

Capacity to Absorb Tourism: An Assessment for Sustainable Tourism Management of Gulmarg Biosphere Reserve Jammu and Kashmir-India

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ABSTRACT

Gulmarg is a beautiful meadow and most popular tourist place of the state of Jammu and Kashmir. The rapid but unplanned tourism activities have been creating various social and ecological concerns. If appropriate planning measures are not derived from the consideration of the carrying capacity of this place, the destination will be overloaded, tourism quality will be degraded and therefore the benefit obtained from tourism activities will be reduced. This paper presents the tentative establishment of a method to calculate the tourism carrying capacity of the Gulmarg biosphere reserve. It was found that carrying capacity of the place is 948 visits / day or 341400 visits per year. This estimation can be used to regulate the tourist flow to the place so that its natural environment can be saved from further degradation and the place may carry on its tourism base on sustainable way.

Keywords: Carrying capacity, Gulmarg, Limiting factor, Tourism Management.

INTRODUCTION:

Tourism, as well as some other economic sectors like Handy crafts, Agriculture and Horticulture are profitable economic sectors in Jammu and Kashmir. There are many tourist places in the J&K among which Gulmarg is most visited place in the Kashmir valley. The tourism activities at this place is mostly related to exploitation of natural resources like logging of trees mostly *Abies pindrow*, *Cedrus deodara* for the construction of tourist huts, rope way Gulmarg gondola, and big hotels, soil erosion due to horse riding on the natural trails, and skiing on the slopes, trampling of vegetation due to camping and uncontrolled flow of visitors. The rapid but unplanned exploitation and utilization of these resources create a risk of losing their recovery capacities, destroying the basic functionalities of ecosystem within tourism areas. Various tourism-related factors can be identified to have impact on these resources, among which the number of tourists would be the most important one. Gulmarg is receiving tourists every year more than its carrying capacity (Table-1) which has made to lose its natural beauty. The concept of carrying capacity of a tourist site was stemmed from this perception. This concept is important in the tourism planning which aims to sustainable development. In 1994, the World Tourism

Organization (WTO) proposed a definition of 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, socio-cultural environment and an unacceptable decrease in the quality of visitors’ satisfaction”.

Luc Hens (1998) defined the tourism carrying capacity as “The maximum number of people that use tourism site without unacceptable effect on environmental resources while meeting the demand of tourists”. Tran Nghi et. al (2007) defined tourism carrying capacity as “ Highest bearing capacity of a natural, environmental and socio-economic system within which the maximum number of tourists has no influence on sustainable development of the entire system and tourists’ satisfaction are remained during the peak tourism period”.

According to this definition, the tourism carrying capacity includes three components: ecological carrying capacity, social carrying capacity and economic carrying capacity.

Ecological Carrying Capacity:

is the number of tourists who can undertake activities in a tourism site without causing, the degradation above the allowable limit of natural environment. In order to calculate the ecological carrying capacity, safety limits of ecosystems are often used through indicators of natural environment, biological diversity, and environmental pollution.

Social Carrying Capacity:

It has two aspects:

- 1- Acceptance level of local community which is reflected by the maximum number of tourists which does not make local residents unpleasant, and
- 2- Acceptance level of tourists which is expressed by their satisfaction to tourism sites and the number of returnees.

Economical Carrying Capacity:

It is the acceptable level of tourism activities without doing any harm to key local economic activities. It means that tourism activities must not make conflict to other economic sectors and decrease in the income of local people.

LITERATURE REVIEW:

Assessment of carrying capacity of a tourist destination has attracted a paramount attention as part of the management of sustainable tourism. The concept of carrying capacity is frequently used when sustainable tourism indicators are applied for a particular tourist destination. This implies that tourist destinations have some specific limits in the volume and intensity that a geographic zone can tolerate without provoking any irreparable damage. The carrying capacity concept in a planning or environmental management context has been defined as the ability of a natural or manmade system to absorb population growth without significant degradation (Schneider,1978) or similarly the degree of human activity that a region can tolerate at an acceptable quality of life in perpetuity(Bhishop etal;1974). Bhattacharya and Shanker (2007) while estimating the total carrying capacity of Bandhavgarh National park, M.P, India with respect to tourism activities found that tourism activity had reduced the total CC of the area by about 36% from its original state. Though the impact still remains within the low impact category, it is perilously close to the moderate impact level (41% - 60%). The study highlighted that management initiatives are required to mitigate the adverse impacts arising from the tourism activities and special emphasis should be laid upon the sensitive components as Ecological and Facility Carrying Capacity in this case study. The authors believe that calculation of total CC is important from the perspective of tourism management, as it gives a holistic view of impacts due to tourism. Lone etal (2013) assessing the carrying capacity of the Bangus Valley an unexplored tourist region of district Kupwara of the state of Jammu and Kashmir,India opines that measuring carrying capacity is a prerequisite tool for any tourism development if negative implications on the ecology of the natural environment due to recreational activities are to be avoided. Sharma (2016) while evaluating the total carrying capacity of Kerwa area of Bohpal India using tourism impact indicators,clearly showed that Kerwa area falls under very low impact category as only 03% carrying capacity due to tourism activity is declined, however the author recommends periodic evaluation of Carrying capacity of the area so that tourism may run on sustainable basis. Pasko (2016) while working on carrying capacity assessment of coastal areas of Albina stressed upon that carrying capacity assessment(CCA) should be considered as an extremely important tool during drafting policies and plans for the development of coastal areas. Carrying capacity assessment (CCA) should not be considered only as a concept or scientific calculation that shows the precise number of tourists to particular area. Instead as a flexible management tool for sustainable development of tourism allowing optimum level of capacity in certain area. 5The study of carrying capacity in a recreation and tourism context has been attempted by many good

