

# **NZSSES Conference 2008**

## **“Blueprints for Sustainable Infrastructure”**

**AUTHOR:** Miss Hanna Taylor

**Presenter:** Mrs Rebecca Sanders

**Title of Paper:** Acknowledging the White Elephant in the Room and Making Aid Work

*Consultant  
Synergine Group Limited  
PO Box 8000  
Symonds Street  
AUCKLAND  
Ph: 09 631 1777  
E:mail: rebecca.sanders@synergine.com*

### **1 ABSTRACT**

The failure of the aid dollar to effect lasting, tangible change is well known. While the failure to meet sustainability targets in New Zealand translates most often to negative environmental impacts, interventions or infrastructure that are unsustainable in an aid and development setting can result in loss of health, livelihood, and in extreme cases, lives. In the face of such consequences, the global momentum for sustainable development must be turned most strongly towards the developing world where the application of engineering and sustainability science has the most potential to engender positive change, now and into the future.

The challenge to achieve long lasting, sustainable change is one of the greatest hurdles facing the aid and development sector and is the topic of this presentation. Partnering with the world’s largest aid and development NGO and funded by NZAID, Synergine Group Ltd was recently engaged in Cambodia to improve their national capacity to implement high quality, sustainable water and sanitation interventions. The engagement consisted of a pilot project in four villages, resource development, and capacity building through training and skills transfer to locally based World Vision Cambodia staff. The Project focused primarily on potable water supply and treatment, sanitation, and hygiene promotion interventions in the rural sector at a household, community and school level. Secondary elements comprised solid waste management and increased household productivity through composting and gardening.

Key findings, challenges and successes of the project will be discussed to aid the development of a blueprint for the design and implementation of sustainable

infrastructure in the rural Southeast Asian setting. The presentation will feature an extensive slide show and provide figures and review of the tangible health and livelihood goals achieved and critique of project methodology.

## 2 INTRODUCTION

Emerging from a recent traumatic history of prolonged civil conflict, Cambodia is one of the poorest countries in the world, ranked 130<sup>th</sup> out of 174 countries on the United Nations Human Development Index. It is however, a country that has received huge inputs of both aid money and expertise: since 1991, over five billion US dollars have been spent on foreign assistance to Cambodia, administered by over 200 non governmental organisations (NGOs). In fact, no country in the world receives a higher per capita rate of foreign aid or has done for the last five years. (Thoughts on Foreign Aid, Bert Hoak and Ray Zepp, November 2003). Despite this, progress towards the widespread provision of safe water and adequate sanitation is limited: UNICEF estimates that only 16 per cent of rural Cambodians have access to adequate sanitation and 65 per cent to safe water. (UNICEF State of the Worlds Children 2008, Monitoring and Statistics: <http://www.unicef.org/sowc08/statistics/statistics.php>)

### 2.1 World Vision Cambodia

World Vision (WV) first entered Cambodia in 1970 in response to the government of Cambodia's international appeals for assistance. WV stayed in Cambodia and, in the following five years, carried out various relief and development activities. During this time, Pol Pot's Khmer Rouge forces continued to widen their control over the countryside. Cambodian and expatriate staff continued to serve until the siege of Phnom Penh by the Khmer Rouge in April 1975. Subsequently, all expatriates and several national staff members were evacuated and all WV programmes ceased. The Deputy Director of WV Cambodia, Minh Tien Voan, elected to stay and was later killed. (A Guide to World Vision Cambodia, 2006).

With the Vietnamese overthrow of the Khmer Rouge in 1979, WV re-entered Cambodia. Despite only three of the original 270 WV staff members surviving the genocidal Khmer Rouge regime, WVC has once again grown to be the largest NGO operating in the country with over 800 staff (A Guide to World Vision Cambodia, 2006).

WVC has implemented various initiatives to address issues of food and water security over the past 10 years, within their network of Area Development Programmes (ADPs) which operate throughout the country. Prior to the project conception, WVC had not employed Water and Sanitation (WatSan) specialists on their full time staff and had outsourced water supply and sanitation intervention design and construction to local consultants. In 2004 WVC commissioned an independent consultant to undertake a comprehensive review of past WatSan interventions and prioritise areas of need for future interventions across all WVC project areas. The consultant report identified that

there was inconsistency in quality across previous WVC WatSan projects; some interventions were of high quality while others reflected basic design, construction and management flaws. The consultant report also identified Prasath Sambo district as the highest priority area for immediate intervention.

Within the review, WVC carried out a survey to assess the water supply and sanitation situation in Kompong Thom Province, within which Prasath Sambo is located. This survey identified that although a number of water points and sanitation facilities had been established in these villages, the majority suffered from technical problems relating to poor design, poor quality construction, and poor management and maintenance. Many of the existing water sources would dry up during the summer months increasing the workload of women and girls who carry the burden of water collection. Furthermore, limited knowledge about safe hygiene and sanitation practices coupled with the limited supply of safe drinking water and sanitation resulted in a high prevalence of water borne and water related diseases such as diarrhoea, intestinal worms, conjunctivitis and skin infections. These factors were contributing to the poverty and poor health of these communities, particularly to the high child morbidity and mortality rates.

