



Water – a key to primary health care

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IN THE LAO PDR, malaria is the most serious health problem. With 1.4 million cases per year on a population of 4.5 million, it accounts for 14,000 deaths per year. Diarrhoea comes second, with an estimated 4,000 deaths among under-5 year old children. Over 80 per cent of the villagers quote malaria and diarrhoea as the two most important health problems (UNICEF, 1996). The impact of these diseases could be decreased easily by simple personal and environmental sanitation. However, such a decrease can not be brought about without a behaviour change of villagers themselves.

Generally, previous Primary Health Care projects in the Lao PDR have only had limited success in attempting this change in behaviour, because few incentives are available to induce it. In a pilot project implemented between 1992 and 1995 in the Southern Province of Salavan (see fig. 1), World Concern experienced the same limited ability to affect villagers' behaviour. At the same time it became clear that clean water was the primary concern of the villagers. At a national level, access to safe drinking water is estimated at 44 per cent (SPC, 1998). The Western part of Salavan Province definitely falls below this figure.

Following this pilot project, the Clean Water and Sanitation Project was implemented between 1996 and 1998. In this project, achieving behaviour change in Primary

Health Care (PHC) was tied to provision of clean water (see box 1 for project parameters).

The aim of the project was to have an impact on the health situation of the target population through the provision of clean water and PHC training, thus trying to affect behaviour that could decrease the incidence of malaria and diarrhoea. This article looks at the question to what extent this has been achieved.

Project implementation process

Figure 2 shows the implementation process used. First, target villages were selected using the criteria outlined in box 2. After a household survey on the "quality of life" of villagers and acceptance of the project conditions by the village, a 2-day PHC training was held with approximately 20 leading villagers participating. The training consisted of five lessons: 1) What is PHC?, 2) Prevention of malaria, 3) Prevention of Diarrhoea, 4) Immunisation and 5) Use of clean water. Emphasis was put on "prevention of malaria and diarrhoea through sanitation".

After the PHC training, the first tube well was drilled, using a PAT 401 rotary drill rig with pneumatic DTH hammer. Hand pumps installed were of the Tara and India Mark III types, depending on the Static Water Level. The first cycle of project activities ended with a regular follow up to monitor the implementation of PHC activities by the villagers and to collect cash contributions. In this follow-up period a training on pump maintenance and monitoring of sanitation activities was conducted for the Village Maintenance Committee and Village Caretakers.

This cycle of project activities was repeated until an amount of 1 well per 150 people in villages of 100 to 1000 people was reached. Drilling of the second, third or fourth well was not automatically carried out, but dependent on the performance of the village in implementation of the messages relayed during the PHC training (see box 3).

This performance, monitored during regular follow-up visits, was checked by repeating the Quality-of-Life survey before approval was given for drilling of the next well.

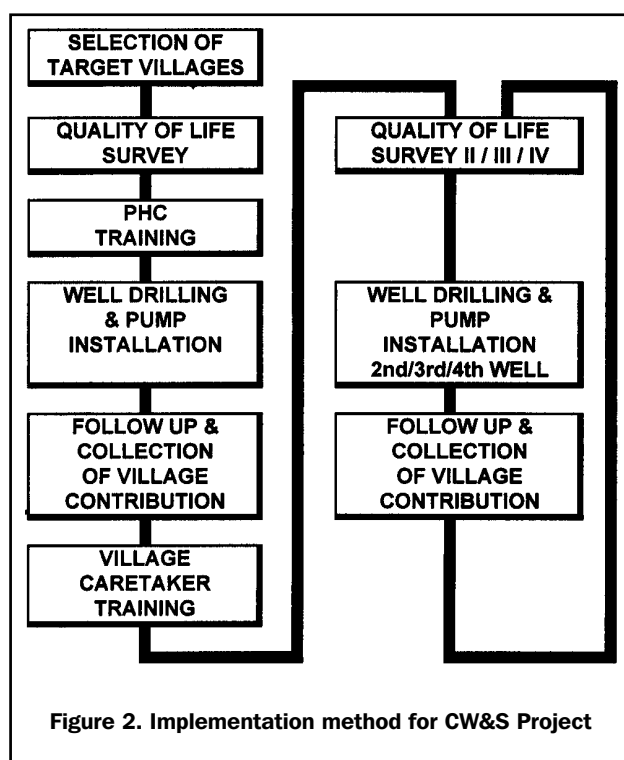
Participation by the village was seen as essential for creation of a sense of ownership of the well and for genuine behaviour change. The villagers were expected to contribute to the project in several ways (see box 4). Implementation of the PHC activities was the key factor of their contribution.