authors(Gatz,1983; Manning,Lime and Hof 1996; Johnson and Thoms,1994; O'Reilly1986;) and there is little point in attempting to repeat such reviews

METHODOLOGY:

To calculate carrying capacity of Gulmarg protected area the formulae of Cifuentes (1992) and Ceballos-Lascurain (1996) were used with the some adjustments into the following levels:

Physical Carrying Capacity (PCC):

PCC is the maximum number of tourists that can physically fit into or onto a specific area, over particular time.

$$PCC = A \times D \times Rf \text{ (1)}$$

Where A: available area for use (m²)

D: tourist density (tourists / m²)

Rf: Rotation factor (number of visits / day)

A is determined by particular conditions of the considered area. In natural area, this parameter can be determined by natural boundary such as mountain range, river, stream, where tourism is developed, the available area can be estimated from the length of track in that area or the total area where tourist can do camping.

The tourist density or the area required per tourist (D) is the area needed for a tourist who can undertake activities comfortably. Rotation factor (Rf) is the number of permissible visits over a specific time (usually calculated by daily open hours) and can be expressed as:

$$Rf = \text{Open period} / \text{average time of visit} \text{ (2)}$$

Effective Real Carrying Capacity (ERCC):

ERCC is the maximum number of tourists that is Permitted by the local conditions and management capacity without influencing the tourists demand:

$$ERCC = PCC - Cf_1 - Cf_2 \dots \dots Cf_n \text{ (3)}$$

Where: Cf_n (Corrective factors or limiting factors) are factors which have negative impact on tourism activities and assessed by limiting threshold which is used for identifying impact level of a fact5or (%).

$$ERCC = PCC \times 100 - \frac{Cf_1}{100} \times 100 - \frac{Cf_2}{100} \times 100 - \frac{Cf_n}{100} \text{ (4)}$$

$$\text{Where limiting factors can be determined by: } Cf = \frac{M_l}{M_t} \text{ (5)}$$

M_l: Limiting magnitude of variable

M_t: Total magnitude of variable

These factors are selected on tourism activities and local conditions of the study area. However for the ecologically sensitive areas, environmental safety, conservation and management of natural resources are taken into consideration while calculating the limiting factors.

Limiting factors used in Calculating Tourism Carrying Capacity:

Environmental indicators are used to indicate the sensitivity of environment and development. Indicators form or set of indicators (index) that help is to recognize on-going problems and propose corrective actions. In estimation of carrying capacity only negative factors which hinder the development of tourism activities are considered. These factors are translated into quantitative or semi-quantitative values which measure the adaptability of environmental socio-economic sub-system and tourists demand. Therefore, indicators selected for calculating carrying capacities have the following characteristics :

- Computable (often quantitative or semi quantitative values).
- Easily surveyed and collected (by field research and questionnaire).

In this research limiting factors were found out by analyzing 52 questionnaires from the tourists, staff members of the Gulmarg development authority (GDA) and Pony drivers.

FINDINGS:

PCC is the maximum number of tourists that can physically fit into or onto a specific area, over a particular time.

$$Rf = \frac{\text{Open period}}{\text{Average time of visit}}$$

Gulmarg remains open for whole day (12 hrs.) for day visitors, and average time of visit is 6 hrs.

$$\text{Therefore, } PCC = 2000000 \times \frac{1}{8} \times \frac{12}{6}$$

$$= 2000000 \times 0.125 \times 2$$

= 500000 visits / day (Approximately). From the estimation it was found that physical carrying

capacity of Gulmarg is 500000visits / day. $PCC = A \times D \times Rf$ Or $PCC = A \times \frac{V}{A} \times Rf$.

Area in use for tourism activity is 2000000m². (Length=2000m, Breadth=1000m).

$$A = 2000000m^2$$

$$v/a = \frac{1}{8} m^2$$

However, in order to find out the tourism carrying capacity it is very important not only to consider the physical carrying capacity of a particular area but, to take other parameters like Infra-structure, Management facilities, Ecological environment of the area and other services into consideration. For this reason effective real carrying capacity (ERCC) of a specific area is to be determined. For determining the ERCC of Gulmarg corrective factors or limiting factors has to be found out.

