

**Analyzing the Case Study of Black-Necked Cranes in**  
**Achieving the Four Pillars of GNH (Gross National**  
**Happiness)**

*A comprehensive report based on the perception of the communities of  
Gangtey and Phobji*



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## **Abstract**

Gross National Happiness, commonly known as GNH is a concept that is deeply rooted amongst the lives of most of the Bhutanese people. Its division into four pillars make it more diverse and relatable to the lives of the Bhutanese people. This relatable aspect of GNH is similar to the influence that the black-necked cranes, locally known as thrung thrung karmo, have on the lives of the Gangtey and Phobji community. Thus, the objective of this research project was to link the four pillars of GNH with black-necked cranes through the perception of the people in Gangtey and Phobji. For this, participants were asked for their perception on questions inhering aspects of black-necked crane and GNH. For simplicity, the concept of GNH was categorized into four respective pillars and people were asked questions from those sets. This report, therefore, is a compilation of people's perspective on the relation between GNH and the black-necked cranes. A series of methodology such as focus group discussions and one on one interviews were used

## **Acronyms and Word Meaning**

BNC: Black-necked crane

GNH: Gross National Happiness

RSPN: Royal Society for Protection of Nature

Gewog: block

RAMSAR: Convention on wetlands

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## **1. Literature Review**

### **i. The Concept of GNH**

GNH as defined by Ura et al (2012) is a measure of “beneficial development of human society” when both spiritual and material development is achieved. It was first introduced by the fourth king of Bhutan, Jigme Singye Wangchuck. The concept can be further divided into four pillars which are good governance, sustainable socio economic development, environment conservation and preservation and promotion of culture. These pillars can further be divided into nine main domains which are Living standards, Education, Health, Environment, Community vitality, Time-use, Psychological well-being, Good Governance, Cultural resilience and promotion ( Schuelka, et al, 2016). Literature also cites that the true essence of the concept is highlighted by the priority given to people’s happiness and wellbeing in a sustainable way (Ura et al, 2012).

### **ii. Semi-Structured Interviews**

Clifford et al (2016) writes that semi-structured interviews are verbal exchanges of questions and answers which happens in a conversational style. The interviewer often has a predetermined set of questions but in some cases, the questions do not follow a certain order and follows the direction of responses given by the participants (2016).

### **iii. Focus Group Discussion**

Focus group discussion, according to Krueger et al (2000), is a special group where people share their views and ideas about a common topic. The discussion proceeds with group interactions through which the researcher is able to obtain the perception of the participants about the common topic. The group comprises of a moderator who facilitates the discussion in such a way that the participants are able to share their opinions at ease and in an interactive manner. The group often ranges from five to a dozen of participants so that all the participants are able to share their ideas and thoughts. This type of research methodology usually consists of initiating a discussion on a topic which is understood by the participants. The participants are asked questions and in some cases are engaged in activities such as brainstorming, planning, therapeutic, advisory, etc. Litosseliti (2003) says that focus group discussions have an advantage over other conventional interviews as the participants are presented with a natural environment

where they will be able to participate in the discussion just like an everyday talk. The discussion also gives an opportunity for the researcher to get different views and opinions in a single discussion. The researcher is also able to obtain in-depth analysis and views of a certain topic with more emphasis on it.

## **2. Introduction**

Asian countries such as China, India, Nepal, Bhutan and Vietnam are well known for hosting Black-Necked Crane (Namgay, 2016). Black-Necked Crane (*Grus nigricollis*), the last crane discovered out of the fifteen different types, is classified as threatened under IUCN Red List (International Union for Conservation of Nature). In Bhutan, these migratory birds fly from the Tibetan plateau during winter (“Black-necked crane”). Black-Necked Crane has a very special and valuable place in the heart of Bhutanese specifically among the people of Gangtey and Phobji because of their role in the daily lives of these people. These roles can be seen in the form of conservation efforts, religious aspects and growing tourism industries among many others which complement the pillars of GNH. Considering Bhutan is well known to the world for GNH (Gross National Happiness), and taking into account the effect of the black-Necked Crane on people, there seems to be a positive correlation between the two. Black-Necked Crane also seem to have an influence in elevating the overall well-being of the people of Gangtey and Phobji gewog. This paper aims to analyze the relation between the principles of GNH and the black-necked crane.