Implementation of the project was for a large part carried out by the governmental District Health Service, with assistance from the project. PHC training was totally in the hands of these district PHC teams, while surveying, follow



Figure 1. Location of 3 target districts within Laos

Box 1. Project parameters	
• implementation period	1996-1998
• project costs (US\$)	540,000
• target districts	3
• # of target villages	96
• # of beneficiaries	32,500
• beneficiaries as percentage of total population in target districts	31
• wells drilled	183
• wells rehabilitated	2
• failed bores	9
• completed wells	176
• Tara pumps installed	125
• India Mark III pumps	44
• other	7
• # of people who received PHC training	2017



up, well drilling and pump installation was carried out jointly by district and project staff.

Data collection methods

A Quality-of-Life survey was carried out before project commencement in each of the 96 target villages in 3 districts of Salavan Province. This household survey interviewed 30 per cent of the households in the village (with a minimum of 10 households) on water use, personal hygiene, environmental sanitation, and prevalence of malaria and diarrhoea.

Before drilling of the second well, this survey was repeated to check the judgement of the project staff on the villager's performance in implementation of PHC activities (see box 3). This resulted in a number of 51 villages in which pre and post PHC training data could be compared.

Parameters that were compared before and after intervention include:

- type of water source used
- distance to water source
- water use per person per day (calculated from average number of yokes of 22 litres of water each)
- involvement of women, children and men in fetching water
- estimated time used for fetching water, based on the distance from house to well and the following assumptions: average walking speed is 4 km/hr; filling one yoke at the water source takes 3 minutes
- incidence of malaria as percentage of people/year
- incidence of diarrhoea as percentage of people/year
- percentage of people sleeping under mosquito net
- percentage of people that wash hands prior to food preparation and meals
- percentage of people that drink boiled water
- environmental sanitation rate, a compound of the percentages of houses that have: a) a fence, b) no animal pens under the house, c) no animal dung in the yard, and d) no high grass and shrubs in the yard.

No statistical software was available to test the significance of differences.

During follow up visits (about 3 times a year), cash contributions were collected and performance of the villages regarding implementation of PHC activities (see box 3) were monitored.

From data collected during these visits the following parameters were evaluated:

- fences and well covers constructed
- cash contributions collected

Next to these more formal methods of data collection, insights were gathered from experience of the project implementers and by observation.

Box 2. Criteria for target villages

- short in clean water
- low level of knowledge on Primary Health Care
- accessible, but preferably not too close to the main road either
- interested to participate in project
- not targeted by other clean water projects

Box 3. PHC activities to be carried out

- sleep under mosquito nets
- drink boiled water
- wash hands before food preparation and meals
- use clean water
- join the immunisation program
- keep the yard clean (no animal pens under the house, fenced yard without grass and manure)
- take care of the water place (cover the pump, maintain the drainage canal, fence the water place, and keep it clean)

Box 4. Village contributions

- join the PHC training
- choose well sites
- assist in well drilling and pump installation
- appoint Village Maintenance Committee and Village Caretakers
- cash contribution of 200,000 Kip *)
- practice PHC activities (see box 3)

*) equivalent to 225 US\$ by project start and less than 50 US\$ by project end

Results and discussion

Analysis of the Quality-of-Life survey data shows marked improvements in most of the parameters after the first cycle of project activities. Once the PHC training is conducted and the first well is drilled, the number of families using water from pumps jumps to 95 per cent, leaving out solely those people that lived too far away from that first pump. This percentage would rise to 100 per cent once sufficient wells were put in (1 well per 150 people), which is not reflected in these data.

The distance to the water source was reduced from over 600 to 168 meters, which is already close to the target distance of 150 meters. Water use increased from 15 to 18 litres per person per day, showing an increase due to easier access to water. It can be estimated that people bring home less than half of the water they use (for cleaning, cooking and drinking), while more than half is used at the well site (for bathing and laundry). Thus it can be estimated that people actually use 45 litres of water per person per day, used as target by the Lao Institute of Clean Water. Both before and after the first cycle of project activities water use varied between villages activities from 7 to 24 litres per person per day. This figure can clearly be correlated to the distance to the water source.

