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Relationship between Social Carrying Capacity and Tourism Carrying Capacity: A Case of Annapurna Conservation Area, Nepal

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Abstract

The paper aims to examine the relationship between social carrying capacity and tourism carrying capacity in the Annapurna Conservation Area (ACA), Nepal (along the popular Annapurna Base Camp Trail). Carrying Capacity is a key indicator in assessing the sustainable tourism development at a given place. The study used Survey Research Design to obtain information from tourist and local residents. From the research, it was evident that the visitors were highly satisfied with the tourism activities, along with conservation and development activities at ACA. Similarly, local residents were satisfied with the development of tourism in ACA, yet they perceived crowding, and congestion, cultural degradation as some impending challenges in the near future. Social Carrying Capacity in the ACA has not exceed its threshold, even though this popular trekking destination has been witnessing robust growth in the number of tourist in the region post armed-conflict (1997-2007). Hypothesis test result indicate that the relationship between dependent variable [Tourism Carrying Capacity (TCC)] and independent variable [Social Carrying Capacity (SCC)] has a positive correlation. Adequate and appropriate management intervention

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by the Nepal Trust for Nature Conservation (NTNC)/Annapurna Conservation Area Project (ACAP) there has been well-planned and sustained tourism growth in the region.

Keywords: *Carrying capacity, tourism, conservation, tourist satisfaction*

Introduction

The predominant form of tourism in Nepal is mountain tourism, thanks to Nepal's ecological diversity and cultural richness (Zurick, 1992). Nepal has world's highest eight mountain (out of ten) which is a pull factor to attract tourist around the world. Nepal has experienced unprecedented growth in the past thirty years, approximately 6,000 tourist arrivals in 1962 to almost 1 million tourist arrivals in 2018. The Tourism Policy 2009 and the subsequent policies by the governments identifies tourism as an important vehicle for economic and social development. The focus of government has been for development and expansion of tourism activities, quality improvement of tourism services, increasing revenue and expansion of employment opportunities to improve the living standard of Nepalese people. In the same line, the policy "Vision 2020" envisions to increase tourist arrival to two million and tourism related employment to one million (GON, 2016). Due to the increase in international visitors, it is likely to develop this sector to generate more revenue, employment and other benefits, considering the low level of tourism development in the country. Regarding the much-needed foreign exchange, the government's tourism philosophy is to attract tourist, and afterward hopes to generate more income, employment, and tax revenues. But the tourism development is depend upon the improvement of basic infrastructure, information, facilities, access, transportation options, safety and security, which are all needed in the case of Nepal. A report by the Nepal Rastra Bank, earnings from tourism stood at Nepalese Rupees 58,526,918,000 for 2016/17 (around 551,000 thousand US$) (GON, 2018). This according to the report is more than 40 percent than 2015/16. Similarly, the tourist per day expenditure was USD 54.

Tourism for long identified in Nepal as a powerful means for socio-economic transformation; however, the sector retains a relatively minor role in Nepalese development planning. Most of the planning activities have revolved around increasing – agriculture productivity, infrastructure development, hydropower production, but without much consideration on tourism's increasing importance as a source of foreign exchange and employment and its continuing steady growth in an otherwise stagnant economy have brought it growing attention in national economic planning (Stevens, 1986, pp. 76). The country has experienced over six decades of tourism development. Until 1950, Nepal was closed to foreign visitors apart from foreign dignitaries and individuals with special status, whose travel was restricted to Kathmandu. It was not until 1955 that Thomas Cook offered the first organized tour of Nepal for Western

visitors. The advent of organized mountain trekking in the late 1960s affirmed its position as a popular international destination. Until the late 1970s, the Nepalese Himalayas were considered an exotic destination, but their Shangri-La image has gradually been transformed to that of a cheap, rugged and dirty destination popular mainly for budget backpackers. The findings indicate that approximately 138148 persons were engaged in the tourism sector at the time of survey in 2014 and about a quarter (24%) of the employees were seasonal. 80% were male and about one-third (32%) had secondary job as well. Furthermore, about two-third (68%) employees were of age between 20 to 40 years, half of the employees had completed intermediate level of education and 19% were high skilled employees (GON, 2014).