The project was carried out in one of the popular tourist destinations, a rural area known as ‘Phobjikha’ which is 2900 meters above the sea level (“Black-necked crane”). It is also the largest wetland in the country and has conserved area under protection for the cranes (Guest, 2013). Given this fact, the people of Gangtey and Phobji have been actively participating in conservation efforts of the wetlands. Thus, to get an insight about such conservation efforts, people’s perception about black-necked cranes and its other aspects formed the core part of this project. These responses were then analyzed in terms of GNH’s principles.

### 3. Methodology:

#### i. Secondary Research

Prior to the project, a brief secondary research was done by reading scholarly articles and books about black-necked cranes and Gross National Happiness (GNH). Based on the findings, our research was first divided into two headings: Black-Necked Cranes and Gross National Happiness. Gross National Happiness was further divided into four sub-groups: Good Governance, Sustainable Socio-economic Development, Preservation and Promotion of Culture and Environmental Conservation according to the four pillars of GNH.

#### ii. Study Area



*Figure 1. Map of Bhutan showing project site (Map source: Google Maps, 2018)*

### iii. Participant Selection and Sample Size

Random sampling was exercised in order to avoid biases and to include a diverse group of people. A total of 147 participants took part in the study which includes a control group of 55 students. Number of participants differed in each phase of the study which will be discussed in the respective sections. Out of the total participants, 74 represented Gangtey gewog, 71 represented Phobji gewog and 2 were officials residing in Thimphu.

### iv. Data Collection and Analysis Method

Our research collected data through the use of two methods, conducting one-on-one interviews and focus group discussions. Using these methods, we categorized our research as Phase I, II and III. Face-to-face interview was done with note-taking, voice recordings in cell phones, pictures and videos were recorded on camera, all with prior consent from the participants. The analysis of the collected data was done using Microsoft excel.

#### iv. a) Phase I (One-on-one interviews with participants of Phobji and Gangtey)

Sample size: 76 participants and a control group of 55 students.



*Figure 2. One on One interviews*



Table 1 showing age group of 76 participants

Age	Count of Age
10-21 years	2
21-35 years	13
35-50 years	31
50 and above	30

Under this phase, one-on-one interviews was done with the people from all five villages of the two gewogs (Phobji and Gangtey) along with a control group. As a control group, 55 middle school students were selected. We tested their understanding on GNH. .

b) Phase II (Focus group discussion in Phobji and Gangtey)

Sample Size: 13

This phase included FGDs which was conducted in each gewog with the gewog officials, the gup who is the village head, and representatives.

*Table 2. Age range of 13 participants*

Age	Count of Age
10-21 years	1
21-35 years	2
35-50 years	9
50 and above	1



*Figure 3 (a) Focus group discussion in Gangtey Gewog*



*Figure 3 (b) Focus group discussion in Phobji Gewog*

iv. c) Phase III (One-on-one interview with environmental officials in Thimphu and Phobjikha)

The environmental officials of RSPN and the Watershed Management Division were asked a set of questions. One set of questions was also designed for an officer under the Department of Forest and Park Services in Gangtey Gewog.

## **V. Questionnaire**

Accordingly, a set of questionnaire was developed for phases I and II which mainly inquired about the people's perception, understanding and the effects of black-necked cranes on their lives. The semi-structured interview questions were under the sub-headings: *Human Population dynamics, Chronological account of major turning points, People's association with Black-necked Cranes and Crane conservation.*

Human Population dynamics inquired about the trend in population change and the reason behind it. Chronological account of major turning points was about key historical events and major establishments of infrastructure and other institutions. People's association with Black-necked cranes include their memories associated with the cranes, impacts on their lives due to the cranes and cranes conservation activities and cultural/religious role of black-necked cranes in their lives. Crane conservation included questions about their understanding of the issues related to black-necked crane vulnerability and conservation, their involvement and knowledge about crane conservation activities and then their attitude and expectations towards the crane conservation. Group work/Activity was to list things that needed to be done for the benefit of the cranes, individuals and the village as a whole.

For Phase I, a different set of questions which centered on the principles of GNH was included and the participants were also asked to draw a link between the black-necked crane and GNH. A discussion with students of grade six and grade ten of two different schools was initiated which served the purpose of control in the research. The control was selected based on prior knowledge about the inclusion of principles of GNH in school curriculum. A hypothesis that, roughly 98% of the students would know about the concept of GNH was considered. The responses about GNH given by the control group was later compared with the responses of the other 76

participants on the basis of their knowledge about GNH and how well they were able to link the principles of GNH with black-necked crane. On the other hand, phase II did not have separate questions about GNH as it was a group based discussion.

