



**Title: Integrated indigenous knowledge for dry sanitation in Madimba;
case of Lusaka – Zambia**

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ABSTRACT

Integrated indigenous knowledge greatly enhances the ability to improve sanitary technologies of dry toilets being piloted in Madimba, one of the 44 periurban communities in Lusaka. The paper discusses practical experiences of integrated indigenous knowledge on architectural design, construction and maintenance of sanitary options available in Madimba. It also brings out the findings of the baseline survey with focus on indigenous knowledge on architecture design, construction and maintenance of sanitation options and the possible integration into dry toilets. It also discusses strategies that empower the vulnerable groups of the poor with cost sharing skills. It brings out how implicit experience and tacit knowledge translated into shared experiences and explicit knowledge resulting into effective community structures for implementing Ecosan, one of the dry sanitation systems, through demand driven approach. The paper points out negative and positive experiences on dry sanitation implementation through integrated indigenous knowledge, considering gender perspectives, cultural background as well as the socio-economic situations of the vulnerable groups of the poor.

Indigenous knowledge on architecture designs and constructed on-site sanitary systems are convertible into ecosan dry toilets. This enhances the ability to improve on dry sanitation technologies. Integrated indigenous knowledge on sanitary options creates easy acceptance of dry sanitary technologies. Dry sanitation systems are suitable in high water table, like Madimba. A community demand driven approach to dry sanitation requires effective community sensitising and awareness campaigns that are focused and action oriented. Indigenous knowledge on architecture design and construction of sanitation options are influenced by ecological and socio-economic factors. Some indigenous architecture design and constructed sanitation options aren't easily



converted into dry toilets. Majority of the people in the periurban Madimba community are vulnerable of the poor, hence the implementation of sustainable new sanitation options should consider small incentive for the project to succeed. Women do most of the community based voluntary work as compared to men. Households' economic status has a large influence on community participation on voluntary work. Integrated community based environmental sanitation projects should consider income-generating activities.

Indigenous knowledge on architecture designs and constructed sanitary systems are influenced by ecological and socio-economic factors, hence when converting into dry toilets these factors should be considered critically. An assessment of the socio-economic factors, gender as well as cultural aspects should be included in the decision making process when implementing dry sanitation project. Indigenous knowledge on sanitary options can improve on sanitary technologies with considerations to influencing factors.

INTRODUCTION

The 1992 Rio conference and Brundt land report [1] defined the social/cultural aspect as the third dimension of the concept of sustainability along with the ecological and economic dimensions; interest in social compatibility and the assessment of social aspects has been kindled [2].

The integration of the social dimension into the processes of decision-making, planning and problem solving requires an innovative and interdisciplinary approach [3]. Therefore, integrated indigenous knowledge (social/cultural aspects) enhances the ability to improve sanitary technologies of dry toilets in Madimba, one of the 44 periurban settlements in Lusaka, Zambia, where the historical common excremental sanitary disposal systems are on-site traditional latrines. They are characterised among other things by short life span, no standard design, odours, permeability, breeding ground for vermin and pathogenic (bacteria and parasites); making a pit-latrines a source of pollution (air and ground water) as well as source of infectious diseases and environmental hazard [4].

Pit-latrines cover about 95% of latrines used in Madimba and high-density residential areas of the city. When they are filled they are emptied into side holes of the pit and back fill or back fill the pit and construct a new one [5].

Dry sanitation systems are suitable in high water table areas like Madimba where during rain season the area floods and latrines submerged in rain cause run offs. Some indigenous architecture design and constructed sanitation options aren't easily converted into dry toilets.

Based on indigenous knowledge, ecological and economic concepts, a non-profit and non-governmental organisation, Network for the Environmental Concerns and Solutions



(NECOS-Zambia) is dedicated to reshaping periurban Madimba community for long-term health of human and natural systems by developing an Eco-model called “Peri-Urban Human Ecosystem Integration Model” (PUHEIM Concept). PUHEIM is an indigenous ecological model developed through community participation by Obed Kawanga, a Zambian environmental health expert. The concept was developed in one of Lusaka’s periurban communities (Madimba) that we intend to call Eco-village.

