

## **CHAPTER III**

### **PROPOSAL**

#### **A STRATEGY FOR IMPROVING SANITATION PROGRAM (ISP) IN SUB-DISTRICT NAMSON, SOCSON IN NORTHERN VIETNAM**

##### **3.1 Introduction**

Mahatma Gandhi (1869 –1948) who has spent all his life to struggle for the democracy and freedom of India as the chief architect of the Nation's Independence movement has stated that “ Sanitation is more important than Independence “.

Poor environmental conditions give rise to high rate of diarrhea diseases, to helminthes infection like Ascariasis and hookworm and to vector-borne diseases like malaria, Dengue fever and Japanese encephalitis. More than three million people die of diarrhea every year, most of them are infants and young children, 1.500 million people are currently infected with intestinal worms, all of which are spread through human excreta (WHO.1995).

Presently, most of rural communities in Vietnam still living in the poor sanitation condition in term of accessibility to hygienic sanitation facilities and safe water, on the other hands, at households level poor sanitation practices and bad habits still exists in their daily life.

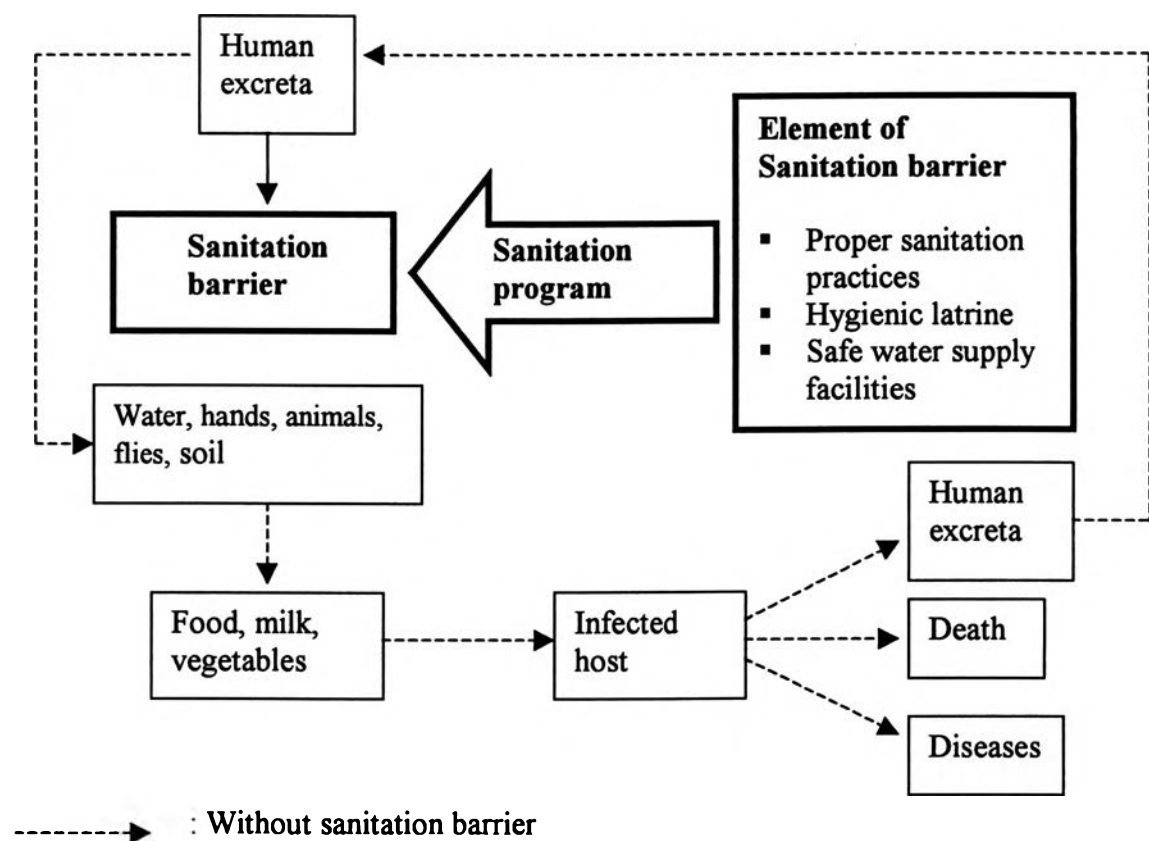
Majority of the Vietnam rural population use unsanitary facilities for human excreta disposal such as surface latrine, one compartment latrine, open field defecation or uncovered pits. These unsanitary facilities of excreta disposal and lack of proper sanitation practice are critical factors for high incidence of parasitic and intestinal infection such as diarrhea, helminthiasis, dysentery and cholera.

In the Five years national program for rural water supply and sanitation in period from 1995 to 2000 the gap between national target and achievement is still very large and clearly. The target has been planed to reach at the year 2000 in accessibility to safe water is 60 % of total rural households and the accessibility to adequate sanitation should be 50% of total rural households. However, in reality according to the statistics from the end of the year 1999, accessibility to safe water is only 39% of total households and accessibility to adequate sanitation is only 18 % (National statistic, 1999). Therefore, the national target has not been met.

Human excreta are the main source of transmission and spread of communicable diseases. More than fifty diseases can be transmitted from the excreta of one person to the mouth of another. This transmission occurs in a number of different ways .The diagram below shows clearly how human excreta is the source of infection.

Poor sanitation and contaminated drinking water are two of the most common environmental hazards in many countries of the world. Unsanitary excreta disposal and contamination of drinking water by pathogens are associated with diarrhea which kill approximately three million children annually and schistosomiasis and helminth infection which affect hundreds of million each year (WHO.2000).