The concept of conservation friendly tourism-development has long been debated (Wight, 1993; Garrod and Fayal, 2000; Robinson, 2004). The increased tourism development at places of touristic interests, particularly at protected areas has far-fetched consequences, not just for tourism but also for the ecosystem and the resources on which tourism and other economic activities depend on. Protected Areas (PAs), globally and in Nepal, have been used as an environmental conservation tool in maintaining the representative sample of unpolluted and unaltered species and ecosystems for the future, and equally to limit the potential for environmental degradation through human management of resources (Grant, Kratli, Mahiba, Magnussen, Saavedra and Rodrigues, 1998). The main purpose behind establishing PAs varies globally. According to Grant, et al. (1998) management reasons for establishing protected areas are: (1) wilderness protection, (2) preservation of species and genetic diversity, (3) maintenance of environmental services, (4) protection of specific natural and cultural features, (5) scientific research, (6) tourism and recreation, (6) education, (7) sustainable use of resources from the natural ecosystems, and (9) maintenance of cultural and traditional attributes. Protected Areas are key to tourism growth and development in Nepal. With increased tourism growth and development in Nepal, there will be increased demand for PAs resources for tourism. Which is why it becomes important to consider several management tools and practices, such as Carrying Capacity, to understand the state of tourism growth and development in these parks and to plan for the sustained and equitable development in and around those resources.

Literature Review

Concept of Carrying Capacity

Carrying capacity means different things to different people; there is no universal definition, and "is centered on tolerance-levels' (Cooper et al., 1998 *as cited in* Simon, Narangajavana and Marques, 2004). The 'Carrying Capacity' (C.C.) concept focuses on ensuring sustainable development at places of touristic interest. The C.C. concept refers to the maximum-use, which can be made of a site without causing detrimental effects

on its resources, diminishing tourist satisfaction levels or generating socio-economic problems for the local community (Getz, 1983 *as cited in* Kunwar, 2012). According to Simon *et al.*, (2004) a large range of factors, including socio cultural, economic, psychological and perceptual factors besides the environmental aspect of carrying capacity should be considered, however based on particular (specific) concern.

Thomas Malthus first published the concept of carrying capacity in 1798 with a broad understanding of limiting the population and economic growth and it has become the foundational concepts of current environmental movement (Narasimmaraj, 2012). Mathieson and Wall (1982) (*as cited in* Saarinen, 2006, p. 1125) defined carrying capacity as - the maximum number of people who can use a recreational environment without an unacceptable decline in quality of recreational experience.

There are several studies on the issue of Carrying Capacity, but are focused on the quantitative operationalization of the concept, thereby neglecting the qualitative aspects. In addition, the concept has sometimes been related to the concept of sustainable development (Coccossis & Parpairis, 1992 *as cited in* Clivaz, Hausser and Michelet, 2004). However, only selected attempts have been made to operationalize the concept by taking into account the economic, ecological and social aspects. There have been significant studies carried out to understand and estimate the carrying capacity of protected areas in the Europe and Australia (see Table 1); there are limited and surficial studies carried out in Nepal in general and ACA in particular. Table 1 presents synopsis of some of the previous studies on determining carrying capacity at different places.

Table 1: Results of Previous Studies Determining Carrying Capacities

Methods and results of previous studies determining carrying capacities for protected areas around the world

S.N	Methodology	Reference	Location	Capacity
1	The cost-benefit analysis and the voting rule method	Brandolini & Mosetti (2005)	Mass tourist sites in Europe	0
2	Based on qualitative and quantitative data research. The focus is not to determine a specific number as various authors have noted that this is not feasible in a changing regulatory environment	Bretlaender & Toth (2014)	Kwanini, Pemba Island, Africa	0

S.N	Methodology	Reference	Location	Capacity
3	Methodologically, this paper based upon a mixed-methods approach (social network analysis, kernel density analysis, gravity model, and other statistical analyses) in examining the impacts of various theme park attraction and spatial layout attributes on visitor movement	Zhang, Li, Su & Hu (2017)	China's Wuhu Fantawild Adventure theme park	0
4	Develop a multidimensional model in the form of a mathematical programming application to assess tourism carrying capacity	Pazienza (2004)	Gargano National Park (South Italy)- San Giovanni Rotondo, Vieste, Manfredonia	San Giovanni Rotondo- 2249 per day, Vieste - 5080 per day, Manfredonia- 1208 per day
5	Qualitative analysis TCC dimensions regarding the Valley of Whales natural heritage site. Secondary data via analyzing documents, while, the primary data collection includes a semi-structured interview with the official employees who are in charge for managing the Valley of Whales (total 28 interviews), and direct observation checklist.	Wafik, Awzy and IBRAHIM (2011)	Valley of Whales, Natural Heritage sites, Egypt	0

