

**LAKE SUKHATAL**

**Citizens perceptions about future use**

**Final Project Report**

**Submitted by:**

**Tobias Haefele**

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**ABSTRACT**

*Lake Sukhatal is a small seasonal lake next to Nainital, a hill station and tourism hotspot in North India. It is also an important recharge zone for Nainital lake, providing ca. 40% of its annual subsurface inflow. However, over the previous years (illegal) buildings had encroached on the lakebed, leading to pumping to fight “flooding” of these buildings, when the lakebed filled in summer. As this pumping interferes with the ecological function of the lake, a ruling by the HC of Nainital following a PIL, ordered to have all (illegal) constructions removed and the lakebed restored. This piece analyses data collected from a survey, capturing citizen’s perceptions about the ecological function and their preferences for a future, ecologically and economically sustainable use.*

**Keywords: Recharge Zone, Nainital, Participatory Planning, Ecological Awareness, Sustainability**

## Table of Contents

<b>Abstract</b> .....	<b>2</b>
<b>1</b> .....	<b>I</b>
<b>ntroduction</b> .....	<b>4</b>
<b>2</b> .....	<b>O</b>
<b>bjectives and Methodology</b> .....	<b>5</b>
<b>3</b> .....	<b>A</b>
<b>nalysis of Survey Data</b> .....	<b>6</b>
<b>3.1</b> .....	<b>O</b>
<b>verall Analysis</b> .....	<b>6</b>
<b>3.2</b> .....	<b>C</b>
<b>ross Sectional Analysis</b> .....	<b>8</b>
<b>3.3</b> .....	<b>L</b>
<b>imitations</b> .....	<b>10</b>
<b>4</b> .....	<b>C</b>
<b>onclusions</b> .....	<b>11</b>
<b>5</b> .....	<b>R</b>
<b>ferences</b> .....	<b>12</b>
<b>Appendix</b> .....	

## 1. INTRODUCTION

Nainital is a hill station in Uttarakhand, North-India. Established by the British, Nainital has turned into a popular tourist destination, particularly during the hot Indian summers. This development has also led to mounting anthropogenic damage to the lake and its ecosystem (Rawat (ed.) 1989, CDP 2007, Roorkee 1989 etc.). This is not only problematic, as the lake and the overall beauty of the environment are in danger, but also because the lake provides services such as “water [...] for irrigation purposes and drinking water” (Kundu 2010/11: 36) as well as indirect and direct income via e.g. tourism (compare Singh 2001/2) and many others. Given the nature of these services, it is well understood that Nainital as a town does not only benefit from the lake but is also highly dependent on the lake and the services it provides, as Kundu states: “The majority of the population are (sic) dependent on the lakes directly or indirectly to earn their living (2010/11: 36).”

One of the areas that is ecologically interrelated with the Nainital area and community is Sukhatal (O’Hanlon 2014), a lake filled only in summer, located ca. 1km to the east of Nainital. Lake Sukhatal stores water during the monsoon, which then slowly trickles down and provides large amounts of sub-surface inflows of water into both Nainital lake and an underground aquifer during the dry season. This process also filters the water effectively, increasing the quality of the water (compare HH Rorkee, O’Hanlon 2014). Additionally, Lake Sukhatal acts as an overflow storage or a natural sponge, balancing water levels in Lake Nainital over the season. Differently put, Lake Sukhatal represents the upstream or supply catchment area for these ecosystems and helps to sustain the ecosystem services enjoyed by communities living in Nainital. Few months after the end of monsoon, Lake Sukhatal dries up, turning into a flat patch of land.

Over the previous years, municipal waste dumping, construction of a car park, homes and large pumping stations have begun to turn Lake Sukhatal into a literally “dry lake”, damaging not only Lake Sukhatal as an ecosystem, but also reducing the ability of Lake Sukhatal to provide the functions described above, affecting the people who benefit from and depend on the services provided by Sukhatal *and* Nainital further down-stream.

Following an argument by Prof. Rawat in a PIL from last year, the HC Court of Nainital has ordered in August this year that all illegal encroachments on the lake are to be removed immediately, so that the ecosystem around Lake Nainital / Lake Sukhatal remains preserved and can continue to deliver ecosystem services to the community.

