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Sanitation Coverage And Impact Of Open Defecation Free (ODF) Zone With Special Reference To Nepal: A Review

Khet Raj Dahal[1*], Bikash Adhikari [1] and Jyoti Tamang[2]
[1]Ph.D. Scholar of Kathmandu University, Nepal
[2]Department of Water Supply and Sewerage, Kathmandu, Nepal

Abstract
The basic needs of people such as safe drinking water, improved hygiene and sanitation must be fulfilled for a dignified life of human being. Sanitation is one of the major components which directly impact the living standard of people. However, people in many parts of the world have not got the sanitized condition and have been living in a non-hygienic situation. About 35% (2.5 billion) populations in the world are still lacking to access improved sanitation. There are many indicators of sanitized society but toilet is considered as one of the important ones. In Nepal, around 62% households have got the facility of toilet. This indicates that 38 % of households have no access to toilets and defecate openly. As a result people have got poor hygiene and sanitation environment. In turn, the country has got the loss of NRs. 10 billion annually. The objective of this paper is to explore the knowledge on open defecation (OD). OD is being eradicated from many parts of the world. Many western countries have already been free from OD. But this problem still exists in most of the developing and under-developed countries like Nepal. Though the adverse impact of OD is very high; people are not aware. Construction of toilets by providing outside support for the ultra poor people is not the rational way of eradication of OD. Technical and financial support for toilet construction could be effective if people are aware.

Key words: Sanitation, open defecation, Terai, Mountain, Nepal

1. INTRODUCTION

The Millennium Development Goals (MDGs) are international development goals that were established following the Millennium Summit of the United Nations in 2000, following the adoption of the United Nations Millennium Declaration. All 189 United Nations member states at the time (there are 193 currently) and at least 23 international organizations committed to achieve the following Millennium Development Goals by 2015 **(Bartram, 2013).**

(I) To eradicate extreme poverty and hunger
(II) To achieve universal primary education
(III) To promote gender equality and empower women
(IV) To reduce child mortality
(V) To improve maternal health
(VI) To combat HIV/AIDS, malaria, and other diseases
(VII) To ensure environmental sustainability
(VIII) To develop a global partnership for development

Under Goal (VII): Ensure environmental sustainability following targets was made:

Target 7A: Integrate the principles of sustainable development into country's policies and programs; reverse loss of environmental resources

Target 7B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss. It includes:

- Proportion of land area covered by forest
- CO_2 emissions, total, per capita and per $1 GDP (PPP)
- Consumption of ozone-depleting substances
- Proportion of fish stocks within safe biological limits
- Proportion of total water resources used
- Proportion of terrestrial and marine areas protected
- Proportion of species threatened with extinction

Target 7C: Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation

- Proportion of population with sustainable access to an improved water source, urban and rural
- Proportion of urban population with access to improved sanitation **(WHO and UNICEF progress Report, 2012)**

This paper focuses on opportunities and challenges on achieving the Goal VII, Target 7 C.

Sanitation is defined as "all activities which improve and sustain hygiene in order to raise the quality of life and the health of an individual **(WHO and UNICEF, 2004)".** Generally it includes: appropriate methods of disposal of human excreta,

personal hygiene, food hygiene, appropriate handling, storage, and use of drinking water, appropriate solid, liquid and animal waste disposal. However, the results of sanitation programme could not be achieved without people's participation with feeling of ownership from local level. Thus, government of Nepal thought to launch rural water supply and sanitation programme for all people of Nepal with the aim of providing sanitation facilities all over the country by 2017 **(GoN, 2004).** Later on the National Water Plan Policy came into in existence and it also focused on sanitation program in Nepal. The district should be selected for sanitation programme according to Human Development Index (HDI) along with the demand driven approach **(WECS, 2005).**

Many other attempts were made for the improvement of sanitation status in Nepal. However, the situation of sanitation remained unimproved in urban areas of Nepal. Then government of Nepal enforced the Urban Water Supply and Sanitation Policy-2009 **(Sah, 2013).** The policy has the objectives such as, to ensure the availability of basic, accessible and adequate water supply, to protect, harness, develop and manage surface and ground water services, to promote public private partnership in water supply and sanitation services delivery, etc. Despite the above attempts, the sanitation situation in Nepal is still poor and unsatisfactory. The main problem of not achieving the goals on sanitation sector were: less priority was given in this sector by the government and the other agencies, lack of investment in this sector, fragmented approaches of investment in the sanitation sector, lack of disadvantaged and marginalized group participation, local administrative bodies were not mainstreamed in the sanitation sector, need of higher cost and level of technology for urban sanitation, and lack of political commitment for the sanitation sector, etc. **(SHMP,2011).**

The Sanitation and Hygiene Master Plan (SHMP) was felt necessary in order to accelerate the pace of the progress along with the objectives such as synergize the efforts, generate and maximize local resources, reduce the gap between access to drinking water and sanitation, provide guidance to achieve national goal, support to mainstream the concept of total sanitation into national development agenda, support to national commitments South Asian Conferences, etc. **(GoN, 2011; Sah, 2013).** The guiding principles of SHMP were: ODF as the bottom line, universal access to toilet in water supply project, technology of household toilet (permanent/temporary), mainstreaming of local bodies, universe of program intervention, user's friendly facilities in institutions, mandatory provision of toilets in new residents/offices **(SHMP, 2011).**

National Planning Commission (NPC, 2012) prepared a document of Millennium Development Goal (MDG) focusing on sanitation facilities in the country. Actually, it is a framework developed by the NPC to accelerate or speed up the pace of the related things to find out new ways which can support to achieve 100% national goal on sanitation by 2017. This means by the end of 2017, the country will have been in a status of ODF **(NPC, 2012).**