**Figure 3.1: Schematic diagram of sanitation barrier**



(Sanitation barrier, Source: Dao Ngoc Phong et. al. 1989)

Public Health intervention aims at breaking the diseases cycle at vulnerable point. The diseases may be broken at various levels: segregation of feces, protection of water supplies, protection of food, proper sanitation practices, control of flies.

Among these approaches the most effective way will be to segregate the feces and arrange for its proper disposal so that the diseases agents can not reach the new host directly or indirectly together with these the hygienic water supply facilities and proper sanitation practice play very important role.

It is also estimated that improving water supply may reduce the incidence of diarrhea by 16-37% while improving hygiene behaviors related to water and sanitation may reduce incidence by 14-48% (Dialogue on Diarrhea, issue No 57. June-August 1994).

Many efforts have been made by Vietnamese government and other NGOs organization in order to improve the sanitation practices in rural Vietnam. However, present situation of sanitation practices in rural areas is still very poor. One of the biggest problem that leading to this situation is "low adoption of proper sanitation practices of households in rural Vietnam" (UNICEF Vietnam.2001).

Many studies have shown that better sanitation facilities and proper sanitation practice can reduce the incidence of these diseases. Innovative strategies to induce the people to adopt proper sanitation practices are the key to the successful sanitation program. Therefore, this proposal aims to develop an appropriate approach in

improving sanitation practices in the rural community in Vietnam where most of the population lives.

## **3.2 Objectives**

### **3.2.1 General objective**

To improve sanitation practices at household's level in Sub-district Namson, Socson Northern Vietnam and then improve the health of the households' members

### **3.2.2 Specific objectives**

- To change the old habit and behavior of the households toward living with proper sanitation practices
- To increase adoption to proper sanitation practices of households and their accessibility to hygienic sanitation facilities and safe water supply facilities.
- To train the staff and students of Faculty of Public Health (FPH) by providing a "learning by doing " method when they take part in the program.
- To establish the field-work site in Sub-district Namson for FPH teaching and field working activities in the coming academic years.
- To evaluate the Improving Sanitation Program if it is successful, it will be an approach to expand all over the rural areas in the coming future.

### **3.3 Project Description**

This project proposes a sanitation program that has three main activities. First, an education course on sanitation especially on proper human excreta disposal will be provided to housewives- the considered high-risk group. Second, an appropriate facility for human excreta disposal and water supply will be introduced and promoted to households. The third is a mass-treatment of worm infection by providing de-worming program yearly. The program should be based on the households' demands and participation from the initial collection of baseline data and identification of preferences, through the taking part in the education course, construction of facility, to the continued operation and maintenance of facilities. The program will be funded from Faculty of Public Health, Hanoi Medical University.

The faculty of Public Health in Hanoi Medical University is one of the few institutions in Vietnam that can provide excellent training in Public Health. Training method used in the FPH focus on stimulating the students and trainees to participate actively in their own learning process. Active method such as problem-base learning and field studies encourage students not only to acquire knowledge but also to develop skills in data collection, data analysis and problem-solving. In order to improve the learning process and provide a chance for practicing of students, the staff of FPH has participated in many researches, health projects and programs in Public Health and Preventive Medicine in collaboration with MoH, National Institutes and International Organizations.

The project is at Namson Sub-district which is located 100km Northwest of Hanoi and there are 6 villages in Namson Sub-district. According to the statistics from the Namson Statistic report at December.2001, the total population of the Sub-district is about 7,440 inhabitants (nearly 1,200 households), GDP per capita is about 140 US\$, the total area is about 2,935 ha. Agricultural production is the main source of income so the economic status of the households is still very low .In Namson Sub-district, 366households (31 %) are calculated like the poorest with GDP per capita below 60US\$.

By carrying out the proposed sanitation program, Faculty of Public Health aims to improve sanitation practices in rural areas at household level and further more to improve the health of the households, experiences and lesson-learned from this program may be useful for other sanitation programs in the future. Additionally, Namson Sub-district may be established for field- studying of students at Faculty of Public Health in the next academic years.

The strategy used in developing the proposed sanitation program is based on the following principles:

1. To provide housewives of Namson Sub-district comprehensive knowledge and information on proper sanitation practice
2. The program should base on community demand and community participation

3. The program should be an intersectoral approach such as when it is a component of the Health promoting or Disease control program and collaborate with other institutions in its implementation.
4. Sanitation facilities should be suitable, affordable and acceptable for the households, the environmental condition, the sources of water supply, the household's benefit and behavioral change.

As mentioned above, the proposed sanitation program has three main activities. Details of each activity are described below.

### **3.3.1 Education course to housewives**

Improving sanitation program plans to provide comprehensive knowledge and information on sanitation practices for women groups with a collaboration of Women's Union by providing a sanitation course. Women and children are high-risk groups that the WHO Executive Board have identified and emphasize their new strategy to these groups (WHO, 1999). The special role of women in developing countries in running the home, collecting water, and managing the sanitation facility should not be underestimated. Many training programs are automatically biased towards men or, by including men, exclude women. However, women have a very important role to play in selecting the appropriate design of facility, construction of facility, operation and maintenance of facility. Any human resources development programs must be considered for the role of women. The men in households also actively take part in decision making of selecting the appropriate design of facility and especially in the



construction of facility due to the simplicity of facility's construction most of the men can construct latrine for their house by themselves.

