Improvement of sanitary conditions and latrines (toilets) construction in Rwanda.

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ABSTRACT

The Latrine Construction & Hygiene Promotion MP aims to construct latrines and improve the sanitary conditions in the village of Mpungwe, the district of Huye, and then continue in other villages in the republic of Rwanda, which has a very high number of population (8.2 million). The population was resettled there after the genocide, when the construction of houses had not been finished, and there were no latrines.

In response to the situation, we have already built six shared Ventilated Improved Pit (VIP) latrines for 12 families in a pilot project. Following the success of this, a further 39 latrines are planned. The latrines are built by villagers chosen to be paid after their capabilities, thus, this will also be an income generating activity in the village. The ultimate goal of the latrine project is to provide adequate sanitation for each villager. This would mean that, on average, twelve people will be sharing a latrine. It is felt that this solution will go along way to improving the health of villagers, and it is also within guidelines as set by the World Health Organization (WHO), which states that not more than 25 people should share one latrine. To avoid contamination of water sources and unnecessary human contact, the location of each pit must satisfy the following criteria:

- Downhill and 50 metres from water abstraction points
- More than five metres from house
- Less than 50 metres away from house
- The bottom of the pit cannot be less than 1.5 m above the water table.

For our purposes we have modified VIP Latrine which is not totally the same as VIP recommended by the WHO but is modified to allow for the proposed shared latrine concept. The advantages of the VIP latrine, like the ability for the latrine to stay fresh, fly-free and odour-free will still be utilised, and the superstructure is slightly modified to suit Mpungwe's requirements. Lifespan of latrine should last for around 30 years, based on the assumption that twelve people are using the latrine and that the pit is dug to a depth of 8 metres.

INTRODUCTION

The village of Mpungwe, which is our current target group, is located in the cell of Nyakagezi in the sector of Huye, which is situated in Huye District, the Southern Province of Rwanda. The village was planned for 125 households and at the moment 96 have been established. The population is at around 600, averaging at six persons per family and household. Of these 96 households, 36 are managed by women, and five by children. The population was resettled there after the genocide, and consists predominantly of women, children, and elderly.

By the time the population had settled in the village, the construction of houses had not been finished and up to now no further improvements have been made. In particular, the absence of hygiene facilities means that cases of diarrhoea, dysentery and cholera are frequent and widespread. And this is the same case in all rural villages of Rwanda where about 90 % of the population (8.2 million) live.

Picture 1. Mpungwe Village.

The Absence of Hygiene Facilities

Results of needs assessment study 1999

The goal of this study was, firstly, to investigate the health and hygiene conditions. A questionnaire was formulated by the Rwandan students in co-operation with the international students and the project committee of IFMSA.

All of those asked use the water pipe, which is about 200 m away, for their water supplies. 96 % drink untreated water and 88 % keep their water in jerry-cans, which can easily be contaminated by bacteria and protozoa. All of the inhabitants use pit latrines. However 99 % of those asked said that the pit latrines were inadequate or inappropriate, being uncovered and used by too many people. Almost all of the inhabitants empty their rubbish into open pits.

Table 1. Answers concerning latrine use in Mpungwe village.

Q: Where do you go to the toilet?		
no answer	1	1.59%
1 Private Latrine	55	87.30%
2 Public Latrine	5	7.94%
3 In the bush	0	0.00%
4 Other	3	4.76%

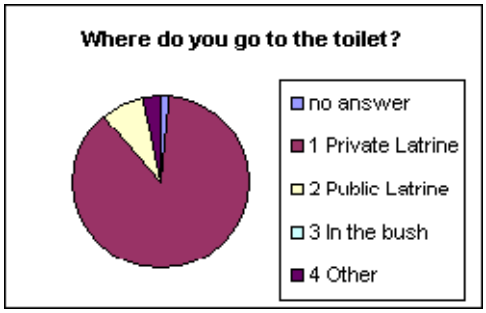

Figure 1. Answers concerning latrine use in Mpungwe village.

Table 2. Description of latrines construction supervisors in Mpungwe village before our intervention was presented.