The basic needs of people such as safe water, improved hygiene and sanitation must be fulfilled for a dignified life of human being **(Devkota, 2011).** However, people in many parts of the world have not got the sanitized condition and have been living in a non-hygienic condition. About 35% (2.5billion) populations in the world lack access to improved sanitation **(WHO and UNICEF, 2004).** It indicates that there is not the sanitized situation for all in the world. The poor sanitation condition causes diseases such as diarrhea, dysentery, cholera, hepatitis, worms, and schistosomiasis, which are the barriers to improve the livelihood and living standards of the people in the developing and under-developed countries **(Sah, 2013).**

There are many indicators of sanitation but toilet is considered as one of the important ones. In Nepal, only 62% households have got the facility of toilet **(CBS, 2011).** This indicates that 38 % of households have no access to toilets and they compel to defecate openly. Consequently, people have got poor hygiene and sanitation environment. In turn, the country has got the loss of NRs. 10 billion annually **(Neupane, 2001).** Thus, the country's national target is to achieve total sanitation through the use of toilets by the year 2017 **(SHMP, 2011).** There are 5.427 million households in Nepal and 2069430 numbers of toilets are yet to be constructed in the country **(CBS, 2011).** This is a large number and challenging to construct within a given timeframe. Thus, it would be better to build the toilets through social mobilization at a cheap rate **(Sah, 2013).**

\Poor sanitation causes poor health. Especially, women, adolescent girls and infants suffer from the poor sanitation. As a result of poor sanitation, acute respiratory infections (ARI) spread among children of age under five **(MoHP, 2006).** Generally human faeces are the main sources of ARI. "***One gram of human feces can contain 10 million viruses and 1 million of bacteria***" **(GoN, 2000; cited in Sah 2013).** Thus, there is a need of movement for toilet construction in Nepal. Government of Nepal realized this fact and started a movement of ODF throughout the country. The programme has become popular; schools, households, local administrative bodies (i.e. VDC, Municipalities, and DDCs) have accepted the concept of ODF. And, the rate of ODF declaration is increasing day to day. According to the Sanitation and Hygiene Master Plan **(SHMP, 2011)**, open

defecation free zone can be declared if following conditions are fulfilled:

- Every household of a village development committee (VDC), Municipality or a whole district should have an access to improved toilet,
- There should not be seen any sign of human excreta openly in the declared zone, and
- Public and private institutions such as schools, hospitals, government and private offices must have toilet facilities.

Declaration of ODF is followed as the request of VDC, municipality or a district. If a VDC level water supply, sanitation and hygiene co-ordination committee (V-WASH-CC) requests for declaration of ODF, district water supply, sanitation and hygiene co-ordination committee (D-WASH-CC) manages to monitor the situation of VDC against the above conditions. If a municipality requests for declaration of ODF through municipality level water supply, sanitation and hygiene (M-WASH-CC), district water supply, sanitation and hygiene co-ordination committee (D-WASH-CC) manages to monitor the situation of VDC against the above conditions. Similarly, if a district requests for declaration of ODF through district water supply, sanitation and hygiene co-ordination committee (D-WASH-CC), regional water supply, sanitation and hygiene co-ordination committee (R-WASH-CC) manages to monitor the situation of VDC against the above conditions **(GoN, 2011).**

According to the government records, Ekata Chowk of Morang district is the first settlement of Nepal declared ODF in October, 2004; Panch primary school of Kapilvastu is the first school declared ODF in 2005; Pragatinagar VDC is the first VDC declared ODF on May 11, 2007; Dharan of Sunsari and Ratnagar of Chitwan were the first two municipalities declared ODF in the same day of March 23, 2011. Similarly, Kaski is the first district declared ODF on June 24, 2011**(Sah, 2013, DWSS/ESDMS, 2013).** Though there are many institutions and local administrative bodies which have already been declared ODF, there is a question of sustainability. The problems are of diverse in nature. Some of the problems are: management, awareness and post ODF programmes in the area **(Sah, 2013).** Similarly, lack of technical supports and use of construction techniques, lack of proper planning and implementation and poor behavioral attitude (i.e. defecating at open places and negligence of proper sanitation habit) are major management related problems for sustainability **(Devkota, 2011).**

Devkota (2011) conducted a study on "Open Defecation Free Situation" in Nepal. He found that only 92% households used toilets. Out of 92%, 14% households had partially functional toilets and 3 % had non-functional toilets. The study showed that only three quarters of the households had fully functional toilets **(Devkota, 2011; Sah, 2013).** Thus, there is a big question of sustainability of ODF in the context of Nepal. There are some stories of failure of ODF in Nepal. Toli and Pandusen VDCs of Bajura district were declared ODF but could not maintain minimum requirement of post ODF situation. Then, ultimately the District Water Supply, Sanitation and Hygiene Co-ordination Committee (D-WASH-CC) reverted the decision **(DWSS/ESDMS, 2013).**

2. SANITATION COVERAGE IN NEPAL

In the past (especially before 1980), there was no record keeping system of sanitation coverage in Nepal. But it was found a rough calculation of sanitation coverage as 2% in national level. It was assumed that the sanitation coverage was more in urban areas than in Terai, hills and mountainous regions of Nepal **(Sah, 2013).** Area-wise records of sanitation coverage in Nepal are presented in Table 1. The data indicates the percentage of households having toilet facilities.

Table 1: Area-wise records of sanitation coverage in Nepal

Area	Year								Remarks
	1980	1990	2000	2005	2010	2011	2015	2017	
Urban	-	34%	80 %	81%	78 %	91%	67 %	100%	2017 is the national target for declaration of ODF throughout the country.
Rural	-	30%	25%	30%	37 %	55%	52%	100%	
National	2%	6 %	30%	39%	43 %	62%	53%	100%	

Source: GoN/NPC, 2010.

According to the development regions of Nepal, the use of toilet is different. The region-wise scenario of sanitation coverage of Nepal is presented in Table 2.

Table 2: Region-wise sanitation coverage in Nepal

Development Region	Households having toilets (%)
Far western development region	47.30
Mid western development region	51.40
western development region	73.00
Central development region	63.90
Eastern development region	60.30

Source: CBS, 2011.