Women constitute 51% of total population in Vietnam and play a very important role in national socio-economic development. In rural areas women constitute over 60% of the farming population and carry the dual responsibilities of farming and managing their households. Although the principle of gender equality is recognized in Government policies and national laws, however, gender disparities still exist in Vietnam, and discrimination against girls and women continues to be a serious problem especially in many ethnic minority communities. Gender inequality negatively affects women and girls in many different ways. Although Vietnam has a high literacy rate (91 %), 71% of the illiterate population are women, and women over 25 years of age have a 15% lower literacy rate than men. The 27% of Vietnamese households that are headed by women are among the poorest in the nation. Furthermore, Vietnamese women bear a disproportionate burden of development with rural women working an average of 15-16 hours a day.

On the other hand, Vietnamese women play an extremely important role in the sanitation practices. In the family women are the users, who access and settle everyday the problems of living water supply and discharge, environment hygiene treatment of dust and solid waste, keeping their sanitation facilities hygienic, take care of their children etc. Therefore women are persons who manage the sanitation practices they have practical experiences and have consequently to contribute true and reasonable suggestions to the sanitation practices in the community.

The Vietnam Women's Union is a public organization to represent the legitimate rights and interest of every woman's stratum in the whole country with 11 million members and with 4 levels organized tightly from central to local. Over the last years, the Union has participated actively in the Information – Education – Communication, to mobilize women in Environment protection. The Vietnam Women's Union consider the Information- Education- Communication program is the best way to raise environmental awareness, to create demand, to change behavior and this program is a key work, a prime activity in any program or project like a pre-condition to ensure for the sustainability and durability. (UNICEF.1999).

Knowledge and information on sanitation provided to housewives during the education course are as followings:

1. Parasitic diseases like consequences of poor sanitation practices
2. Prevention of parasitic diseases in rural condition
3. Hygienic latrine and proper human excreta disposal
4. What behaviors are bad and should be changed in order to improve sanitation practice of households
5. What benefit would be brought to the households if they improve their sanitation practices
6. Some main techniques applied in communication and working with community

The education course aims to provide knowledge and information on sanitation practices to the housewives. In this education course in every village a group of about 15 participants should be selected by the community with prioritization of those who

are Women Union member, community leader, health volunteers, and housewives who have a willingness to attend the course. This group is also called as “core group” These participants will be the educators for other housewives after the course. A two-day course will be provided to each group. Lecturers from Faculty of Public Health, Hanoi Medical University will be the trainers for this education course. The education course will be organized in each village at the appropriate time for the participants.

Criteria of selecting participants who will be attended the course are as following:

- Community leader, member of Women Union, health worker and should be respected by the community
- Have hygienic human disposal facility and safe water supply at the house
- Literacy and have time
- Have willingness to attend the education course and the project activities

### **3.3.2 Construction of hygienic latrine**

Safe disposal of human excreta is one of the world’s biggest challenges in Public Health. It is not an exaggeration to state that the hygienic disposal of excreta for the millions of villages in the world is the one of the greatest challenges facing Public Health workers. (Cairncross, S et. al. 1983). Human excreta are the main source of transmission and spread of a wide range of communicable diseases. Rural people themselves are also not aware of this significance and importance to latrine. The

improvement in the sanitation condition of the rural households without hygienic latrine is not possible. Latrines are required mainly:

- For improvement of sanitation and health condition of households members
- For improvement of local environment by avoiding sewage draining to water supply resources such as streams , rivers , ponds etc
- For recycling human excreta into farm soil or fertilizer
- For avoiding a bad smell

Households latrine program can be viewed from two points which are construction aspect and the other aspect are functioning, utilization and maintenance. Construction is said to be complete when latrine had been proper built. Due to the simplicity of the construction of double vaults latrine, most of the households can construct it by themselves. Those households who can not construct latrine by themselves , they can hire other people to do it or the project can assist by identifying a contractor who are trained and able to carry out the work to a satisfactory standard and in this case an agreements and pricing levels may also be negotiated by the project on behalf of the households.

The more important is to function, utilize and maintain the latrine proper after construction. These activities rely mainly on socio-cultural customs, old habits, behaviors and knowledge especially social behaviors because present household sanitation practices in Vietnam rural areas have their roots in centuries-old custom and habits. Community involvement in term of community acceptance and self-reliance become important for successful implementation of households latrine program.

From the technical point of view the choice of latrine design should be meet the following criteria:

- It can destroy almost of diseases' agents
- The soil surface should not be contaminated
- There should be no contamination of surface and ground water
- Excreta should not be accessible to flies or animals
- These should be no odor or unsightly condition
- The construction methodology should be simple and inexpensive and easy to maintain (Financially affordable)
- It should be safe for children to use
- It should be design in such a way that it is acceptable in term of culture, habits, climate and geographic condition.

The model of double vaults latrine or dry composting latrine are very appropriate form of latrine to promote for the rural areas in Vietnam where human excreta is regarded as a valuable resources for fertilizer. The latrine is an aboveground facility, comprising of two alternating vaults constructed in brickwork and a simple bamboo superstructure. Feces are only deposited in the vaults and urine is collected separately.

The theory of composting latrine is that the rate of decomposition of fecal material can be increased if it is combined with other waste materials such as ash, straw, earth, etc so that the ration of carbon to nitrogen in the waste is optimized. (Pickford J .1995). Ash from wood-burning stoves and other materials such as earth, organic waste materials are added to the vaults at least daily and preferably after each

use. When one vault is full (usually after 4-6 months), it is sealed and the other vaults is put in to service. When the second is full the first one will be emptied and its contents kept for application to the land immediately before planting or sowing. Urine is collected and store in a separate tank. After a couple of days it is completely sterile and may diluted with water in a ratio of between 1:10 and 1:5 and then applied to vegetation such as for plant watering. After 4-6 months of anaerobic mesophilic composting in the vaults the contents are transformed into a dry, odorless materials with a crumbly soil-like consistency. The organic matter content is 3-10 % with 0.3 – 1.1 % nitrogen, 150 – 410 mg/kg of total phosphorus and 7000 – 7600 mg/kg of total potassium. During the storage period it is important that the nitrogen gas does not escape as it converts to ammonia and raise the pH. For this reason the storage vault should have limited ventilation. Besides that the pH is high because of the large quantities of ash added and in the range 9.8 – 11.2, killing off any pathogens present. Coliform counts are reasonably low, generally less than 4000 per gram (wet weight), and helminthes eggs are fewer than 8500 per gram with availability of less than 30%.

