



БАЙГАЛЬ ОРЧИН,
АЯЛАЛ ЖУУЛЧЛАЛЫН ЯАМ



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LEVERAGING BEHAVIOURAL NUDGES
to improve waste collection at the
GORKHI-TERELJ NATIONAL PARK



2019
MONGOLIA



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LEVERAGING BEHAVIOURAL NUDGES TO IMPROVE WASTE COLLECTION AT THE GORKHI-TERELJ NATIONAL PARK



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Authors: Javkhlan Ariunbaatar, Enkhdul Tuuguu, Tuya Shagdar, Nyamdorj Alimaa, Behavioural Insights Team in Australia led by Ravi Dutta

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LIST OF ACRONYMS

ANT	Actor-Network Theory
BIT	Behaviour Insights Team
CO	Country Office
EAST	Easy-Attractive-Social-Timely
EF	Ecological Footprint
GTNP	Gorkhi-Terelj National Park
HSPIM	Health Social Policy Institute of Mongolia
MET	Ministry of Environment and Tourism
MNT	Mongolian Tugrik (Currency)
NGO	Non-governmental Organization
SPA	Special Protected Area
TEST	Target-Explore-Solution-Trial

I. EXECUTIVE SUMMARY

This final report documents and summarizes the main findings of the project on “*Leveraging Behavioural Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park*” implemented during August 2017 and September 2018. The main purpose of the project was to increase the waste collection rate at Gorkhi-Terelj National Park (GTNP) through an effective implementation of behavioural interventions targeted at holiday makers or tourists visiting the park. The project activities consisted of 3 phases: (1) conducting a baseline study of the target area, which included a detailed analysis of the waste generation rate and gave insight into the waste disposal behaviour of visitors; (2) designing the behavioural interventions with a detailed trial methodology targeting the visitors; (3) implementing the behavioural interventions and developing policy recommendations informed by behavioural insights.

The Gorkhi Terelj National Park¹ is located 35-50 km from Ulaanbaatar city, which makes it one of the closest national parks and a pleasant venue for holiday makers all year around. Approximately 120,000 domestic and 20,000 international tourists visit this park each year with 8.5% increase annually². Most of the holiday makers or tourists visit the park during the warmer months (June – September) and the number of visitors is reduced significantly during colder months (October – May). There is a small community with a population of 1591. They reside at the immediate vicinity (buffer zone) of the GTNP which administratively belongs to the 6th khoroo (subdistrict) of Nalaikh district. The lifestyle of the residents’ changes as the holiday makers visit the national park. Residents set up ger³-camps to host

visitors during the warmer season, thus creating points of collected wastes, which often counted as residential or entity wastes. Baseline data suggests that about 92% of the annual waste is produced in the warmer season, whereas the remaining 8% is generated in colder seasons; and 51.4% of the annual waste generation is produced by visitors, while 48.6% is generated by residents⁴. Moreover, it was found that the littering behaviour is often driven by a lack of social architecture, cultural influences and the consumptive behaviour of the visitors as well as the residents. This includes the fact that the existence of some litter leads to a perception that littering is okay, and everyone does it, and a lack of opportunities to dispose of waste.

Unfortunately, due to poor waste management and non-environmentally friendly behaviour of the visitors, waste is scattered and dumped everywhere around the park, polluting the environment and harming the ambience of the park. It was estimated that the ecological footprint of the generated waste is 1.64 ha/capita and 1.22 ha/capita in warm and cold seasons, respectively. Improving waste management at the GTNP may take a staged long process and a significant contribution from the state or local budget, which is not a priority of the municipality or the park administration. However, behavioural interventions targeting the main source of littering could offer inexpensive innovative solutions to improve waste management at GTNP.

Behavioural interventions were designed and implemented according to the Target-Explore-Solution-Trial (TEST) framework⁵, which was developed by the

¹ UNDP (2015) Valuation of Contribution of Ecosystem Services of the Gorkhi Terelj National Park to Sectoral Economic Development.

² Tuya Sh. (2017), Behavioral Drivers Study Report: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

³ Ger – traditional nomadic yurt (house).

⁴ Enkhdul T. (2017), Baseline study report, Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

⁵ https://transparencyschool.org/wp-content/uploads/Luke-Ravenscroft_LApplying-Behavioural-Insights.pdf.

Behaviour Insights Team (BIT)⁶. Specific objectives and activities of the project were detailed during the **Target** stage, while the **Explore** stage focused on a baseline study. During the **Solution** stage six behavioural interventions were designed and two of them were prioritized according to the Easy-Attractive-Social-Timely (EAST)⁷ framework by the BIT team. A combination of three interventions (distributing bags and installing waste containers at the park entrance with messages informed by behavioural insights) were implemented during the trial stage, which lasted for five weeks with 3 control and 2 treatment weeks during the peak summer season in July – August.

The interventions resulted in an increase of waste collection by 86% suggesting that illegal dumping in nature was reduced significantly. By making it easier for people to dispose of their waste, more visitors disposed of their waste in or around the provided containers. In fact, the scheme was so popular that in some cases, there was more waste than the containers could hold. However, it was found that such interventions could also encourage park visitors to generate more waste.

In addition, qualitative research found that the provision of bags and waste containers was generally popular, and visitors reported that they felt there was less litter as compared to previous years. This suggests that the underlying behavioural mechanism – that is, making the process easier – was having some effect. Further, the fact that there was a perception of less litter could potentially help in future years if the pilot is scaled up and used more widely – many people would perceive litter as a sign that littering is okay, hence by reducing the amount of litter, we send a signal that littering is not acceptable and that instead people should place their waste in the containers provided.

Based on the main findings of the interventions, a policy recommendation for short, medium and long-term management is provided.





⁶ <https://www.behaviouralinsights.co.uk/>.

⁷ <https://www.bi.team/publications/east-four-simple-ways-to-apply-behavioural-insights/>.

II. BACKGROUND INFORMATION

INTRODUCTION AND PROJECT MANAGEMENT

“Leveraging Behavioural Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park” is an innovation project implemented by the UNDP Country Office (CO) in Mongolia and funded by the Government of Denmark through the UNDP Global Innovation Facility. The project funding was granted in late summer 2017, and it took several months to kick-start the project and recruit the project team. Once the project team was onboard, the Behavioural Insights Team (BIT) developed and delivered a series of training sessions on behavioural insights and the TEST framework which helps the team to design, implemented and evaluated projects informed by behavioural insights. TEST stands for Target-Explore-Solution-Trial (TEST) framework, and each step is briefly explained in the table below⁸.

Phase	Objective	Output
 Target	Choose a specific behaviour to focus on and change.	A Target Statement to inform your Explore research.
 Explore	Understand the context of the behaviour you are focusing on.	Insights to help you create an effective solution.
 Solution	Design a solution that achieves your Target.	A solution to implement and trial.
 Trial	Test your solution to see if it achieves your Target.	A trial result to help you decide whether you should scale your solution up.

Following the TEST framework steps, the project team identified the specific targets, conducted baseline studies, developed and trialled the behavioural interventions. The waste management specialist (Enkhdul Tuuguu) focused on the waste generation rate and ecological footprint of the wastes, whereas the cultural anthropologist (Tuya Shagdar) delved into the behavioural drivers as well as cultural and societal norms of littering. Data collection was done both in colder (October – January) and warmer seasons (May – August), as the waste generation rate and lifestyle of the residents, operation of the economic entities and number of visitors varies accordingly. After clearly defining the target and conducting the baseline study, potential solutions or interventions were designed and prioritized using the Easy, Attractive, Social, and Timely (EAST) principles⁹. In cooperation with the consultants, a local NGO (Health Social Policy Institute of Mongolia) implemented the trials and conducted and evaluated the success of the trials. BIT guided the team throughout each step of the project and provided technical expertise on behavioural insights. Each of the consultant and contracted entity (HSPIM and BIT)

⁸ BIT (2018), Interventions Report: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

⁹ <https://www.bi.team/publications/east-four-simple-ways-to-apply-behavioural-insights/>.

developed an independent report with extensive details of the findings. This report serves as the synthesis final report, which contains the overall methodology, core findings of the project and the policy recommendations.

SCOPE AND CONTEXT OF THE PROJECT ¹⁰

Littering behaviour. Non-environmentally friendly behaviours, such as improper dispose of waste is a common anti-social behaviour. Littering or dumping waste is, for many park users, a convenient way to deal with their waste. The negative impact on the person who litters or dumps their waste is minimal and the chance of being fined is low. For those that do not have easy access to designated waste collection points or face inefficient waste removal services, it is far easier to simply litter. This individualistic behaviour, however, has negative implications on the community: the collective burden of the waste increases the costs of waste management, harms the ambience of the park, contaminates Ulaanbaatar's water source, and damages the park's biodiversity.

Whose behaviour do we want to change? Different types of wastes are generated by different groups e.g. park visitors, number of economic entities operating within the park, the residents whose property lies within or next to the park and traveling herders. As the project aims to reduce the illegal dumping and increase the waste collection, identifying the main litterers and understanding the behaviours of them is crucial. Due to its complexity, illegal waste disposal at the national park might not be fixed with a single intervention.

What behaviour do we want to encourage? It is important that the interventions focus on shifting behaviour or actions, rather than simply changing beliefs or attitudes. If we want to discourage a behaviour, rather than simply telling people not to do it, it is better to tell people what behaviour to do instead. If we want to encourage behaviour, we need to be specific about what we are encouraging. It is also important to consider unintended consequences when decided which behaviour to target. For instance, asking tourists to take waste out of the park may mean they simply dump it just outside the park, shifting rather than fixing the problem. Therefore, it is important to break down the behaviour into specific action, for example, what actions are required for 'proper disposal of waste'.