The questionnaire for Phase III focused mainly on the linkage between the black-necked crane and its environmental importance and effects.

#### **4. Results and Discussions**

##### 4.1 Phase I: One-on-one Interview

*Human Population dynamics, Chronological account of major turning points, People's association with Black-necked Cranes, Crane conservation, perspective on GNH, control group: student discussion.*

##### Human population dynamics

In general, majority of the people said that there has been an increase in the population trend over the years. This was attributed to better medical health facilities which in turn helped in decreasing the mortality rate. However, 18% of 76 respondents also said that the increase in population in the area was due to availability of better job opportunities which led to migration and permanent settlement in the valley.

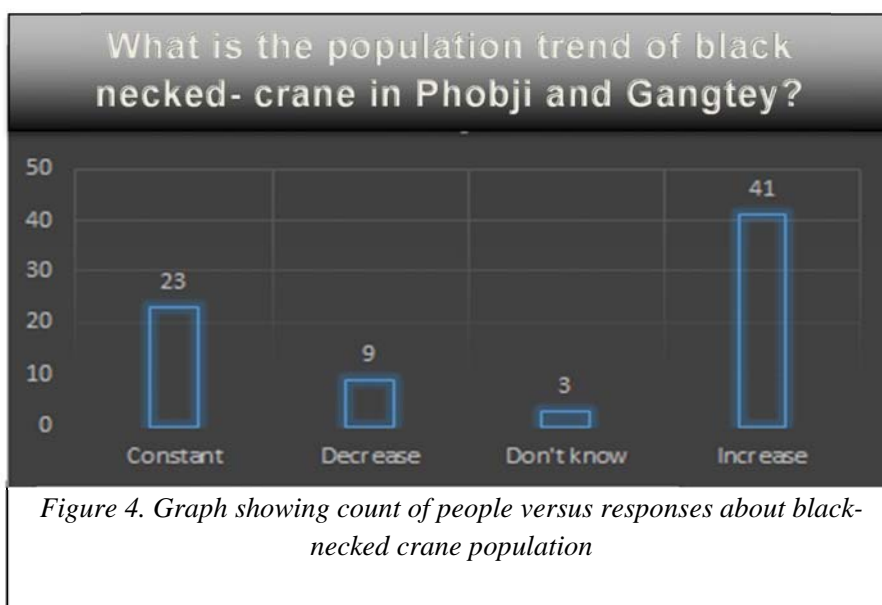
##### Major historical events

The most common developmental activities pointed out by the participants were expansion of the school to higher secondary level, establishment of Basic Health Unit (BHU) and construction of road. This was followed by the establishment of the first ever RSPN crane information center. Eventually, the number of infrastructures, buildings and commodities like hotels and homestays also increased, as reported by the participants.

### People's association with black-necked crane

Sixty eight out of the total respondents were aware of the presence of black-necked crane as early as at the age of 12 which shows the early association of people with the black-necked cranes.

### Crane conservation



Black-necked crane, because of its special affiliation to spiritual omen, is highly embedded in the life of the people of Phobjikha. Thus, from a young age, the people are well aware of its existence and significance. Of the 76 respondents, more than 30 of them were well aware of the BNCs impact on their area, while less than 5 of them, came to know of it at a later stage.

As illustrated in figure 4, while, minority of them suggested that BNCs population were decreasing with time, 41 of the participants said that it has increased. 23 of the respondents took on a neutral stand, suggesting that it has remained somewhat constant.

