CARRYING CAPACITY, STANDARD TOTAL DAILY VISIT AND TOURIST EXPERIENCES AND OBSERVATIONS IN HULUGAN FALLS: BASIS FOR LOCAL ENVIRONMENTAL PROTECTION POLICY

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ABSTRACT

Overcrowding is one of the most unresolved issues in the tourism industry specifically in natural attractions. Therefore, having carrying capacity as a form of sustainability can reduce overcrowding in different natural attractions. The purpose of this study is to identify the carrying capacity, the standard total daily visits and the quantified tourists' experiences and observations, as basis for adding guidelines in local environmental protection policy. Computing for carrying capacity and standard total daily visit can monitor and control the number of tourist arrival per day in the water falls.The carrying capacity for the swimming area of the falls was estimated using "Boullon's" formula. Both the upper and lower limits were used and results showed that tourists in the swimming area should not exceed 107 persons while visitors of the place should not exceed 394 persons for it to be considered not overcrowded. Perceptions of one hundred tourists and locals were also collected during surveys to quantify experiences and observations. Tourists and local residents want additional policies, specifically on solid waste management, segregation, and some infrastructure to support the needs of both the tourists and the locals.

Keywords*: carrying capacity, standard total daily visit, environmental policy, Hulugan Falls, local tourism*

INTRODUCTION

Hearing the word tourism nowadays makes us think of various things such as different cuisines, attires, climate, cultures, people and their personalities, and mostly places that are absolutely breathtaking; everything that is related to tourism is always accompanied with the word "different".

Since tourism became a "hit" in today's generation, many beautiful places are discovered not only here in the Philippines but worldwide. Tourism became a "boom" not only because of the things that were mentioned earlier but mainly because of the thrill. The chase that the tourist wants, this is one of the positive things about tourism; most of them are not tourists but

adventurers. They seek for the adventure and not only to discover such places, but the experience towards a certain destination as well.

But as they say, every positive has its negatives. Tourism becoming the "talk of the town" caused some of these destinations destroyed or being destroyed as of the moment. Tourists are so excited to go to these places that tourism can offer, but they are forgetting how to be responsible for our environment by maintaining the natural beauty of it.

One great example will be Boracay. This is considered as one of the most beautiful beaches in the world. But today, because of the huge amount of tourists residing there and the number of business that is established, we cannot see the beauty of Boracay anymore; it is now just considered as a place for partying, for amenities, and for accommodations – and not for witnessing the beach itself.

By continuing this routine, the people overcrowding Boracay and other places can result in too many negative outcomes; which is why carrying capacity must be measured and monitored because this is one way of helping to take care of the tourist destinations and attractions. There will be no changes within places, because it is focused on the people itself, the tourists. This is for the avoidance of overcrowding, improper waste management, and different types of pollution (water, air, noise, etc.). Most of all, this is to monitor the tourist arrivals, so as much as possible, it cannot go more beyond its limit. It has to stop.

One of the central concepts in the management of such results is that of carrying capacity. However, it is argued that destinations have been poorly served by the development of the concept of carrying capacity into growth management techniques such as limits of acceptable change and opportunity spectrums. This is particularly the case for destinations dependent upon natural characteristics for their appeal (Butler 1996). Therefore, it is necessary to define and implement the concept of carrying capacity as a critical aspect of facilitating planning in the tourism process (Simóna, Narangajavanab, Marquésa 2003).

Carrying capacity, as a measure of sustainability, is a practical tool to use in maintaining the balance between development and conservation. It can serve as a benchmark against which one can measure change and the causes of that change. Carrying capacity will serve as the early warning system for trouble (Chamberlain 1997).

Although “carrying capacity” may have various meanings (e.g., in relation to the maximum number of people who could potentially inhabit the Earth at the same time), it is more often used to determine the level of human activity an area can accommodate without adverse effects on the resident community or on the quality of visitor experience (Quicoy, Briones 2009). On the other hand, as cited by Stewart (1993), one of the earliest

formal definitions of carrying capacity was that put forward by James and Ripley (1963) who simply defined it as the biological and physical limitations of the land to support recreational use (cited in Pratt 1976).

However, an examination of works of several other authors revealed other dimensions to the carrying capacity concept. LaPage (1963) in Stewart (1993) maintained that there are two essential components to be considered: 1) the aesthetic recreational carrying capacity, which is defined as that level of development and use beyond which measurable decreases in satisfaction occur as a direct result of gross numbers of recreationists; and 2) biotic carrying capacity, which might be defined as that level of development and use beyond which the site's capacity to provide a sustained high level of satisfaction becomes impaired due to severe damage to the natural site.