Similarly, sanitation coverage in mountain, hill and Terai is 60.10 %, 75.10%, and 48.80 % respectively **(CBS, 2011).** There can be many diseases due to poor sanitation but in Nepal diarrhea is considered as one of the major diseases. The average records of diarrhea in far western development region, mid-western development region, western development region, central development region and eastern development region is 239, 260, 205, 218 and 259 respectively per 1000 population of fewer than five years of age **(MoHP, 2006).**

3. SANITATION PRACTICE IN NEPAL

Generally, in rural areas of Nepal, household toilets are being constructed on the basis of low cost technology. Among them the following types of toilets are commonly used in Nepal:

I. Water seal offset type single pit latrine

These latrines have a squatting hole in the cover slab; they have a shallow toilet pan with a U shaped water seal. It is used where there is sufficient amount of water and there is less chances of odor. This type of latrine can be easily constructed and also suitable for low income group people. But there also the chances of ground water pollution.

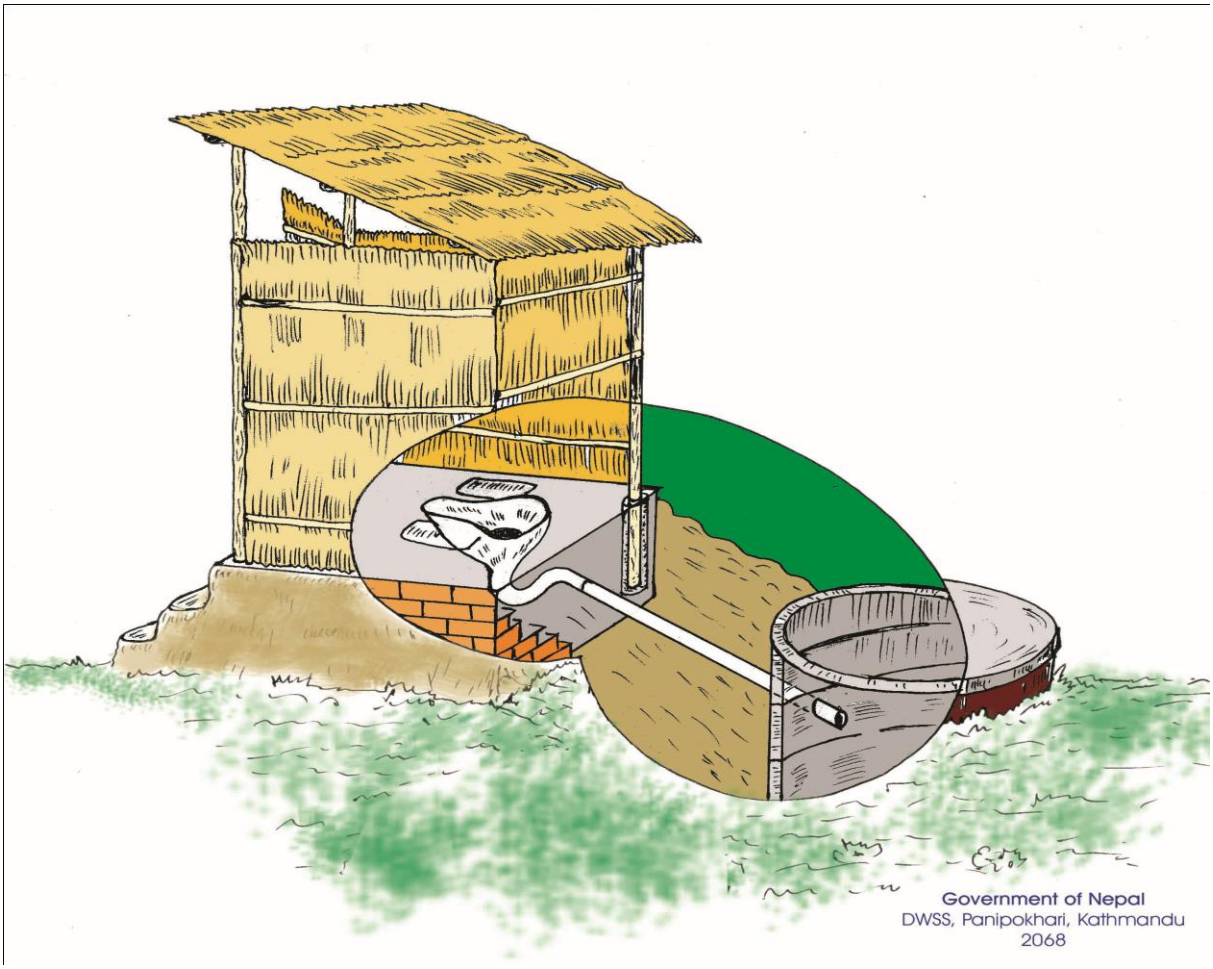

Fig. 1: Water seal offset type latrine (Source: DWSS, 2014)

II. Water seal latrine (direct pit type)

These latrines are useful in hilly areas where water logged areas are less. It can be constructed with local materials. The squatting hole is just above the pit so there are maximum chances of odor and health hazard issues. To stop odor, people can use ash or wood dust or dry leaves after defecation. It is used where is less availability of water.

