

Qualitative study of Kathmandu's traditional water spout (Hiti) system.

Introduction

Kathmandu's Hiti (water spout) network is a feature known to some, but used by many. Due to a mixture of urban pressures and modernisation, the future of the Hiti network is uncertain, however the actual use and dependency upon such a system as a source of water, as well as a social, religious and heritage feature is not particularly clear.

This study aims to consider how the Hiti network is used, followed by any processes which could be adopted to assist in maintaining or preserving this unique system.

Method

This qualitative survey comprised both observational and informal/unstructured interview techniques with the assistance of a translator. A number of Hitis within central Kathmandu were selected as the subjects upon which this report is based. **Table I** below identifies the specific Hitis, the dates upon which the surveys were undertaken, the times visits were undertaken and the relevant photo appendix reference.

Table I – Identification of surveyed Hitis

Name	Date visited	Time visited	Location (approximate) Lat/Long	Accompanied by translator	Appendix reference
Manga Hiti	16/11/2019	08.10 – 09.00	27.673651, 85.325451	Yes	Appendix A
Alko Hiti	16/11/2019	09.15 – 10.15	27.678351, 85.325625	Yes	Appendix B
Sundara Hiti (also known as Lu Hiti)	16/11/2019	14.00 – 14.30	27.669693, 85.328082	No	Appendix C
Ga Hiti	15/11/2019	15.40 – 16.15	27.717484, 85.312831	No	Appendix D
	17/11/2019	11.20 – 12.30		Yes	
Maru Hiti	17/11/2019	10.00 – 10.30	27.704514, 85.305476	No	Appendix E
		12.40 – 14.00		Yes	

During surveys, an initial period of time was spent observing the Hiti, noting how people interacted with the space, the functionality and (qualitative) flow rate of each spout, signs of cultural or religious use and any obvious pollution or litter within the Hiti space or water system. This was then followed (dependent upon translator availability as identified in **Table I**) by an informal interview process.

The informal interview process consisted of two elements. Firstly, the respondent was asked to rank their dependency upon the various water sources available in Kathmandu: (Hiti/spout, water tanker, bottled/jar, taps at home, private wells and community wells) from 6 (most dependent upon for water consumption) to 1 (least dependent). If a source was not available in that location, a score of zero was registered. The results of water source dependency for users of each Hiti were then averaged and provided in graphical format below (**Plate I**). An unstructured interview/conversation was then held with each respondent.

Limitations

The list of Hitis selected for this study are considered to be a fair reflection of central Kathmandu's Hiti network, however this list is not exhaustive and may not be representative of the wider Kathmandu network.

It should be noted that as the vast majority of people observed and interviewed were actively using the Hitis themselves there is an inherent cohort bias within the data gathered.

Due availability of the researcher, the survey period was isolated and should be seen as a 'snapshot' in time rather than a comprehensive representation of Hiti use.