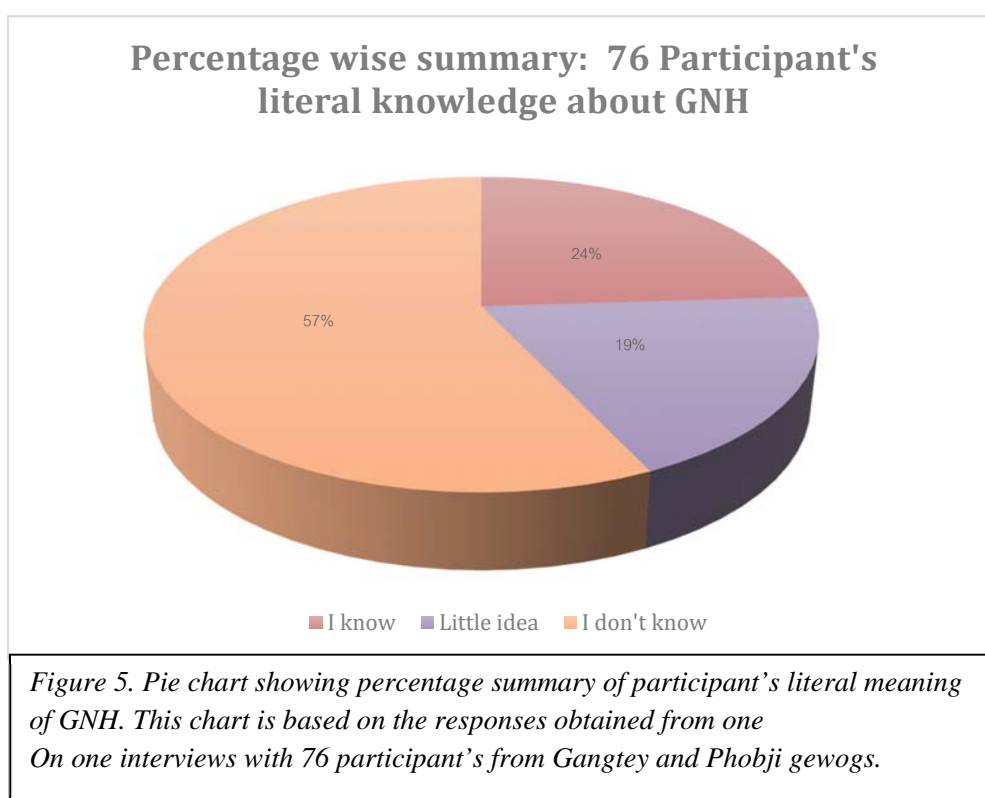
The participants were asked about the benefits of conserving land (for BNC) on three levels; community, family and government level.

- Community level: more than half of the respondents showed positive reaction. Only one took on a neutral stands, while 10 of them saw no benefit in it.

- Government level: Similar responses was recorded. More than half of the participants were content and said that it was beneficial for the government, while very few didn't agree.
- Family level: Less than 25 participants said that there were benefits, while maximum number of participants saw no benefit to their family.

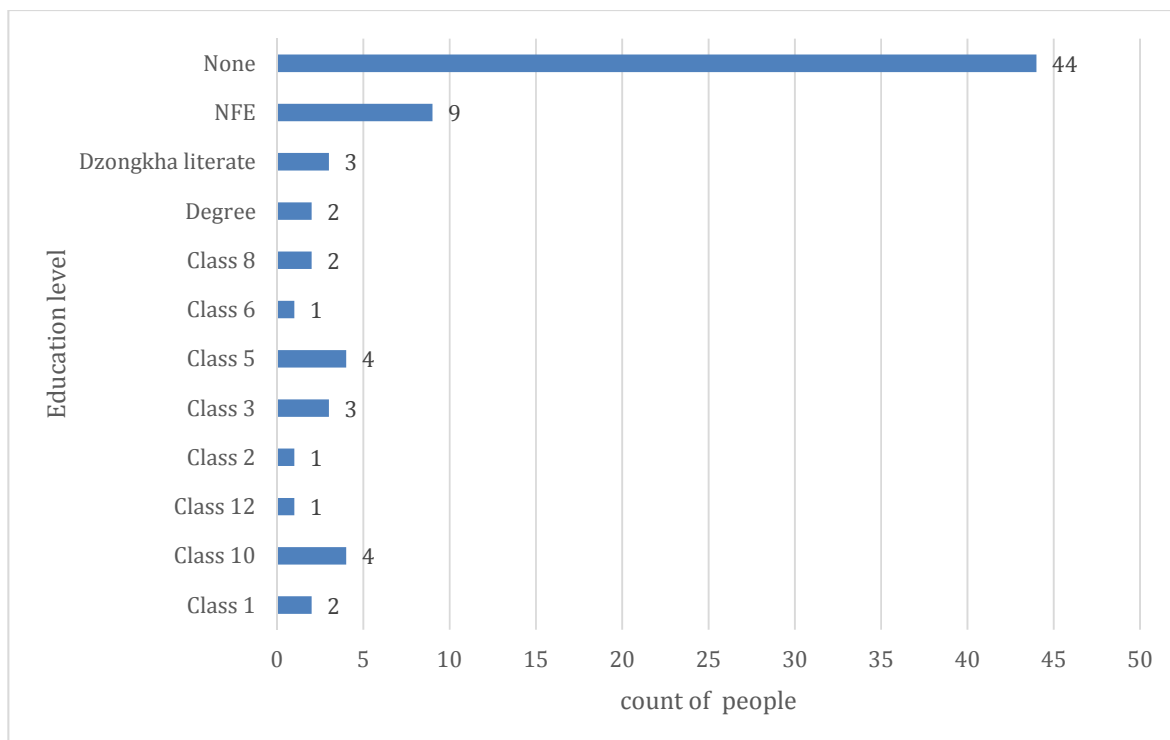
For the above data, very small number of the respondents took neutral stands.