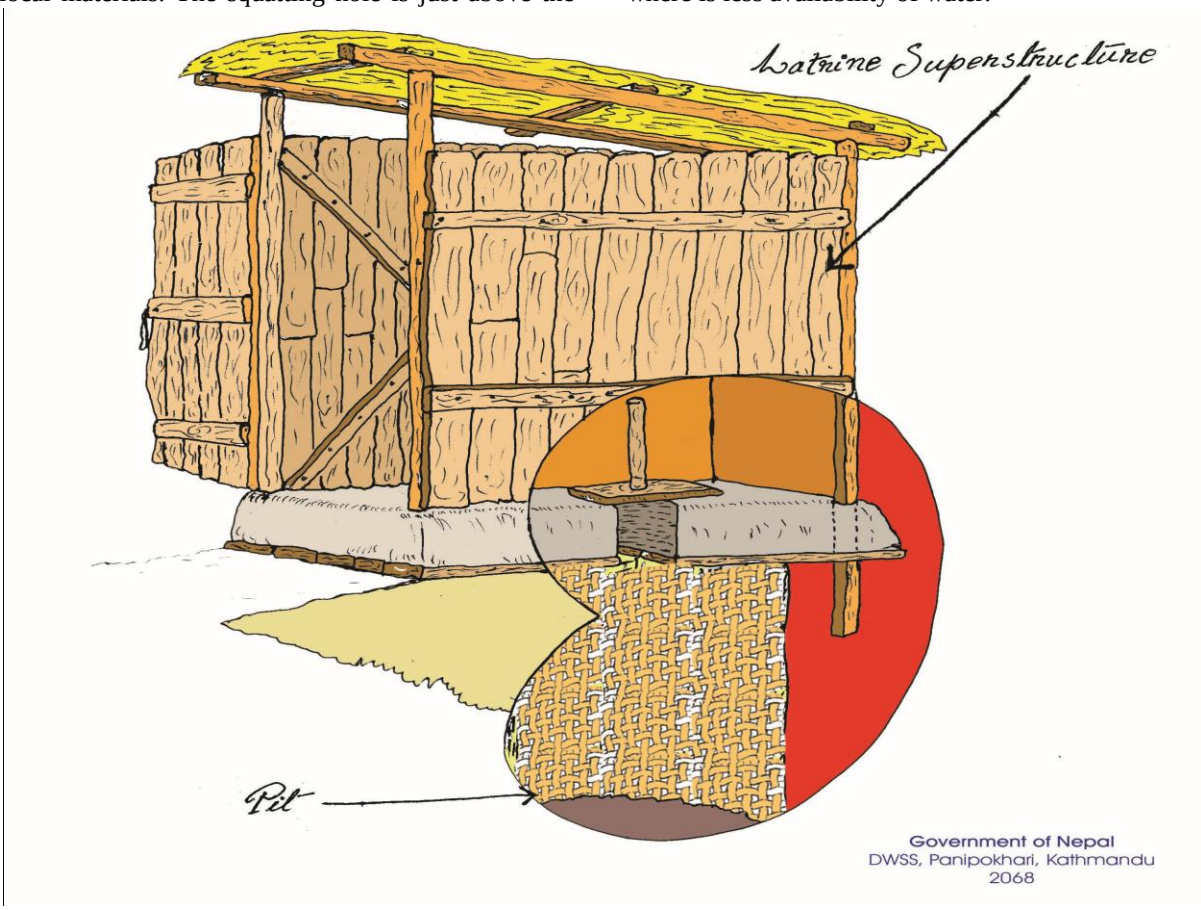

Fig. 2: Water seal/ Direct pit latrine (Source: DWSS, 2014)

III. Ventilated Improved Pit latrine (Sulav Sauchalaya)

It is similar to conventional pit latrine but has a offset that permits the installation of vertical ventilated pipe. It allows for the air flow through the ventilated pipe which helps in reduction of odors. Files are attracted at the top of the ventilated pipe due to the presence of light but cannot escape due to screen thus helping in reduction of transmission of disease. There are also the chances of ground water pollution.