Madimba is a local name that means farms or gardens. It stated as an unplanned settlement. The population is estimated at 6,000. 47% of this population are male and 53% are female. They occupy an area of about 1.2 square kilometres (km²), representing 0.33% of an estimated 360 square kilometres (km²), of Lusaka district. There is approximately 567 households occupying more than 500 housing units. The first settlers in the area were American missionaries who belonged to the Church of Christ in 1960. Population was only four households by then. Madimba is located at the north-western side of the city about 10km away from city center, towards Barlastone park in Lusaka west. Since the area is not serviced and underground water table is high, many dig shallow wells in their yards adjacent to their homes and use the water for daily activities. The openings of these wells are generally at ground level, and occasionally up to 4-5 inches above ground [6]. The critical community concern is that every year there are cases of children drowning in open unprotected pits or shallow wells which has reached a death toll of 14 since 1995. Another problem is that toilets, generally traditional pit-latrines are often dug within several yards from the wells. A scenario of having pit-latrines closer to shallow wells has resulted into massive ground water contamination. The biological analyses of the water samples collect from three points in 2004 isolated E.coli, Salmonella and other bacterial responsible for Diarrhoeal cases. During the rainy season, excrement in the latrines overflow with rainwater as well as percolation of faecal coliform into the shallow wells causing the situation to be even more worse.

METHODOLOGY

The baseline survey was conducted in April 2004. Quantitative and qualitative approaches as well as literature review were employed to capture primary and secondary data.

Direct observation of the ecology of the pilot area (Madimba) was carried out and pictures were taken. A simple Social Compatibility Analysis (SCA) was carried out to determine the social aspects on the acceptance of dry toilets (Ecosan) in Madimba community. Madimba area was selected as an area to develop an indigenous knowledge eco-village model as well as Ecosan pilot project for the reasons being that, it has rich social and cultural diversity and it is one of the unserviced periurban settlements of Lusaka city. Secondly, Madimba has had no donor interventions carrying out environmental or any developmental programmes making it easier for the recommendations to be turned into projects by any donor locally or internationally.



Thirdly, Madimba area is well located for Ecosan activities and majority of the residents are involved in urban agriculture.

The purposive sampling was applied, whole households in Madimba pilot area were covered and the criteria for selection of respondents were as follows:

- To have been a resident of Madimba for not less than 3 years or more
- Knowledgeable of major community concerns
- Must be 16 years of age or more
- Could be single or family person

Data collected by the use of questionnaire at household level, was subjected to quantitative analysis by the use of computer packages (software), Statistical Package for Social Sciences (SPSS). The variables analysed were gender perspective, socio-economic, cultural backgrounds and norms as well as community participation. The demographic characteristics were analysed too. The general objective was to promote ecological awareness, help people understand their place in nature, cultural identity, responsibility for the environment and help them change for better nutrition and to contribute to maintain high quality periurban ecosystem, in urban settlements of Zambia to induce economic growth and environmental protection. The specific objectives:

- To identify and develop ecological priority indicators of public health importance which shall be monitored over time (e.g. control of mosquitoes, flies etc).
- To bring in issues of gender, poverty and HIV/AIDS in environmental management.
- To establish resource centres so as to avail sound knowledge transfer through education and training on environmental issues.
- To integrate ecological sanitation into agriculture by promoting the use of waste as fertilizer e.g. human excreta
- To promote natural resource conservation (biodiversity)
- To promote non-motorised transport i.e. safe pedestrian and use of bicycles
- To promote ecoscape integrity (environmental landscaping i.e. tree planting, parks, plaza.)
- To collaborate and network with communities, institutions and organisations at local, national, regional and global levels with similar objectives.

RESULTS

Baseline results revealed practical experiences of an indigenous ecomodel development and application of integrated indigenous knowledge to enhance improved sanitary technologies of dry toilets (Ecosan pilot project) in Madimba community. Several community concerns that adversely affect the residents have been highlighted and discussed to come up with intervention strategies that empower the periurban vulnerable groups of poor with ecological principles among other things.

It is further revealed that people's social and cultural background is an important influence on several aspects of their lives, including their attitudes towards wealth, well-being and livelihood. Therefore, understanding social networks is one of the most effective way of exploitation and utilisation of indigenous knowledge.

POPULATION BY GENDER

Madimba has a population of approximately 3,036 of which 47% representing male where as 53% female as at April 2004. Although there are more females than males in the area, 90% are in a monogamous marriage. More women participate in community work than men and certain jobs are gender inclined. See figures 1 and 2.