Where and when will we try to make this happen? It is likely that some parts of the target area are more problematic than others for scattered litter or illegal dumping of residential waste, so it is worth designing interventions to target the biggest problem in the area. Deciding where and how to intervene is not always easy and you can identify many possible intervention channels; it can be difficult to choose between them. To overcome these problems, it can be helpful to create a *User Journey Map*. A diagram lists in order all the individual actions the user completes while doing an activity, making it easy to identify possible channels and levers, and behaviours to try to shift.

Delivering the intervention. How the intervention will be delivered to or communicated to the target audience will depend on communication channels and our control over the system. For example, messengers might be more influential to nudge proper behaviour, such as local households or students, who might volunteer to act as communication channels for other visitors.

¹⁰ BIT (2018) Baseline Findings Report: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

Evaluation. In addition to identifying promising interventions and levers, it is important to keep potential evaluation strategies in mind. The effectiveness of behavioural interventions is highly content dependent, can be impacted by small variations, and may influence different stakeholder groups differently. Therefore, it is important that the intervention is implemented in a testable manner. Some interventions may be easier to evaluate than others or would benefit from a different strategy. For example, changing the descriptive norm by cleaning the area would be evaluated differently than varying what rangers tell tourists at the entrance.

III. TARGET STAGE

TARGET AREA

Gorkhi-Terelj National Park (GTNP) is one of thirty-five locations that are identified nationwide as a Special Protected Area (SPA) under the category of a national park. GTNP covers an area of 293 thousand hectares at the southern tip of the Khan Khentii Strictly Protected Area (Figure 1). Administratively 89.7 % of the area falls under the Nalaikh district (one of the districts of Ulaanbaatar city) and only the northern valley of Terelj river falls under the Töv province.



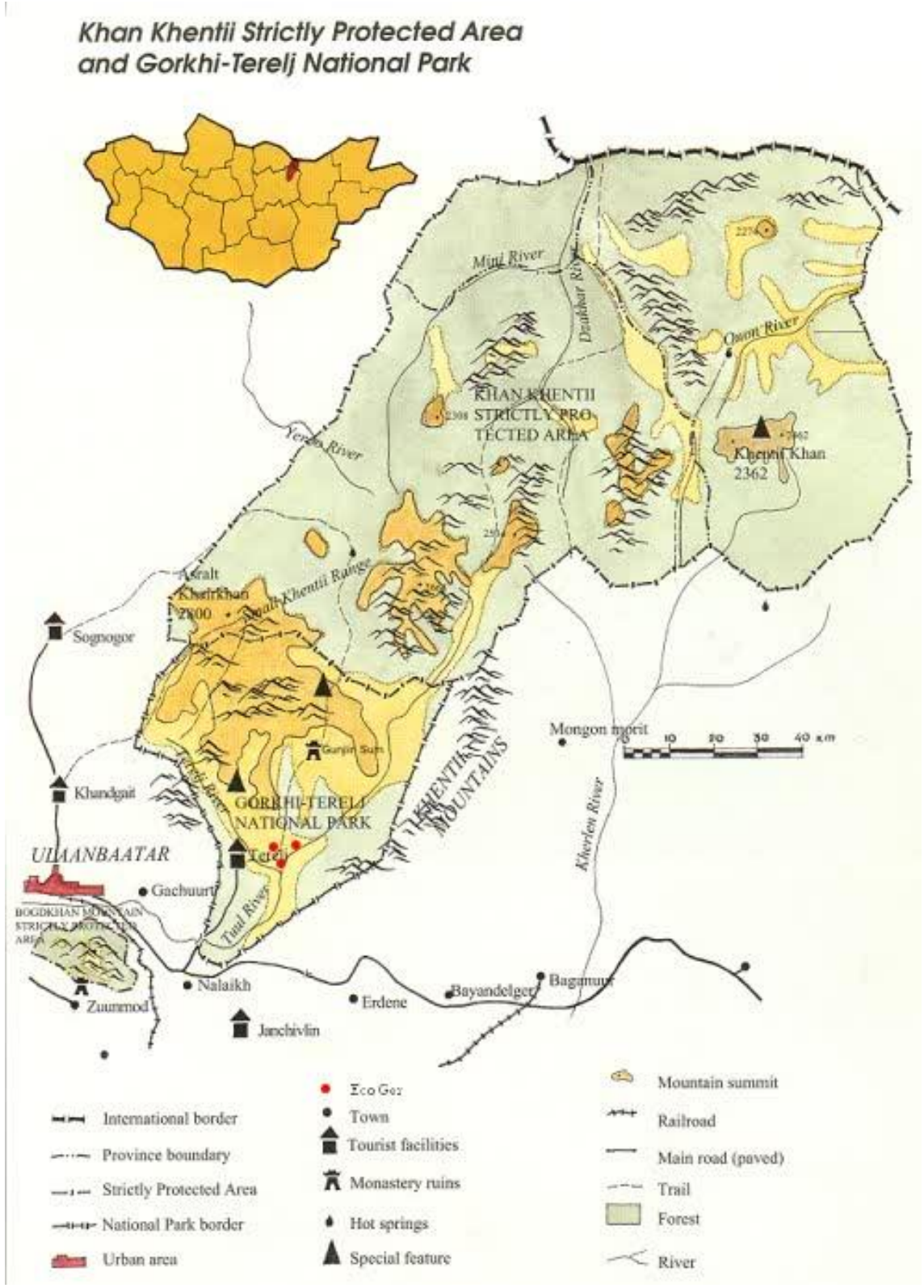


FIGURE 1. GORKHI TERELJ NATIONAL PARK AT THE SOUTHERN TIP OF KHAN KHENTII SPA

Source for this map: <http://www.mongols.eu/maps-of-mongolia/maps-tov-aimag/>

GTNP is located 35-50km far from the capital city of Ulaanbaatar, where more than half of the country's population resides. Proximity of the park makes it one of the most popular holidays making venue for locals and tourists. Park visitors go to GTNP all year around for various leisure activities that it offers. Visitors usually camp along the Terelj River or visit the ger-camps (some are owned by residents of the Nalaikh district) or hotels. Celebrations of special occasions, events and workshops are also organized at the different economic entities in the park.



FIGURE 2. A TYPICAL SUMMER DAY AT THE TERELJ RIVER

The popularity of the park and poor waste management of the administrative units result in improper disposal of solid waste in and around the state protected area of Gorkhi-Terelj National Park (GTNP), which threatens wildlife and contaminates soil and water bodies. It is not only the surrounding environment that is affected by this waste pollution, the main drinking water resources for the capital city, Ulaanbaatar, are at risk of contamination.

PRESENT WASTE MANAGEMENT

There is no well-established and operational waste management system, and illegal garbage sites are common. Waste collection at GTNP remains a major burden on the park administration. There is waste scattered everywhere, especially along the river due to almost total absence of waste disposal sites where the tourists could dispose their waste. In addition, the limited human resources at the park is also one of difficulties contributing to for a successful implement and enforce the environmental law or regulations related to the waste management practices in the park. Also, the park rangers are not permitted to issue fine for the illegal waste dumpers.

Households and tour-camps often dump their waste at established collection points for tourists. Due to poor infrastructure and ineffective operation of the waste collection companies, the waste collection and recycling rates are near to zero.

Improper waste disposal is not simply a behavioural problem. Structural barriers in existing systems deter or prevent proper waste disposal. Researchers highlighted the problematic operational context for waste collection and disposal in GTNP. There are few waste collection points in the park and the removal of this waste is unreliable. Entrance fees do not cover sufficient services and budgets are inflexible. Efficient waste collection and removal is an important structural barrier. These contextual factors, systems and processes, make it difficult for either tourists or residents to do the right thing and properly dispose of their waste.

Ministry of Environment and Tourism. GTNP is administered by the Ministry, which regulates the businesses and tourists visiting the park. At the level of the Ministry, there are no effective strategies to enforce the law on solid waste and there is no financial support for additional waste disposal infrastructure. The Ministry is planning on gradually removing all GTNP waste collection sites.

The Department of Specially Protected Areas Administration of Ministry of Environment and Tourism is responsible for coordinating the implementation of legislation and defining travel and tourism routes, directions and procedure to be pursued in the National Park.

Nalaikh district. The majority of GTNP falls under Nalaikh district, which is responsible for the settled households, herders and their waste collection. The waste collection company is contracted to Nalaikh district. At the level of Nalaikh District, there are no good monitoring and controlling mechanisms for reliable waste collection by the contracted company. There is also insufficient cooperation with local law enforcement to monitor incorrect disposal. The management of waste seems to be inefficient. However, recently Nalaikh district has purchased four waste transport trucks and improved the waste transportation.

Waste collection company. The waste collection company contracted to Nalaikh district is meant to collect the waste from households in GTNP, and bring it to the dumpsite, which is 35-40 km away from GTNP. However, waste collection fees for households are too low to cover the cost of collection from remote places, meaning collection services often do not run.

Khoroo-level governance.¹¹ Nalaikh district is divided into subdistricts. The 6th khoroo is the most active regarding waste management in GTNP, yet in the khoroo there is no staff position responsible for waste management and no control on waste disposal of residents and entities. The three waste disposal points established by the local khoroo in GTNP for tourists are now being used by residents and other business entities in the park. However, this is costly as the khoroo pays for waste removal services and is not meant to be responsible for the costs of residential waste disposal, which should be borne by residents themselves. The budget for waste management cannot be increased without cooperation by Nalaikh district.

GTNP administration and park rangers. GTNP administration is responsible for collecting the waste within the park. However, there are not enough staff members or sufficient processes in place to monitor or control waste disposal and collection. Waste clean-up is not meant to be a park ranger's responsibility, they are not compensated for the task, and there are no volunteers to assist. GTNP does not have a budget allocation for waste disposal and tourist entry fees are too low to cover the cost of waste collection. The operational costs of the park are allocated at the national level, by the Ministry of Finance,

¹¹ A khoroo is an administrative subdivision of a district, e.g. 6th khoroo is a subdivision of Nalaikh district.