This microbiological method is considered safe for reuse. The rising of pH not only assists in the destruction of pathogens it also prevent foul odor from escaping. Of the three main methods of killing pathogens: pH reduced moisture and increased temperature -raising the pH is found to be the most effective .At a pH of 9.8 -11.2 the human excreta are rendered safe and odorless after 4- 6 months. (WHO.1989).

In rural Vietnam at present time people is mainly dependent in agricultural products. Economically, they are weaker than the urban people, their purchasing

capacity is low. They are likely to adapt new practices if it is economically cheap and if it does not affect their hard saving. If constructions are cheaper and available in the village it will act as one of the motivating factors for the construction and use of sanitary latrine. Another advantages of double vaults latrine are: it provided a readily available, low cost fertilizer and soil conditioner which “ noticeably “ improves crop yields and it is an odorless households sanitation facility that avoids the need for indiscriminate defecation in the fields. For the using of this latrine no water would be needed. This point is very important due to each person produces about 500 liters of urine and 50 liters of feces per year, for flushing away these 550 liters of polluted human excreta by using a flush system we should need about 15000 liters of water every year. (Winblad U and Kilama W .1985). Nowadays in the rural areas of Vietnam water supplying to households is another big problem because of water scarcity and a flush system does not work without water and so on by applying the model of double vaults latrine in rural areas we can save a lot of water. On the economic aspect, the cost of double vaults latrine is about 70US\$ per each including both infrastructure and superstructure. While compost that this kind of latrine can produce, cost about 8US\$ per 50kg- bag, normally one family of five can produces 10 bags annually, and in this case the latrine’s costs can be recovered in a year or little over (Duncan Mara, Sandy Cairncross1989). However, in rural areas of Vietnam, the costs of this model of latrine could be cheaper. It costs only 30-35US\$ per each because we can promote the households use the available local and cheap materials to build up the superstructure and in this case the cost is only for the infrastructure construction (Dao Ngoc Phong. et al 1989).

Double vaults latrine or dry composting latrine are suitable for use, as they require no water and are not connected to a network they can also be cheaply and easily introduced in poor households in rural areas. A lot of these latrines have been installed in middle class households in China, Mexico and even in Sweden and in rural Vietnam. Unfortunately in the rural of Vietnam they are often abandoned in favor of indiscriminate defecation or improper used because the households fail to master the art of managing the latrine properly. The construction of double vaults latrine is simple and affordable but for the operation it need carefulness of the users (Dao Ngoc Phong et al 1989). The common improperly practices of using double vaults latrines at rural areas in Vietnam are:

- Using two vaults at the same time
- Emptying the vault full of human excreta before 4 month
- The users forget to add organic material after defecation
- Mixing the excreta and urine together
- No hands washing after defecation

### **3.3.3 Construction of safe water supply facility**

Nowadays over one billion men women and children (more than four times the population of United states and Canada combined) do not have enough safe water to drink and therefore can not live a healthy life. Every day almost 40,000 people die from causes directly related to contaminated water. A surprising statistic to many people is that contaminated water causes 80% of the health problems throughout the world. Especially in the rural areas of developing countries the problems is more severe, because the only water source for people to wash with, to drink from is often a badly



polluted shallow well (less than 10 feet deep) or a streams, ponds, rivers used by both animals and humans. Of course in those area streams, rivers, ponds are often polluted as well because animals and human excreta are emptied into it without proper treatment.

Throughout the world, water supplies in developing countries are contaminated with a wide variety of microorganisms that cause typhoid, diarrhea diseases, amoebic dysentery, cholera and other virulent diseases. Diarrhea alone are directly linked to the death of more than 6 million children per year. Unfortunately there has been a dramatic increase in the past 10 years of the number of deaths from the consumption of contaminated drinking water around the world (Global Water. 1999).

The surface water that many households using now such as streams, ponds, rivers in the rural areas now are heavily polluted, on the other hands where the source of drinking water is surface or shallow groundwater there may be the risk of getting contamination from the latrines. As a “General rule of thumb” a downstream water abstraction point must be at least 15 meters from the point of pollution (i.e. the latrine). It would often be practical to ensure that alternative drinking water sources are developed at a safe distance from the on-site sanitation facilities (Lewis, J, Foster, S and Drasar, BS.1980).

Although water is abundant in many parts of Vietnam safe drinking water is scare. In facts a majority of rural families in Vietnam lack of access to safe drinking water in rural areas only 39% of population have access to safe water supply . Generally there are three water resources used in water supply system: surface, underground, and rainfall water. Vietnam has humidity tropical monsoon climate with

two seasons, dry and rainy. The average rainfall volume is traditionally high fluctuating from 1700mm-2000mm per year, but most of it is in the rainy season. According to statistic data, rainfall is a major water resource for people's consumption in rural areas, where pipe-water systems are not available now .(UNESCO Vietnam.1999) In rural Vietnam the level of technology that is usable and will acceptable for the households should be readily understood by the local population and that technology should used equipment made from locally available materials and that can be repaired by local craftsmen (Dao Ngoc Phong et al.1989). During the past years, failures in water supply programs in rural Vietnam caused by:

- Improper and high cost equipment for rural situation are provided
- Personnel not properly trained to start
- No follow –on training for new personnel

(UNESCO Vietnam.1999)

Improving sanitation program aim to introduce and promote safe water supply facility to households in rural Vietnam with following objectives:

- Introduce the appropriate facilities for safe water supply to households
- Promote a construction of facilities base on community participation at all level from constructing, operating and maintenance of the facility
- Provide training for local village personnel to construct facilities and operate equipment on-site
- Provide the financial support for the construction of facilities

The domestic water supply program focus on permanent solution to households water needs consists of two main programs:

- Drilling new tube-wells using hand-pump to pump clean water instead of an open-unprotected dug wells using buckets this will allow rural Households access to safe, clean underground water
- Purifying and storage of existing sources of water , mainly focus on raining water

The tube-well should be deep to 150 feet into the ground in order to get a safe water from underground water resources, the whole depth of the well should be lined by a special plastic-porous tube that can function like a filtration device. A hand pump is a simplest form of water pump, it is very suitable for these areas if ground water is available and the water flows required are relatively low. In the other hand the hand-pump is the most typically among the pumping apparatus for its easy installation and maintenance free and available for rural application.

The construction and volume of rainfall storage facilities at households depend on water norm of consumer (in the dry season the norm is limit from 15litre personal per day to 20 liter personal per day) and number of consumer. Construction of rainfall storage also depends on local technical economical condition. Usually the storage is to be constructed with brick and cement having the following details: pipe use to outlet the first storm rainfall, filter part and storage part. Another kind of storage facility available for rural condition is a narrow-mouth water storage container or a rainwater jar with a capacity of 2,000 litters. Beyond their effectiveness another attractive of the jar is its financially affordability, the rainwater jar only cost 400,000 VND

(approximately 28US\$) a price that many households in rural Vietnam can afford (Dao Ngoc Phong. et al 1989).

Nowadays, through rationally exploiting and using natural water resource, using rainfall in supplying clean water for households plays very important role not only in rural areas but also in those areas having bad quality surface and underground water sources as saltwater areas or areas with severe contaminated water resources.

Why we have to introduce and promote two choices: tube-well and rainwater jar in this program. The answer is problem of arsenic and fluoride. Arsenic is omnipresent inside the earth. Arsenic that come through the exploitation of nature such as with agricultural irrigation, withdrawing underground water, geothermal power plants or mining the WHO drinking water guideline value of arsenic that can accept for drinking water is 0.01mg/l (WHO.1999). The health implications of long term expose to arsenic can vary from mild such as arsenic dermatitis to the severe such as cancer of skin of lungs and bladder, chronic respiratory and liver diseases .Up to now there is no known cure for arsenic poisoning. While fluoride is recognized as an effective agent against tooth decay when taken it optimal amount, the ingestion of excessive fluoride is actually quite harmful. It can cause dental fluorosis, which severely discolors, blackens and calcifies teeth. The long term ingestion of fluoride can also lead to skeletal fluorosis, which can cause structural changes in bone and cartilage joint pain and stiffness, osteosclerosis of the pelvis and vertebra, calcification of bones and even neurological defect. Fluorosis presents a particular threat to the children.

According to a Swedish study children and adolescent excrete fluoride less efficiently than adults do and retain more fluoride in their bone. However, unlike adults children and adolescents can at least partially recover from the effect of dental fluorosis if their ingestion of fluoride is terminated or mitigated. If the tube-well is contaminated with arsenic or fluoride, it should be used for washing only and rainwater should be the alternative one.

#### **3.3.4 Curative intervention: Mass-treatment of worm infection by deworming yearly**

Almost more than any other parasitic diseases worm infection is a result of human carelessness and lack of appropriate personal hygiene and sanitation measure. Human feces in the roads, fields and yards provide a major source of infective eggs in heavily populated areas. The worm infection is more common in warm climates. The worm eggs are not infective for human when first excreted. They are very resistant to extremes of temperature and humidity. They usually are transmitted by hand to mouth, although the use of human feces as fertilizer may also permit transmission of infective eggs by food that is grown in the soil and eaten without being thoroughly washed. The eggs require several weeks to embryonate and become infective. The best solution to the problem is preventing worm infection by improving sanitation practices of communities and curing them at the same time. In rural areas in Vietnam the worm infection rate at present time is very high, it is more than 90% (MoH. 1999).

The complication of worm infection may vary from mild such as abdominal pains, vomiting, restlessness, and disturbed sleep to partial or complete blockage of the intestine and malnutrition in children. Curative program for worm's infection can not separate from improving sanitation facilities such as latrine and sanitation practices such as washing hands before meals and after defecation, using boiling water for drinking and eating a well-done food.

Improving Sanitation Program aim to provide de-worming program to households such as a mass-treatment with collaboration with Local Health Care services. Drugs for de-worming should be distributed free to all households' members (except children under 3 year old).

### **3.4 Implementation of the Project**

#### **3.4.1 Phase 1: Base line survey**

##### **3.4.1.1 Purpose of baseline survey**

The most appropriate sanitation facility is that which best meets the needs and aspirations of the people within all locals constrain. Sometimes what is quite satisfactory for one community is rejected by other people living nearby, the baseline survey may help us to find out what the people are doing and help them to do it better (R.Franceys, 1992). In order to assess what is the most appropriate and identify the present sanitation practices and knowledge at households a baseline survey of the project location should be carried out. In our baseline survey primary data are obtained

by direct observation, households interview .On the other hands the baseline survey will provide the results such as pretest for the evaluation of the project later on.

