IZE Journal 49 (2013)

# Measuring Behavioural Change in Bangladesh

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**Abstract**

*Behavioural change via environmental education is a fundamental cornerstone of conservation (Jacobson and McDuff, 1998) as the majority of environmental threats are the result of human activities. Changes in human behaviour can be challenging to accurately capture and measure. Using a case study from Bangladesh, we share an example of one way that behavioural change (reduction in littering) was successfully measured as part of a larger hoolock gibbon focused conservation education program.*

## Introduction

Education plays an essential role in conservation projects by supplying individuals with the knowledge, skills, attitudes, and motivations necessary to take action towards protecting and preserving the natural environment (UNESCO, 1977). Species that are experiencing population decline are most often doing so because of human actions (Newhouse, 1990). Shifting human behaviours towards being more environmentally friendly is a major conservation education objective. Capturing and measuring behavioural change independently of highly subjective self-assessment techniques can be difficult due to the inherent dynamic nature of human beings and the limited availability of proven measuring techniques (Sterling et al., 2007).

A perceived lack of established and appropriate behavioural-change measuring techniques is a common critique of the field of conservation education (Saunders, 2003). Having the capacity to effectively measure conservation education programs' ability to achieve behavioural change therefore is vital not only for individual programs to demonstrate their success, but also for the field of conservation education more generally.

The Wildlife Trust of Bangladesh (WTB), a prominent non-government, non-profit conservation organization in Dhaka, Bangladesh, created the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program in 2005. The intention of this program is to foster knowledge, attitudes, and behaviours among local school children that support and perpetuate hoolock gibbon *(Hoolock hoolock)* conservation efforts in the area.

Many conservation organizations in the region suggest that ecotourism is a viable option to generate resources, protection, and land for hoolock gibbons. These organizations presume however that the forests of Bangladesh are typically too littered and unclean for foreign tourists to visit and enjoy at a rate that would support a viable eco-tourism industry. Therefore reduction of littering among participants and surrounding communities is one focal behavioral action change that the WTB attempts to elicit. We found that the intervention created significant and marked increases in proper trash disposal across rural, suburban, and urban children and that our assessment tool to capture this behavioural change worked well.

Because many environmental education programs aim to increase proper disposal of trash and to measure and report this effect sufficiently, this approach could be generalizeable to similar programs at other sites. Here we share the program's approach to eliciting this change, the methods that were used to assess success in achieving this behavioural change, and subsequent results.

## Methods

The Wildlife Trust of Bangladesh implements the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program at rural, suburban, and urban sites throughout Bangladesh. We generated a broad list of potential schools that mirror those typically served by WTB (Greig and Taylor, 1999) that was narrowed from 30 down to 10, as school officials declined or accepted participation.

Potential candidates were then limited further to include only those schools that were funded by the Bangladeshi government. This was done in attempt to eliminate variability in school and education quality.

Urban, suburban, and rural community type classifications were made for each school based on local population density and their distance from Dhaka city, the capital of Bangladesh. During our implementation and evaluation period, June – August 2008, a total of 291 children from five schools participated in our program. These five schools were characterized by community type and then classes from each school were assigned to either the treatment or control condition. Three classes were included in the control condition (N = 112) and four were in the treatment condition (N = 179). Of the students that participated, 166 were male (57%) and 125 (43%) were female.

A pre / post study design with treatment and control groups was used to implement and evaluate this program (Oppenheim, 1992). Treatment groups were administered questionnaires (and given a piece of candy) before and after participating in the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program.

Control groups did not participate in program activities, but were also administered the questionnaires (and a piece of wrapped candy) in a time frame and fashion consistent with their corresponding treatment group. Post assessment questionnaires on average were delivered within two days after the pre-assessment questionnaires.

Program activities were administered during regular school hours in classrooms, auditoriums, and/or school courtyards depending on the number of students and facility availability. Head teachers and other members of staff from each school were not present during implementation or evaluation to minimize stress in students and to ensure that teachers did not communicate program related information to students between questionnaire sessions (Oppenheim, 1992).