FIGURE 3. OFFICIAL PARK SIGNAGE ON ILLEGAL DUMPING OF WASTES

and are absorbed back into this central budget. GTNP administration does not have the juridical base to generate budget from entrance fees. There is a lack of enforcement of laws on waste management in GTNP.

Initiatives around GTNP in the 6th khoroo. The local authorities have been seeking to improve waste collection since June 2017. A clean-up process with university students was organised to collect all waste that had been improperly disposed of, and three waste collection points for domestic and foreign tourists were established at the GTNP. The collection of waste has improved due to the availability of a collection truck, which is owned by the governor of the 6th khoroo. He has been collecting waste from GTNP and lobbying the Nalaikh district to pay for waste collection. Citizens of 6th khoroo sometimes donate to supplement waste collection, and employees working with waste collection have not been paid for nearly a year, but still work without a salary because it is their local area.

Current messaging within GTNP. Signs and messages within the park already encourage visitors not to litter. Five park guidelines and restrictions are printed on the back of the

entry ticket, including one that instructs visitors to stay at designated camping sites, fully extinguish fires, and dispose of waste in bins and containers. A private company has sponsored signs in the area asking people not to litter, stating 'cherish your environment, don't dispose your waste here'. Official park signage at the two main entrances of the river area informs visitors of the penalties for improper waste disposal. These state that "Anyone who violates the law on waste disposal and disposes their waste in non-designated area will be fined 200,000-up to 2 million MNT".

Legal penalties in Mongolia. Related to the penalty signage, the law on waste disposal states that "State inspectors or governors of soums/ddistricts or baghs/khoroos shall impose the following administrative sanction for breaches of the legislation on waste unless the person responsible is subject to criminal liability" (Article 43.1 of the Law on Waste¹²). The low risk of being caught or fined means that punishments are unlikely to have a strong deterrent effect and may be further undermined if the advertised penalties are obviously unenforced.¹³

¹² <https://www.legalinfo.mn/law/details/12652?lawid=12652>

¹³ Becker, G.S. (1968). *Crime and Punishment: An Economic Approach*. Gash, T. (2016). *Criminal: the truth about why people do bad things*.

WASTE GENERATORS

There are three main groups of waste generators at the GTNP, namely visitors, residents, and economic entities. According to the 2017 statistics, there are 1653 residents of 665 households, approximately 90 entities in the vicinity, and on average more than 120 thousand visitors enter GTNP annually¹⁴. However, the residents of Nalaikh district, specifically the 6th khoroo residents tend to operate ger-camps during the warmer season to attract visitors and earn economic income. Therefore, the waste generators can be divided into two broad groups (i) visitors and (ii) households and tour-camps.

Tourists. There are designated waste collection points in GTNP for tourist waste; however, they are few and far between. Through a series of environmental assessments and observations carried out by the park rangers, GTNP identified that visitors dispose of their waste irresponsibly, often leaving it where they have camped or picnicked. The fieldwork and research indicated that these visitors tend to picnic or camp along the Terelj River. A typical camping activity consists of lighting a camp fire and erecting a cluster of tents for the extended family, friends, colleagues and relatives to stay. The visitors who stay at the river area are often low-income level households who cannot afford to stay in already privatized spaces of the GTNP. The number of visitors to GTNP and other specially protected areas (SPA) are shown in Table 1.

TABLE 1. STATISTICAL DATA OF VISITORS TO SPECIALLY PROTECTED AREAS 2013-2018¹⁵

	2013	2014	2015	2016	2017	2018	Avg annual growth rate (%)
Foreign tourists travelled to GTNP	18,300	20,800	19,100	22,300	28,828	30,764	11.6
Domestic tourists travelled to GTNP	80,500	112,700	108,400	113,000	125,641	104,051	6.9
Total tourists travelled to GTNP	98,800	133,500	127,500	135,300	154,469	134,815	7.6
Total foreign tourists visited SPA	59,153	65,626	70,661	65,324	71,809	81,946	7.0
Total domestic tourists visited SPA	201,187	299,199	272,860	281,544	328,806	380,558	15.1
Total tourists travelled to SPA	260,340	364,825	343,521	346,868	400,615	462,504	13.2

Table 1 shows that number of both foreign and domestic tourists entering the specially protected areas increased by an annual average rate of 7% and 15.1%, respectively, while the number of visitors to GTNP increased by 11.6% and 6.9%, respectively. It can be estimated that on average 1 in every 3 foreign tourists, who visit SPA in Mongolia visits GTNP, whereas 1 in every 4 domestic tourists visits GTNP every year. It proves the popularity of the park for both foreign and domestic tourists in Mongolia. The analysis of the statistical data also shows that 17.8% of the total GTNP visitors and 19.3% of the total SPA visitors were foreigners. However, it is worth noting that the number of visitors to SPA (Table 1) is estimated based

¹⁴ Census 6th khoroo, <http://ubstat.mn/StatTable>, 2016

¹⁵ Ministry of Environment and Tourism (2018) Number of tourists visiting specially protected areas based on sold entrance ticket

on the sold official tickets issued by the Government of Mongolia. Field observations and site visits during the project revealed that usually the domestic visitors are reluctant to pay the entrance fee, which amounts to 300MNT (12 cents) per domestic tourists and 3,000MNT (1.2USD) per foreign tourist. Moreover, during the peak summer days, misdistribution of the tickets can be observed. For instance, if a vehicle with 10 domestic tourists approaches the park administration officer for tickets, she/he would charge 3,000MNT (1.2USD) but issue only 1 ticket for foreign tourists instead of 10 tickets for domestic tourists. Therefore, the project team conducted manual counting of cars at the GNTP entry gate to approximate the number of tourists. The results are summarized in Table 2.

TABLE 2. NUMBER OF CARS VISITING GTNP FOR ONE WEEK

	Min.	Max.	Average no. of cars
Tourists during weekdays			
Cars per hour	18	21	19.5
Cars per day (active 5 hours)	90	105	97.5
Total weekday estimate (5 days)	450	525	487.5
Tourists during weekends			
Cars per hour	23	31	27
Cars per day (active 4 hours)	92	124	108
Total cars per week	542	649	595.5

Based on the observations the estimated average number of cars visiting GTNP was 596 per week. These were only cars. There were no big group of tourists who visited sites during this observation. The total number of tourists was estimated and tabulated in Table 3.

TABLE 3. ESTIMATION OF TOURISTS WITHIN A WEEK, MONTH AND YEAR

	Min.	Max.	average
Number of people in a car	3	4	3.5
People in min. num. of car	1626	2168	1897
People in max. num. of car	1947	2596	2271.5
Average people per week	1786.5	2382	2084.25
Average people per month (4 week)	7146	9528	8337
Average people per year (52 week)	91111.5	121482	106296.8

This study estimated that the total number of tourists who visited GTNP last year was about 1,179,000, based on seasonal variations. Table 3 shows the percentage of each tourist group who visited GTNP. Statistics reveal that on average around 500,398 foreign tourists visit Mongolia every year, of which only about 4% visit GTNP.

Households and tour-camps. Households residing in GTNP pay a flat monthly fee for a waste collection service. The waste collection companies are contracted to the local municipalities; in GTNP's case the waste collection company is contracted to Nalaikh district. However, due to the relatively long distance to the GTNP from the Nalaikh district (approx. 35-50km), the waste collection companies often avoid visiting according to the agreed schedule. Without a proper waste collection service some residents transport the waste to the nearest settlement or disposal points themselves, whereas the

other remaining residents leave their waste in nature or near the disposal points designated for tourists. Such mishandling of waste has led to discussions to remove the designated disposal points, as the national policy aims to make all national parks waste-container free. As a result, some of the waste disposal points were removed by the authorities. Nevertheless, stakeholders including the households, tour-camps and local administration insist on establishing waste containers within the vicinity of the GTNP, as it would make the waste concentrated at designated points, collection service easier and more accessible. Moreover, during the warmer seasons the households usually set up ger-camps for the overflowing of visitors, which result in dispersed spots for waste generation. Herder households also move near the national park, so that they can offer tourist activities such as riding horses, camels or cattle.

SPECIFIC TARGET OF THE PROJECT

Field observations and interviews with the pertinent stakeholders including the administrative personnel and park rangers found that the root cause of illegal dumping or littering behaviour is often driven by a lack of social architecture, cultural influence and consumptive behaviour of the visitors as well as the residents. However, the baseline study showed that the most problematic target group was the visitors or the tourists entering the GTNP, as they are the main waste generators at the GTNP and responsible for the high ecological footprint of the wastes that are mostly recyclables. Hence, during the next stages of the TEST framework, interventions targeting visitors would be explored, designed and trialled. With reference to the baseline findings, the objective of the project was defined as *"To improve the waste collection at the GTNP by a minimum of 30% during July – August 2018 through the implementation of behavioural interventions targeting visitors"*.

FIGURE 4. VISITOR CARS WAITING TO PAY THE ENTRANCE FEE AT THE GTNP GATE



IV. EXPLORE STAGE

WASTE GENERATION RATE AND COMPOSITION¹⁶

The solid waste generation rate and composition vary due to the seasonal changes, different locations, changing lifestyle of the locals, and tourist numbers. Thus, waste generation rate was analysed in both colder (November- December 2017) and warmer (June – July 2018) seasons. Waste generation rate and composition was determined according to the Standard Test method for unprocessed municipal solid waste D5231-92 (2016)¹⁷. Based on monthly analysis of the waste generation in warmer and colder season, the total annual waste generation was estimated. Table 2 shows the cold, warm seasonal and annual waste generation.

TABLE 4. WASTE GENERATION AMOUNT AT GTNP

	Cold season (8 months)	Warm season (4 months)	Annual waste amount
Waste amount, kg	8,891.3	98,736.0	107,627.28

It can be estimated that 92% of the total annual waste is generated in warmer season, despite the short length from May to August, whereas the remaining 8% is generated in colder season from September to April. This low generation of waste amount in cold season is attributed to the limited number of tourists in colder months, whereas in warm season tourists, especially locals visit GTNP for outdoors and stay overnight for several days. Waste generation rate was estimated in warm and cold seasons using average number of tourists who travel to GTNP per day (Table 3).