The concept and premise of carrying-capacity are employed as tools for the operationalization of sustainable development. Carrying capacity of a region, comprising its supportive and assimilative capacities, is defined as the ability to produce desired outputs from a constrained resource base to achieve a higher and more equitable quality of life, while maintaining desired environmental quality, and ecological health. The proposed planning process explicitly includes interaction between the community, experts and decision-makers to arrive at trade-offs between the desired production-consumption levels through the exploitation of supportive capacity within its regenerative potential, and environmental quality within the assimilative capacity of the regional ecosystem. These trade-offs result in structural shifts necessary for reconciling competing demands in the overall process of socio-economic development through appropriate technological, managerial and organizational interventions.

The assessment of carrying capacity for progressively higher categories of models is based on a sound understanding of proceeding. Models and tools for assessing the carrying capacity of an area of interest for bivalve culture can be classified according to their level of complexity and scope (McKindseya, Thetmeyerb, Landryc, and Silvert 2006).

Hulugan Falls is located in Barangay San Salvador at the municipality of Luisiana in the province of Laguna. It has another two adjacent waterfalls which are the Talay and Hidden Falls, located just above the former one and about just a few meters away. To get to the place via private vehicle, drive south in SLEX taking Calamba exit, going through Pansol, Los Baños, Pila, Sta Cruz and Pagsanjan. From there, turn right from Our Lady of Guadalupe Parish Church. About 30 minutes from Pagsanjan, you'll find the San Salvador arc on your right past a waiting shed. Turn right and park in front of "Kapitan's house". You can also reach the place via public transportation or commute. You just have to ride a bus going to Sta. Cruz, Laguna and descend from the vehicle at Sunstar Mall or at Pagsawitan

where the bus terminal, which is the last stop, is located. From there, ride a jeepney going to Luisiana which usually departs every 15-30 minutes. Ask then the driver to drop you off in Brgy. San Salvador, particularly at the street going to Hulugan Falls. Get on a tricycle and tell him or her to alight you at the Kapitan's house where the registration area is.

The area that encompasses the falls is approximately 500 square meters.It is an open space that allows tourists to move freely.There is no required distance between groups but it is limited to five persons per tour guide only.In an average, there are 1,400 tourists visiting the place daily, during peak season - semestral breaks, holidays and summer. The site is open from 6:00 am to 5:00 pm, except for those who will have an overnight stay at the campsite. Residing hours are not limited, but according to the tourism officer, a group of tourists approximately stays for an average of 3-4 hours.It is open 11 hours a day, excluding overnight camping and registration is until 3pm only

Assessing the carrying capacity of Hulugan, where the waters from the other two water falls can be very useful to the municipality which creates the environmental policy; for it is the first one that is visited before anyone can proceed to Talay and Hidden. The number of tourists that can be accommodated and the experience, as well as observation of each, should be the foundation as to what and what's not to be executed on the policy.

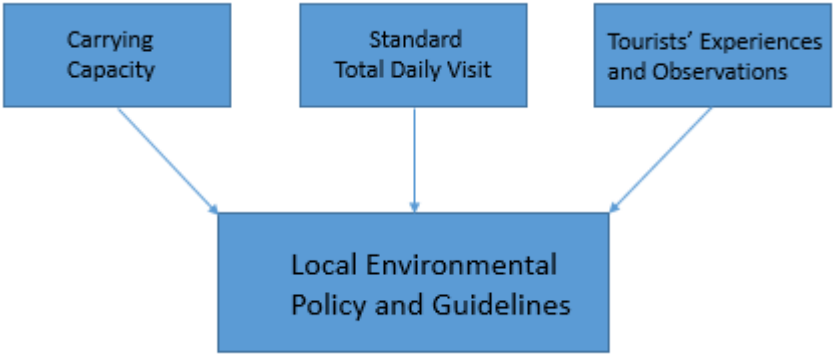

Figure 1. Conceptual Framework

The conceptual framework presented in Figure 1 shows the integration of some important local environmental policy guidelines namely: carrying capacity that identifies how many persons are capable to limit maximum space use; standard total daily visit that set limitations in a certain

place to achieved quality movement; quantified tourists' experiences and observations to evaluate existing local environmental policy and guidelines.

Objectives of the Study

The purpose of this study is mainly to add some important local environmental policy guidelines based on the following specific objectives (1) identify the carrying capacity of Hulugan Falls, (2) identify the standard total daily visit of Hulugan Falls (3) quantify the perceived tourists' experiences and observations indicators in Hulugan Falls

METHODOLOGY

The study is a quantitative type of research and was conducted in Luisiana, Laguna on the weekends of February, 2016. Data were gathered using checklists answered by the tourists. This contains information whether they experience problems in Hulugan Falls as well as their perception of the needs at the site. Primary data were obtained by conducting interview with the tourism officials of the municipality of Luisiana and Barangay San Salvador where the water falls are located. This includes information such as the frequency of tourist arrival, its existing environmental policy resolution, facts about Hulugan Falls and their plans for the succeeding months.