S.N	Methodology	Reference	Location	Capacity
6	a measure of central tendency and spatial variability in the visitors' pressure indicator, to evaluate the spatial pattern of recreational pressure on protected areas	Kostopoulou & Kyritsis (2006)	Mount Olympus National Park, Greece	105,000 visitors over the 23,841 Ha
7	Groups at Any One Time (GAOT), which determines the level of visual and physical interference associated with a visit. Similarly, Other methodologies, such as the Recreational Opportunity Spectrum (ROS) and Limits of Acceptable Change (LAC), in which environmental and social qualities of the visitor sites are determined, have been used for zoning of public use space	Reck, Casafont, Oviedo, Bustos & Naula (2008)	Galapagos National Park	102425 per year

Source: Various

Tourism and Carrying Capacity

The practice of carrying capacity as the principal concept in tourism management undertakes that there is a direct relation between the numbers of visitors and a tourist destination and its effects on the environment, wildlife, social and culture (Reck, Casafont, Oviedo, Bustos and Naula, 2008). According to Reck *et al.*, 2008) such impacts could be managed through regulation of the number of people or groups of people that access visitor places. It was reported that the progress and development of tourism industry has been causing positive and negative impacts at the tourist destinations ever since it was considered as a means for economic development. Therefore, carrying capacity of the tourist destinations should be considered while managing the mass tourism activities. In the same line, Zelenka and Kacetl (2014) points the opportunity of carrying capacity in the protected area as – "the carrying capacity application has the best potential in protected regions, in every cultural and

natural attractions, and in connection to supporting the lifestyle of local community and tourism destination potential in general (p. 641).

The UNWTO (1999) has defined Tourism Carrying Capacity as "the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic and socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction " (*as cited in* Castellani and Sala, 2012). Each tourism destination can sustain a specific level of acceptance of tourist development and use, beyond which further development can result in socio-cultural deterioration or a decline in the quality of the experience gained by visitors. Researchers have learned that not only biological environments are dynamic in reference to carrying capacity, but so too are human values, needs, benefits, expectations and levels of satisfaction. In the given context, setting up specific numerical limits in outdoor settings will not be successful in controlling the effects of outdoor recreational use (Fennel *as cited in* Weaver, 2001). Similarly, Lindberg (1997) (*as cited in* Weaver, 2001) states that the focus has shifted away from 'How many is too many?' to one of 'What are the desired conditions?' In response to the shortcomings of carrying capacity, a number of preformed planning and management frameworks have been developed with the purpose of balancing biological and social components of outdoor recreation settings, experience, and use.

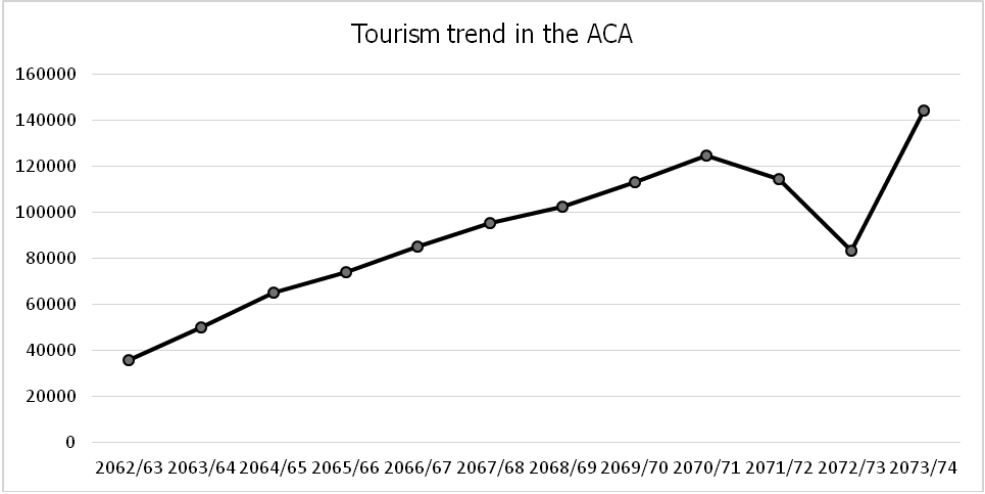
Tourism in the ACA

Nepal acknowledged its vulnerability to environmental risks as early as the 1960s. By the mid-1970s, Government of Nepal started establishing protected areas in areas of social and natural importance. According to Nepal Trust for Nature Conservation (NTNC) (2018) in the last three decades only, Nepal has put aside over 19% of the aggregate land zones as ensured regions under different categories. The Annapurna Conservation Area Project (ACAP) was initiated in 1986 from Ghandruk village as a pilot project integrating nature conservation and community development. ACA is the first initiative in conservation history of Nepal where local communities were directly involved in the management of the protected area. It is the ACA, where NTNC developed and tested integrated Conservation and Development Program (ICDP) model of conservation, which has now become the role model both at national and international level.