Activities in the area of personal hygiene and prevention showed a significant improvement: from 33 to 67 per cent for drinking boiled water, from 61 to 80 per cent for hand washing prior to food preparation and meals, and from 73 to 87 per cent for sleeping under mosquito nets. The environmental sanitation rate increased from 48 to 73 per cent.

These preventive measures reflected themselves in a decrease from 13 to 6 per cent in reported incidence of malaria and from 9 to 6 per cent in reported incidence of diarrhoea cases, a decrease of over 50 per cent in both cases.

Fetching water in this society is a women's task. Only in about 10 per cent of the households, where children of 10-15 years old can do the job or where no able-bodied women are present, this job is taken over by husband and children. The decrease in involvement of men (from 21 to 14 per cent) can be attributed to the villagers' opinion that there is less need for help from the men once fetching water has become easier.

The increase in the women's share in fetching water should not be regarded as an increased work load. The estimated time used per family for fetching water has been

Table 1. Change in PHC indicators during the first part of project implementation (n=51 villages)

Description	project activ.		unit
	before	after	
Average population / village	358	361	prs
Average no. of families / village	68	69	fam
Families surveyed	30	30	%
Females in surveyed families	51	52	%
Perc. of families using water from:			
*river	8	-	%
*stream	22	1	%
*well	32	8	%
*pond	23	5	%
*pump	27	95	%
Distance to water source	609	168	m
Water use(lt./prs/day)	15	18	
Time used fetching water (minutes/fam/day)	91	28	
Perc. of households in which			
-children fetch water	18	16	%
-women fetch water	90	92	%
-men fetch water	21	14	%
Personal hygiene:			
*wash hands prior to food preparation and meals	61	80	%
*drink boiled water	33	67	%
*sleep under mosquito net	73	87	%
Environmental sanitation rate	48	74	%
Incidence of malaria	13	6	%
Incidence of diarrhoea	9	4	%

Table 2. Village contributions and care for the wells

Description	Achievement
Cash contribution paid	99.8%
Fence around well constructed	91.8%
Cover over well constructed	87.4%
Pumps repaired with assistance of project	21 pumps

reduced from 91 to 28 minutes per day. This figure does not even include the fact that in the old situation water often had to be scooped from seepage-wells dug in near-dry stream beds.

Table 2 shows the excellent contributions from the villagers' side. As per 1 May 1999, cash contributions were as good as completely paid. The majority of wells was protected by a fence, and covers were constructed.

Quality and reliability of the tube wells drilled in this project depends on a number of factors, which include:

- *reliability of the water source* - These wells do not tap sub-surface seepage water, which could easily be depleted, as evidenced by wells drilled or hand dug with local technology. The wells drilled by the project (with 97 per cent being 28 to 60 meters deep and 3 per cent

being 61-80 meters deep) tap aquifers in water holding rock layers. These can be expected not to be subject to depletion. Moreover, since in the project area the population is predominantly determined by the amount of available rain-fed paddy fields, we do not think that by well drilling one 'artificially' keeps the population on a level that will cause major depletion of groundwater sources.

- *protection from pollution* - The project has made strong and successful efforts in this area: villagers were assisted in choosing appropriate well sites. Construction of the wells included high quality PVC casing, a sanitation seal in the bore, and a concrete slab (2 * 2,7 m) plus drainage canal. The villagers constructed and maintain a cover, a fence and a drainage canal, and have a high awareness about the need to keep the well site clean. All this can be regarded as sufficient guarantee against seepage of dirty water into the well.
- *water quality* - Primary pollution thus can be avoided. However, about 6 wells (less than 5 per cent) do have problems with high concentrations of iron, which cause corrosion if an India Mark III pump is installed. A few wells showed dusty water, which can be caused by either fine soil particles in the water holding layers, or be a result of cracked casing pipes. These problems can be regarded as aesthetic or secondary pollution, affecting taste and appearance only.
- *dependability of the hand pump* - The direct-action Tara pump is subject to rather quick wear and tear in valve rings, and, to a lesser degree, broken pipes and pump rods. A proper distribution system of spare parts would suffice to solve this problem. The India Mark III pump can be maintained, but not repaired by villagers. Although more sturdy than the Tara pump, it thus requires a repair service system. In a former central-plan economy like the Lao PDR, private sector service systems are still virtually non-existent, so villagers have to rely on the government service system. This is not yet functioning, neither for spare parts for both types of pumps, nor for repair of the India Mark III pumps.