This sentence, if enforced, will guarantee preservation but it does not give an answer to the question whether or how the lake could or should be used in an ecologically sustainable way. While

the encroachments became possible in the absence of coordinate planning, a more coordinated approach to the lakebed's use would deliver better results for environment and residents alike.

Thus, the first step towards providing such an answer is identifying the population's perceptions and ideas for how this area could be used. This is not only because the population has to offer "local knowledge" on both what is desirable and what is possible, i.e. to find a solution that "...is more likely to produce a set of outcomes actually desired by the community" (Kaur 2007: 1), but also because not involving the population into the planning process can have negative consequences for acceptance and, ultimately, the success of any (urban) development project. This is because, if "the community has no role to play [...]" in the decision-making process, it "[...] encourages dissatisfaction amongst the people" and "creates [...] mistrust for the government", as the population "lack a feeling of [...] ownership of the plan" (Kaur 2007: 2)

Thus, this piece offers a first glimpse on residents' ecological awareness levels, perceptions and ideas regarding Lake Sukhatal and should help to foster public debate and help policy makers. It is based on a survey that was carried out between August 4<sup>th</sup> and 18<sup>th</sup> – the specific methodology and objectives of this piece of research are laid out in the next section.

## 2. OBJECTIVES AND METHODOLOGY

The theoretical approach I follow rests mostly on assumptions of urban planning theory that public participation in framing, developing and monitoring of urban development projects can not only help to create better outcomes but also increase acceptability and ownership and therefore increase the overall success of a project. While there has been significant debate about how to achieve this best, there is consensus that project planning should involve those that are affected by them and take their perspectives into account (compare: Lane 2005, Hensold et al. 2012, Kaur 2007, Center for International Forestry Research 2007, Ford 2013 and others).

Thus, methodologically, the question about Lake Sukhatal can be split into two. First, how should the lake be used in an ecologically sustainable fashion and second, what would the process to establish such a result look like and / or who should make that decision? Any development will have to take into account both. This study aims to give a first indication of a sample of the population's opinions on both of these issues.

The aims of this piece will be to

1. Establish and quantify residents' levels of ecological awareness about Lake Sukhatal
2. Establish and quantify residents' perceptions about the ruling by the High court
3. Establish and quantify residents' suggestions and preferences for using Lake Sukhatal in future
4. Establish and quantify residents' preferences about who should decide how to use the lake and by whom the lake should be managed.
5. Understand how demographic factors shape and influence the answers given above.

To answer these questions, I found it beneficial to combine quantitative and qualitative data. Hence, I decided to complement secondary data from publicly available sources and the materials available at CEDAR, with primary research, using a survey with mostly qualitative questions that could be aggregated and analysed quantitatively later.

When designing the survey / interview script, I followed the five stage model suggested by Blair, Czaja and Blair (2013). During the first stage, survey design and preliminary planning, I focused on finding a balance between closed and open-ended questions. Open-ended questions have two major advantages over closed questions. Firstly, they uncover the responses individuals give spontaneously. Secondly, they avoid potential biases from suggesting answers (Reja et al. 2003). Thus, they seemed particularly well suited to gather the qualitative data I was particularly interested in. However, open-ended questions are more difficult to analyse quantitatively and yield higher non-response rates (Lozar Manfreda and Vehovar, 2000). Therefore, I decided to use open-ended questions only in cases in which it was necessary to obtain qualitative data and created closed questions for other questions wherever possible.

Blair et al. (2013) suggest that questionnaires be pretested by interviewing people to ensure questions are clear. Given the project's time constraint, I informally interviewed few friends and discussed the questionnaire with colleagues and supervisors at the office as well as asking research staff at Kumaon University for their input. With their feedback, I amended the ambiguities revealed.