About tourist flow to the Annapurna Conservation Area, it is undoubtedly one of the famous trekking destinations among the foreigners visiting Nepal. Tourism is essential part of local economy in the ACA. For more than two decades, ACAP has been striving to develop tourism programs to minimize environmental impacts, help educate visitors and local people about the benefits of sustainable environmental practices and generate sufficient revenue to manage the protected area (Baral, Stern

and Hammett, 2012). As per the record of ACAP, 158,578 foreign tourists visited the Annapurna region in 2017, which is 38.88 percent higher than the figures of 2016. Due to the increasing number of tourist visit to the ACA, it is assumed that the carrying capacity will possibly exceed in near future. Increased usage of natural resources like water, fuel wood and encounter with wildlife animals is common in ACA due to tourism. The increasing number of tourists is one important factor that will affect the nature and that is why it is important to consider the carrying capacity at ACA. Researches globally asserts that carrying capacity sets limits on tourist number, resulting in steady tourism growth and development so that the overall natural, social, economic and ecological circumstances can tolerate without minimizing the tourist satisfaction. Which is why, it is advocated that the continued growth of tourism in the ACA might experience the ill effects of tourism (in terms of social, economic and environmental) on the very resource in which tourism is dependent on. For the last few decades, the ACA has become one of the most popular tourist destinations in Nepal. Thus, ACA will experience the ill effects of such a large number of physical, social, economic and ecological issues in future. For details on the number of tourist to ACA, refer to Figure 1.

Figure 1: Tourist Arrival in Annapurna Conservation Area from 2062/63 to 2073/74



Source: Department of National Parks and Wildlife Conservation, Nepal.

Research Questions, Objectives and hypothesis

Carrying Capacity consideration revolves around three basic components: physical-ecological carrying capacity, social carrying capacity, and political-economic carrying capacity. However, only social carrying capacity in relation to tourism has

been considered for the purpose of this paper. Thus, the study aimed to find out the following research questions.

Research Questions 1: What is the social carrying capacity in ACA?

Research Questions 2: What is the relationship between dependent variable [(Tourism Carrying Capacity (TCC)] and independent variables (social carrying capacity)?

ACA is one of the most visited touristic places in Nepal. That is why, it was imperative to understand the impact of increased tourism activities along the main trekking trail in the ACA. The research is fundamentally based on the two-core principle of Carrying capacity, i.e. 'How much is too much? In addition, 'how much change is acceptable?'

Based on the above research questions, the main purpose of the study was to examine the social carrying capacity of ACA. The specific objectives of the study were to-

- examine the social carrying capacity in ACA; and,
- study the relationship between dependent variable (TCC) and independent variable (social carrying capacity).

Research hypothesis

In order to find the relationship between dependent [Tourism Carrying Capacity (TCC)] and independent variable (social carrying capacity indicator), following research hypothesis was set:

H1: There is significant relationship between TCC and social carrying capacity indicator.

Study Area: Annapurna Conservation Area (ACA), Nepal

To examine the relationship between tourism carrying capacity and social carrying capacity of the ACA, the research was carried out along the base camp trail from Bire Thati, Ghangruk, Chhomrong, ABC, Landruk, and to Dhampus (see Figure 1). These areas represent the social, physical, ecological and economic aspects (employment opportunities, living standard and income from tourism activities). ACA is the largest protected area covering 7,629 sq. km. in Nepal and spreads over 57 VDCs in five districts. It is home to around 100,000 people belonging to different ethnic, cultural and linguistic groups. The cultural diversity of ACA is rivaled by its biodiversity, which is a treasure house of 1,226 flowering plants, 102 mammals, 485 birds, 41 reptiles and 23 amphibian species. The area is one of the most popular trekking destinations for visitors from all over the world (NTNC, 2018)