#### 3.4.1.2. Implementing of baseline survey

A set of structured questionnaire has been carefully prepared to ensure that the answers will reflect the true opinion of respondents. Students at Faculty of Public Health who carrying out the survey also has been properly trained. The baseline survey should be covered the whole area using method of cross-sectional survey.

The sample size for this survey could be calculated by the following formula applied from Health Social Science, A Transdisciplinary and Complexity Perspective, Strengthening Cross-sectional studies (Nick Higginbotham, Glenn Albrecht, and Linda Connor.2001):

$$n = \left[ \frac{Z}{\Delta} \right]^2 p (1-p)$$

Where:

n : is the required sample size

Z : is the value from the standard normal distribution relevant to the confidence interval of interest, Z = 1.96 for 95% CI

p : is the expected proportion

Δ : Is the desired precision of the confidence interval

According to the National Statistics (GSO. 2000.) and the previous study (Dao Ngoc Phong et al .1989) the accessibility to adequate sanitation is only 18%. After the project would be done we expected the accessibility to adequate sanitation of households should be 30% so the formula to calculate sample size will be:

$$n = (1.96)^2 \frac{(0.3)(0.7)}{(0.05)^2} = 322.694$$

Total sample  $n = 322.694 + 10\% 322.694 = 355$  (households)

(Plus 10 % for the estimated lost of sample)

Where:

- n = estimated sample size
- Z = is the value from the standard normal distribution relevant to the confidence interval of interest,  $Z = 1.96$  for 95% CI
- p = expected proportion of households can access to the adequate sanitation facility
- d = is the desired precision of the confidence interval of study = 0.05

Systemic simple random sampling should be used for selecting the households in the survey. Based on the list of households and with the sampling interval we will select the sample until the number is reaching to a size requirement. After all questionnaire are completed the data will be entered into computer and Statistical Package for Social Science (SPSS) software for Windows will be used as an instrument for data entry and analysis.

### **3.4.2 Phase 2: Demonstration/testing period- Pilot project**

#### **3.4.2.1 Purpose of pilot project**



A demonstration or testing period is normally required for a new sanitation project. During which field staff will investigate whether the proposed combination of an approach such as techniques, materials, management, man- power will work effectively at an affordable level in the particular socioeconomic, cultural, and geographical situation of the area. Particularly in our project, where the new technique is being introduced in combination with other activities such as providing education, de-worming, we need to carry out a pilot project to work out the technical details before promoting the idea to others. Low-income community can not afford the risk of installing an unproved system at their own expense. The pilot project also provides an opportunity for informal training of field staff for the next step.

Dong Ha village (one from six villages of Namson Sub-district), where data exercise should be done, will be selected for pilot project. In Dong Ha village, households who are involved in our data collection for Data Exercise should be chosen for pilot project also.

#### 3.4.2.2. Implementing of pilot project.

Among 40 housewives, who involved in our data exercise, we will select a group of 10 housewives, those who do not have latrine or their latrine are not hygienic. In this group we ask for the participation of village committee authorities, Women Union member so the total should vary from 12 to 15 persons.

Knowledge and information on sanitation practice, which will be provided during the expansion phase, should be provided to these housewives. Together with

providing sanitation education to housewives in collaboration with Local committee and Women Union we try to promote them to construct hygienic sanitation facilities with our support in terms of technical and financial.

#### 3.4.2.3 Appraisal of the pilot project.

The period of our pilot intervention will last for 3 months, at the end of this period one workshop will be organized. The main objectives of the workshop are to identify whether the approach is appropriate or not, experiences and lesson-learned also be identified in order to support to the expansion of an intervention program.

Lecturers and facilitators would be the officer from project staff or from Faculty of Public Health and participants are included the housewives involved in the pilot intervention, the head of the village, head of Women Union, health workers and health volunteers in the village. Total participants for the workshop should be 30 participants.

### 3.4.3 Phase 3:Expansion of project

The implementation of expansion of project has three stages as followings:

#### 3.4.3.1 First stage, an education course for educators

The expansion of the project is a time of mass communication .It is an opportunity to share information and lessons learnt from the pilot project and knowledge and practices that the participants of a sanitation education course with other housewives. On the other hand by providing a sanitation education to the housewives we hope to create the sense of ownership of the problem among them and consequently we can create a demand and a need of households for construction of

hygienic sanitation facilities. In sanitation education course, we also aim to convey the message that good sanitation practices should bring economic gains to the households when they and their children are healthy.

In this period in every village a group of 15 participants should be selected with prioritization of those who are Women Union member, community leaders, health volunteers, and housewives who have a willingness to attend the course. These participants will be the educators for other housewives after the course. For the selecting of those educators we encourage the community to select by themselves according to our given criteria. This point is very important due to villagers will learn and follow the practices and recommendations of those people to whom they pay a respectation. A two-day course will be provided to each group. Lecturers from Faculty of Public Health, Hanoi Medical University will be the trainers for this education course. The education course will be organized in each village at the appropriate time for the participants.

After the course the participants now become educators for the other housewives, they also act like a person who will introduce and promote the construction of sanitation facility and proper sanitation practices. There are many methods of promotion, in our project a meeting and visit are selected. Various types of meetings and visit can be used for example, an individual discussion between educator and housewife, public meeting where it is convenience between housewives and educator, house-to-house visits by educator and health worker. By doing meeting and visit educators with an collaboration of Women Union members, Health workers and

especially community leader will not only provide housewives in the village a knowledge and information on sanitation practices but also introduce and promote them to construct sanitation facilities.

#### 3.4.3.2 Second stage, construction of facilities

Double vaults latrine, tube well and rainwater storage were selected like an appropriate facilities for households. However, an individual household will be responsible for decision of facility's construction at their own houses. Having decided the construction of facility will create a sense of being the partner of a project and the owner of the facility will promote cost sharing and ensures sustainability at households. Together with the men we encourage housewives to take part actively in the decision and construction of the facility.