TABLE 5. WASTE GENERATION RATE BY SEASONAL VARIATIONS

	Cold season (8 months)	Warm season (4 months)
Generation rate per visitor (kg/day)	0.124	0.089
Average generation rate per tourist (kg/day)	0.11	
Average generation rate per person in Ulaanbaatar (kg/day) ¹⁸	0.51	
Jose Ramon et al., (2011) Agua Blanca State Park, Mexico generation rate (kg/day-tourists) ¹⁹	0.144	0.188

¹⁶ Enkhdul Tuuguu (2017), Baseline report: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

¹⁷ <https://www.astm.org/Standards/D5231.htm>.

¹⁸ <http://www.eic.mn/box/search.php?action=search>

¹⁹ Jose Ramon et al., (2011), Basic diagnosis of solid waste generated at agua blanca state park to propose waste management strategies, Waste Management and Research, 30-2, pp.

Waste generation during cold season was only about 8% of total waste, while generation rate during cold season is higher by 0.035 kg/day-tourists. This can be explained by the fact that local residents dump their household waste in the tourist designated bins. Since during winter it is not easy to travel 40 km from Nalaikh to collect waste at GTNP, residences and tourist camps dispose their waste at collection points for tourists. This low generation rate is also because most tourists travel for a short period of time, therefore they have less consumables than residences. Yet, the generation rate of residents depends on the income of the households. Compared with other state and national parks like in Mexico, the generation rates are almost similar to GTNP.

Waste composition has been identified by segregating wastes into 8 types: construction waste, plastics (bottles and wrappers), glass, paper (including cardboard), can, coal ash (only during cold season), food waste and others.

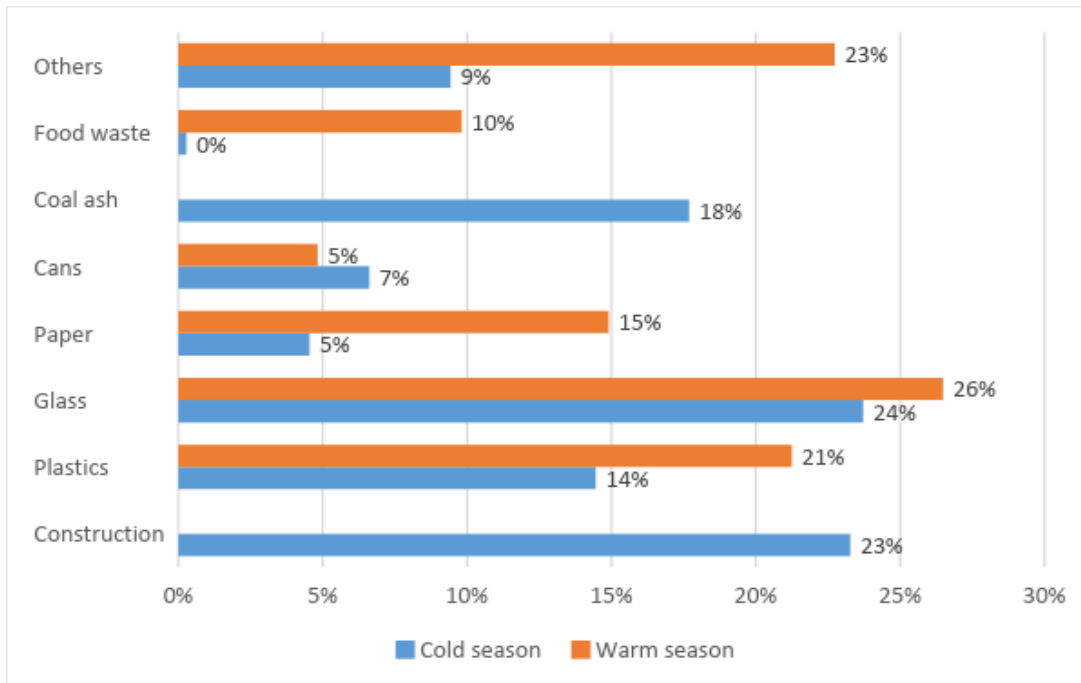


Figure 5. Waste composition by season

Based on the compositional analysis of the waste, it was found that 77.3% and 49.6% of the wastes were recyclables in warmer and colder seasons, respectively. It can be explained by the high number of visitors, who enter the park for leisure activities and consume mostly packaged food or bottled/canned drinks. Non-recyclables including coal ash and construction materials amount to 50.4% in colder season. It is due to the households and tour-camps disposing of their waste at the visitor's designated areas, as well as their increased burning of coal to generate heat and electricity in cold season. Table 4 shows the composition of recyclables and non-recyclables in cold and warm seasons.

TABLE 6. RECYCLABLES IN WASTE COMPOSITION BY SEASONAL VARIATIONS

	Cold season	Warm season
Recyclables	49.6%	77.3%
Non-recyclables	50.4%	22.7%

ECOLOGICAL FOOTPRINT OF THE WASTES²⁰

The ecological footprint (EF) is a land-based indicator for evaluating the sustainability, by documenting the extent to which human economies stay within the regenerative capacity of the biosphere²¹. Cropland, grassland, water area, forestry, built-up land and fossil land are six categories of biologically productive lands in EF. The built-up land footprint was calculated based on the area of land covered by human infrastructure, including transportation, housing and industrial structures. The socioeconomic consumption of resources, production and services are converted into bio-productive lands using equivalence factors related to available bio-productive lands which are adjusted by considering regional conditions. EF is a straightforward method to reflect the carrying capacity of environmental systems and can uncover the spatial features of ecosystem appropriation and the state of human-ecosystem interactions.

TABLE 7. ECOLOGICAL FOOTPRINT IN WARM AND COLD SEASONS

	Cold season		Warm season	
	ha/capita	%	ha/capita	%
Energy land	1.20	98.41	1.64	99.8
Forest land	0.00	0.26	0.00	0.2
Built-up land	0.02	1.33	0.00	0.0
Total EF	1.22		1.64	

During baseline study the total land requirement to assimilate waste generated was estimated at 1.22 ha and 1.64 ha in cold and warm season, respectively. Based on the three different types of land requirement the energy land has most affected area (98.4-99% of total ecological footprint). Energy land is an area of forest to absorb the carbon dioxide emission resulting from the individual type of waste's energy consumption. Therefore, it is necessary to introduce re-use, recycle and/or recovery technology or initiatives to decrease the energy consumption as well land requirement to decrease the impact (footprint) from solid waste, especially in national parks.

CULTURAL AND BEHAVIOURAL LENS ON THE ILLEGAL DISPOSAL OF WASTES²²

From the Mongolian cultural point of view, the notions of purity (ariun) and impurity (buzar) make up the traditional dichotomy that maintains the boundaries between the sacred and profane objects. In this regard, for instance among mobile pastoralists most of the human-derived waste, commonly termed as "hog" (rubbish), "hayagdal" (waste) are carefully managed on daily basis so as not to come spatially in direct contact with the sacred that are often understood to be the spirits (burkhan) and ancestral hearth (ôvôg deedsiin golomt). Thus, for instance in mobile dwellings there are spaces allocated for the sacred such as the khoimor²³ and gal golomt²⁴. At larger and scalar level, these understandings translate into interaction with ecological landscape where sites such as ovoo 8 are consecrated as seats of masters of the land

²⁰ Section is extracted from Baseline report by Enkhdul Tuuguu. For more information:

²¹ Wackernagel, M., Kitzes, J., Moran, D., Goldfinger, S., & Thomas, M. (2006). The ecological footprint of cities and regions: comparing resource availability with resource demand. *Environment and Urbanization*, 18(1), 103-112.

²² Tuya Shagdar (2017), Behavioral Driver Study: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project. BIT (2018), Baseline findings report: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

²³ A seat of honour directly facing the entrance and usually the southern direction reserved for either the master of the household or a respected guest.

²⁴ The hearth.

(gazryn ezed)²⁵. In the presence of sacred and profane Mongolians often proscribe specific norms of behaviour governed by the larger set of customs and values commonly termed as *yos*²⁶. In contrast to the spatially designated sites for the sacred, the management of waste at household level is carefully maintained through such norms. For instance, in typical rural households the rubbish is not easily dumped into the hearth as it is regarded a largely profane act against the master of the fire. Instead, anything that is not biodegradable such as plastic bottles and packaging are recycled and reused as containers.

Yet, the current state of waste disposal at GTNP by local households and tourists challenge the proper cultural norms of removal of profane and rubbish objects. Quantitative surveys, which were administered both online and at physical sites based on the Actor-Network Theory (ANT)²⁷ was conducted with an aim to investigate on the matter. Results showed that 82% of physical and 77.5% of online survey takers consider GTNP as purely a tourist destination, more than 68% of them believe that the land is inhabited by invisible masters or spirits, and more than 84% of them understand the environmental impacts of the wastes. However, it was observed that most of the park visitors dispose of their waste illegally and/or leave wherever they camped or picnicked. This indicates that visitors view the nature in purely consumptive terms, and the traditional cultural practices have been changed. This could be related to the relatively recent transition to market economy, shifting values of cultural perspective, transformation from the simple nomadic lifestyle and change of the items that is used daily.