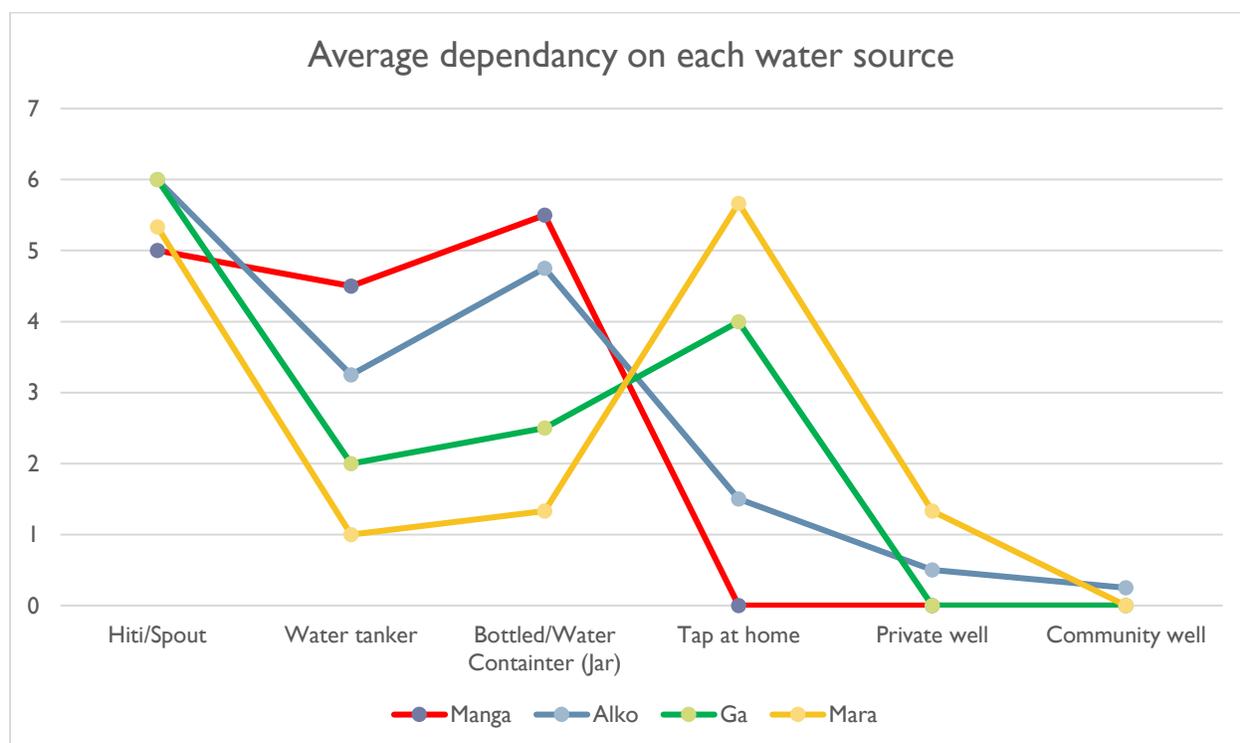
Interviewing Hiti users was only possible when the researcher was accompanied by the translator, thus it was not possible to rank Hiti dependency for every Hiti visited.

Finally, it was not always appropriate to approach Hiti users to conduct interviews if they were using the Hitis for purposes of personal hygiene, therefore some interview opportunities were missed. However, the researcher's translator advised that results at each individual Hiti would be broadly consistent, and that the limited sample number could still be considered representative (noting the survey period) of users for that Hiti.

Results

This section of the report firstly shows a graphical representation of the average dependency upon the varying available water sources, followed (for each Hiti) by reporting the noted observations and a summary of interview results.

Plate 1 – Average dependency on each water source



Manga Hiti – Observations

This three tiered Hiti consisted of three spouts all of which were observed to be consistently flowing at a relatively low flow rate and appeared to be kept in a clean condition. The drainage channel under the spouts seemed clean (comparatively to other Hitis), with water successfully flowing out of the Hiti via a drainage channel.

Users of the Hiti were observed to be collecting water for drinking purposes, as well as washing hands and feet prior to entering a nearby religious ceremony/event. Self-washing for hygiene purposes was not observed (likely due to its location at Patan Durbar Square World Heritage Site (WHS) with high footfall). Several women with young children entered the Hiti with the sole intention to educate them on the Hitis and their decorations, perhaps for religious or social reasons. Indeed, some users of the Hiti were observed praying to deities carved into the Hiti walls.

A mix of both male and female users were noted at Manga Hiti, however the majority of users were women. It was generally noted that users would make a short and specific trip to the Hiti, rather than stopping to converse/socialise with other users.

Uses of the wider Hiti space involved both members of the local public and tourists sitting on the top tiers, generally conversing and allowing time to pass. Throughout the survey, many people were observed to use the space socially.

Manga Hiti – Interview results

The water collected at Manga Hiti was generally understood to be used for cooking, drinking and sanitation purposes at home. It was learned that the majority of users rented rooms nearby rather than being homeowners themselves. In such a situation, direct access to taps or community wells is not available thus often people would buy a jar/large bottle (similar to an office water cooler) of water from a shop, then use the Hiti to refill the empty bottle once depleted. One respondent noted that the Hiti often runs dry in April before the monsoon rains arrive. It was understood that historically there was an additional spout, however this was removed approximately five to six years ago, evidence of which was noted during the visit (see the flat fronted structure with three holes in **Appendix A**).

No respondents were aware of a specific management committee for the Hiti, nor was there any tariff required to collect water. However, one respondent identified that as there was no formal management process, the local community now prevent people from washing clothes in an attempt to prevent litter/chemical packaging from blocking drainage channels. Notwithstanding this, it was generally understood that due to the Hiti's location at a WHS, a level of management (i.e. superficial surface cleaning) was undertaken by the government due to the prevalence of tourist footfall.