Corrective factors or Limiting factors:

During the survey of the area the following limiting factor were observed.

i) Whether limiting factor (Cf₁):

Heavy snow fall in winter is a common phenomenon of Gulmarg weather. Therefore the visitor number in this season (December, Jan. Feb. and March) are very less.

$$Cf_1 = M_1 / M_t$$

$$M_1 = 120 \text{ days}$$

$$M_t = 120/365 = 0.328 = 32.8\%$$

ii) Noise (Cf₂):

After the analysis of 52 questionnaires filled by tour guides, tourists and Pony drivers 20 indicated that there is noise and congestion at the entrance of Gulmarg (Market area). The following formula is used to estimate the noise limiting factor:

$$Cf_2 = \frac{M_1}{M_t} = \frac{20}{52} = 38.46\%$$

iii) Infrastructure limiting factor (Cf₃):

52 questionnaires were distributed among tourists (National as well as Foreign tourist) regarding the infrastructure like hotel accommodation, transportation service, health facilities and communication facilities. According to the assessment of tourists 21 out of 52 were not satisfied with the infrastructure facilities in Gulmarg.

$$Cf_3 = \frac{M_1}{M_t} = \frac{21}{52} = 40.3\%$$

iv) Management Limiting Factor (Cf₄):

For capacity of resource use and management attention was paid as on the following issues:Landscape management, continuous water supply, electric supply, transportation and waste management. Following results were obtained from the assessment of staff of Gulmarg development authority (GDA) and staff of tourism reception center (TRC). Out of 15 respondents 6 respondents marked that it is very difficult to manage during peak tourism period.

$$Cf_4 = \frac{M_1}{M_t} = \frac{6}{15} = 40\%$$

v) Loss of vegetation cover limiting factor (Cf₅):

After the assessment of questionnaire filled by tourists and GDA staff members, it was found that there is loss of vegetation cover in Gulmarg .

$$Cf_5 = \frac{M_1}{M_t} = \frac{41}{52} = 78.8\%$$

vi) Horse riding limiting factor (Cf₆):

Tourists use horses for riding because, of this activity there is loss of herbaceous plant cover of meadow and also soil erosion, out of 52 respondents 31were agreed that due to horse riding there is loss of top soil and trampling of herbaceous plant cover.

$$Cf_6 = \frac{M_1}{M_t} = \frac{31}{52} = 59.6\%$$

vii) Drinking water limiting factor (Cf₇)

Drinking water is not easily available. There are only two water points. Because of this limitation visitors take drinking water bottles along them and after use empty plastic bottles are thrown out in the meadow which not only pollutes the soil but also adds burden to the solid waste and also due this water scarcity the two water points become much crowded. Out of 52 questionnaires served 34 were agreed that drinking water supply is not satisfactory.

$$Cf_7 = \frac{M_1}{M_t} = \frac{34}{52} = 65.3\%$$

Therefore, Effective real carrying capacity of Gulmarg is:

$$ERCC = PCC \times \frac{100-Cf_1}{100} \times \frac{100-Cf_2}{100} \times \frac{100-Cf_3}{100} \times \frac{100-Cf_4}{100} \times \frac{100-Cf_5}{100} \times \frac{100-Cf_6}{100} \times \frac{100-Cf_7}{100}$$
$$ERCC = 500000 \times \frac{100-32.8}{100} \times \frac{100-38.46}{100} \times \frac{100-40.3}{100} \times \frac{100-40}{100} \times \frac{100-78.8}{100} \times \frac{100-59.6}{100} \times \frac{100-65.3}{100}$$

$$ERCC = 500000 \times 0.67 \times 0.59 \times 0.28 \times 0.6 \times 0.21 \times 0.40 \times 0.34$$

$$ERCC = 948/\text{day OR } 948/ \times 30 = 28450 \text{ visits/month}$$

CONCLUSION:

The result findings showed that effective real carrying capacity of the meadow is 948 visits per day. However, so far the current tourist flow is concerned Gulmarg receives visitors more than its carrying capacity in peak tourism season. This means Gulmarg has crossed its limits of carrying capacity. From the tentative calculations it was revealed that ecological carrying capacity of the Gulmarg has exceeded as problems related to vegetation loss, noise pollution, soil erosion and waste disposal was highlighted almost all the respondents. Therefore in order to maintain the ecological sensitivity of the place it is very important to assess the carrying capacity on periodical basis to regulate the flow of tourists to visit the place.

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Table 1: Tourist arrival in Gulmarg from 2005-2017

Year	Domestic	Local	Foreigner	Total
2005	325902	220551	4420	550873
2006	390311	104247	8101	502659
2007	330466	268968	20109	619543
2008	422756	287934	12991	723681
2009	308136	270123	6003	584262
2010	319545	262701	6773	589019
2011	990460	425219	7282	1422961
2012	1693140	855034	7481	2555655
2013	1896295	943843	10964	2851102
2014	1412472	300220	5976	1718668
2015	484850	223359	3879	712088
2016	483405	119871	5254	608530
2017	181577	377446	11229	570367

Source: Jammu and Kashmir tourism department.
