genuine participation. Empowerment is the key term here, where local community ideas, concerns, and validation are included in the decision making processes. Local community wants to participate and have desire to participate, given proper exercises and practices (Manaf, Mohamed & Lawton, 2016) but lacking of meaningful processes will just diminish their intention.

The findings also found that the practice has failed to address some of the reasons behind a true and effective public participation process. Lacking of technical advice, information not sufficient, information not comprehensive and insufficient time given to review all the information are some of the worthy concerned made by the local community and require attention from the management. Muhammad et. al (2015) mentioned that low level of information shared among participants will not lead to any kind of improvement in any practices. Furthermore, the minimum level of education possess by majority of local community just adding to the hardship faced by them to participate.

Thus, this alarm the management and other authorities to consider a friendlier and layman approach to conduct public participation in Malaysia. Besides, it is also important to acknowledge that for long time, the local community often feels that their views and concerns have very little or no effect to the planning and development decisions. This is why any effort made by the management or government often received little to no support from the local community. This has need to change in order to genuinely practice and uphold sustainable tourism concept in planning for tourism locally.

Results from the findings may bring to a close that the limitations for true and effective public participation is the upshot of weak practices by the agency. It proved that information on technical advice and development plan is either absent or insufficient for the community to review. Unfortunately, they are also given very limited opportunities in sharing their views and concerns, let alone making influence in the decision making process. These aspect of public participation and planning process at Kuala Gandah need serious attention to ensure the development of this area will not only bring benefits to the management and governing agencies but also to the local community.

#### Acknowledgement

This study is funded by the University Cawangan Selangor Grant (DUCS). Project code 600-UiTMSEL (PI.5/4) (026/2018). The researcher wished to thank all personnel in RMI UiTM Cawangan Selangor, the management of Kuala Gandah Elephant Sanctuary and the local community of Lanchang who have contributed their time to this study.

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## References

- Abdul Razak, F., Ismail, A. I., Md. Isa, K., & Mustaffa, H. A. (2012, October). The impact of Chewong tribe resettlement through image representation: The documentation of Chewong tribe in Kuala Gandah, Lanchang, Pahang, Malaysia. Paper presented at the 2<sup>nd</sup> International Conference on Humanities, Society and Culture, Hong Kong.
- Bushell, R., & Bricker, K. (2017). Tourism in protected areas: Developing meaningful standards. *Tourism and Hospitality Research*, *17(1)*, 106-120. doi: 10.1177/1467358416636173
- Bushell, R., & McCool, S. (2007). Tourism as a tool for conservation and support of protected areas: Setting the agenda. In R. Bushell & P. J. Eagles (Eds.), *Benefits beyond boundaries: Tourism* and Protected Areas (pp. 12-26). Wallingford: CABI Press.
- Dola, K., & Dolbani, M. (2006). Public participation in planning for sustainable development: Operational questions and issues. *ALAM Cipta, International Journal on Sustainable Tropical Design Research & Practice, 1(1),* 1-8.
- DWNP List of Protected areas (2018). Retrieved from https://www.wildlife.gov.my/indexphp/en/2016-04011-03-50-17/2016-04-25-02-12-43/kawasan perlindungan.

- DWNP National Elephant Conservation Centre (2012). Retrieved from <u>http://www.wildlife.gov.my/index.php/bm/aktiviti/ekopelancongan/93-pusat-konservasi-gajah-kebangsaan-kuala-gandah-pahang.</u>
- Fletcher, S. A. (1990). Parks, protected areas and local populations: New international issues and imperatives. *Landscape and Urban Planning, 19 (2),* 197-201. doi: 10.1016/0169-2046(90)90054-6.
- Jackson, G., & Morpeth, N. (1999). Local agenda 21 and community participation in tourism policy and planning: Future or fallacy. *Current issues in Tourism, 2(1),* 1-38. doi: 10.1080/13683509908667841.
- Leverington, F., Hockins, M. & Costa, K. (2008). *Management effectiveness in protected areas: A global strategy report*. Retrieved from University of Queensland, IUCN, WCPA, TNC, WWF: Gatton Australia.
- Lillegraven. A. L. (2006). Paths of change in fields of power: A study on Chewong: An indigenous minority in Peninsular Malaysia. (master's thesis). University of Oslo, Canada.
- Manaf, H. A., Marthada, A. M., & Lawton, A. (2016). Assessing public participation initiatives in local government decision making in Malaysia. *International Journal of Public Administration. 39* (11). doi: 10.1080/01900692.2015.1035788.
- Manning, R. (1999). *Studies in outdoor recreation: Search and research for satisfaction*. Corvallis: Oregon State University Press.
- Marzuki, A. (2009). A review on public participation in environmental impact assessment in Malaysia. *Theoretical and Empirical Researches in Urban Management, 3(12),* 126-136.
- McCool, S. F. (2006). Managing for visitors experiences in protected areas: Promising opportunities and fundamental challenges. *Parks*, 16(2), 1-7. Retrieved from <u>https://iucn.oscar.ncsu.edu/mediawiki/images/archive/a/a6/20141027160449!McCool(200</u> <u>6).pdf</u>.
- Mitchell, J. & Ashley, C. (2010). *Tourism and poverty reduction: Pathways to prosperity*. London: Earthscan.
- Muhammad, Z., Masron, T., & Abd. Majid, A. (2015). Local government service efficiency: Public participation matters. *International Journal of Social Science and Humanity, 5(10).* doi: 10.7763/IJSSH.2015.V5.565.
- Omar, D., & Leh, O. L. H. (2009). Malaysia development planning system: Kuala Lumpur structure plan and public participation. *Asian Social Science*, *5(3)*, 30-36.
- Perez-Verdin, G., Lee, M. E., & Chaves, D. J. (2004). Outdoor recreation in a protected area in Southern Durango, Mexico: Analysis of local residents' perceptions. *Society and Natural Resources*, 17(10), 897-910. doi: 10.1080/08941920490505310.
- PKGK (2011). Komponen projek pusat konservasi gajah Kuala Gandah: Mesyuarat Jawatankuasa Unit Gajah. KL: DWNP
- Sharina, A. H., Hood, S., & Mustaffa, O. (2011). Engaging the local community in participatory resource management through learning: The experience from Langkawi Island, Malaysia. *Kajian Malaysia*, *29*(1) 125-139.

- Snyman, S. (2014). The impact of ecotourism employment on rural household incomes and social welfare in six southern African countries. *Tourism and Hospitality Research*, 14(1), 37-52. doi: 10.1177%2F1467358414529435
- Spenceley, A. & Snyman. S. (2017). Protected area tourism: Progress, innovation and sustainability. *Tourism and Hospitality Research*, *17(1)*, 3-7. doi: 10.1177%2F1467358416646646.
- UN Protected areas categories (2018). Retrieved from United Nations <u>http://www.iucn.org/theme/protected-areas/about/protected-areas-categories</u>.
- UN Managing sustainable tourism development (2014). Retrieved from United Nations https://sustainabledevelopment.un.org/topics/sustainabletourism.
- UNEP Protected areas, biodiversity and conservation (2012). Retrieved from United Nations Environment Program <u>http://www.unep.fr/shared/publications/other/3084/BP8-2.pdf</u>.
- World Tourism Organization (2004). *Indicators of sustainable development for tourism destination: A guidebook*. Madrid: WTO
- Yasak, M. N. (1996). Development of ecotourism in Malaysia. Retrieved from Economic and Social Commission for Asia and the Pacific (UNESCAP):

https://www.unescap.org/ttdw/publications/tpts\_pubs/pub\_1748/pub\_1748\_tp-g.pdf