60 people (n=60) gave valid responses (see Appendix X) and were interviewed in person. While I was not informed about the dropout-rate, given that individuals were interviewed in person, it can be assumed that it was significantly lower than the average rate of 30% (Galesic 2006). Finally, I analysed the collected data using Excel tools and calculating 95% confidence intervals for percentage values [p] from a sample with the size [s] using the formula:

$$[p] \pm 1.98 * (\text{SQRT}(p * (1-p) / s))$$

The survey allowed me to complement my understanding acquired from looking on secondary research and provided valuable qualitative and quantitative insights into residents' actual ideas and perceptions. Moreover, it helped me to clarify and test some of the expectations and predictions I had formed from looking at secondary sources and the other primary data available. Limitations are set out in a separate section.

### 3. ANALYSIS

#### 3.1 OVERALL ANALYSIS

Altogether 60 (n=60) people were surveyed. 10%<sup>1</sup> of respondents had lived in Nainital for 1-5 years, 25%<sup>2</sup> for 5-15 years and 39 (65%<sup>3</sup>) for more than 15 years. 8.3%<sup>4</sup> of respondents were up to 20 years old, 45%<sup>5</sup> of respondents were 20-39 years old, 31.7%<sup>6</sup> respondents were 40-59 years old and 15%<sup>7</sup> of respondents were above 60 years old. The female-male ratio was 65:35 (M/F). 10%<sup>8</sup> of

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<sup>1</sup>2.3%-17.7% at 95% confidence

<sup>2</sup>13.9%-36.1% at 95% confidence

<sup>3</sup>52.8%-77.2% at 95% confidence

<sup>4</sup> 1.3%-15.4% at 95% confidence

<sup>5</sup> 32.3%-57.7% at 95% confidence

<sup>6</sup>19.8%-43.6% at 95% confidence

<sup>7</sup>5.9%-24.1% at 95% confidence

<sup>8</sup>2.3%-17.7% at 95% confidence

respondents live in a single household, 28.3%<sup>9</sup> live with one other person and a majority of 58.3%<sup>10</sup> live in a household of 3 or more people.

Thus, the sample taken is composed mostly of long-term residents. This is also reflected in the average age slightly above that of the overall population. Given this, it is perhaps surprising to find over a third of the respondents to live alone or with only one other person.

The most common profession in the sample taken were government employees (25%), followed by researchers, students and teachers (each accounting for 13.3%) The other professions found in the sample are lawyers, shopkeepers, hoteliers, bank employees, housewives and one person working in an NGO. Only one of the respondents was no white collar worker, working as a boatman. The sample does not contain any horsemen, auto drivers, unemployed or low level-employees.

This suggests that the sample taken is heavily biased towards the middle and upper classes of Nainital. Socioeconomically less well-off residents are not at all represented in this survey.

Perhaps correspondingly, environmental awareness is high in the sample taken. 88.5% of respondents named “Recharge zone” as one of the three most important functions of Lake Sukhatal, and 65.6%<sup>11</sup> named it the most important one. The second most important category was “natural beauty”, named by 98.2% of respondents, although only 11.5%<sup>12</sup> saw it as the most important.

The two other categories that people deemed Lake Sukhatal most important for were “space for residency” (although some qualified their answer with “not in the lakebed” or similar remarks), which 44.4% of respondents mentioned. The fourth most selected answer was playground for children, which 48.4% mentioned, although 37.5% of respondents only as the third-most important function.

This is surprising as environmental awareness was deemed low by all other measures. This, again, might be attributed to the socioeconomic composition of the sample more than a sudden change in overall awareness levels.

Perception of the HC ruling was slightly positive. 57.6% of people either agreed or tended to agree (while 35.6%<sup>13</sup> of respondents “agreed”) with the decision, 27.1% of people were negative (tend to disagree, or disagree). 15.3%<sup>14</sup> of respondents were “neutral”. This seems to be in line with what was to be expected.

Asked what which options they like best for the future use of Lake Sukhatal, the two most popular options were a “boating area” mentioned by 69.5% of respondents (31.7%<sup>15</sup> as first choice), and to “leave it to itself (76.5%), with 36.7%<sup>16</sup> mentioning it as first choice. The third most popular answer was to turn Lake Sukhatal into a “seasonal park” (57.6%), although 31.5% mentioned it only as their 3<sup>rd</sup> choice. Another popular response was to turn Lake Sukhatal into a “playground for children”, mentioned by 43.7% of respondents, although by 27.8% as only their 3<sup>rd</sup> choice.