The key principles of the program in terms of financial aspect are:

The households act very important role in the project with their own decision for construction of facility

The households will contribute about 50% of the cost of the construction of the facility at the beginning, for example in construction of latrine the contribution of households is mainly for latrine's superstructure by providing their local materials and women participate actively in decision making process

The project has a facilitating role in mobilizing all available resources and providing technical assistance towards achieving the objectives

The project's fund provides other 50% of the cost of the facility but in the way of revolving fund

A revolving fund, like a financial support to the households in construction of facility, should be established by the project. The project will launch initiative money or seed money. This money will give to the households like a loans but on a rotating basis through the Local Women Union Committee and the money enable each household to construct a double vaults latrine or a tube well or a rain-water storage. Within a half year, when each household repays its loan with a low interest, the project is then able to give this money to the other household again. During the time of the project's implementing the seed money continues to grow, allowing more and more households can have financial supports to construct their hygienic latrine or tube-well or rainwater storage. By providing a revolving fund, the project aim to assist those households who do not have enough money for construction of facility. Instead of paying the total cost of construction of the latrine at the time of construction, these households will pay only 50% of the total cost when they construct their latrine. The other 50% of total cost they can pay within duration of a half or one year later with a low interest.

#### 3.4.3.3 Third stage, de-worming program

The best solution to prevent worm infection is a combination of improving sanitation practices of communities and curing them at the same time. Curative program for worm's infection can not separate from improving sanitation facilities such as latrine and sanitation practices such as washing hands before meals and after

defecation, using boiling water for drinking and eating a well-done food. De-worming program to households such as a mass-treatment with collaboration with Local Health Care services. Drugs for de-worming should be distributed free to all households' members except children under 3 year old. This program would be conducted every six months or two times per year during the time of the project.

### **3.4.4 Phase 4: Project evaluation**

#### **3.4.4.1 Purpose of project evaluation**

It is very helpful to carry out an evaluation of what have occurred in the project .Evaluation is important for the project investigator, as it gives staff a better understanding of what has been effective and why, and at the same time to consider any failures that could be avoided in future programs. For water supply and sanitation projects, evaluation was defined as “ a systematic way of learning from experience and of using the lessons learned both to improve the planing of future projects and also to take corrective action to improve the functioning, utilization and impact of existing project” (WHO.1983).

#### **3.4.4.2 Indicators for evaluation**

- The percentage of households regularly using hygienic latrine

Evaluation of utilization and functioning that is, to compare the percentage of households in the project location, who regularly using hygienic latrine after intervention with project's estimated target. In this project our target of hygienic latrine coverage would be 30% of total households.

- The percentage of households have knowledge and practice improvement on proper sanitation

Evaluation of project's impact aims to determine whether there has been any improvement in knowledge and practices at households as results of the sanitation program.

- The Health impact of the project can be measured with such as parasitic infection rate but such evaluation usually tends to be expensive and normally require specially trained personnel such as medical officers and epidemiologist. However, the most important evaluation is that of the households themselves. A project can be considered successful where households, by their own choice, have invested a significant amount of time and money in the construction of their own sanitation facility, and demonstrate their satisfaction by their continued willingness to use, operate and maintain their facilities (R. Franceys.1992).

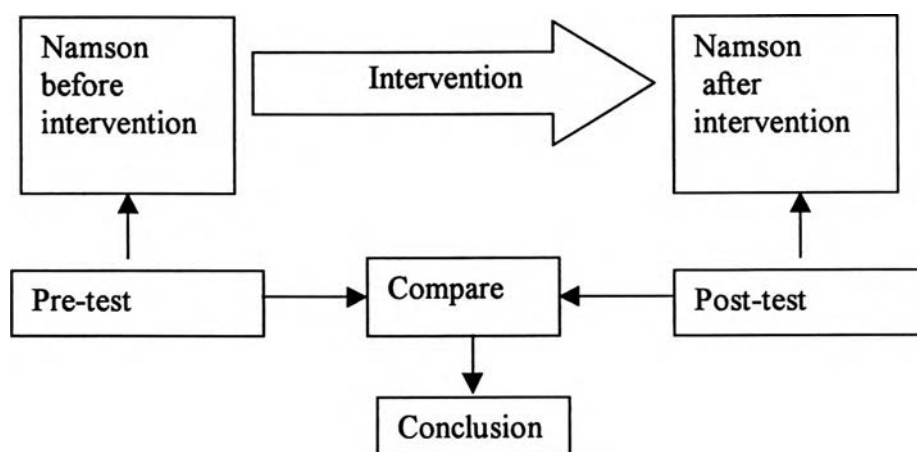
#### 3.4.4.3 Evaluation design: pre and post test design (Before and after design)

- Do pretest and post test before and after intervention
- To compare the results before and after the intervention from pretest and posttest to find out if the intervention has made any difference

Sampling using systematic sampling technique. Base on the list of households available from Namson Sub-district Local Committee with the total number of households being 1,200 households, the sampling interval will be  $1,200 / 355$  The

sampling interval will be four. The data come from baseline survey will be used as pretest results, the post-test will use cross-sectional survey for data collection and the same sample size with baseline survey also will be used.

**Figure 3.2: Diagram of an intervention's evaluation design**



### **3.5 Responsibility of Faculty of Public Health, Hanoi Medical University as a Investigator of the Project**

1. Faculty of Public Health will provide fund for this project, this fund come from the Neitherland project for upgrading quality of teaching and learning at Faculty of Public Health , Hanoi Medical University.
2. Staffs, lecturers and students at FPH will take part in project in management, carrying baseline survey, training and providing



education .All materials for sanitation education also are prepared by staffs and lecturers of FPH.