Perspectives on GNH through One on One interviews:



- On average, roughly 24% of the 76 respondents were confident about the literal meaning and concept of GNH. 19% had little idea about the concept and the rest 57% of the respondents had no idea about the literal meaning of GNH. This could be

attributed to the educational background of the participants. Most of them had no educational background as illustrated in figure7



*Figure 6. Chart showing 76 participant's education level*

- Environmental conservation: All 76 respondents had an idea about climate change and its growing impact on crop production. One fourth of the participants also felt that crane conservation programs like cleaning campaigns in their area were indirectly helping in conservation of the environment.
- Preservation of culture and tradition: Four fifths of the 76 participants felt that the black-necked crane festival helps in promotion and preservation of culture and tradition. One out of the 76 participant also pointed out that the black-necked crane festival was becoming more of an entertainment than a festival. This was also pointed out as a demoralizing cultural factor rather than a promotional event.

- **Good Governance:** 54 of the 76 respondents chose RSPN as the main agent responsible for overlooking the conservation programs. This 54 participants also saw the RSPN in positive light, stating the agent as a very responsible body. This number indicates that almost 87% of the respondents were satisfied with the way RSPN governed. Here, 14 of the participants were less aware of the matter, and chose not to respond.
- **Sustainable Development:** Around 86% of the participants depend on agricultural produce for their livelihood. Tourism reliant source of income like farm house, home stay and lodge accounts to 5% of the respondents. Although it can be seen that most of the participant's livelihood activities centered on agriculture, 57% of them said that the presence of black-necked cranes in the valley brought in economic and structural development in the area.
- **Participant's view about the relation between GNH and black-necked crane:** While 95% of the 76 respondents were able to link black-necked crane with the overall happiness of the people, 4 % were able to relate the cranes with some aspects of the four pillars of GNH. Only a single respondent was able to precisely relate all the four pillars of GNH with the black-necked cranes.
- **In terms of the control group,** a 100% result was obtained as all of them were aware of the concept of GNH. Almost 70% were able to speculate a relation between GNH and black-necked cranes while the rest 30% saw no relation.

#### 4.2 Phase II: Focus group discussion (FGD)

*Human Population dynamics, Chronological account of major turning points, People's association with Black-necked Cranes, Crane conservation*

##### Human Population dynamics

The gewog heads gave the headcounts of their respective gewogs as following:

- I. Population count in Gangtey gewog: 2251 of which female accounts to an estimate of 55% and male accounts to 45%of the total population.



II. Population in Phobji Gewog: 4420 people of which female accounts to an estimate of 60% and male accounts to 40% population.

Out of the 13 participants, 12 feels that there is an increase in the overall population whereas 1 participant feels that there is a decrease in the overall population. The reason for an increase in the population in the area are attributed to factors like better medical facilities, low birth mortality rate and moving out of houses to start their own family. It was also noted that the number of households in the area doubled in just 20 years. This can also be related to the increase in developmental activities like building of houses, roads, BHUs and other commodities which might have improved the lives of the people living in the community. However, one participant who felt that there is a decrease in the overall population, reasoned his opinion saying that there is a decrease in the number of people in each household. This variation in the response regarding human population shows that people have different ways of looking at various parameters which fulfills our objective of conducting a diverse research.

#### Chronological account of historical events

As far as the participants remembered, over the years in Gangtey gewog, some notable changes that occurred were commercialization of potato farming which started around thirty years ago, expansion of schools to a higher level, construction of Basic Health Units (BHUs) and expansion of roads and living infrastructures. Building of RSPN crane information center was also agreed to be one



*Figure 7. RSPN crane information center in Gangtey gewog*

notable change in the community. In terms of Phobji gewog, one event includes a major flooding which seemed to have damaged most of the potato fields. Other changes were noted to be similar

to Gangtey gewog. These changes implies that the people witnessed a gradual developmental change in the area and some of those changes could be attributed to the black-necked cranes which brought many visitors.