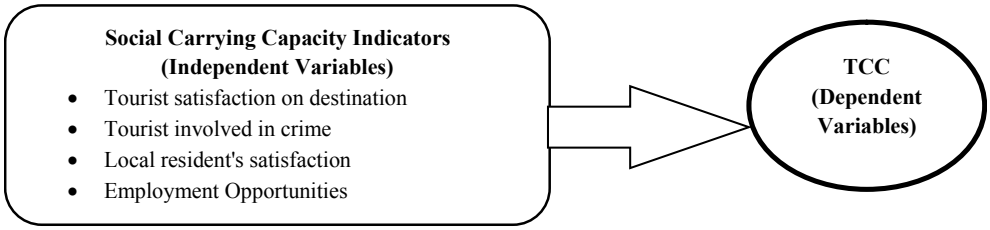
Conceptual Framework of the study

There has been continuous debate/discussion on the concept and the issue of carrying capacity in tourism in the last three decades. However, it was difficult to find a universal accepted practice. It was evident that much of the discussion are of operational purpose that too varies from destination to destination. Based on the assumption made by Environmental Planning Laboratory of the University of the Aegean, Greece (2005), this study used the conceptual framework as presented in Figure 2.

Carrying capacity considerations revolve around three basic components or dimensions: physical-ecological, social carrying capacity and political-economic. These dimensions reflect the range of issues considered in practice. One such study carried out at Phong Nha Tourism Center in Vietnam centered around three basic components: ecological, economic and social impacts and the findings of the study have presented that Dong Hoi tourism center have the highest TCC, about 71,000 visits per day. Similarly, the Phong Nha National Park has a lower TCC than other centers in Quang Binh, with 11,000 visits per day (Tran, Lan, Thai, Mai and Thanh, 2007). However, European Commission (2002) points that setting capacity limits for sustaining tourism activity in a place involves a vision about local development and decisions about managing tourism. These should be carried in the context of democratic community strategic planning which requires participation of all major actors and the community at large.

The Social carrying capacity dimension is associated to all the elements, which concern social communities, as well as the problems of interrelation between local resident population and tourists. In general, social carrying capacity is the reaction of the local people towards the tourism development of a place (Mohamad, Jaafar and Marzuki, 2014). More specifically, from the review of the literature it was found that the Social Carrying Capacity (SCC) of a tourist area is defined from two different points of view. From the point of view of residents, the SCC represents the social interaction between residents and visitors, and it is the MNV (Maximum Number of Visitors) tolerated by the host population without reducing their quality of life. Yet again, from the point of view of visitors, the SCC describes the interaction between the visitors themselves, and is defined as the MNV tolerated by the visitors themselves without reducing the quality of the recreational experience or desiring to go to an alternative site or return home (Brandolini, 2005). From the literature review, some of the common and most cited social carrying capacity indicators were found to be - Employment Opportunities, Tourist satisfaction on destination, Tourist involved in crime, and Residents' complaints. That is why; these factors have become the center of the study of this research paper.

Figure 2: Conceptual Framework of Social carrying capacity and Tourism Carrying Capacity



It was evident in many of the researches that 'community' is at the center of sustained tourism development at a touristic place. It has been argued that community involvement is significant in destination management and growth. When considering levels of community involvement and government control in planning and management of tourism, most destinations in developing regions fall into community-based or state-controlled groups (Gartner, 1996; Snowdon, Slee and Farr, 2000, *as cited* in Nyaupane, Morais and Dowler, 2006).). Some authors suggest that members of the host community should be involved in tourism planning because they: (a) have an historical understanding of how the region adapts to change; (b) will be the ones most closely affected by tourism; and (c) will be expected to become integral part of the tourism product (Scheyvens, 1999).

According to De Ruyck, Soares and McLachlan (1997) social carrying capacity refers to the maximum visitor density in an area where the tourists quietly feel satisfied and perception of crowding should be managed if local people are to continue benefiting from tourism and minimizing the negative effects of tourism. Especially, the social carrying capacity impacts should be researched in order to get a precise idea of social change due to tourism and how it can be guided to avoid most common negative effects and optimize positive drivers (Bretlaender and Toth, 2014). Similarly, social carrying capacity dimension is associated to all the elements, which concern social communities, as well as the problems of interrelation between local resident population and tourists. In general, social carrying capacity is the reaction of the local people towards the tourism development of a place (Mohamad, Jaafar and Marzuki, 2014). More specifically, in literature the SCC (Social Carrying Capacity) of a tourist area is defined from two different points of view. From the point of view of residents, the SCC represents the social interaction between residents and visitors, and it is the MNV (Maximum Number of Visitors) tolerated by the host population without reducing their quality of life (Brandolini, 2005).