Carrying capacity and total daily visit of the water falls is computed using the formula of "Boullon" (1985). The formula is widely use to identify the tourism carrying capacity and standard total daily visit.

Carrying Capacity = area used by tourists/average individual standard
Rotation Coefficient = no. of daily hours area is open to tourist/average time of visit
Total Daily Visit = carrying capacity x rotation coefficient

RESULTS AND DISCUSSION

Carrying Capacity of Hulugan Falls

The average daily carrying capacity of Hulugan Falls will be computed using "Boullon's formula". The computed value will assess using the standard in the Visitor Carrying Capacity Guidelines used by the Florida Department of Environmental Protection, Division of Recreation and Parks. It requires 50-200 square feet or 4.65-18.58 square meters (as converted) per swimmer only.

Table 1. Computed Daily Carrying Capacity for Hulugan Falls

Area Requirement Limits	Area Used by Tourists (Hulugan Falls)	Average Individual Standards	Carrying Capacity
Lower Limit	500 sqm	4.65 sqm	107.53
Upper Limit	500 sqm	18.58 sqm	26.91

Table 1 presents the average carrying capacity of Hulugan Falls. The area limit guided by the standard was set to 4.65 sqm as for the lower limit and 18.58 sqm for the higher limit. The area that encompasses Hulugan Falls is approximately 500 square meters. Using the lower limit, the computed carrying capacity is 107.53 indiviuals that will enjoy the 4.65 sqm limit as indicated by carrying capacity standard. Moreover, the upper limit value of 26.91 individuals will enjoy a standard space of 18.58 sqm.

The maintenance of aesthetic beauty of water tourism will be obtained if the carrying capacity implementation were practiced (Greist 2010). In the study of Zacarias (2011) results indicate that the high value tourist destination are those who reserved and obtained an upper limit requirements for the excellent satisfaction of the visitors.

Standard Total Daily Visit for Hulugan Falls

The Carrying Capacity which will be computed as the area used by tourists divided by the average individual standard is needed in finding the the standard total daily visit. Another variable is the rotation coefficient which is the number of daily hours the area is open to tourist divided by the average time of visit. Hence, the total daily visit is the carrying capacity multiply by rotation coefficient.

Table 2. Computed Total Daily Visit for Hulugan Falls

Area Requirement Limits	Rotation Coefficient (3-hr stay)	Rotation Coefficient (4-hr stay)	Total Daily Visit (3-hr stay)	Total Daily Visit (4-hr stay)
Lower Limit	3.67	2.75	394.64	295.71
Upper Limit	3.67	2.75	98.16	74

According to the Visitor Carrying Capacity Guidelines used by the Florida Department of Environmental Protection, Division of Recreation and Parks, the area requirement for swimming activity is 4.65-18.58 sqm (as converted) of water per swimmer. If we use the lower limit, which is 4.65 sqm, the carrying capacity will be 107 and the total daily visit will ranging

from 295-394 tourists, if they stay for 3-4 hours. However, using the upper limit which is 18.58 sqm, the carrying capacity and the total daily visit will be lowered to and range from 26 and 74-98, if they stayed for 3-4 hours.

Using the data from the Lower Limits' Total Daily Visits, the Hulugan Falls exceeds more than three times of the computed standard total daily visits, giving an average visitors of 1,400 daily during peak seasons. Results indicates that the carrying capacity is not observed, if the visitors will come in Hulugan Falls and stay there for more than 4 hours.

In relation to the results, Silva, 2007 observed that the increasing popularity of the river system tourism of Portugal leads to sacrificing the standard carrying capacity of the tourist spots. Similarly, in the study of UK river system they found out that the demands of environmental policy control must be observed in maintaining the carrying capacity.

Table 3. Frequency of Tourist Visit in Relation to Carrying Capacity

3-Hour Stay Interval	Frequency of Tourists' Visit (Peak Season)	Carrying Capacity (Based on Computed 395 per swimmer)
6:00 am – 9:00 am	236	Observed
9:01 am – 12:00 pm	485	Not Observed
12:01 pm – 3:00 pm	385	Observed
3:01 pm – 6:00 pm	294	Observed
Total	1,400	

Results show that in the 3-hour stay interval, only 9:01 am to 12:00 pm period was the carrying capacity not observed and it indicates that this is the peak hours to visit the falls. Tourist still enjoy the tranquil beauty of the water falls in other time intervals, given that they stay only for 3 hours. Local tourists officials mentioned that they want to set cut-offs per intervals but the tourists' insist to stay more than 3 hours. The results of this study will give them an idea on how to include cut-off time in the local environmental protection policy and to formalize the idea that visitors understands and follow when it is included in the policy guideline.