Alko Hiti – Observations

This small, single tiered Hiti was observed to have five spouts, all of which were functioning well with a high and consistent flow rate. Interestingly, flow from three of the five spouts was being collected and diverted into a series of large containers within the bounds of the Hiti curtilage. Alko Hiti is located in a quiet residential area, and no observations were made of the space being used for social purposes.

Users of the Hiti were observed to be collecting water for drinking purposes, as well as washing hands/feet and cleaning teeth.

Given the limited size of the Hiti, the number and size of religious items/deities either standing within the Hiti or carved into the surrounding walls was both surprising and impressive. Evidence of brightly coloured paint was noted on and surrounding the deities, thus it was

assumed that this Hiti was being actively used as a place of worship, as well as a source of water.

Alko Hiti – Interview results

The water collected at Manga Hiti was generally understood to be used for cooking, drinking and sanitation purposes at home. Respondents appeared to be proud that the water from the Hiti had not been known to contain contaminants, and that it was regularly used for drinking purposes.

Interestingly, one respondent raised a concern that in the future the government might provide sufficient drinking water to all homes, resulting in the potential reduction in value of the Hitis as religious or social spaces generally.

As mentioned in the observation section, water was being diverted into large storage tanks. During the interview process, an Alko Hiti committee member (with a remit of approximately 1km from the Hiti) was interviewed concurrently with an informed and interested local resident. Through this, it was understood that that the tanked water (capacity of 22,000 litres) was then being piped to approximately 200 nearby homes. For this service, each household pays 7,000 rupees to register their property on the piped system, followed by a monthly tariff of 250 rupees. In the respondent's 18 years of committee membership, a similar supply system to the local area has been in place and apart from seasonal fluctuation, no change in flow rate had been noted.

The same two respondents stated that both the specific source of the water, and the pathway taken by the water to reach the Hiti was a mystery. They noted concerns that, to their knowledge, there has never been a survey into the water channel system and that there was no knowledge of the engineering that allowed the Hitis to function. Additionally, concerns were noted that urban pressures from nearby development could introduce cracks/leaks into the underground system and disrupt the flow of water.

This topic of conversation was furthered by the reporter's questions on local government involvement and local construction projects. The respondents identified that new housing development was not a particular concern due to shallow foundations, however larger development such as supermarkets or road schemes often used deep foundations which could impact water systems. The respondents then confirmed that they have never had contact with local government in relation to new development surrounding the Hiti. It was specifically raised that construction contractors and local government officials liaise between themselves (in relation to financial incentives for new development) with no consultation on impacts to the local community. The conversation elicited the fact that the Hiti committee has no ability to start such consultation, and thus are not informed of future development. As a result of this

lack of communication, the respondents identified a sense of community spirit and indirect empowerment however no action had been taken as a result.

Despite a Hiti committee member being present at the site, another respondent interviewed was not aware of any managing committee for the Hiti. This was surprising given the significant pipework at the site.

Sundara (Lu) Hiti – Observations

This small Hiti was a small rectangular (as opposed to square as with all other Hitis) space adjacent to a busy road. Of the four spouts evident, none were flowing and given the level of dust surrounding the spout bases it was assumed that these had been dry for a considerable length of time. The Sundara Hiti was noticeably more ornate than others, with detailed carvings in the surrounding walls and a gold finish to the spouts themselves.

A large stone slab was located at the front of the Hiti which, along with the decoration, would suggest this Hiti has a high level of cultural or religious significance despite its lack of water supply. An informal conversation between the reporter and a member of the public identified that the Hiti was around 1,000 years old and renovated in 2011.

There was a significant amount of construction work and newer tall buildings surrounding the Hiti which may well have had an influence in the lack of water supply. Members of the public were observed to sit around the Hiti, however not within the Hiti itself perhaps due to its smaller size.

Ga Hiti – Observations

This Hiti was significantly larger than other Hitis in the study with four deep tiers. Of the five spouts visible only one was functioning, which had a good level of flow. Under the operational spout, a large amount of stagnant 'grey' water was noticeable. This left a large volume of scum sitting in the drainage channel which did not flow to the outlet.

Predominant uses observed consisted of washing clothes, collecting water for drinking purposes, washing for personal hygiene and socialising. Upon each visit to the Hiti, a large number of users was noted (around 11 people), however due to people washing themselves in the water, the reporter was unable to enter the Hiti properly. The surrounding tiers, while littered and overgrown with plants in some places, had been swept up previously as evidence of piles of leaves were observed.