As described above, this project was implemented in close co-operation between the World Concern project team and the Lao government (which formally is the owner of any project implemented by NGO's and International Organisations in Laos). The advantages of this system were that service systems developed were closely linked and thus easily integrated into the government system. This increased the chance that these systems not only formally, but also actually are owned by the government. At the same time, World Concern still could be intimately involved in project implementation, bringing an emphasis on serving those most in need and accountable management of resources. Disadvantages of this system were the fact that the project had to work within a tight framework of strict government policies. Moreover, the project had to work through government staff who were hit hard by the Asian economic

crisis. This severely affected the staff's motivation and ability to carry out their duties.

Conclusions

Experience confirmed that clean water supply was the primary need of the target population. Hence the project focused on the right priority. Reasons for this were two-fold: Not only is the target area a dry area due to relief and sandy topsoil, but the hard rock layers in the deeper soil (starting between 2 and 20 meters) make it practically impossible for villagers to dig wells or to drill boreholes themselves.

The main achievements of this project lie not in the number of villages trained or in the number of wells drilled, but rather in:

- *the impact on the quality of life of the villagers* - As shown above, the increase in practice of preventive health care activities are reflected in a decreased incidence of malaria and diarrhoea. This proves that it really has been possible to affect the behaviour of villagers by PHC training and provision of clean water, even in the short period that the project worked with these villages. It can be expected that behaviour change will be sustained in the long term, now that villagers recognise the correlation between sanitation and disease prevention.

- *the model that has been established* - This project proves that it is possible to integrate Primary Health Care and clean water in a meaningful way. Provision of clean water is a powerful activity that can be used as a key to behaviour change, but provision of clean water by itself is not sufficient. Primary Health Care projects are ridden with problems arising from a limited motivation from villagers to change behaviour. This project shows that a combination of the two can provide a significant impact in both areas, with mutual enforcement of each others strong points.

Other strong points of the project include:

- *appropriate choice of technology* - The choice of technology for the project has been very appropriate for the conditions in the target area. A risk was taken by choosing a prototype drill rig without a track record. The quality of the wells drilled, the low percentage of failed bores, the limited down-time of the rig, and the short lines to the supply service in Bangkok all prove that this risk was well worth taking.

- *service to the least advantaged* - Compared to other projects in the region, this project has distinguished itself by reaching out to villages that are at the "end of the line": mostly off the main road, not accessible by car for large parts of the year, and at distances of up to 7 hours travel from the project office.

- *awareness raising effect* - A number of the villages that first were not willing to accept the conditions of the project, gradually recognised its advantages and requested to be included at a later stage.

- *clear criteria* - Working with clear criteria on expectations and contributions of the different parties involved (see e.g.

boxes 2-4) appeared to be a necessary and successful way for working under the complex and variable conditions in the project areas.

Activities in the follow up phase of this project will have to be aimed at gradual handing-over of the project to the government partner. The aim of the project, to have an impact on the health of villagers through PHC training and provision of clean water, does not have to change. But the objectives of the project should reflect a turn from “setting up the system” to “working towards sustainability”.

Improvements to be made include the following:

- *water quality improvements* - As explained above, a number of wells show problems with secondary (aesthetic) pollution by iron and maybe sulphur. The project will have to attempt to built filters for removal of these elements. Due to corrosion problems in the India Mark III pump, another pump type should be introduced. To make sure that the wells are definitely free of disease carriers, the project will have to perform water quality testing to confirm absence of coliforms.
- *repair and maintenance service for pumps* - Next to the public service system, a private system will have to be set up for the repair and maintenance of the pumps. This will have to include a dependable supply and distribution system of spare parts, training and equipping of Area Service Providers, and an agreed system of co-operation between the public and private sector.
- *planning and management by government partners* - Provincial and district co-ordinators of CWS and PHC will have to receive on-the-job training in planning and management of the project, in order to be able to continue the project activities after the final phase of the project.

For the sustainability of the clean water sources, an important foundation has been laid through the construction of quality wells, awareness raising at village level, and mechanisms that have laid the ownership of the wells in the hands of the villagers (village contributions, Village Maintenance Committee, and Village Caretakers).

Sustainability of the implementation capacity built up over this project period will mainly depend on the commitment of the Lao government to provide resources for these activities. The project has done a lot to built human capacity among government staff, and will continue to do so in the hand-over phase. After handing-over, the baton will be in the hands of the Lao government.

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