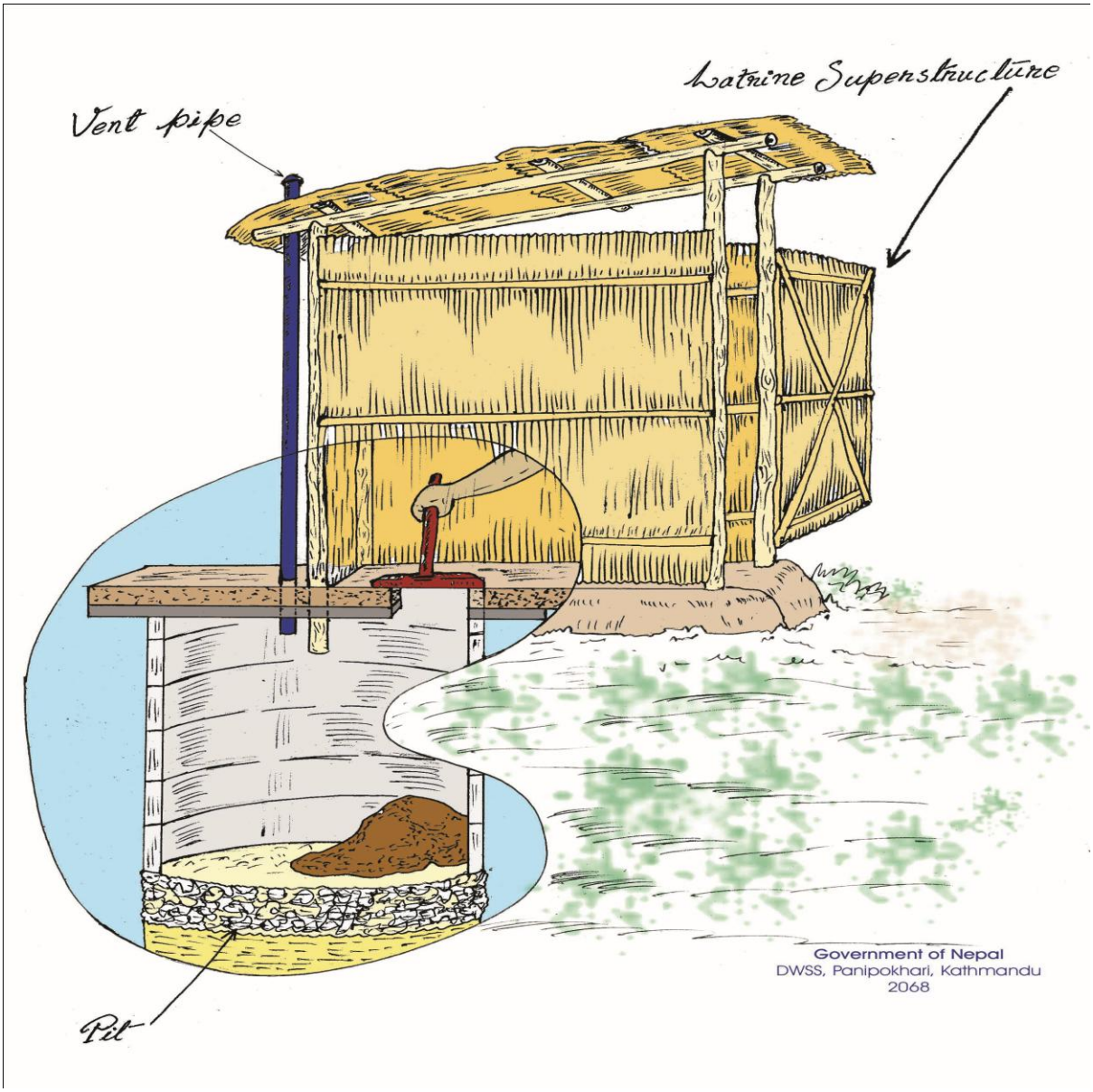

Fig. 3: Ventilated pit latrine (Source: DWSS, 2014)

IV. Latrine for differently able people

This latrine is designed for differently able people. Ramp with landing is provided at the side of the door. Door should be made in such a way that it can be easily opened during emergency.

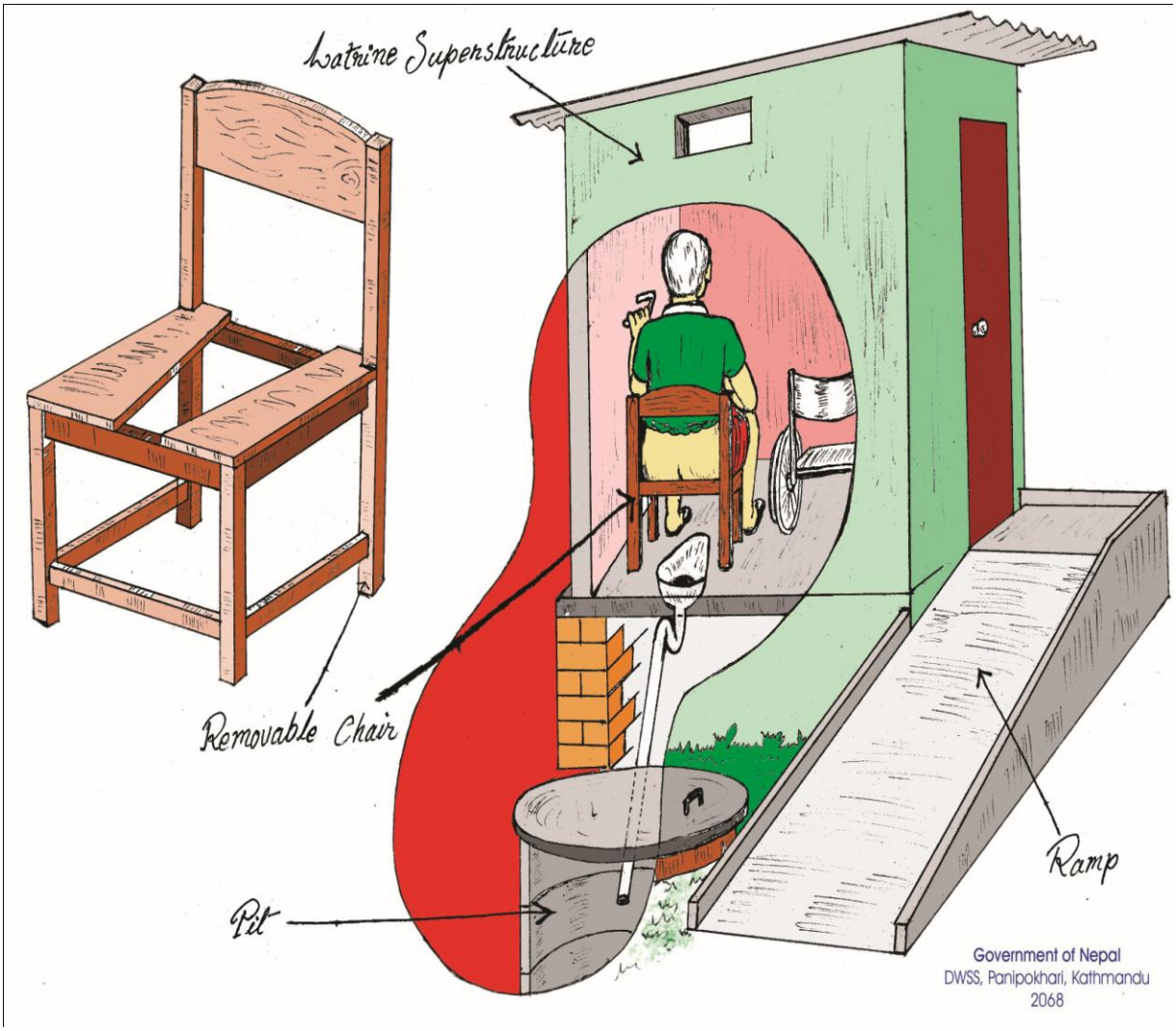

Fig. 4: Latrine for differently able people (Source: DWSS, 2014)

V. Ecological sanitation (ECO-SAN) latrine (Dry and Wet Type)

Dry type: It is based on the concept that human waste contains nutrients which helps in increasing the fertility of the soil. In this toilet urine and excreta are collected and disposed off separately. It is suitable for all group people whether in rural or small town areas. It is little bit expensive as compared to other simple type latrines.