#### People's association with Black-necked Cranes

Five out of six participants from Gangtey gewog seem to have an association with the cranes as early as at the age of four. In addition to this, three out of the seven participants representing Phobji geowg were aware of the black-necked cranes at an early age. The other five from both Phobji and Ganngtey geowg later came from different parts the country and thus saw them when they first arrived in the area. Nevertheless, the love and appreciation for the cranes was expressed by all the participants in the discussion. Most of them assumes that the cranes feed upon the small grasses and insects from the roosting area and sometimes, even from the farms of the community. It was agreed upon by all of the participants that the cranes seem to come from Tibet and go back to Tibet as well. It was further noted that most participants found the black-necked cranes beneficial in aspects like income due to tourism industry. However, some participants also felt that they were not able to avail electric fencing services due to the harm it might impose to the black-necked cranes upon landing or departure. They also felt that with increase in number of tourists who often come to see the cranes, there is an increase in issues like waste management and expansion in infrastructures. Regardless of these points raised, most of the participants agreed that the presence of black-necked cranes in the valley is an important asset for families, the community and the government at large. These observations imply that the people of Gangtey and Phobji live closely with black-necked cranes as they seem to know about their feeding and roosting habits. The observations also show that although people born and raised in Gangtey and Phobji have an early association with the black-necked cranes, the ones who settle later in the area also realizes the importance of the crane.

#### Crane conservation

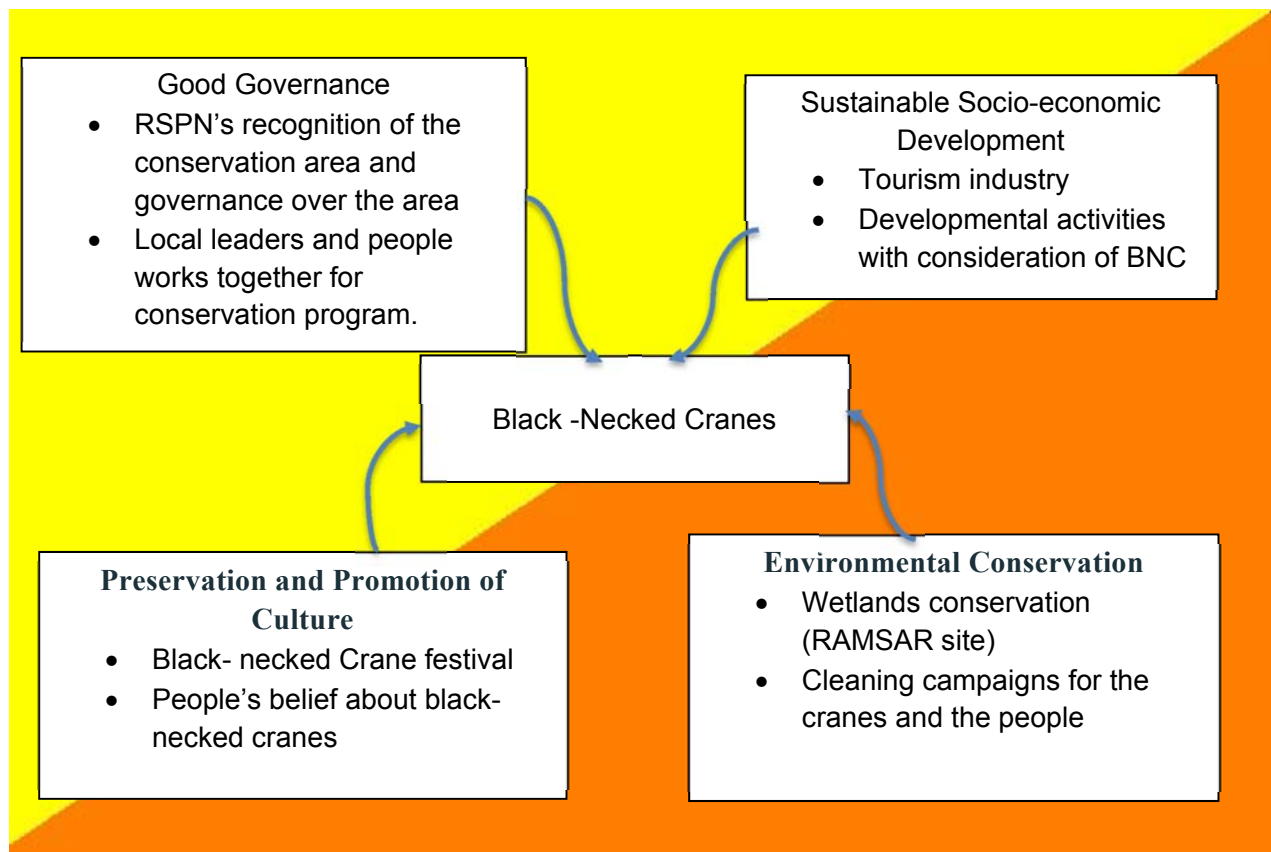
It was agreed upon by most of the participants that the conservation efforts like cleaning campaign was necessary for the cranes and for the community as a whole. The participants also felt the need to have proper waste management systems which was a major issue in the area. When asked about the willingness to participate in crane conservation programs, most