From the behavioural science perspective, several different considerations can be found in literature on similar challenges. These can be broadly grouped into three main categories:²⁸

- A. Social norms.** People take strong cues from the way others around them behave. Waste is very visible and is likely to lead others to assume that littering or dumping waste is the norm in an area, feeling entitled to do the same. For example, if there are only one or two pieces of litter in an area, most people would not litter; once there is more litter, littering and anti-social behaviour dramatically increase²⁹. Moreover, some the researchers found that anti-littering signs (signalling the injunctive norm) actually increased littering in an already littered environment. In other words, anti-littering sign can be perceived as other people litter, thus it is ok to litter as well³⁰.
- B. Friction costs.** Friction costs can be considered any small hurdle, seemingly insignificant, that can stop individuals from making the right decisions for themselves and the environment. There are several friction costs in place for tourists and residents that intend to properly dispose of waste. For example, if people do not know when to expect a waste collection point, they may choose to litter now.³¹ This may also be applicable if asking tourists to take their waste with them to the city as they may not know where to dispose of waste there either. Moreover, people tend to discount future considerations, such as having a dirty park, and instead focus on present ones, such as the hassle of carrying waste with them.³² Field survey results suggest that people care about the water quality of

²⁵ Murphy, D. J. (2014). Ecology of rule: territorial assemblages and environmental governance in rural Mongolia. *Anthropological Quarterly*, 87(3), 759-792.

²⁶ *Ovoo* is a cairn often consecrated on top of mountains, in between major hills as seats of spiritual masters of land.

²⁷ Actor-network theory (ANT) is a theoretical and methodological approach to social theory where everything in the social and natural worlds exists in constantly shifting networks of relationship.

²⁸ BIT (2018), Baseline findings: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

²⁹ Geller, E.S., Witmer, J.F. & Tuso, M.A. (1977). *Environmental Interventions for Litter Control*.

³⁰ Keizer, K., Lindenberg, S. & Steg, L. (2011). The Reversal Effect of Prohibition Signs.

³¹ Reich, J. W., & Robertson, J. L. (1979). Reactance and Norm Appeal in Anti-Littering Messages.

Reiter, S. M., & Samuel, W. (1980). Littering as a Function of Prior Litter and the Presence or Absence of Prohibitive Signs.

³² Zauberaman, G., Kim, B. K., Malkoc, S. A. & Bettman, J. R. (2009). Discounting time and time discounting: Subjective time perception and intertemporal preferences.

the city, the environment of their holiday, and the quality of the national park, but the pervasive litter suggests that these considerations are not taken into account at that point in time. In other words, the benefits of a clean park and waterways in the future are currently outweighed by frictions and hassles that tourists and residents face in the present.

- C. Responsibility.** There is a lack of clarity over who is responsible for disposal of waste. Each person who litters or dumps their waste feels like they only has a small effect on the environment, but these incidents collectively cause significant harm to the environment and others in an area. For instance, if there are waste collection points for tourist waste within GTNP then households and tour-camps are able to dump their waste at the site and avoid the cost and time associated with proper disposal. These negative behaviours are more likely to be present when people think that their impact is limited or inexistent,³³ such as adding a small amount of litter to an already littered environment. People also tend to consider actions that are side effects or omissions as more morally permissible than those that were directly intended³⁴ which may be applicable to tourists that do not intend to litter but cannot find a bin. The field survey results indicated that there is disconnect between what respondents believe should be done with waste and the amount of litter that is left in the park. More than 90 percent of respondents said they take their own waste to the closest waste site or to the city, and more than 65 percent say they either want to collect others' waste or do collect others waste. This indicates that proper waste disposal is the right behaviour. The intention to dispose of waste properly may be present, but this does not necessarily translate into action.³⁵ Also, the park visitors may think that they have paid for the service, when they paid the entrance fee. They may not realise that park rangers are not compensated for their waste collection efforts and it is not part of their job responsibilities.

POTENTIAL INTERVENTION POINTS ³⁶

Deciding where and how to intervene is not always easy. As a policy maker, it can be difficult to see things from the user's perspective and to identify all the possible intervention channels. Conversely, if you can identify many possible intervention channels, it can be difficult to choose between them. To overcome these problems, it can be helpful to create a User Journey Map. This diagram lists in order all the individual actions the user completes while doing an activity, making it easy to identify possible channels and levers, and behaviors to try to shift.

Project team brainstormed and developed a User Journey Map of the visitors entering GTNP. The map shows all the activities of the trip, which starts from '*decide to go camping*' and finishes with '*disposing of wastes*'. Based on the brainstorming sessions, number of key intervention points were identified. These points are highlighted green in the User Journey Map (Figure 6).

³³ Fehr, E., & Fischbacher, U. (2004). Social norms and human cooperation.

³⁴ Cushman, F., Young, L., & Hauser, M. (2006). The role of conscious reasoning and intuition in moral judgment testing three principles of harm.

³⁵ Sheeran, P. (2002). Intention-behaviour relations: A conceptual and empirical review;

Webb, T. L. & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change?

³⁶ BIT (2018), Baseline findings: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

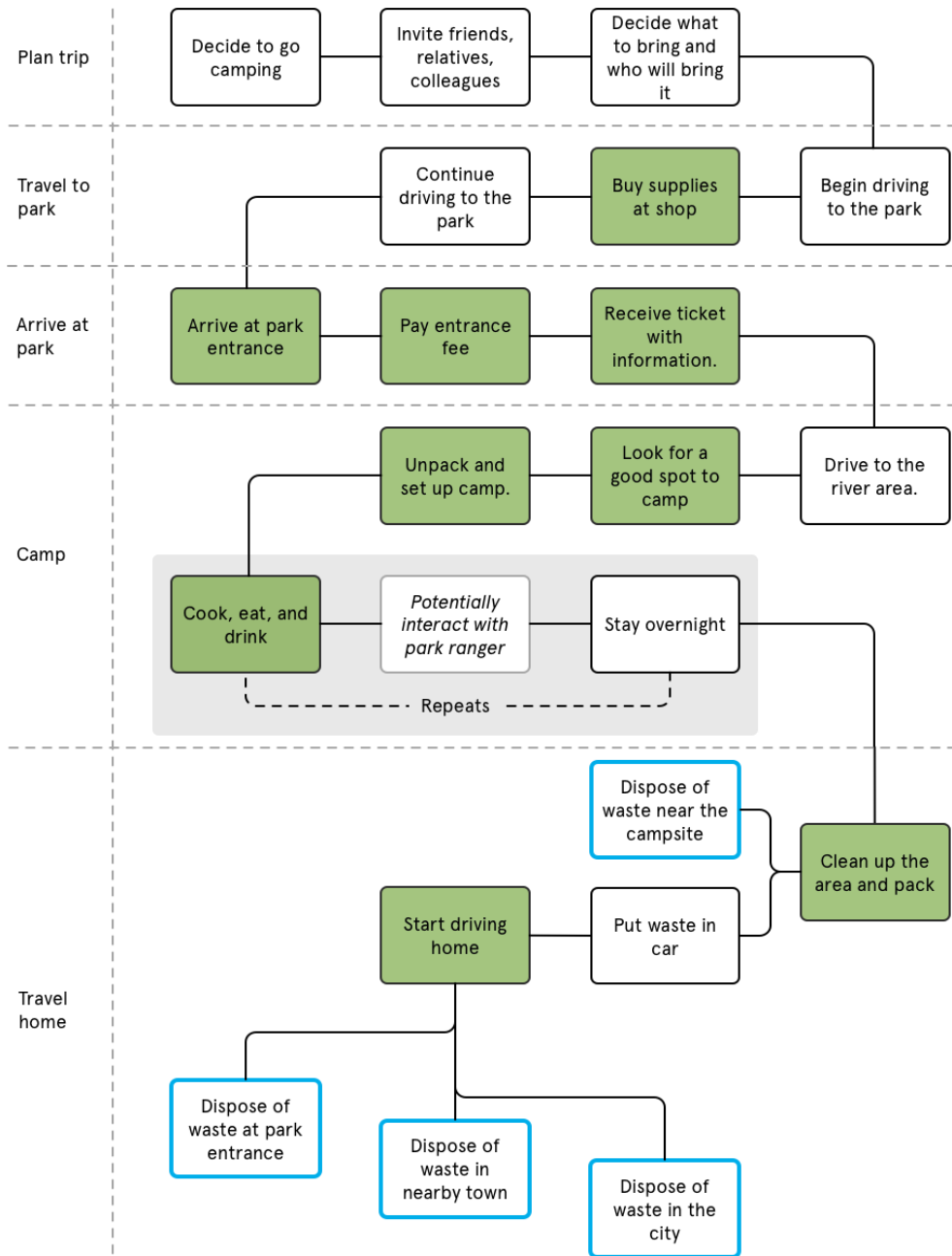


FIGURE 6. USER-JOURNEY OF GTNP VISITORS

V. SOLUTION STAGE

DESIGN OF INTERVENTIONS³⁷

To achieve the target of the project, the team brainstormed and developed several interventions targeting the visitors at GTNP, which can be used at the intervention points. During the brainstorming sessions, the most popular interventions were shortlisted as follows:

1. Place signs, with messages showing the correct behaviour, in those park locations with the highest amount of waste dumping.
2. Give maps marked with waste disposal points to visitors as they enter the park.
3. Get the supermarket near the park to distribute eco-friendly garbage bags with a map of waste disposal points printed on them. The bags would be given to people on their way to the park, and those who take a photo of themselves with a bag of rubbish at a waste disposal site and post it on social media would receive an entry into a lottery.
4. Install trash bins at bus stops on the way to the nearest town/smaller waste collection points in strategic locations in the park.
5. Share stories of pro-environmental behaviour via social media platforms.
6. Create a cartoon character as the "champion" and use it to promote pro-environmental behaviour.

It is necessary to assess the potential of the solutions or the developed interventions. Table 8 shows the criteria and indicators used to assess the potential of the solutions. For each indicator a scoring method of 1 – 10 was applied.

TABLE 8. ASSESSMENT CRITERIA AND INDICATORS FOR THE SOLUTIONS

Nº	Criteria	Indicators
1	How feasible it is	<ul style="list-style-type: none"> - the control of the system or process - the cost of the solution - the people and resources required to implement the solution
2	The impact it will potentially have	<ul style="list-style-type: none"> - The number of people that will potentially be affected by the solution. - The potential effectiveness of the solution - The potential sustainability of the solution.
3	How measurable this impact is	<ul style="list-style-type: none"> - Ease of data collection. - Whether you can run a Randomised Controlled Trial, or a Controlled Trial.