Wet type: This type of latrine has the provision of using the special type of pan which separates urine and excreta and water is used for flushing. But urine is separated and collected separately. It is also relatively expensive than other simple toilets and also requires the skilled manpower for the construction.

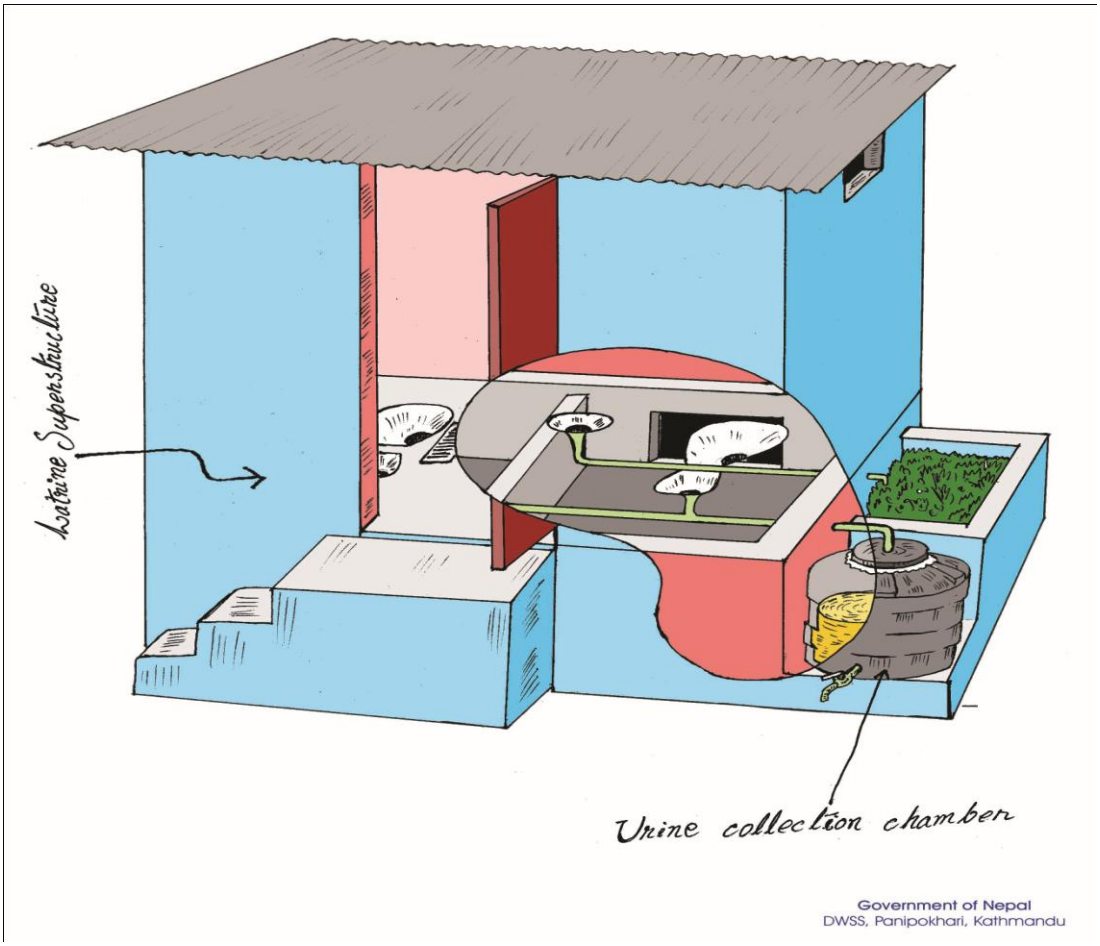

Fig. 5: ECO-SAN latrine (Wet/ Dry type) (Source: DWSS, 2014)

VI. Latrine with septic Tank and soak pit

These type of latrines are used in those areas where there is no provision of sewerage facilities. It is like offset type of latrine which is attached with septic tank and soak pit. Septic tank is the water tight structure which helps in separating and digesting the solid wastes. The liquid effluent is very harmful for the health of human being, thus effluent is collected in the soak pit which helps infiltration of effluent. This type of latrine is relatively expensive and difficult to maintain due to the requirement of skilled manpower. Also large space is required for construction compared to other latrines.