of them were willing to do so. In terms of current conservation efforts, most of the participants felt that these were assets to their families, communities and the country. These responses show that there are issues which need to community participation as it will not only benefit the black-necked cranes but also the community.

#### **4.3 Phase III: One on One interview with Environmental officials in Gangtey and Thimphu:**

There seemed to be a strong link between the black-necked cranes and environmental conservation. Through the interviews with various environmental officials in both Thimphu and Gangtey, it was noted that wetlands formed the core part of the presence of black-necked cranes amongst other reasons. For this, their work towards conservation of the wetlands was considered a priority. The recognition and governance of conservation area by RSPN was a huge step forward in conservation of the cranes. This initiative was further strengthened when the wetlands were signed under the RAMSAR convention in 2012. It was also found that the Forest and RSPN officials along with the locals often went for patrolling at night and even placed tracking devices on the cranes. With this, their movements could be tracked and observed. When asked about any incidents of crane hunting by the people, they responded that there were none reported. These responses imply that the conservation program of black-necked crane helped in conservation of the wetlands which is a huge way of giving back to the nature. The initiatives also helped in involving the local people in the conservation program.

#### 4.4 Relation of GNH and BNCs; A framework



*Figure 8. A framework connecting black-necked crane and GNH*

From all the interviews and discussions, it was found that there is a strong correlation between black-necked cranes and GNH. The principles of GNH and the conservation activities for the black-necked cranes had connections in various aspects. With regards to the first pillar which is good governance, it was found that with the initiative of RSPN to recognize the communities of Gangtey and Phobji as a conservation site, the area was taken care by RSPN along with the involvement of people. Further, the crane conservation events are also assisted by the local heads which implies that there is involvement of government officials as well. The second pillar which is sustainable socio-economic development is depicted by the bloom in tourism industry due to the cranes and crane festival in the community. Primarily, the people in Phobji and Gangtey

communities were seen to be dependent on agriculture as their source of income. However, the presence of black-necked cranes seems to have brought along many visitors which gave opportunities for the people to sustain themselves economically. It was also observed that changes were made for a better lifestyle of the society and also for the visitors who most often came to watch the cranes. For example, construction of toilets and drinking water came gradually with developmental plans and these plans were accelerated by the bloom in tourism industry in the communities.



*Fig. 9 A local handicraft shop selling handmade black-necked crane souvenirs*

Subsequently, the third pillar of GNH which is preservation of culture and tradition, is reflected in the black-necked crane festival held annually on the 11th of November. The festival, along with a black-necked crane dance, also depicts other traditional mask dances which is a way of acknowledging and celebrating their culture. In addition to the festivals, people's beliefs and stories about black-necked cranes are said to be in their culture. For instance, the cranes, on their arrival in the valley circumambulate the Gangtey monastery three times. These stories are said to be passed down generation to generation in order to preserve the tradition. The cranes not only provides a platform for acknowledging the culture but also helps in keeping the tradition of the older generations intact which fulfills the core of the third pillar.

The last pillar of GNH which is environmental conservation is depicted by the priority given to wetland conservation, primarily for the cranes. 6% of the total land on earth is constituted by the wetlands which harbors a diverse group of species (Meng et al., 2016). Additionally, as part of the crane conservation program and for the well-being of the community, it was seen that people were involved in cleaning campaigns. The people also expressed that the cleaning campaigns were usually a gesture of welcoming the cranes in their locality. This shows that in the name of cranes, people were involved in reducing the problem of waste management issues. These crane

conservation efforts seen in Phobji Gangtey communities undeniably contribute towards environmental conservation.