3. FPH is an initiator of this project and FPH not only has responsibility for project's planning but also for its implementation.
4. Many different institution are involved in implementing of this project such as Local Committee Authority, Local Health Care services, Local Women Union, Water supply company, each of these institution take a different responsibility, the responsibility of FPH is to collaborate with them in order to achieve the project's objectives. For example the skills require for construction of latrine and tube well may not simple for households and many households may prefer to pay for other to carry out the work. The project can assist by identifying a contractor who are trained and able to carry out the work to a satisfactory standard and in this case an agreements and pricing levels may also be negotiated by the project on behalf of the households.
5. Establishing the field-working site in Sub-district Namson for FPH teaching and field working activities in the coming academic years is one of the objectives of FPH through implementing this project. In the coming years FPH continues to take responsibility in providing education and support in operating and maintenance of facility in the future like an integration activities with field-working activities.





## 2. Salary

No	Description	Fund allocation
1	1 coordinator of project 1 person x 120US\$/month x 12 months	1,440
2	2 staffs working for project 2 persons x 60 US\$/month x 12 months	1,440
	<b><u>Sub-total</u></b>	<b><u>2,880</u></b>

## 3. Travel cost

No	Description	Fund allocation
1	Travel for researchers and staffs during the project	400
2	Travel for interviewers to carry out survey (pretest and posttest)	200
	<b><u>Sub-total</u></b>	<b><u>600</u></b>

## 4. Equipment rental and documentation

No	Description	Fund allocation
1	Overhead & projectors	200
2	Handouts	100
3	Miscellaneous	100
	<b><u>Sub-total</u></b>	<b><u>400</u></b>

### 5. Initial Money for revolving fund

No	Description	Fund allocation
1	Revolving fund for construction of 200 double vaults latrines (latrine costs about 30-35 US\$ per each, we will provide 50% of the cost, households contribute other 50%)	3,000
2	Revolving fund for 200 safe water supply facilities ( tube-well costs 40US\$ per each and rain water storage costs 30 US\$ per each , we will provide 50% of the cost, households contribute other 50%)	3,000
	<b><u>Sub-total</u></b>	<b><u>6,000</u></b>

### 6. De-worming Program

No	Description	Fund allocation
1	Recruiting health workers to carry out the program 2 health workers x 30 days x 6 US\$/day	360
2	Cost of drug ( Mebendazol 500 mg /dose/year/person) 7000 doses x 0.2 US\$/dose	1,400
	<b><u>Sub-total</u></b>	<b><u>1,760</u></b>

- Estimated grand total: 15,045US\$
- The fund proposed: from The Neitheland project for upgrading quality of teaching and learning at Faculty of Public Health, Hanoi Medical University

### 3.8 Limitation

The proposed project may have the following limitation

1. The duration of project is one year, but the operation and maintenance of double latrine at households need a careful follow-up and supports not only for one year but also for further more.
2. The project last only one year and so that it may be difficult in changing an old habit and behaviors of households, which have been last for very long time.
3. One year's project and low socio-economic status of households can make cost recovery of facility to become a problem .The poorest may not be able to pay their loan after one year.
4. Due to the limited fund the project can support 50 % of the cost for construction of 200 double vaults latrines and 200 safe water supply facilities (tube-well or rain water storage). With assumption that the poorest households need to construct both latrine and water supply facility so the project can support only 200 households it is equal to 17% of total households in the Sub-district.
5. This project will conduct in one Sub-district so it would be rather difficult to predict and generalize the results to all Districts or all Provinces in Northern Vietnam.
6. According to the limitation of budget and time this project will restricted to an intervention in the combination of providing sanitation education to housewives, introduction and promotion of hygienic sanitation facility and

de-worming. Other factors which could affected to the sanitation practices of households such as impact of leadership in the villages, different programs or projects for the promotion of the sanitation facility, the status and the ideas of the other households members of the same households were not included in this project.

7. Sanitation practices including three main parts: personal hygiene, household cleanliness and community cleanliness (WHO, 1997). Due to the limitation of budget, human resources and time the intervention in this project will be concentrated in household cleanliness and personal hygiene only.
8. Faculty of Public Health have never done a such comprehensive project like this project before .In the past FPH only had responsibility of providing education in other projects, so it will be a challenge for FPH to implement this project.
9. The evaluation's design of this project is pretest and posttest design without control group, so if the change after an intervention will be small we can not claim that is an effectiveness of an intervention.

### 3.9 Discussion

1. This project is designed to implement in Sub-district Namson Socson Northern Vietnam where the sanitation practices at households are poor. The success of this project can be applied for other Sub-districts where they have the same characteristics with Namson Sub-district.
2. The project not only aims to improve the sanitation practices at households and then improve the health of the households' members but also aims to establish a fieldwork-site for learning and teaching in coming academic years. Students can have a chance to practice what they have learnt from problem identification though prioritizing problem solving approaches to data collection and evaluation of project .The staff and lecturers will have chance to improve their skills in carrying a comprehensive project.
3. The general objective of this project is to improve sanitation practices at household's level by conducting an Improving Sanitation Program, this program is a comprehensive one and it should be successful if each activity in the program can work effectively and with accordance with the other.



### **3.10 Ethical Consideration**

Before starting the intervention, all the households, local authorities, local health care workers will be informed about the purpose, objectives, and process of intervention and meaning of the intervention.

All household interviews will be held only with the permission of the participants, who are informed that they do have right not to answer the questions or participate in the intervention.

All information are obtained from households will be used solely for this intervention and the privacy of the participants will be fully respected.

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