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<sup>9</sup>16.8%-39.9% at 95% confidence

<sup>10</sup>45.7%-70.9% at 95% confidence

<sup>11</sup>53.4%-77.7% at 95% confidence level

<sup>12</sup>3.3%-19.6% at 95% confidence level

<sup>13</sup>23.4%-47.8% at 95% confidence level

<sup>14</sup>6.1%-24.4% at 95% confidence level

<sup>15</sup>19.8%-43.6% at 95% confidence level

<sup>16</sup>24.3%-49% at 95% confidence level

These answers also reflect the high levels of environmental awareness we had found above. All popular options are environmentally sustainable, while those options that were not (space for residency, space for cars, space for hotels etc). What should be noted, again, is the socioeconomic composition of the sample: given this, very few, if any, respondents depend on a (economic) use of the lake for their livelihoods. The few people who did want to use it economically for parking cars or hotels were all working in hotel business.

The question who should ultimately decide how Lake Sukhatal should be used is answered ambiguously by the sample and there is no consensus, although some options are viewed more favourable than others. 43.3%<sup>17</sup> of respondents stated the government should decide, whereas 35.8% stated the decision should be with the residents of Nainital. Only 3 respondents (4.5%) thought the decision should be with the residents around Sukhatal only, while 9%<sup>18</sup> would favour an NGO to make this decision.

There is more consensus about who should implement a decision taken and be in charge of maintaining the lake. A large majority of over 70% (70.3%<sup>19</sup>) stated it should be the government, 10.9%<sup>20</sup> think it should be an NGO and only 9.4%<sup>21</sup> think it should be the residents of Nainital. Few respondents suggested an expert committee consisting of environmentalists, government and residents.

This data suggests that there is an interest to be involved in decision-making regarding Lake Sukhatal but not so much in the day-to-day administration of the lake.

Also, the data suggests that Lake Sukhatal is considered an “Nainital”-wide issue that is not to be decided by the Sukhatal residents alone. Perhaps this is due to the high awareness levels about its recharge function discovered in the previous questions. Thus, this attitude might only hold for the sample and might not apply to one in which environmental awareness is less developed.

Finally, when asked how much individuals were willing to contribute annually, if the lake was used in the way the suggested, 32.2%<sup>22</sup> were not willing to contribute anything, while 44.1%<sup>23</sup> were willing to contribute up to Rs. 500 a year. 10.2% were willing to contribute more than 500 Rupees a year, whereas 13.6%<sup>24</sup> said that this was “not applicable” to their preferred option (such as leaving the lake to itself).

This suggests that while environmental awareness is quite developed, there is less willingness towards paying and maintaining such an environment. Some respondents also showed a naïve understanding of the working of nature, asking to “leave it to itself” and “nature knows best how to use a water reservoir”. While this might be true in isolation, it might not hold for a lake that is surrounded by and influence by human beings.

### 3.2 ANALYSIS BY DEMOGRAPHIC FACTORS

Moving towards cross-sectional analysis provides some additional nuances to the results provided above and generates some interesting insights into which demographic factors drive and influence

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<sup>17</sup>30.6%-55.9% at 95% confidence level

<sup>18</sup>3%-18.9% at 95% confidence level

<sup>19</sup>58.6%-82% at 95% confidence level

<sup>20</sup>3%-18.9% at 95% confidence level

<sup>21</sup>1.9%-16.8% at 95% confidence level

<sup>22</sup>20.3%-44.1% at 95% confidence level

<sup>23</sup>31.4%-56.8% at 95% confidence level

<sup>24</sup>4.8%-22.3% at 95% confidence level

answers and attitudes. Caution should be used when interpreting those findings though, as the confidence intervals rise drastically when segmenting the sample and the sample size falls accordingly. Thus, most of the results presented here would not hold against rigorous statistical testing and are not statistically significant, unless stated otherwise. Still, they are included here as indicators that might be useful to pursue in future research, once a better data basis is available.