*Figure 10. A view of Gangtey and Phobji wetlands*

All in all, with these analysis about people's perception, beliefs and actions taken for the black-necked cranes, it can be seen that there is a strong association between the pillars of GNH and black-necked Cranes. At first sight, it seems to be just a subtle hint but when analyzed comprehensively, a close relation can be seen which also fulfills the objective of the research.

### **5. Recommendations**

The following recommendations are based on the study findings:

A proper garbage disposal system needs to be introduced: both of the gewogs had only one pickup truck responsible for collecting waste. Due to this, the garbage was scattered and disposed improperly. This could potentially affect the overall well-being of the people.

An awareness program regarding waste management needs to be conducted as most of the people living in the village are old and had little to no educational background. The programs should also include the harmful effect of unhygienic environment on health.

A GNH workshop needs to be conducted. Our research has revealed that most of these people understood GNH in a very basic form. Almost no one had an idea about the pillars of GNH nor the domains. Thus, we recommend that a workshop on GNH be conducted. Also, students with

knowledge of GNH should be encouraged to share it with their parents and grandparents who spend most of their time in the field and does not have much information about Gross National Happiness.

## **6. Conclusion**

Known as the heavenly birds, the black-necked cranes are considered to be a special asset to the communities of Gangtey and Phobji. After doing field research and listening to the stories of many people closely, it was convincing that the cranes had a special presence despite the issues people were facing due to the conservation activities. The sole purpose of conducting this research was to relate the importance of BNC to the concept of Gross National Happiness in achieving the four major pillars. Majority of the respondents were aware of the presence of black-necked cranes and its implication since their childhood and have shared several fascinating stories. They talked about their first encounter with the cranes and how they felt seeing the cranes gathered by the meadows, in groups, performing dances fascinatingly similar to the Bhutanese people's gathering during festivals. Participants were asked about the concept of GNH and out of all respondents, more than half of them had little knowledge about the literal meaning of GNH. However, when the concept was broken down into the four pillars, they were able to link many aspects of the black-necked cranes to GNH. They talked about crane festivals, bloom in tourism industry due to black-necked cranes, cleaning campaigns and RSPN's initiative to recognize their community as a conservation site. Although not explicitly linked, these were constituents of GNH. It can thus be concluded that there is a strong correlation between GNH and the black-necked cranes.

## References

- “Black-necked Crane Conservation.” (n.d.). Retrieved from <http://www.rspnbhutan.org/black-necked-crane-conservation/>
- Boere, G. C., Galbraith, C. A., & Stroud, D. A. (2006). Waterbirds around the world. *The Stationery Office, Edinburgh, UK, 960.*
- Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2016). *Key methods in geography.* Sage.
- Guest. “Conserving black-necked cranes in Bhutan” *Ecology Webinar Series, May 2013*
- Krueger, R. A., & Casey, M. A. (2000). Focus groups: a practical guide for applied research.
- Litosseliti, L. (2003). *Using focus groups in research.* A&C Black.
- Meng, L., Roulet, N., Zhuang, Q., Christensen, T. R., & Frohling, S. (2016). Focus on the impact of climate change on wetland ecosystems and carbon dynamics. *Environmental Research Letters, 11(10), 100201.*
- “Gangtey Monastery, Wangdue Phodrang.” Maps. *Google Maps.* 2018. Retrieved from <https://www.google.com/maps/place/Gangtey+Monastery/@27.4843542,89.6937047,9.25z/data=!4m5!3m4!1s0x375f433e98bf44bd:0xcce8a1bf915774f3!8m2!3d27.4843542!4d90.1648612>
- Namgay, R., & Wangchuk, S. (2016). Habitat preferences and conservation threats to Black-necked Cranes wintering in Bhutan. *SpringerPlus, 5(1), 228.*
- Phuntsho, T & Tsheirng, J. (2014) “Black-necked Crane (*Grus nigricollis*) in Bhutan: Current population status and conservation initiatives” *RSPN*
- Schuelka, M. J., & Maxwell, T. T. (2016). Education in Bhutan: Introduction. In *Education in Bhutan* (pp. 1-15). Springer, Singapore.
- Thompson, D. B. A., & Underhill, L. G. (2006). Waterbirds around the world.
- Ura, K., Alkire, S., Zangmo, T., & Wangdi, K. (2012). *A Short Guide to Gross National Happiness Index, The Centre for Bhutan Studies.*