As a result of the assessment top three interventions were identified as follows:

1. Place signs, with messages showing the correct behaviour, in those park locations with the highest amount of waste dumping.
2. Give maps marked with waste disposal points to visitors as they enter the park.
3. Get the supermarket near the park to distribute eco-friendly garbage bags with a map of waste disposal points printed on them. The bags would be given to people on their way to the park, and those who take a photo of themselves with a bag of rubbish at a waste disposal site and post it on social media would receive an entry into a lottery.

³⁷ BIT (2018), Interventions report: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

However, at this point it should be stressed that a lot of assumptions were applied to assess the solutions. Hence, prior to trial, the interventions need to be detailed further using the Easy, Attractive, Social, and Timely (EAST) principles. In other words, interventions should be *easy* to implement, *attractive* to the group, *social* so that people would perform the desired behaviour, and *timely* to prompt the actions.

TRIAL PROTOCOL³⁸

Given the complexity of the interventions, short summer season and limited timeframe of peak period for visitors (long holiday season is expected during the Naadam festival³⁹ in Mongolia, which is in July), a bundle of the top interventions would be trialled for a period of five weeks. After a careful revision and series of brainstorming sessions, the top shortlisted interventions were simplified and integrated considering the EAST principles. Integrated interventions are shown in Table 9.

TABLE 9. INTERVENTIONS TO TRIAL

Intervention	Description
Container at the entrance	A large waste container will be installed at the entrance of the GTNP. This will salient the need to bring the waste out of the park, as well as making clear where the rubbish can be disposed.
Messages at the entrance	Two signs in Mongolian will be displayed on the container as shown in Figure 7.
Rubbish bags given to each visitor	Giving all visitors a rubbish bag will make it much easier for them to pick up after themselves and will serves a physical reminder to do so. This bag may also act as a gift to individuals, prompting them to reciprocate by picking up their wastes.

Allocating individuals to visit the park or collect data at the individual level would be practically not possible. Therefore, no randomisation was used, and trial participants were allocated to the treatment and control group by the week that they choose to visit GTNP. The intervention was trialled for five weeks, which started with a control week followed by treatment week and ended with a control week (Table 10). All data was collected on the ground by the waste management specialist. Weight and composition of the waste left behind at the popular campsites and at the waste container was measured.

³⁸ BIT (2018), Trial protocol: Leveraging Behavioral Nudges to Improve Waste Collection at the Gorkhi-Terelj National Park project.

³⁹ Naadam is a traditional Mongolian festival which dates back to the 13th century, and it is registered as the intangible world heritage of UNESCO. It is celebrated in July all across the country, although 11 – 13th of July is the official state holiday.

FIGURE 7. DESIGN AND MESSAGING OF THE WASTE CONTAINER TO BE INSTALLED AT THE ENTRANCE OF GTNP

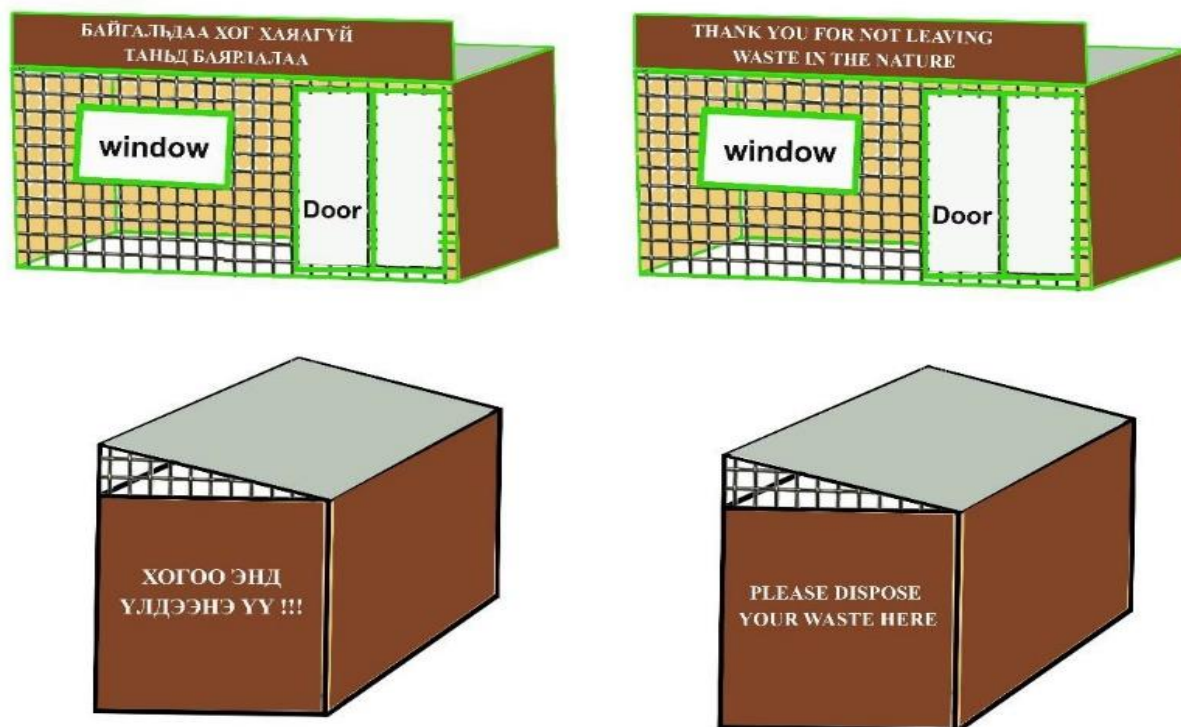


TABLE 10. SCHEDULE OF THE TRIAL

№	Week/Date	Description of activities
0	Trial preparation July 2	Prior to initiating the trial, popular destinations were all cleaned.
1	Control week July 3 – 9	The trial was started. At the end of the week, the waste was collected and measured. The number of visitors was estimated based on the number of tickets sold at the entrance.
2	Treatment Week July 10 – 16	Plastic bags were distributed to each visitor, and the waste container was installed at the entrance of the GTNP. At the end of the week, the wastes at popular destinations and at the waste container were measured and all sites were cleaned. The number of visitors was estimated based on the number of tickets sold at the entrance.
3	Control Week July 17 – 23	Waste container was removed, no plastic bags were distributed. At the end of the week, the waste was collected and measured.
4	Treatment Week July 24 – 30	Repeated procedure of Treatment week.
5	Control Week July 30 – August 5	Repeated procedure of Control week.

VI. TRIAL STAGE

The five-weeks trial was organized during the peak tourist season in July – August. Three popular destinations were identified as: 1) Tuul bridge area; 2) Tuul river area; and 3) Garam (near 6th khoroo residential area), which are shown in Figure 8.



FIGURE 8. SELECTED POPULAR DESTINATIONS OF THE PARK

Partners, including the GTNP Administration, the local government of the 6th khoroo, and a local NGO responsible for the collection of wastes, cooperated to successfully implement the trial. Distinctive brown plastic bags were distributed during the treatment weeks, and local NGOs transported the collected waste to disposal sites (Figure 9).

FIGURE 9. BROWN PLASTIC BAGS AND LOCAL NGO TRUCK TO TRANSPORT WASTE



After each week the number of sold tickets was counted manually, and the total amount of waste generated at the selected three locations as well as at the waste container was collected and measured (Figure 10).

FIGURE 10. ENTRANCE TICKETS AND WASTE GENERATED



WASTE GENERATION

The number of visitors and the total amount of waste generated varies greatly. Table 11 shows the number of tourists and the total amount of waste generated during the trial period.

TABLE 11. WASTE GENERATION DURING THE TRIAL PERIOD

Trial Week	Description	Total visitors	Total waste (kg)	Generation rate (kg/person)
1	Control	5300	405.8	0.08
2	Treatment	18650	15387.2	0.83
3	Control	4800	4647.3	0.97
4	Treatment	7500	5783	0.77
5	Control	11920	226.4	0.02

Based on the number of sold tickets, a total of 48170 tourists visited GTNP during the trial period, of which 32570 were domestic and the remaining 15600 were foreigners. According to the MET data, a total of 134815 visitors entered the GTNP in 2018; thus, it can be estimated that 35.7% of the total GTNP visitors entered the park during the trial period (July 2 – August 5). This peak visitor period can be attributed to the long holiday season, pleasant summer weather and the Mongolian tradition, which believes that it would be safe to swim in the rivers after June 22, as the water is purified by then. It can be observed that the highest number of visitors (18650) entered the GTNP during the long holiday week of Naadam festival, which was the first treatment week. Due to heavy rain and chilly weather during the third week of the trial (control week) almost 3-4 times less visitors entered the park; and when the weather condition improved during the following weeks, the number of visitors increased gradually. It shows that the GTNP is indeed one of the most popular holiday destinations in summer season.

Figure 11 shows the waste generation rate and the total amount of waste generated. It can be observed that during the first week of the trial the waste generation rate amounted to 0.08 kg/person, which is almost similar to the baseline data of 0.11 kg/person. However, during the second week of the trial the number of visitors increased by almost 3 folds and the waste generation rate amounted to 0.83 kg/person. Regardless of less visitors during the third week, the waste generation rate was 0.97 kg/person, which is higher than the previous weeks. The second round of the treatment resulted in a decrease of the waste generation rate to 0.77 kg/person. It is also interesting to note that the waste generation rate during the control weeks varies significantly, whereas it is almost similar during the treatment weeks (2nd and 4th week).