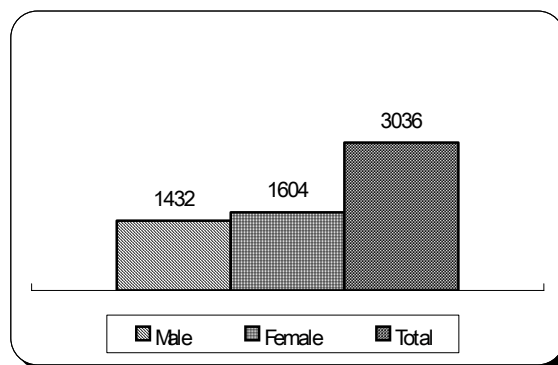


Figure 1. Population by Sex in Madimba

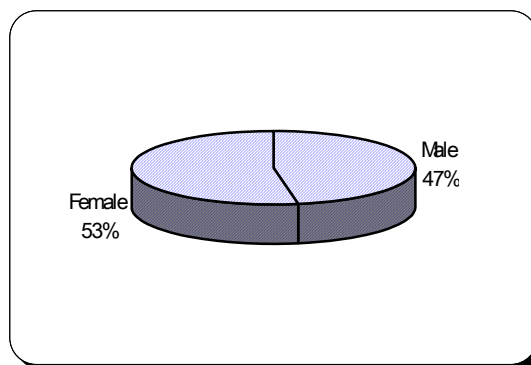


Figure 2. Population in Percentage.

MAIN WATER SOURCES IN ECOVILLAGE

The main water sources are shallow wells that counted for 68 %, Kajima (JICA) communal taps counted for 20 % and 12 % counted for other sources. Most of the residents who draw water from JICA communal taps walk long distances of about 500 metres to 1 km or more to those who live further away from the communal taps.

During rainy season the shallow wells are more contaminated with faecal coliform from latrine overflow due to rainwater run-off and percolations from traditional pit-latrines. The problem is that toilets, generally traditional pit-latrines are often dug within several



yards from the wells and solid waste is dumped indiscriminately. A scenario of having waste dumped indiscriminately and pit-latrines closer to shallow wells has resulted into massive ground water contamination. Rainwater floods create environmental nuisance and are one of the community concerns as identified in the baseline survey. See figures 3 and 4.

Figure 3. Pit-latrines and Floods.

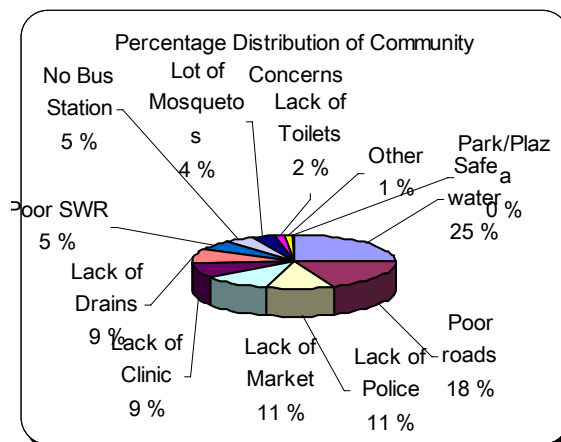


Figure 4. Major Community Concerns.

INDIGENOUS KNOWLEDGE ON CONSTRUCTION DESIGN

Application of indigenous knowledge on architecture designs, e.g. constructed overhang, and on-site sanitary systems are convertible into Ecosan dry toilets and enhance the ability to improve on dry sanitation technologies. Integrated indigenous knowledge on sanitary options creates easy acceptance of dry sanitary technologies in Madimba. Figure 5 shows indigenous designs of overhang latrine.



Figure 5. Indigenous Design of Overhang-latrine.

The common excremental sanitary disposal systems in Madimba are overhang on-site traditional pit-latrines, which are characterised among other things by short life span, no standard design, odours, permeability, breeding ground for vermin and pathogenic (bacteria and parasites) making a pit-latrine a source of pollution (air and ground water) as well as source of infectious diseases and environmental hazard. When they are filled they are emptied into side holes of the pit and back fill or back fill the pit and construct a new one. Figure 6 shows emptying to side hole.



Figure 6. Pit-latrine emptied into side holes.

Majority of the people in Madimba are poor and rather pay for drinking water than give priority to emptying pit-latrine using vacuum tank.

CONVERTIBLE OVERHANG LATRINE

Coping strategy for the flood prone Madimba Eco-village community is to construct overhang pit-latrine to avoid rain run-offs. Individuals as members of a society inherit and perceive their environment and develop a coping strategy. Therefore it is good to build up on the existing indigenous knowledge through participatory process as means to visualizing the different evaluations and standpoints of various interest groups. A convertible overhang pit-latrine is individual indigenous knowledge constructed to meet the socio-economic and environmental demands of Madimba community. See figure 7.