In the centre of the Hiti were some religious items, one of which has stone disks in front each with orange powder on representing the Hiti's use for religious purposes. It was therefore assumed that regular religious activity takes place.

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The Hiti space was observed to be used by homeless people (sleeping on the tiers), as well as by young boys running and playing while their female relations used the Hiti's water as above. Throughout the time spent at Ga Hiti, multiple members of the public were observed leaning on the barriers watching the Hiti users.

Ga Hiti – Interview results

Owing to people washing themselves, an interview was conducted with a gentleman on the curtilage of the Hiti who was the ex-president of the 'Thamel Ga Hiti Youth Club'. This is a club for the local community who seek to manage the Hiti as one of a number of social actions in the area via the collection of a tariff (which apparently varies). The respondent provided anecdotal evidence that when a large building was constructed recently, sand was noticed within the Hiti's water flow.

The respondent noted that there is some limited contact with local government. They organise meetings and invite government representatives, however this would appear to be on a 'listen only' basis and no action is taken in response to any concerns. Often, the benefits of new development is re-stated by government representatives as a reason for the allowance of new construction. The government also note the mystery of how water reaches the Hitis as a reason for not being able to actively manage or preserve water flow, which was raised as a specific concern by the respondent. The respondent was open to the idea of discussing issues with other local Hiti committees.

Maru Hiti – observations

Of the five spouts evident at this Hiti only two were flowing, identified as having a low flow rate. Overall this was a small Hiti with a tight single tier and less ornate spouts than others. Uses of the water here were for drinking, washing for hygiene and washing clothes. This Hiti was the first observed which had a bin, actively being used by people discarding their plastic shampoo sachets. One user allowed her child to urinate in a corner adjacent to an active spout.

On the eastern side of the Hiti, drainage water was clear with seemingly good drainage flow, whilst on the western side the drainage water was cloudy with a layer of dark scum on the surface.

Again, religious items were evident at the Hiti however there were no signs that it was actively used for worshipping purposes.

Maru Hiti – interview results

Owing to a lack of people using the Hiti during times of translator availability, a local shop owner was interviewed who confirmed that again there are discussions with the local government

however this is on a listen only basis. It was noted that due to high land value, the government was more interested in monetary realisation from development rather than maintenance of the Hiti. The respondent commented that the local community was concerned about the future of the Hiti, however had no finances or platform from which to act. They also commented that, in their opinion, the increased prevalence of new groundwater boreholes being dug, along with increased surface water runoff from development of impermeable surfaces, prevented the recharging of groundwater thus a drop in the water table has resulted in many Hitis no longer functioning.

It was then identified that there is a local club for the preservation of the Hiti (among other social elements) made up of varying political parties. However, as there is no understanding of how the Hitis work, there's been no action to maintain them, nor any understanding of why the Hiti's water is not contaminated. It was understood that this club only consisted of some of the closest houses, who all have access to other sources of water and thus the Hiti's maintenance is a low priority.

Anecdotal evidence was then provided that a recent excavation near the Hiti identified a large 'silver' sheet of metal under the ground, angled toward the Hiti. The significance of this in relation to water flow was not clear.

Discussion

Three main elements will be focused on within this discussion, however the author acknowledges that there are other discussion points which could be followed or explored (see the 'further work' section).

First, it is clear that the traditional Hiti system in Kathmandu is very important and secondly, that there is a clear lack/gap in construction consultation between local government and the local community (as well as an apparent lack in policy to require such action). Finally, there is a substantial level of surveying work required to understand the engineering work behind the Hiti systems which is key to firstly allowing them to be understood and properly maintained.

I – Importance

This study has identified a high average dependency on the traditional Hiti system, however this is potentially skewed by the cohort bias of Hiti users. Despite this potential uncertainty in dependency, through observations and interviews the *importance* of Hitis is clear, as assets of religious and social significance in active use. The existing presence of informal and unstructured Hiti committees is further evidence of their wider and general importance.

It is the opinion of the author that the overall dependency of Hitis as a water source will vary between regions of Kathmandu, but that their importance as religious, social and cultural

features will remain high. **Plate I** identifies varying access to other water sources, which demonstrates the variability in dependency. The 'Further Work' section of this report identifies a high level approach to further survey work with the aim of providing more robust results on dependency.

2 – Apparent gap in consultation between local communities and contractors/local government.