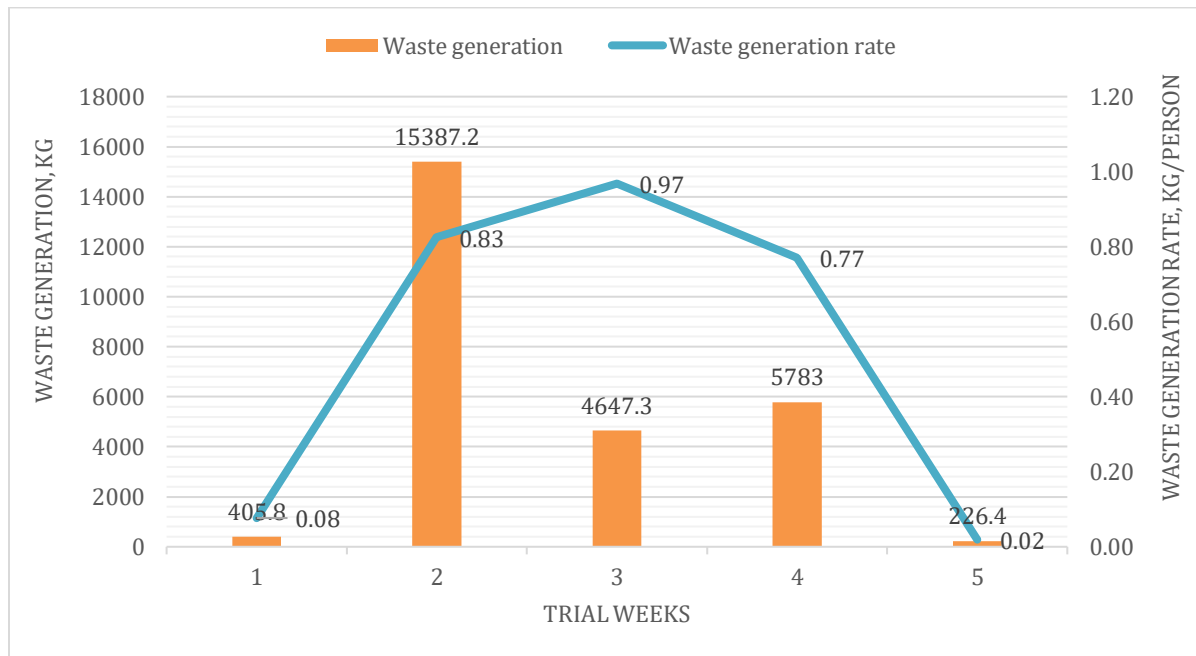


FIGURE 11. WASTE GENERATION AT GTNP DURING TRIAL PERIOD

Table 11 shows the waste generation at each of the selected destinations (site 1, 2, and 3) and the container site. The average waste generation amount during the control weeks show that site 2 is the most popular destination followed by site 1 and 3. Moreover, the percentage of waste distribution during the treatment weeks was estimated based on the average

waste generation at different sites. Figure 12 shows that 86% of the total waste generated during the treatment weeks was collected at the container.

TABLE 11. WASTE GENERATION AT DIFFERENT DESTINATIONS DURING THE TRIAL PERIOD

Week	Description	Site 1 (kg)	Site 2 (kg)	Site 3 (kg)	Container (kg)
1	Control	79.3	195.9	130.6	0
2	Treatment	0	880.2	783.6	13723.4
3	Control	248	1586.7	42.2	2770.4**
4	Treatment	154.9	365.5	612	4650.6
5	Control	85	55.9	85.5	0
Control average (kg)		137.4	612.8	86.1	
Control average (%)		16.43	73.27	10.29	
Treatment average (kg)		154.9*	622.9	697.8	9187.0
Treatment average (%)		1	6	7	86

* Due to unexpected cleaning of Site 1 by the volunteers, average amount was not estimated, but the second week treatment data was used for further estimation.

** Waste left at the container site during the control week was included in the waste generation rate estimation; although it was excluded from the estimation of waste generation percentage at the destinations (Site, 1, 2, and 3).

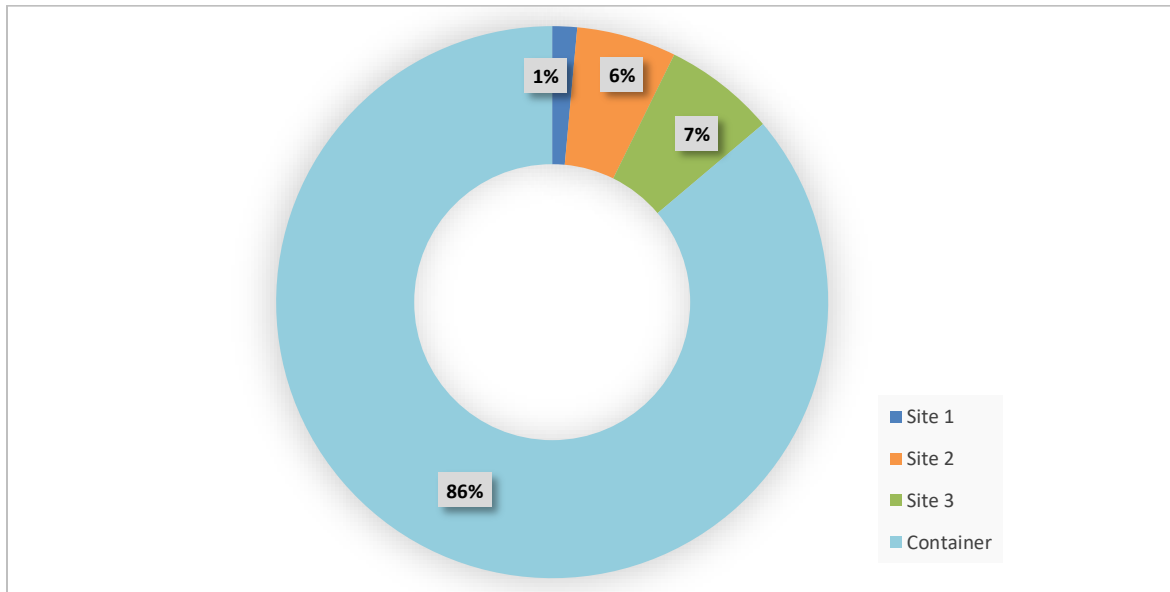


FIGURE 12. DISTRIBUTION OF WASTE DURING THE TREATMENT WEEK

Nevertheless, few unexpected outcomes were observed during the trial. For instance, during the first treatment week, environmental volunteers cleaned all the waste at Site 1; thus, no waste was left to measure. Also, even if the waste container was removed during the second control week (3rd week of the trial), visitors were leaving their waste near the container site (Figure 13).



FIGURE 13. VISITORS LEAVING THE WASTE NEAR THE CONTAINER SITE

The waste composition was also analysed, and the average percentage of the recyclables (glass, cans, papers and plastics) and non-recyclables (bones, food waste and others) are shown in Figure 13. In terms of waste types, not much difference was observed between the control and treatment weeks. However, during the treatment weeks, a slightly higher amount (4%) of recyclables were collected.

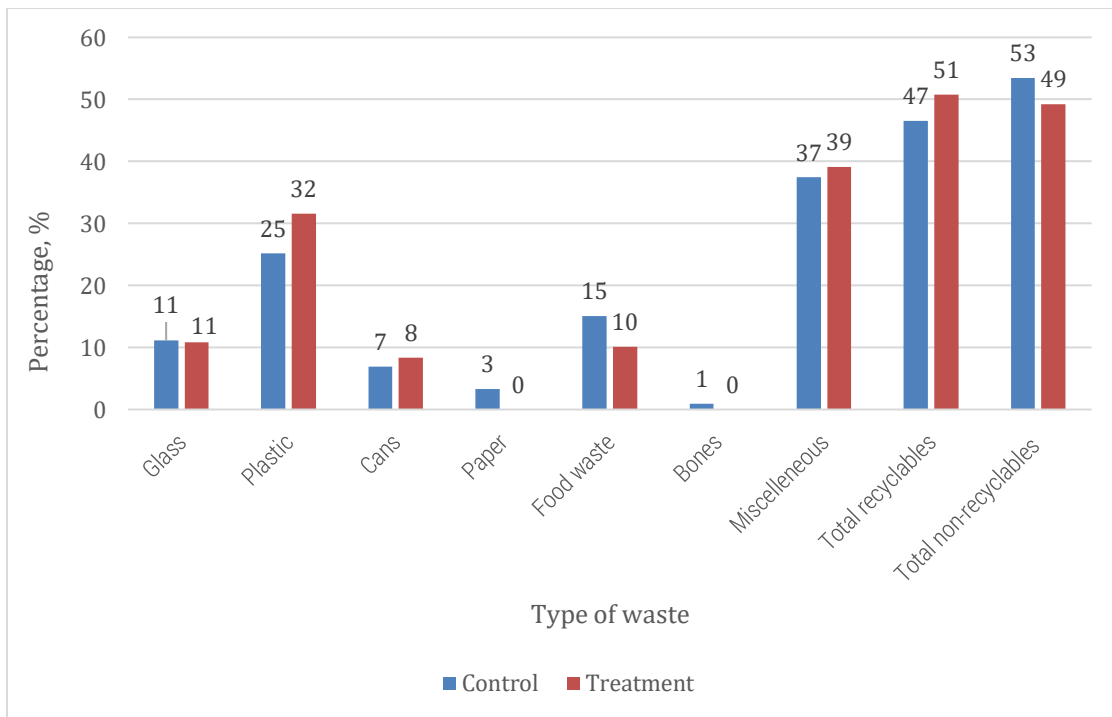


FIGURE 14. PERCENTAGE OF RECYCLABLES AND NON-RECYCLABLES DURING THE TRIAL

VISITORS QUESTIONNAIRE

To provide additional qualitative insights on the waste management at GTNP, a random questionnaire from the visitors was conducted. A total of 123 visitors were engaged in the questionnaire, of which 41% were male and 59% were female. 44% of

the respondents were between the age of 21-30, 41% were between 31-40 years old, and the remaining 15% were above the age of 41, which shows that most of the GTNP visitors were relatively young. More than 51% of the respondents said that they visit GTNP at least 3 times per year, while 20% of them visit twice, and the remaining 29% visit GTNP once a year.