Figure 7. Convertible Overhang Latrine.

DISCUSSION AND CONCLUSIONS

It is evident that the Social Compatibility Analysis is particularly valuable when social dimension of a project is concerned, when clarification of stakeholder opinions is needed or when sets of solution are to be negotiated [7].

SCA is suitable for use in participatory process as means of visualizing different evaluations and standpoints of various interest groups, thus providing a common basis for developmental discussions and solution finding, as well as structuring the planning phase [8].

Assessment of social aspects and inclusion of these dimensions concerning external ecological effects always have external social consequences. Hence people's cultural background (indigenous knowledge) is an important influence factor on several aspects of livelihood, including their attitudes towards their well being that include acceptance of dry toilet (Ecosan) concepts, especially in African societies like Madimba Eco-village. Implicit experiences and tacit knowledge revealed that cultural inheritance is an important factor that needs to be incorporated when ever designing community projects, awareness campaigns and sensitising programmes to make it more focused and action oriented.

Developing a local dry toilet (Ecosan) implementation model should incorporate all the limiting factors such as cultural backgrounds, norms, gender perspectives and the socio-economic issues that may perceived as limiting factor to effective implementation of dry toilets programmes at local level especially in African societies. Although it is observed that a number of urban farmers in Madimba community have engaged in raw sewage without realising the dangers and earn a living to sustain their livelihood. These people use raw sewage in their gardens.



Ecosan implementation in Zambia has a number of constraints or hindrances, such as lack of skilled knowledge on Ecosan principles, effective collaboration and networking on issues of ecological sanitation and absence of financial support (donors). Gender perspective has its own negative aspects on implementation of Ecosan.

The cost sharing strategy in the periurban communities like Madimba depends on the legal framework designed at community level by various community structures to ensure effective and efficient running of communal social amenities such as water sources. Community participation on voluntary basis have been low due to the number of factors such as socio-economic status, lack of confidence in some civic leaders and lack of policy.

It is not possible to expect vulnerable groups like the elderly and orphans to pay for the service. Individual households showing interest in project ideas that could benefit the community at large should be targeted and supported.

Women do most of the community based voluntary work as compared to men. The common community work includes e.g. construction of storm water drains. Foodstuff are more appreciated than small cash incentive for peri-urban voluntary community work especially if an incentive is less than \$1.

The household economic status has a very big influence on community participation on voluntary work. Integrated community based environmental sanitation projects should consider income-generating activities. The practical experiences of an eco-model development and integrated environmental sanitation pilot project in Madimba revealed that community knows their problems and can be addressed adequately through community participation. During the baseline survey residents identified community problems among which poor sanitation; drains, poor road-network and lack of wholesome drinking water supply that counted for 50%. After analysis of the baseline data we came up with proposed community projects and presented them back to residents before commencing the pilot projects. The community concerns that adversely affect the residents were highlighted and discussed to come up with intervention strategies that empower the peri-urban vulnerable groups of the poor.

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REFERENCES

1. EnviroInfo 2004. *Awareness of the Social Dimension of sustainable*



- development* [online]. CRN Geneva Switzerland. Available at WWW address: <http://www.enviroinfo2004.org> [cited 29.4.2006]. 2004.
2. Kawanga, O.C. *Madimba Baseline Survey*. Network for the Environmental Concerns and Solutions (NECOS), Lusaka Zambia Report 4-5. 2004.
 3. Ludwig, C. et al. *Municipal Solid Waste Management Master, Strategies and Technologies for Sustainable Solutions*. Chapter 7. Springer – Verlag: Berlin. 2003.
 4. Lusaka City Council and GRZ. *An environmental Profile of the Greater Lusaka Managing the Sustainable Growth and Development of Lusaka*. Lusaka, 1997.
 5. Musoke, I. K. *The Social-cultural Sector Study of the Shinyanga Human Development Report Project (HDRP)*. University of Dar Es Salaam, Department of Sociology and Social Anthropology. 1998.
 6. Shinyanga, R.G., UNDP. *Shinyanga Human Development Report - Shinyanga Region, Tanzania*. The Institute of Development Studies, Sussex. 1998.
 7. Wamukwamba, C. K. & Share, W. *People and Systems for Water, Sanitation and health*. In: 27th WEDC Conference (ed.), *Sewage waste management in the city of Lusaka 2001: 27th WEDC Conference 2001*, Lusaka: Zambia. 2001.
 8. WEDC. *Our common Future (the Brundtland Report)*. World Commission on the Environment and Development. University Press: Oxford. 1987.