The importance (if not dependency) of the Hiti system is identified above, thus it is imperative that local communities have the platform upon which they can ensure their voices, opinions and concerns are both heard and taken into account. Currently, the Hiti system would appear to be incredibly fragile and at the whim of contractors/local government, who appear to be taking a short-sighted approach to allowing development without due consideration to the environment or consultation to local communities. As evidenced in this report, one construction project with deep foundations could easily impact a local Hiti network with multiple practical and social consequences. In addition, one theory considered by the author is that because concerns would appear to be currently raised to the government in a singular and sporadic fashion, it is easy for them to be dismissed or not acted upon. Therefore, a coordinated and cohesive approach is required to reduce the opportunity for such dismissal.

The author therefore considers that a formal and structured strategy on community consultation in relation to new physical development should be adopted and (if possible) adopted as policy. For any governmental policy to be fit for purpose it should be informed by stakeholders at multiple levels to ensure buy-in and that it is deliverable. A consultation framework to allow Hiti users to inform such a policy is therefore suggested by the author, with the aim of providing a structured and transparent approach to the consultation process, resulting in the empowerment of local communities and due consultation between parties before major construction work is allowed. **Appendix F** demonstrates such a strategy which is briefly outlined below:

1. Collation of local knowledge surrounding a particular Hiti. Hiti committees could take a greater level of ownership over their assets, talk to surrounding residents of all casts, abilities, sex and age and collate a list of concerns and wishes. Through this study, it was identified by the translator that messages may be conveyed more convincingly by 'local social leaders' rather than Hiti committees themselves, as they already have the trust and respect of the community would elicit a better 'buy in'. Working together, Hiti committees and local social leaders (champions) could create a simple dossier for each Hiti.
2. The champions for other areas (informed by other Hiti committees) would then join to form an 'Informed Champion Committee', who would meet to collate concerns and prioritise required actions.

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3. The Informed Champion Committee would then meet with local government representatives in an open forum to convey messages. It is considered that using such a prioritised and structured approach would allow local government to readily understand and comprehend the combined issues within their area of remit, as well as reducing the ability to dismiss concerns so readily. During discussions, goals should be set and actions noted to ensure progress.
 4. Regular forums should be arranged between the Informed Champion Committee and local government to update on progress and for each to provide feedback to their respective groups. This latter point is key to ensuring momentum is not lost.

It is clear from the conversations held in this study that there is a healthy appetite at the grassroots level to become actively involved in such a coordinated approach. However, the author acknowledges there may be reluctance at the governmental level and that such a structure will be logistically challenging to implement.

3 – Mapping of water pathways and understanding engineering works behind Hitis.

It is not in the remit of this study to suggest how such an enormous task could or should be undertaken, but it is clear that it will not be possible to maintain the Hiti network properly or efficiently until further knowledge is gained on how they physically work.

Items 2 and 3 in this discussion are not mutually exclusive, and are both required in order to properly maintain the Hiti network.

Further Work

Through the study conducted, a series of work items became evident that the author considers would be useful projects to progress.

- During this study, the details of certain respondents were noted who were interested in being involved in future Hiti maintenance work. Details have been passed on externally to this report subject to consent from the interviewee. Contact should be made with these individuals as an immediate task to form links and discussion processes.
- Conduct a similar survey of Kathmandu residents in their homes, rather than at Hitis themselves. This would omit the cohort bias and elicit a broader spectrum of results and thus provide greater clarity on the dependency upon Hitis as a primary water source. It is considered that, subject to resource, this would be a useful exercise to undertake in the near future.
- Run a program to firstly identify which Hitis have a committee, seek to establish committees where they do not exist, and then secondly educate local communities about the committees and the aims they are working towards.

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- A technical review of the 1999 Local Self Governance Act is outside the remit of this study. However, such a review should be undertaken to establish whether it (ironically) provides policy support for the suggested consultation framework (to address the lack of policy requirement to properly consult on new development projects).

Conclusion

This qualitative study cannot identify a level of dependency on the Hiti network due to cohort bias, however it has concluded that the network remains important for a variety of reasons. Alongside this, a clear gap exists in consulting with local communities in relation to major development, and a framework has been suggested which seeks to provide a structure for such consultation. Finally, it will not be possible to properly maintain such a complex Hiti water pathway network without a full understanding of the engineering works which allow them to function.

Uncertainties aside, from conversations held and from observations made, Kathmandu's Hiti network is one to be treasured and admired. Every effort should be made to prolong its viability for a multitude of reasons, such that an asset of such importance is there to be enjoyed and utilised for generations to come.