The 'proper disposal of trash' activity included in the Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program was straightforward. We introduced the concept of littering versus proper disposal of trash to participants in the treatment condition and then discussed the potential consequences of litter on humans, animals, and potential income streams like ecotourism. A trash clean-up activity in the surrounding area followed.

| School Name | Community Type | Condition | Num. Participants |
|---|---|---|---|
| Bhanugach Primary | Rural | Control | 19 |
| Dolochara | Rural | Treatment | 31 |
| Tetuljhora | Suburban | Control | 22 |
| Tetuljhora | Suburban | Treatment | 37 |
| Bin Shreshtha Noor Mohammad Rifles | Urban | Control | 71 |
| Bin Shreshtha Noor Mohammad Rifles | Urban | Treatment | 60 |
| Manarat International | Urban | Treatment | 51 |
| Total | | | 291 |

*Table 1. School community type and treatment condition classification*

Trashcans were placed in fixed positions at all sites, for both the treatment and control conditions, for the duration of program implementation and evaluation. These fixed positions were approximately 9-10 metres away from the place where students sat to take their pre/post tests. All students were given a wrapped piece of hard candy while filling out their pre/post questionnaires. The number of wrappers that were placed in trashcans versus improperly disposed of wrappers (i.e. thrown onto the school yard, classroom, or forest floor) was recorded.

To ensure implementation consistency, the same members of the WTB administered program activities in Bangla each time. The lead researcher (CML) was present during all sessions for methodological clarification and to ensure consistency across groups and sites. During evaluation sessions, WTB team members did not indicate desired responses or behaviours to reduce the chance of social desirability bias (Oppenheim, 1992; Fisher, 1993).

Statistical analyses were conducted at the group level with Friedman non-parametric repeated measures tests across community type with pre / post candy wrapper counts for control and treatment groups as the predictor variable using the SPSS statistical package (version 10, IBM Corporation, Armonk, New York).

**Results:**

The number of proper disposals of candy wrappers non-significantly increased (Friedman X2 = 3.0, p = 0.08) in treatment groups post program implementation, while proper disposal counts were virtually the same (Friedman X2 = 0.02, p = 0.93) during pre- and post-assessments with control groups. This trend existed across all three community types (Table 2).

The highest proper wrapper disposal rates observed during pre-assessments were in the urban areas (93.8%, N = 182), with lower overall average rates existing in the rural (63.2%, N = 50) and suburban (82.4%, N = 59) communities.

The non-significant increases in proper wrapper disposal between pre- and post-assessments in the treatment groups were present across all three community types (Figure 1). Note that none of the community types within the control groups increased their rates of proper wrapper disposal.

The greatest increases in proper wrapper disposal were in the rural and suburban community types with an average increase of 13.2%. Although the urban groups had approximately half the increase in proper wrapper disposal, they also had a markedly greater initial rate (91.9%).

**Discussion:**

The environmental education program seems to have had an impact on the behavioural tendency of our participants to properly dispose of candy wrappers after program participation, even if that impact was marginally not statistically significant. Little to no change in proper disposal rates was seen by classes that participated as control groups and did not engage in Save Hoolock Gibbons, Protect Forests, Conserve Biodiversity program activities.

The opportunity to improve proper trash disposal seems to be greatest among rural and suburban children, given that their average rates of wrapper disposal were much less than the urban children in our pre-assessment. The gains were almost double that seen in the urban children. This is likely due to the fact that the overwhelming majority (91.9%) properly disposed of their wrappers during the pre-assessment, they numerically could not have improved by the average increase seen in the other two types of communities (13.2%). Rural and suburban children engaged in proper disposal at much lower rates during pre-assessment (63.2% and 82.4%, respectively). As a consequence, the opportunity to increase proper disposal was much greater in the non-urban communities.

This behavioural modification could enhance conservation efforts for hoolock gibbons by increasing the likelihood of a viable ecotourism industry since tourists are less likely to visit areas with rampant litter problems. This in turn could increase revenue that could be used by local authorities and conservation groups to build local capacity, implement more education programs, and popularize the plight of hoolock gibbons further.

Many conservation education programs include proper trash disposal as one of their main objectives. In addition, many also use pre / post study designs with treatment and control groups. As such, the assessment approach that we describe herein should be easily replicable by other programs.

| | Control (N = 112) | | | Treatment (N = 179) | | |
|---|---|---|---|---|---|---|
| | Rural | Suburban | Urban | Rural | Suburban | Urban |
| N | 19 | 22 | 71 | 31 | 37 | 111 |
| Pre-Intervention (N) | 13 | 19 | 68 | 18 | 29 | 102 |
| Post-Intervention (N) | 12 | 18 | 68 | 22 | 34 | 110 |