Q: Who supervised latrine construction?		
no answer	2	3.17%
1 Authority	1	1.59%
2 Sponsor	2	3.17%
3 Family	54	85.71%
4 Other	5	7.94%

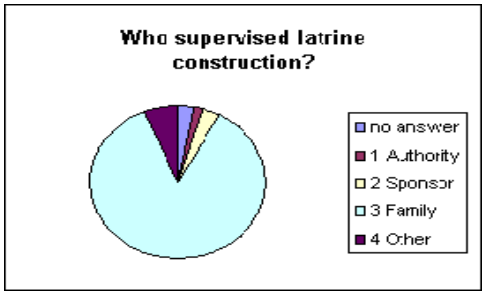

Figure 2. Description of latrines construction supervisors in Mpungwe village before our intervention was presented.

Lack of Latrines

Latrines are of particular importance in Mpungwe Village due to its geographical location. Mpungwe Village is on a ridge, with a valley either side of it. At the moment the majority of the population defecates in the hillside. During the nine months of the

rainy season, all the faeces are washed down the hillside into a village below. This is hygienically unacceptable and a particularly important reason for the necessity of latrines in Mpungwe Village. For a latrine to be of an acceptable standard; there should be a roof, the hole in the ground should be covered to prevent animals and flies from entering, they should allow adequate privacy for the user, and the latrine design should minimize the possibility of disease transfer. There is only one latrine in the village which meets these criteria; the other latrines are simply shallow pits that are less than two metres deep and thus do not meet these criteria. The way in which these shallow pits have been constructed favours the passage of pathogen vectors.

Aims and Objectives of our project

The ultimate goal of the latrine project is to provide adequate sanitation for each villager in Mpungwe Village. However, for financial and spatial reasons, it is not possible to provide private latrines for each household (96), and thus a latrine will be provided for every two households (45 latrines). This would mean that, on average, twelve people will be sharing a latrine. It is felt that this solution will go along way to improving the health of Mpungwe villagers, and it is also within guidelines as set by the World Health Organization (WHO), which states that not more than 25 people should share one latrine.

Having discussed with the villagers, it has been found that two households sharing a latrine is socially acceptable, but the latrines should be modified for sharing use. Wherever possible we aim to employ villagers and local materials in an effort to keep as much wealth in the village as possible. Before the ultimate goal can be achieved, a pilot project is required ensure the final project will succeed, and to clarify certain details.

Communal latrines were considered as an alternative to building many private latrines. However, a decision was made against communal latrines. This was because in the past, purely communal projects set up in Mpungwe have failed, partly due to a lack of sense of ownership from the villagers. Also, the general opinion of the villagers is that pilot projects tend to get completed, but then the implementation of the actual project never happens, and for this reason they wanted to build private latrines in the pilot project and not wait for the actual project.

METHODS AND TECHNICAL DESIGN

Latrine Location Criteria

To avoid contamination of water sources and unnecessary human contact, the location of each pit must satisfy the following criteria:

- Downhill and 50 metres from water abstraction points
- More than five metres from house
- Less than 50 metres away from house
- The bottom of the pit cannot be less than 1.5 m above the water table.

Standard VIP Latrine

The most appropriate latrine construction method is the long drop Ventilated Improved Pit (VIP) Latrine. This is the type of latrine recommended by WHO, and an adaptation of this to accommodate two latrines with one pit will be made.

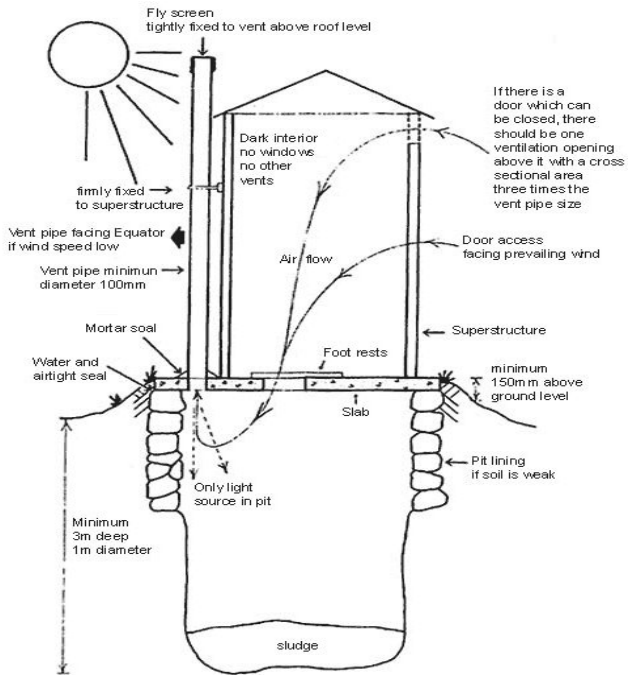

Figure 3. A standard VIP latrine.