In the same line, Saveriades (2000) defines social carrying capacity as – the maximum level of use that can be absorbed by an area without an unacceptable decline in the quality of experience of visitors and without unacceptable adverse impact on

the area's society. From the review, it is evident that the two components of social carrying capacity are: (1) the quality of experience that visitors will accept before seeking alternative destinations (that is to say, the tourists' psychological carrying capacity); and (2) the degree of tolerance of the host population to the presence of tourists (that is to say, the residents' psychological carrying capacity).

The level of tourist satisfaction can greatly influence the prospect of repeat visits. A key outcome of tourism satisfaction that will influence future tourism intentions for revisits both in the short and long term is loyalty to the destination (Chen and Tsai, 2007). Depending on wildlife observation, accommodation, food, trail, facilities and visitors with a satisfying experience may become repeat visitors or recommend the area to future clients. In this way, social carrying capacity helps to maintain the balance between tourism benefits and local perception towards tourism activities.

Research Methodology and Data collection

This study uses quantitative method to meet the objectives of the research. The use of quantitative methods in tourism research has been widely used in recent years. Adopting a quantitative method approach helps understanding complex data and gives a more complete and comprehensive account of the enquiry (Bryman, 2006; Creswell, 2003). The quantitative research in form of a survey will provide numerical evidence and allow statistical analysis. The results from quantitative methods might be explained through the findings generated by the analysis offering a more complete understanding (Bryman, 2006). To examine the tourism carrying capacity in ACA, primary data were collected from the two important stakeholders (tourists and the locals).

Sampling Design and Size

Non-probability sampling design (purposive) was chosen to get data from local residents and visitors to examine the social carrying capacity indicators. According to Kumar (2011), non-probability sampling designs are used when the number of elements in a population is either unknown or cannot be individually identified. Therefore, in such situations the selection of elements is dependent upon other considerations. The primary consideration in purposive sampling is the researcher's judgment as to who can provide the best information to achieve the objectives of the study. As a researcher, one only goes to those who in their opinion are likely to have the required information and be willing to share it with him/her. Thus, purposive sampling was the right option to adopt.

Questionnaire Design and Instruments

The research used self-administered questionnaire to collect data. The survey instrument comprised of local and tourist demographic information (such as - age, marital status, gender, level of education, monthly income, occupation, length of

stay of tourist, money spend per day by tourist, frequency of visit to ACA, purpose of using firewood). The measurement items/statements were taken from previous studies on social carrying capacity and tourism, mainly from visitors and local residents. All statements related to SCC and TCC were measured using a 5-point Likert scale, where 1 represented strongly agree and 5 represented strongly disagree. Similarly, satisfaction (in relation to both tourists and locals) were measured on 5-point semantic differential scale that ranged from 'satisfied' to 'dissatisfied'. The questionnaire had more close ended-questions and few open-ended questions. The close-ended part comprised of twenty-seven Likert scale statement.

The survey questionnaire were administered to tourists and local residents at different times of the day over the three-week period at from Dhampus, Tolkha, Landruk, Jhinu, Chhomrong and Ghandruk of the ACA region, Nepal. A total of 250 questionnaires were returned. The sample size also fulfills the condition of 95% confidence level, standard deviation of 0.5% and ± 5% margin of error.

Data Analysis and Result

The data collected for social carrying capacity and tourism carrying capacity were coded into SPSS and analyze with the help of descriptive statistics to examine the social carrying capacity and TCC. In the same way, correlation and regression analysis were done to examine the relationship between TCC and social carrying capacity. On the other hand, social demographic profile were analyzed through descriptive analysis in SPSS.

Demographic Profile of Respondents

Table 2 shows the demography of respondents. Out of total respondents (n = 250), 60.8% were male and 39.2% were female. The majority of the respondents (36.8%) were of 20-29 years of age, followed by 30-39 (30.4%) and 40-49 (18.8%). About the education, it was evident that 27.6% of the respondents had Bachelor level education, followed by secondary level (23.2%), and Master degree (21.2%). Regarding income, majority of local respondents stated to have income level Rs. 30000-40000 per month (36 %) followed by Rs.40000 above (34%) and Rs.20000-30000 (18%). Similarly, regarding income, majority of tourists stated to have income level less than $5000 per month (45.5 %) followed by $5001-10000 per month (20.5 %) and above $20000 per month (14.5%).