### **3.2.1 TIME OF RESIDENCY**

Segmenting the data according to the length of residency in Nainital, several points seem interesting. First, how long respondents have lived in Nainital does not make a difference for their opinion about what Lake Sukhatal is most important for. This said, those who have lived in Nainital for longer than 15 years name natural beauty more often than other groups. Similarly, none of those who have lived in Nainital for 1-5 years did disagree or tend to disagree with the court ruling, whereas of the residents who had lived there for more than 5 years or 15 years or longer it was 26.7% and 30.7% respectively (either “Tend to disagree” or “Disagree”). Also, only 46.7% (5-15 years in Nainital) and 43.6% (15+ years in Nainital) think the government should participate in the decision-making about Lake Sukhatal’s future use, whereas it is 83.3% of those who moved there 1-5 years ago.

These data points suggest that those having lived in Nainital for less long make fewer claims to participation and are less likely to experience or voice disagreement with (local) court decisions. Why more long-term residents should care more about natural beauty is unclear; one possible interpretation would be that they have more time or fewer other things to care about, such as employment or an active family life.

### **3.2.2 AGE**

Segmenting the sample by age groups, it is surprising to find that the group of people 60+ rates the recharge function of Lake Sukhatal as particularly important: 88.9% think it is Lake Sukhatal’s most important function, whereas only 63.2% (40-59 years) and 59.3% (20-39 years) of the middle age groups hold that opinion. Young people (0-20 years) on the other hand, mention the recharge zone function to 80%.

In the sample, the relationship between age and ecological awareness seems to be U-shaped then. This can perhaps be explained by suggesting that old people and students (who form all of our young population sample) follow the (Traditional) media more and are therefore more likely to have learned about the ecological importance as it was featured in the (local) news very prominently in the year before.

In contrast to the data above, the 60+ years age group have the lowest rate of agreeing with the HC decision (only 22.2%) and they form the only group in which the sum of “Tend to agree” or “agree” is less than 50%. This is surprising as they are, as established above, the group with the highest ecological awareness but this awareness does not seem to translate into support for the HC decision. This suggests that either their evaluation of the HC decision was based on different considerations than ecology (justice, compensation etc) or that their (abstract) knowledge about ecological functions does not translate into ecologically-friendly attitudes or behaviours.

The former is perhaps more plausible than the latter, if one considers that it is the youngest and the oldest age groups that are most willing to contribute up to 500 rupees p.a. (0-20 years: 80%; 60+ years: 66.7%), while for all other groups this figure is below 50%.

### **3.2.3 GENDER**

Segmenting the sample by gender, suggests that women are slightly more likely to either answer “disagree” or “tend to disagree” regarding their support of the HC court ruling – while men are 23.1% likely to disagree, women chose these answers to 33.3%. Also, men in the sample were more likely to have suggestions on how to use Lake Sukhatal: 43.6% of men said that they had suggestions on how to use it in the future, whereas only 19.0% of women did.

However, there were no significant differences in who should make the ultimate decision about Lake Sukhatal’s future use between men and women. Women found the idea of an NGO as being in charge or administrating the lake more appealing than men did (19% of women chose this as their preferred option but only 7.7% of men). For all other questions, there were no significant gender differences in the answers provided.

### **3.2.4 HOUSEHOLD SIZE**

Another interesting segmentation is by household size. Only people living in households of 3 or more people found that Lake Sukhatal was important for residency space (28.6%), while none of the other groups did. This difference also showed in reply to the question of what the Lake Sukhatal should be used for: while 14.3% of those living in households of three or more people believed that it should be used for residency, only 5.9% of those living in households of two and no one living by themselves gave this answer as their first choice.

This might suggest that those sharing a household with more people are more sensitive about crowding and living space issues, whereas those sharing accommodation with fewer people do not see the housing situation as pressing. Perhaps this is also why the approval of the HC decision to clear all illegal constructions fell consistently with increasing household size. While those living in households of one agreed to 83% with HC ruling, those living in households of two agreed to only 47.1%, and of those living in households consisting of three or more people, only 22.9% agreed with the HC decision.