There are many advantages in the VIP Latrine, and these are primarily the ability for the latrine to stay fresh, fly-free and odour-free. Flies which are drawn by smell into the pit will be attracted up the vent pipe by the brightness of daylight at the top it, but cannot escape because of the screen. Wind passing over the vent pipe will cause an up draught, removing any smell and helping to draw flies up to the top of the pipe.

Modified VIP Latrine

For our purposes the latrine is not be the same as the above but have been modified to allow for the proposed shared latrine concept. The advantages of the VIP latrine will still be utilised, and the superstructure is slightly modified to suit Mpungwe's requirements.

Lifespan of Latrine

It has been calculated that the pit should last for around 30 years, based on the assumption that twelve people are using the latrine and that the pit is dug to a depth of 8 metres.

To calculate what size pit needs to be constructed; equation one is used, which represents the relationship between the volume of the pit and its expected lifespan.

$$V = n * E * L$$

V = volume of the pit
n = number of users
E = expected volume of waste (per person, per year)
L = lifespan of the pit

The area of the pit is $2m^2$. The builders in the village suggest that a depth of 8 m is easily possible for the soil in Mpungwe. This gives a volume of 16 m^3.
So, if on average, twelve people are using the latrine, and each person is producing $0.04m^3$ of waste a year, the pits should have a lifespan of at least 30 years.

RESULTS

We have already built six shared Ventilated Improved Pit (VIP) latrines for 12 families in a pilot project. Following the success of this, a further 39 latrines are planned since this year in Mpungwe village, and then move to other villages of Rwanda.

Picture 2. Whole shared VIP Latrine in Mpungwe village

Picture 3. Inside that VIP Latrine.

DISCUSSION AND CONCLUSIONS

Constructing a few private VIP latrines raises some issues which ought to be considered. These are:

- Are the private latrines too exclusive?

The villagers were consulted as to how they felt about having a few latrines. They were also given the option of communal latrines. The decision taken by the villagers was that private latrines were their preferred option, and were not too exclusive, subject to their criteria.

- How do we decide whom needs/deserves a latrine first?

The villagers' criteria was that: families who were vulnerable, families with members who are HIV positive, elderly parents with small children, children living alone, widows who had no access to an able man to build latrines, and the very poorest families.

- A few good latrines versus many basic latrines?

It was decided by both us and the villagers that there is a minimum standard which should be achieved. This was to ensure that the latrines were hygienic and lasted a long time. Both parties therefore recognise that only a few latrines can be built in the pilot project.

- Should we design a flushable latrine for health reasons?

For simplicity it has been decided that a long drop latrine should be designed. This does not compromise the effectiveness of the latrine, but does mean that a minimum amount of money is spent building the latrines.

- What do villagers contribute (materials/labour)?

In an effort to keep the wealth inside the village, it was decided that the villagers should be employed, as well as sourcing local materials. Wherever possible, materials such as wood may be donated, with villagers helping out by (for example) fetching water.

- Who will share latrines?

The villagers have confirmed that they are happy to share a latrine with their neighbour (i.e. two households per pit). However, they have indicated that difficulties could arise with cleaning of the latrines. Thus the latrines will be design with one pit but with adjoining cubicles back to back with two doors. This will give each family more privacy and responsibility for keeping their latrine clean. The two families which will share one pit will be determined partly by logistics and location – it makes sense for the latrine to be close to both homes.

The assessment of the hygiene situation in Mpungwe village and other villages of Rwanda will highlight the lack of hygienic latrines in those villages. In order to promote

the best possible health levels of the villagers, hygienic latrines will be required in villages, in conjunction with hygiene education. This will maximize the awareness of hygiene-related issues within the villages, and will ensure the latrines built will be used and looked after properly, and their importance and necessity in the protection of the environment is understood.

ACKNOWLEDGEMENTS

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