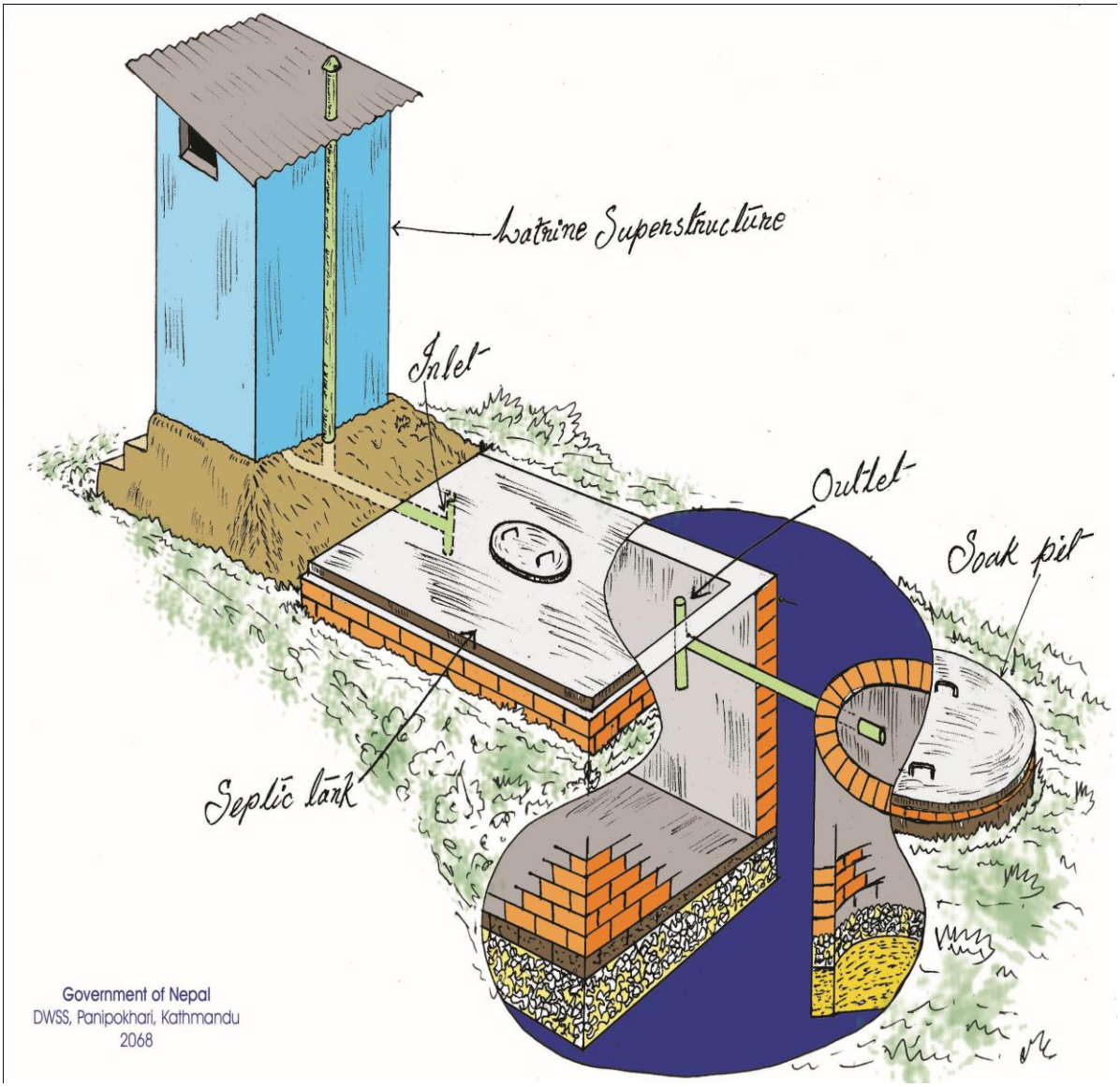

Fig. 6: Latrine with septic tank and soakpit (Source: DWSS, 2014)

The above types of toilets are considered as low cost and suitable to most of the localities in Nepal **(DWSS/ESDMS, 2011).** However, constructions of toilets are not widespread in Nepal. As there is less awareness and there is no rule of compulsion to build toilets; many people of low and mid-level economic status are without sanitation facility. Thus, they openly defecate, which has myriad of adverse impacts. Among them diarrhea and Acute Respiratory Infection (ARI) are the major ones. Twelve percent (12%) children are experiencing normal diarrhea and 2% under five year are experiencing fatal diarrhea. Seven hundred thousand (700,000) children died due to poor sanitation and hygiene during last decade **(CBS, 2011; MoHP, 2006).** There are no toilets in many community managed schools. Only about 80% community managed schools have toilet facilities. And, out of 80%, only 65% community schools have separate toilets for girls **(DoE, 2011).** As there are many schools which have no separate toilets for girls, they are compelled to leave school during the day time **(MDG, 2010).** There are no proper physical facilities such as separate toilets for girls and boys, privacy, physical facilities to dispose of sanitary items or safe and clean facilities to wash sanitary cloths **(UNICEF, 2009).** That's why girls especially adolescent do not go to school.

4. IMPACT AND SUSTAINABILITY OF ODF

4.1 IMPACT OF ODF

After the declaration of ODF, the people in all communities have started to maintain clean environment in their surroundings. Personal hygiene has significantly increased compared to the previous stage (i. e. before declaration of ODF). Community

members are found to have fully internalized health and hygiene messages including hand washing practices at critical period. They have constructed washing platforms to maintain personal hygiene **(Sah, 2013).** Furthermore, the practice of open defecation has significantly reduced. People have the feeling of "we" instead of "I". Definitely, when there is a feeling of "we" in a community, there will always be an improvement and social change.

In all places of ODF declaration areas of Nepal, women and children are the most involved group in the whole process of community mobilization. In all settlements there are some women groups. And this group was found to be active for maintaining better sanitation in the village. Women have empowered and they come into the meeting and share their knowledge and experience with others. They openly take part in the meetings and related developmental works in their villages **(Sah, 2013).** Similarly, people are becoming more civilized compared to the previous stage of ODF. They convey the message of ODF for a new comer to their houses. Thus, any guest could be informed about the ODF and punishment for the violation of ODF. Water and sanitation related diseases such as diarrhea, skin infection and jaundice have been reduced after the ODF campaigning in many parts of the country **(Plan, 2012).** Similarly, school drop out of girls has reduced in the declared zone of ODF. Children are not suffering from fatal diarrhea. The ODF campaign is spreading community to community, village to village and district to district in a rapid way **(Sah, 2013).**

4.2 SUSTAINABILITY OF ODF

Generally, sustainability of ODF situation depends on the awareness of the community. Neverthless, durable sanitation solutions of their choice can be helpful to sustain ODF. Failure of ODF can be less monitoring, use of very cheap materials, lack of information in communities about low cost, progressively upgradable improved sanitation options in the communities, and sharers continuing with open defecation **(Mukharjee, 2012).**

Similarly, topography like water-logged area, high ground water table, and soil types play a vital role for the sustainability of ODF. Furthermore, less priority is given to sanitation facilities compared to other infrastructures, weak institutional capacity and communities not recognizing the benefits from the sanitation facilities are the factors, which govern the sustainability of ODF **(Kumar, 2012).** Long term sustainability of ODF depends on the political commitment as well. But there is no political stability in Nepal for many years and it has made difficulty for ODF programme. Local government must provide continuous financial support for the sustainability of ODF. This is also not available in all parts of the country. Reliable financing mechanisms are needed to replace or upgrade basic latrines and sanitation marketing **(Hanchett et al., 2011).**

There are many temporary toilets in the rural areas of Nepal. Such toilets collapse easily in wet seasons. Then people go to open defecation **(Plan, 2012).** But the people having permanent type of toilets hardly go back to the open defecation. This indicates that the sustainability of ODF depends on the types of technology used in the toilets.