Table 2: Demographic Profile

Variables	Category	Frequency	Percentage
Gender	Male	152	60.8
	Female	98	39.2
Marital Status	Married	97	38.8
	Single	153	61.2

Variables	Category	Frequency	Percentage
Age	Below 20	3	1.2
	20-29	92	36.8
	30-39	76	30.4
	40-49	47	18.8
	50 & above	32	12.8
Education	No Education	27	10.8
	Primary	43	17.2
	Secondary	58	23.2
	Bachelor	69	27.6
	Master	53	21.2
Income(per month) (local)	Less than Rs. 10000	4	8
	Rs. 10000-Rs. 20000	2	4
	Rs. 20000- Rs. 30000	9	18
	Rs. 30000- Rs. 40000	18	36
	Rs. 40000 above	17	34
Income(per month) (tourists) (in dollars)	less than $5000	91	45.5
	$5001- 10000	41	20.5
	$10001- 15000	25	12.5
	$15001-20000	14	7.0
	above 20000	29	14.5

Reliability

For the reliability of the data, Cronbach's alpha was calculated. Besides the reliability rest, other statistical tools such as frequencies and descriptive analysis were used for generating findings. For testing the hypothesis, correlation between the dependent and independent variables were calculated and evaluated based on p-value.

Table 3 shows the results of reliability analysis. Cronbach's alpha was used to measure the reliability of the questionnaire and analyze the collected data. From the result it was evident that the Cronbach's coefficient was $\alpha = 0.668$ for social carrying capacity and $\alpha = 0.689$ for TCC. All of the measured values were above 0.60, therefore it can be concluded that there was consistency and reliability among the statement questionnaire. For the study following social carrying capacity statements were used: safe and secure during the visit; availability of lodging and food/tea house facilities on the trekking trail; congestion on scenic areas; well paved path on trekking trail; job opportunities for the local residents; awareness in conservation; police check-post, health post, School facilities; and status of crime and drug abuse due to tourism activities. Similarly, for tourism carrying capacity, the statement (derived from the work of DeVellis, 1991) were used such as - restriction on activities and use of natural

resources; state of natural environment in ACA; cultural changes in local residents; and the quality of accommodation in ACA.

Table 3: Reliability Test

Variables	Cronbach's Alpha	N of Items
Social carrying capacity	0.668	8
Tourism Carrying Capacity	0.689	4

Social Carrying Capacity Mean Value

To measure SCC, four indicators were used and tested namely: (a) tourist satisfaction on destination; (b) tourist involved in crime; (c) local resident satisfaction; and (d) employment opportunities. From the analysis it was found that tourist satisfaction on destination mean value was 1.60, which indicates that tourist were satisfied with the social-cultural aspects and values were not degraded in the perception of tourist. Similarly, resident's perception towards tourist involvement in crime was neutral which has mean value of 3.16. On the other hand, residents were satisfied with the tourism development in the ACA, and the mean value were recorded 1.72. Local people perceived tourism has a key role in uplifting their standard of living. In the same way, perception of advantages of tourism were more favorable for the local residents (the mean value recorded to be 2.13), which indicated that tourism have significant role in the local community mainly in terms of creating employment opportunities and benefits for local people.

Table 4: Social Carrying Capacity Mean Value

Social Carrying Capacity	**N**	**Mean**	**Std. Deviation**
Tourist Satisfaction on destination	250	1.60	0.1957
Tourist Involved in crime	250	3.16	0.4120
Local Resident satisfaction	250	1.72	0.4473
Employment Opportunities	250	2.13	0.6660

Hypothesis testing

To test the hypothesis, correlation and regression analysis were done (refer table 5). It was found that there is positive relationship between TCC and SCC.

H1: There is positive relationship between social carrying capacity and TCC.

Correlation Analysis

Correlation Analysis was performed to understand the relationship between Tourism Carrying Capacity and Social carrying capacity (see Table 5), and was found to be 0.758, that is, strongly positively correlated. The p-value was recorded to be

0.000, which is highly significant. Thus, it confirms that TCC and social carrying capacity was found to be significant correlated with each other. It indicates that if social carrying capacity exceed, TCC will exceed too.