The results showed that more than 93% of the visitors feel uncomfortable with the wastes left in nature, especially with the scattered toilet papers due to the lack of sanitary facilities. However, most of the visitors, especially the younger ones (below age 41) tend to leave it as it is. This is because most visitors are from urban centres where littering is often tolerated, or perhaps due to their misconception⁴⁰ of the fact that the waste management service fee is included in the entrance fee.

Moreover, 56% of the respondents usually clean the area where they camped but leave the waste somewhere along their way back; while the remaining 41.5% take the wastes with them to the city, and 2.4% leave the waste in nature. It was also revealed that most of the male visitors tend to leave the waste, while the female visitors take the waste back with them. This is because some men consider pro-environmental behaviours as unmanly, thus resist to it⁴¹.

The respondents were also asked to provide their opinion on various approaches to encourage visitors not to litter in nature (Figure 15). 30% of the respondents stated that a waste container would make visitors dispose of their waste properly and 21% said distributing waste bags would be the best solution to reduce littering in nature. Moreover, 17% of the respondents specified that a fine would result in the best outcome, whereas 13% responded that information on the environmental footprint of the waste and its proper management at GTNP would contribute to greater result. The remaining 12% favoured an appropriate camping route with extra payment along the river, while 7% would prefer other incentives to prevent littering.

FIGURE 15. PERCENTAGE OF RECYCLABLES AND NON-RECYCLABLES DURING THE TRIAL



⁴⁰ Brown, T, Ham S.H, Hughes M. (2010). Picking up litter: an application of theory-based communication to influence tourist behaviour in protected areas, *Journal of Sustainable Tourism* 1-22.

⁴¹ Brough, A. R., Wilkie, J. E., Ma, J., Isaac, M. S., & Gal, D. (2016). Is eco-friendly unmanly? The green-feminine stereotype and its effect on sustainable consumption. *Journal of Consumer Research*, 43(4), 567-582.

MAIN CHALLENGES DURING THE TRIAL

- Some of the wastes, especially the commingled wastes that were disposed by the residents were bulky, and it was difficult to measure the bulky wastes accurately;
- Although the local NGOs and waste collection companies committed to transport the waste every week, sometimes they were not on time causing unnecessary hurdle.
- An unexpected clean-up campaign was organized during the treatment week. Although the campaign intended positive outcomes for the GTNP waste management, it contaminated the results and findings of the first treatment week.
- Park officers, who are in charge of issuing tickets were not able to distribute the waste bags to all visitors due to the heavy rain fall and unpleasant weather during treatment week 2;
- Residents and tourist companies were dumping their garbage into the visitors' waste bin; therefore, it was difficult to measure wastes and types of wastes generated by the visitors.

Given the challenges faced during the trial, the following recommendations should be considered to ensure the robustness of the trial:

- Weather conditions – preparedness measure in terms of resources to clean up fast and treatment deployment in the case of bad weather/heavy rain;
- Having better control over the waste disposal infrastructure, both in terms of who disposes and regularity of waste collection from the waste site;
- Improving the communication campaign around the trial implementation;



MAIN FINDINGS AND CONCLUSIONS

1. MET data reveals that visitors to protected areas, especially to GTNP are increasing every year with a rate of 7.6%. It was also found that more than 35% of the total annual visitors enter GTNP in July due to the long holiday of Naadam festival.
2. More than 80% of the visitors at GTNP are below the age of 40, which shows that the park is a popular holiday destination for the younger generation.
3. The baseline research found that approximately 92% of the total annual waste is generated during the warmer season (May – August), while 8% is generated in the colder season (September – April). It was estimated that the ecological footprint of the generated waste is 1.64 ha/capita and 1.22 ha/capita in warm and cold seasons, respectively.
4. During the peak summer month (July) waste generation rate reached 0.97 kg/person as compared to 0.11 kg/person in June.
5. Due to the interventions, 86% of waste was collected in the container near the entrance gate, which is almost 3 times higher than the targeted 30%. It shows that people respond positively, when the intended message is delivered in the immediate time frame prior to their opportunity to behave.⁴² However, the interventions encouraged visitors to generate more waste, thus increasing the generation rate, as it sends a message that the waste will be taken care of. In other words, like many behavioural interventions the trial had both positive and negative results.⁴³
6. It is possible that with more time, the norms about behaviour might shift. As noted, 86% of waste was placed in containers – potentially over time, with a more consistent approach, this proportion might grow. Moreover, if people expect a clean environment, then this will help to perpetuate a norm that people do not litter, which will further encourage correct disposal of waste.
7. It is also interesting to note that visitors were still dumping their waste near the container site, even when the container was removed during the second control week. There are a few potential explanations for this behavior. It may have been driven by repeat visitors who expected the container to be there, and in the absence of any other options, decided to leave their waste in this location. It may also have been driven by residents, who expected the container to be there. Notably, it would only take a few residents or repeat visitors leaving their rubbish at the container site to create a perceived norm – once a certain amount of rubbish has accumulated in a specific place, it may then give the appearance of being the “designated” rubbish disposal area.
8. The behavioural insights process, in particular the user journey mapping exercise, identified a range of potential intervention points – some of these had not been considered previously. For example, a key point for a potential future intervention that was identified were the supermarkets where tourists regularly shop. Future activities could consider focusing on this intervention point.
9. While the results of the trial could contribute to improving the waste management efforts at the GTNP, such positive interventions should be owned and scaled by local authorities. However, it should be noted that behaviourally informed approaches are no substitute to a more robust and systemic approach to the local solid waste management, such as establishing waste segregation and recycling at source, improving the collection and transportation services, and monitoring as well as penalty systems.

⁴² Brown, T, Ham S.H, Hughes M. (2010). Picking up litter: an application of theory-based communication to influence tourist behaviour in protected areas, *Journal of Sustainable Tourism* 1-22.

⁴³ Young RD. (1993) Changing behaviour and making it stick the conceptualization and management of conservation behaviour, *Environment and Behaviour* 25:4

RECOMMENDATIONS

Based on the main findings and challenges of the trial, the following short-and-long term recommendations were developed.

a) FOR SHORT-TERM ACTIVITIES:

- The cost of waste bags could be included in the ticket price for each visitor that enters the park, so that it would prevent from the misconception of visitors. It is also recommended that the park officers would give orientation on how to use the rubbish bags and how to dump the waste properly. One potential way to strengthen this is to reimburse people for part of the cost of the bag if they put their rubbish in the bag and put it in the bin when they leave the park. Alternatively, visitors could receive a coupon to save a little next time they visit the park;
- The location of the waste collection point should be away from households but along the road and the waste transportation should be more frequent, so improper waste dumping will decrease, and visitors will learn to dump their waste in a correct and proper way;
- Ultimately, making it easy for visitors to dispose their trash somewhere is likely to be the most effective way of shifting behaviour. A large-scale study of 130 outdoor public locations in the US found that a lack of receptacles increased littering behaviour, with the greater distance to the receptacle further increasing the likelihood of littering. The knock-on effect being the social norm of a littered environment. In addition, people are often willing to take a suboptimal action if it is certain, in order to avoid ambiguity about a potentially better outcome. Dropping a single item of litter or dumping a single item of waste has a minimal impact on the environment but finding a bin is a challenge.
- More information signs with a consistent message should be placed along the shore of the river where visitors stay. If the pilot is scaled up, then the signs should reflect the fact that people should take their waste and dispose of it in the containers at the entrance. This will help to reinforce the underlying mechanism of the trials;
- Signs could also incorporate other aspects of behavioural insights. For example, previous work in national parks has shown that reminding people that most people disapprove of a behaviour (as opposed to reminding them that many people are engaging in a behaviour) is most effective.⁴⁴ Hence, a reminder that they shouldn't leave waste – and should instead dispose of it at the containers – is likely to be most effective;
- The messages and signs including the bulletin boards should prompt specific actions, as it is found to be more effective and well perceived.⁴⁵

b) FOR MID-TERM AND LONG-TERM ACTIVITIES:

- Conducting a thorough cleaning exercise at the start of the peak season may have long-term benefits – if the park is already clean and does not have litter, it conveys a sense that the norm is not to litter, which will reinforce the correct behaviour. If, however, there is litter already present, people are more likely to litter as they may perceive this to be the norm. Hence, a major cleaning effort should be undertaken at the start of any peak season;
- Further, a ticket machine with smart software solutions should be developed where visitors can pay differently varying on their days to stay at the park;

⁴⁴ Cialdini, R. B., Demaine, L. J., Sagarin, B. J., Barrett, D. W., Rhoads, K., & Winter, P. L. (2006). Managing social norms for persuasive impact. *Social influence*, 1(1), 3-15.

⁴⁵ Brown, T., Ham S.H., Hughes M. (2010). Picking up litter: an application of theory-based communication to influence tourist behaviour in protected areas, *Journal of Sustainable Tourism* 1-22.

- Rolling out similar practices at other national parks will also help to build habits and norms across the community – if the new norm at all national parks is that waste must be disposed correctly, this will have a positive feedback effect.
- In addition, having clear waste disposal containers at all national parks will make it easier to have a consistent, clear and simple national campaign – the message can be the same across the campaign (i.e., do not litter, collect waste in the bag that comes with your ticket and place it in the containers provided).
- Scaling up activities should also consider how other parks have managed this challenge and take into account any specific features or local factors that affect each individual national park.
- Public camping points with proper parking lots, waste collection points and bio toilets should be established;
- Ministries and other related organizations should consider organizing a national “behaviourally informed” communication campaign via social media and other networks to discourage littering behaviours more consistently in the future. Some of these might include: distributing maps marked with waste disposal points to visitors as they enter the park, sharing stories of pro-environmental behaviour through social media platforms, and creating a cartoon character to be the parks “champion” and use it to promote pro-environmental behaviour.



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