Silva (2007) identified the importance of cut-offs in the number of tourists' visiting rivers and lakes in selected tourist destination in Portugal. Tourism industries in Portugal set a great itineraries that controls the number of visitors in a certain tourist spots to avoid overcrowding. Similarly, in the study of Greist (2010), using upper limits as basis for computing carrying capacity standards was great for tourism industry since it will pay higher cost, since limited visitors will accommodate the area. Marketing the place for visitors is easier, because of its character as high prize but worth place to visit (Greis, 2010).

Tourist's Experiences and Observations in Hulugan Falls

In quantifying the experiences and observations of the tourists and the locals, the researchers used a modified questionnaire of experiences and observations used by Briones (2009) in his study on Beach Carrying Capacity Assessment of Coastal Ecotourism in Calatagan, Batangas, Philippines. In consideration of the frequency of tourists' visit presented on Table 3, the researchers conducted a survey for two consecutive weekends between opening and closing of the water falls for visitors.

Table 4. Percieved Tourist's Experiences and Observations in Hulugan Falls

INDICATORS	Weighted Mean	Interpretation
Are you experiencing		
overcrowding	2.42	Disagree
lack of space (for movement, baggage, etc.)	2.30	Disagree
nature disruption	1.80	Disagree
pollution (land, water and air)	1.83	Disagree
difficulty in disposing trashes	3.13	Agree
Is there a need for		
regulating & monitoring tourist arrivals?	4.40	Moderately Agree
area development (landscapes, cottages, etc.)	4.53	Strongly Agree
environmental policy awareness (signage, etc.)	4.30	Moderately Agree
solid waste management & monitoring	4.30	Moderately Agree
additional environmental protection policy	3.00	Agree

The results show that carrying capacity are still observed in Hulugan Falls, since majority of the tourists disagree on experiencing overcrowding. Spaces is enough for visitors for them to set tents or picnic sets. Still, tourists experienced a no nature disruptions and majority disagreed that the area is polluted. Although, the locals and tourist guides are cleaning the area, visitors have some difficulties in disposing their thrashes because the area do not provide thrash cans.

Similar findings are observed by the tourists that regulating and monitoring tourists' arrivials are essential and must be included in their environmental policy guidelines. A weighted mean of 4.53, strongly agree, for their observation on lack of area development. They wanted to have a simple infrustrature such as cottages, descent wash rooms and some store for refreshments. Lack of available thrash cans can lead to pollution, as the tourists' observed, they are willing to participate in waste segration if the

proper disposal was provided. In summary, tourists suggested some additional environmental protection policies based on what they observed (1) walking only on the guided trails, (2) banning of smoking and drinking alcoholic beverages, (3) issuing fines for bandalism on tress and rocks, (4) prohibiting of the use of shampoo and soap in the main water falls and rivers banks, and (5) regulating the catching and killings of living organisms in the area.

CONCLUSION AND RECOMMENDATION

The computed carrying capacity of Hulugan Falls was 107.53 for the lower limit of 4.65 sqm and 26.91 for the upper limit of 18.58 sqm per swimmer. For the lower limit, the standard total daily visit will be ranging from, 295-394, while for the upper limit will be ranging from 74-98 both if the tourists stay for 3-4 hours in Hulugan Falls. In the 3-hour stay interval, only 9:01 am – 12:00 pm period exceeds carrying capacity with a frequency of 485 tourist visits. Majority of the tourists disagreed on experiencing overcrowinding, lack of space, nature disruption, and pollution in the area. Majority of the tourists agreed on the difficulty of disposing thrashes. Tourists moderately agreed that there is a need for regulating and monitoring of tourist arrivals, environmental policy awareness and solid waste management practices. Moreover, tourists strongly agreed that area development was prioritized. Walking only on the guided trails, banning of smoking and drinking alcoholic beverages, giving fine for bandalism on tress and rocks, prohibiting the use of shampoo and soap in the main water falls and rivers banks, and regulate the catching and killings of living organisms in the area are the major of suggested additional environmental protection policies and guidelines of the tourists based on their observations.

The study recommends to add in the environmental policy guidelines the cut-off per 3 hour –interval from opening to closing of the water falls using the carrying capacity of 107 tourists' per batch. Regulate the 295-394 maximum visitors to maintain the standard total daily visit. For the tourists, avoid the peak hours 9:01 am to 12:00 pm intervals, during peak season, to minimize tourist arrivals and achieved the standard total daily visit. Provide trash bins and practice solid waste management for both tourists' and local guides and review the existing local environmental protection policy guidelines.

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