Table 5: Pearson Correlation Analysis

Variables	Test	TCC	Social CC Indicator
TCC	Pearson Correlation	1	0.758
	Sig. (2-tailed)		0.000
	N	250	250
Social CC Indicator	Pearson Correlation	0.758	1
	Sig. (2-tailed)	0.000	
	N	250	250

Regression Analysis

Table 6 clearly indicates that the strength of relationship between SCC indicators and TCC. From the analysis, it was evident that the degree of relationship between SCC and TCC was 17.9%. The definition of R- square is the percentage of the response variable variation that is explained by a linear model and R-square is always between 0% and 100% (Minitab Inc., 2018). In this case (as shown in the Table 6) R- square stands at 17.9%, which means 17.9% of variability in dependent variable (TCC) is explained by independent variables (SCC). Since the Adjusted R-Square value (17.6%) was close to the R-Square, it means the strength and relationship between the two variables (17.9%) is actual and realistic. Thus, if social carrying capacity exceed, it will have same impact in TCC by 17.9%.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.424[a]	0.179	0.176	0.62962

a. Predictors: (Constant), Socio demographic

ANNOVA-test

ANOVA test performed to understand the degree of the strength between social carrying capacity indicators and TCC, showed the relationship to be strong (see Table 7). A Sum of Squares 21.500 Mean Squares 21.500 and F value of 54.235 confirmed the strength of this relationship. The impressions from Sums of Squares 21.500; Mean Squares 21.500 and F value 54.235 is that the model of relationship between the study variables is highly significant at the 0.000 level. From the result, it was clear that the strength of relationship between SCC and TCC in ACA was strong and it can be concluded that there is significant stress of social carrying capacity indicators on TCC in the ACA.

Table 7: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.500	1	21.500	54.235	0.000[b]
	Residual	98.311	248	.396		
	Total	119.811	249			

a. Dependent Variable: TCC

b. Predictors: (Constant), Social carrying capacity

Similarly, the relationship between social carrying capacity and TCC was performed using regression coefficient as indicated (see Table 8),which portrays that the Social Carrying Capacity has significantly impact on Tourism Carrying Capacity at (Beta = 0.575, t = 7.364, p< 0.000). It means the impact level of TCC will increase 0.575 unit when social carrying capacity indicators increase one unit while others remain.

Table 8: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.195	0.151		7.926	0.000
	Social Carrying Capacity	0.575	0.078	0.424	7.364	0.000

a. Dependent Variable: TCC

Conclusion

From the analysis, it was evident that the relationship between Tourism Carrying Capacity (TCC) and Social Carrying Capacity (SCC) was 0.758, i.e. strongly correlated. Therefore, it can be concluded that if SCC surpass then TCC will surpass. Relationship of independent variables (SCC) to dependent variable (TCC) found to be a strongly positive and it can concluded that there is direct impact on tourism carrying capacity. In the same way, it was found that the social carrying capacity in ACA has not exceeded. Hypothesis test indicated that the relationship between dependent variables (TCC) and independent variables (socio-demographic) has positive correlation at 0.05 level of significance. Based on the Table 8, the significant value of social carrying capacity indicators is 0.000, which is below p- value of 0.05. Hence, H0 is rejected, which indicates that there is a positive relationship between social carrying capacity indicators and TCC. Multiple regression analysis indicated

that strength of relationship between dependent variables (TCC) and independent variable (SCC) was 0.179, which was strong, actual and realistic.

The fundamental approaches of tourism carrying capacity are physical, ecological, economic and social. Physical approach characterizes ideal number of visitors that a destination can allowed. Ecological approach manages resilience of visitors at the specific level at the spot. Economical approach states considerate accepting visitors' purpose without the loss of resident activities furthermore, their benefits from ecotourism improvement through local services. Social carrying capacity approach characterizes the contribution to the spot by community, guests and government. Stakeholders should motivate and provide necessary resources to the resident so that they maintain their socio-cultural resources and the areas as unique. The aim of the study was to examine the relationship of SCC indicators and TCC in ACA, and it was evident that the SCC has not exceeded. Carrying capacity varies, depending on place, season and time, visitors conduct, models and levels of administration, and the dynamic character of the environment themselves. The present researcher found that the concepts of carrying capacity and open access are useful in the analysis of the social aspects of tourism. The finding of the study demonstrate that an expansion and dispersal response to increasing tourist numbers is likely to lead to environmental degradation. In addition, defining a carrying capacity for tourism development, by identifying thresholds for particular indicators is difficult, but not impossible. Similarly, employment opportunities were only limited to lodge and hotel sector, employment opportunities should be diversified to other sector (such as agriculture) as well.

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