Acknowledgements

This study would not have been possible without a number of people generously giving their time. Firstly, thanks to Sujeet Gautam from 'Friends Service Council Nepal' for his skills and time as translator, which were imperative in eliciting information from respondents, I've learned a huge amount from him. Secondly to Sachin Tiwari and Harmeet Sehambi of Frank Water – Sachin for his time on calls and in person in Kathmandu, and Harmeet for initial liaison work.

Finally, despite this report being written solely under my own name, thanks must go to Peter Brett Associates (now part of Stantec) for their continued links with Frank Water without which this would not have happened, and also for allowing me time away from the desk for a sabbatical, it has been a fantastic cross-learning experience.

Note from author

Jonny Murphy is an Environmental Scientist from Bristol, England, employed as a Senior Environmental Planner for Stantec. This report is his own work, and permission is given to Frank Water to utilise as they wish. It is noted that, given the short study period and cohort bias, there may well be uncertainties or inaccuracies in the results. This report is intended to provide ideas and a fresh perspective as a starting point upon which future work could take place, with the overall aim of supporting the future management of Kathmandu's Hiti network.

Appendix A - Manga Hiti



Appendix B - Alko Hiti



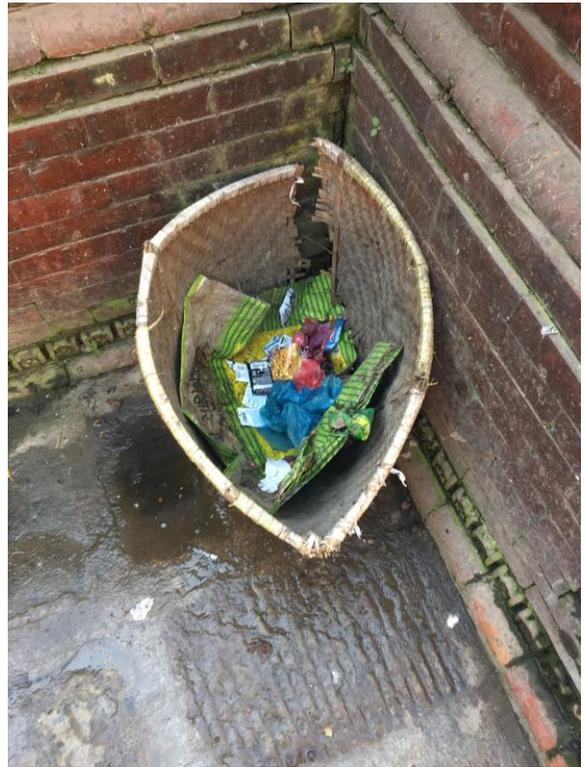
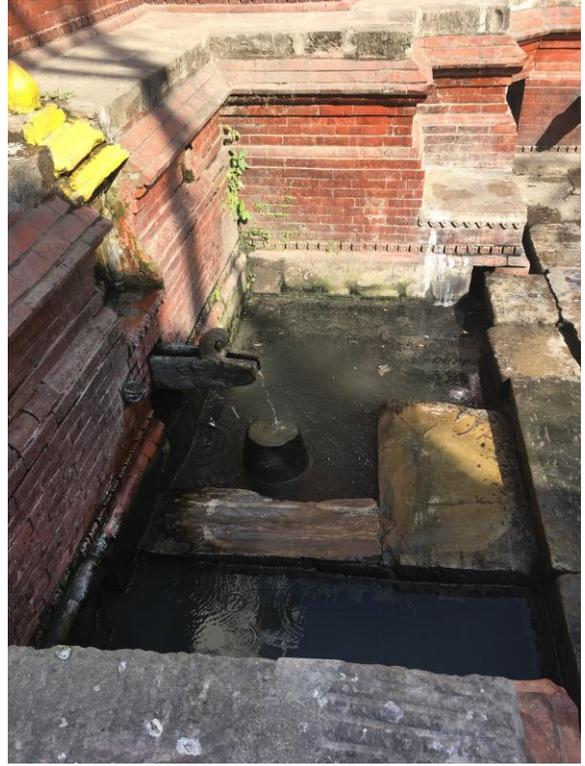
Appendix C - Sundara (Lu) Hiti



Appendix D - Ga Hiti



Appendix E - Maru Hiti



Appendix F – Consultation Framework