Institutions also play the major roles for sustaining ODF. If there is no active water and sanitation users committee, sustainability of ODF is questionable. There must be post ODF activities in the village and it has to get some legal status. In the context of Nepal, in every village, there is an active users' committee and VDC has led it. And, in the later phase, VDC has supported to upgrade the toilets in most of the cases. As a result, sanitation coverage in local level is accelerated **(Plan, 2012).** Similarly, sanitation programme can spread within the community very easily if it is interlinked with other programme **(Plan, 2012; Sah, 2013).**

Technical documents are lacking on sustainability of ODF in Nepal. Violation of ODF is mainly due to the lack of awareness among people. Existing toilets are not users' friendly. And, they need maintenance **(Sah, 2013).** Educational level is also related to utilization of toilets in many parts of the country. Similarly, income level of people is has effects on utilization of toilets in Nepal. Thus, success of sanitation programme depends on many factors. Stage-wise sanitation programme can be successful in the country like Nepal. Institutional arrangements, post ODF campaign and behavioral development, research and development, knowledge management, monitoring, evaluation, reporting and follow up programme can play the vital role to sustain ODF situation in Nepal **(SHMPIG, 2013).**

There are some organizations in Nepal, which support for toilet construction. However, sustainability of ODF will be more challenging if external supports for household toilets are available **(Sah, 2013).** Proper planning, technical assistance, and participatory approach play the vital role for ODF sustainability. Similarly, post ODF provisions should be clearly defined, which should include the continuation of awareness programmes among local people.

Regular monitoring mechanism and provision of reward and punishment should be established for the sustainability of ODF. If somebody violates ODF, he/she should be excluded from the society and social service from the local administrative bodies should be avoided for such persons **(SHMP, 2011; Sah, 2013).** Educational institutions/Schools should be properly mobilized for awareness creation and behavior modification. Financial support to ultra poor

people should be available in conjunction with awareness creation.

References

[1] Bartram, 2013. *How Health Professionals can Leverage Health Gains from Improved Water, Sanitation and Hygiene Practices.* Perspectives in Public Health pp. 215–221.

[2] *WHO and UNICEF progress Report on Drinking water & Sanitation*, 2012, WHO, Geneva and UNICEF, New York, page 2

[3] CBS, 2011. *Report on National Population Census. Kathmandu: Central Bureau of Statistics,* Government of Nepal (GoN).

[4] Devkota, B., 2011. *An Operational Study on 'Open Defecation Free (ODF) Situation' in Nepal.* Kathmandu: Water Aid.

[5] DoE, 2011. *School level education statistics of Nepal/Consolidated report.* Kathmandu: Department of education, Government of Nepal (GoN).

[6] DWSS/ESDMS, 2011.*Types of toilets*. Kathmandu: Environment Sanitation and Disaster management section, Government of Nepal. (GoN)

[7] DWSS/ESDMS, 2013. *List of ODF declarations*, Kathmandu: National Sanitation and Hygiene Coordination Committee, Nepal.

[8] GoN,2000. *Nepal State of Sanitation report.* Kathmandu: Government of Nepal (GoN).

[9] GoN,2004. *Rural Water Supply and Sanitation Policy and Rural Water Supply and Sanitation National Strategy*. Kathmandu: Ministry of Physical Planning and Works, Government of Nepal.

[10] GoN, 2011. *Sanitation and Hygiene Master Plan.* Kathmandu: National Sanitation and Hygiene Coordination Committee, Government of Nepal (GoN).

[11] Hanchett, S., Krieger, L. and Kahn, M.H., 2011. *Long term sustainability of Improved Sanitation in Rural Bangladesh*. Washington D.C.: Water and Sanitation Program World Bank.

[12] Kumar, R.S.A., 2012. *Sustainable Sanitation: A new paradigm in Aceh, Indonesia.*

[13] MDG, 2010. *Millenium development goal progress report, Kathmandu Nepal. NPC/ United Nations Country Team of Nepal.*

[14] MoHP, 2006. *Nepal Demographic Health Survey Report.* Kathmandu: Ministry of Health and Population (MoHP), Government of Nepal(GoN).

[15] Mukherjee, N., 2012. *Factors associated with achieving and sustaining Open Defecation Free communities; Learning from East Java.*

[16] Neupane, A., 2001. *A Report on National Sanitation Action Week.* Kathmandu: Steering Committee for National Sanitation Action Week.

[17] NPC, 2012. *Millennium Development Goal (MDG) Acceleration Framework.* Kathmandu: National Planning Commission.

[18] Plan , 2012. *Assessment of Total Sanitation (ODF Movement) Program through CITS approach.* Kathmandu: Plan Nepal.

[19] Sah, 2013. *Sustainability challenges of open defecation free zone in Nepal.* A thesis submitted to Pokhara University, Nepal.

[20] SHMP, 2011. *Sanitation and Hygiene Master Plan.* Government of Nepal

[21] SHMPIG, 2013. *Sanitation and Hygiene Master Plan Implementation Guidelines.* Government of Nepal

[22] Water Aid, 20111. *An operational study on open defecation free (ODF) situation in Nepal.* Water Aid in Nepal.

[23] WECS, 2005. *National Water Plan 2005.* Kathmandu: Water Energy Commission Seretariate.

[24] WHO and UNICEF, 2004. *Water, Sanitation and Hygiene links to Health, Facts and Figu*res. Geneva: World Health Organization.

[25] WHO and UNICEF, 2012. *Joint Monitoring Program for Water Supply and Sanitation.* Kathmandu: Government of Nepal.