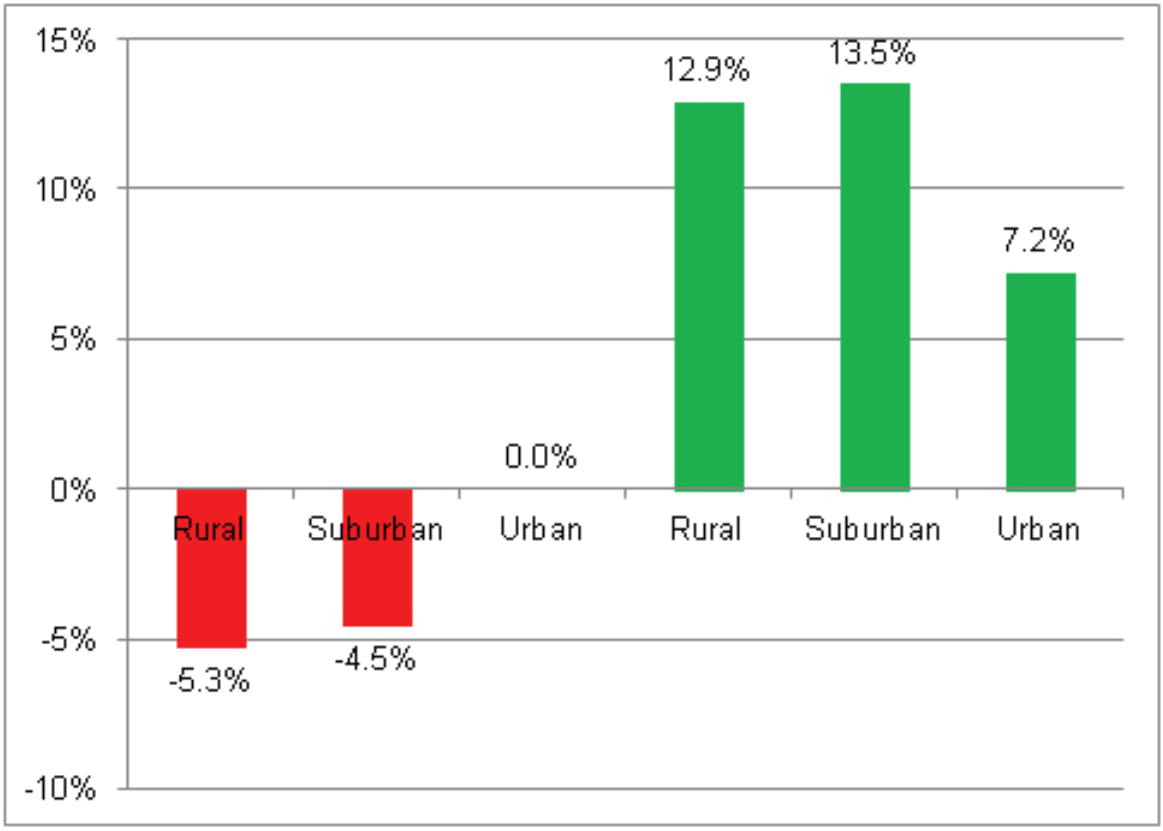


*Figure 1. Average percent difference in wrapper disposal during post assessment for control and treatment groups. Red bars represent control group differences and green bars represent treatment group differences.*

In addition to the basic importance of improving the well-being of people and wildlife derived from trash disposal interventions, the value of assessment to demonstrate impact is crucial for garnering funding from donors and in reporting progress.

We do acknowledge some limitations to our findings, including our ability to generalize disposal of a single candy wrapper to other trash types that are larger or more difficult to process (e.g., tires, construction debris, etc.). Another potential limitation of our study is duration of time between assessments. We would have liked to replicate the wrapper disposal test again several weeks, months, and/or years later. This would help us determine whether or not the trend of more people properly disposing of candy wrappers in trash cans would continue over time.

Nonetheless, a systematic approach to measuring behavioral change such as this can potentially add great value to conservation education programs, especially those with a proper trash disposal objective. This behavioral-change measuring technique not only assisted us in accurately gauging the success of our interventions, but also quantified a shift in behavior in a very tangible way. This is something that has been called forth by friends and critics of this field. Lastly, this assessment approach is simple, inexpensive, and low tech, increasing its attractiveness and usability potential even further.

***Acknowledgements:*** Special thank you to the entire Wildlife Trust of Bangladesh education team (especially Sir Anwarul Islam and Gawsia Wahidunnessa Chowdhury), Dr David Chivers, and Mr Enayet Khan for their graciousness, guidance, and assistance in the field, and also to the International Primatological Society for their funding support through the Lawrence Jacobsen Education Development Award.

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