Similarly, those living alone were most supportive of the government making the decision about Lake Sukhatal, giving this answer 83.3% of the time, while only 41.2% of those living in two person households, and 45.7% of those living in households of three or more gave the same answer.

One potential answer to this question is that individuals living by themselves depend more on the state and therefore trust it more and / or see it as more competent than those whose primary reference and support group is the family they live with.

### **3.3 LIMITATIONS**

First of all, a note of caution. While part of the original intention with this data was to capture the perceptions of the residents of Nainital with this survey, this objective has been missed, given the socio-economic composition of the sample and its overall size. As only 60 people were interviewed (due to rain, unfavourable conditions and the overall time constraint of this project) and all but one respondents had either administrative or other middle / upper class professions, this sample is not representative of the population and inferences made here cannot or only with great caution be used to make statements about the population at large.

Thus, this survey is perhaps better understood and interpreted as a first glance into ecological awareness and perceptions of the middle class population, rather than a representative account of the population more widely. One of the reasons why this is so important is that very few of the individuals surveyed depend directly on (Economic use of) the lake or tourism for their

livelihood. Given that their personal income is not at stake, it is perhaps easier for them to care about environmental degradation.

Moreover, even for the more limited subset of the middle class population, the overall size of the sample (n=60) leads to very wide confidence intervals, when calculated both at 95% and 99% confidence levels. Thus, any point-estimates given in the text should be treated with caution and always cross-checked with the confidence intervals calculated in footnotes or the appendix.

Finally, another limitation of this study is its scope. Questions asked were by nature broad, as no special expertise and engagement of residents could be assumed or expected. Thus, for more detailed accounts of residents' thoughts, it would be important to follow up with focus groups that do not only ask for opinions but also seek to educate residents about what is possible, in which time frame and at what cost. All this information, that is surely likely to influence opinions and preferences have, *nolens, volens* been ignored in this study.

#### 4. CONCLUSION

The results of the research can be summarised as follows. As the survey indicates, there is significant interest of the residents sampled to participate in decision-making about the future use of Lake Sukhatal. This confirms the theoretical assumptions of urban planning theory introduced in the beginning.

The most popular choices for a future use of Lake Sukhatal were to "leave it by itself" and to turn it into a "boating area". The two next-most popular options were a "playground for children" and a "seasonal park". Residents also think of Lake Sukhatal as an issue that affects and should therefore be decided by the whole town, not only the population surrounding Lake Sukhatal directly. This is perhaps best understood in conjunction with the high levels of ecological awareness and the ensuing understanding of the import of Lake Sukhatal as a recharge zone.

This high ecological awareness found in the sample deserves some special attention, as it is surprising to find such high knowledge, understanding and appreciation of Lake Sukhatal and its ecological function. This could be potentially attributed to three factors: either, the biased nature of the sample taken, or a (successful) information campaign from the media, as this subject received a lot of coverage particularly over the last year. However, a third explanation seems also plausible: that the educated classes are well aware of the ecological situation and its implications but that this knowledge does (still) not translate in corresponding behaviour. In this scenario, while they would have known, they would not care enough to get involved themselves or to exert pressure on government and administration to take action.

This possible interpretation is supported by the gap between the willingness to participate in decision-making and administration: while there is consensus in the sample that citizens should participate in decision-making, there was also a (negative) consensus, that it should not be the population who should actually participate in maintaining the lake. This suggests that environmentally conservative behaviour is (still) seen to be mainly as a state task, and nothing any actual citizens would have to concern themselves with. Encouragingly though, a majority of the

respondents from the sample would be willing to contribute 500 Rs. or more a year to their chosen development.

Thus, by offering a first glance onto the perspectives and thoughts of a sample of the citizenry of Nainital, this piece offers two key messages to the public, stakeholders and government:

The first is to allow the citizens to participate in and contribute to any planning that might happen regarding Lake Sukhatal. The second is to look into the causes for the gap between environmental awareness and citizenship action and see how environmental awareness can be raised further and spread more throughout society, and how citizens' environmental awareness can be channelled into action. Finally, given all the limitations of the data and ensuing uncertainties in their interpretation, a more comprehensive study should be undertaken to complement and verify this research.

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