### 3 DISCUSSION

#### 3.1 Project Objectives

In light of the above, Synergine Group Ltd, in partnership with World Vision New Zealand was contracted to WVC to undertake capacity building in the area of water supply and sanitation. The Project objective was to reduce poverty and improve the health status and livelihoods of rural communities in Cambodia by supporting the developmental impact of existing WVC ADPs in the area of water supply and sanitation.

#### 3.2 Project Scope

The Project focused primarily on potable water supply and treatment, sanitation, and hygiene promotion interventions in the rural sector at a household, community and school level. Secondary elements comprised rubbish management at a village level and household composting and gardening. Large-scale water treatment plants or distribution systems were outside the scope of the Project as were agricultural, businesses, or industry water and sanitation needs. The Project did not address emergency relief.

#### 3.3 Project Methodology

The Project scope was twofold comprising the physical implementation of WatSan infrastructure through a pilot project in four rural villages, and capacity building within WVC. Capacity building comprised training and the development of theoretical and

practical WatSan resources and skills transfer through staff involvement in the pilot project. The two Project elements were closely linked and occurred iteratively: skills transfer was achieved as the WVC staff were involved in the pilot project and theories and designs developed as part of the creation of WatSan resources were applied and tested through the pilot project allowing practical findings to be fed back into the materials developed and skills taught. The project moved through five stages; at all times focusing on maintain gender equity and a participatory approach.

### **Stage One: Research and Development**

To optimise skill and knowledge transfer and ensure the pilot project, and wider Project, followed current best practice in WatSan design and implementation, the assignment included an initial internet and literature search of the rural water supply and sanitation interventions currently adopted in Cambodia and other developing countries and review and gap analysis of WVC's current capability to implement rural WatSan interventions.

Rapid rural appraisal (RRA) of the four villages chosen for the pilot project intervention was conducted to confirm the current extent and quality of water supply and sanitation available and the existing level of hygiene understanding and practice. The RRA included participatory planning sessions in each of the four pilot villages to identify water and sanitation issues considered important by the community and its various constituent groups. In addition, environmental data; including water quality, soil permeability, rainfall and groundwater levels were gathered and assessed.

### **Stage Two: Rural Water Supply and Sanitation Skills Transfer**

The second project phase involved working with WVC to establish a Core Team of WatSan Specialists and a wider support network of WatSan point people distributed throughout WVC nationally. Based on the gap analysis of WVC undertaken in stage one, a number of training programmes and materials focused on community engagement and Watsan skills and project management were developed and implemented.

### **Stage Three: Training within Delivery of RWSS to Four High Priority Villages**

Stage three of the Project focused on training of the Core Team of Technical Specialists within the context of implementing WatSan interventions in the four villages of Veal Veng, Kon Khaek, Chrasmas and Chineang. This implementation element of the overall assignment was termed the 'pilot project' indicating its purpose of giving the WatSan Specialists an opportunity to 'walk through' the implementation process, and together with ADP staff work closely with the NZ Consultants to gain hands on, practical experience.

## Stage Four: Tools and Resources for Future Capacity Building

The need for WatSan tools and resources was seen as vital to enable WVC to standardise and improve the quality of their water and sanitation interventions nationwide. Based on the experience gained from both the pilot project and stage one research, high quality standardised design drawings, operation and management plans, and hygiene training programmes for water supply and sanitation facilities were developed and compiled to form the Rural WatSan Manual.

## Stage Five: Monitoring and Evaluation

To ensure the longevity of the installed Watsan infrastructure extensive monitoring and evaluation was proposed, considering the following indicators:

- Improved health and hygiene understanding and practice within the four pilot villages
- Improved water supply, storage, and treatment within the four pilot villages
- Uptake of the Rural WatSan Manual within WVC ADPs operating throughout Cambodia

## 4 PROJECT OUTCOMES

### 4.1 WatSan Intervention in the Pilot Villages

#### Hardware

Implementation of WatSan interventions in the four villages of Chineang, Chrasmas, Kon Khaek and Veal Veng in Kompong Thom Province (the pilot project) comprised the successful installation of the following water supply and sanitation hardware:

Village	Veal Veng	Kon Khaek	Chrasmas	Chineang
<b>Hardware</b>				
VIP latrines	246			68
Dry pit latrines		265	169	
Shallow well + rope pump	16	17	14	
School latrine water supply		1	1	
Drilled well + afridev pump				6
School raintank				1
Ceramic water filters	272	274	176	22
Rehabilitated wells		5		

**Table 1: Pilot project infrastructure summary**

The pilot communities participated in the intervention through the contribution of labour (digging of latrine pits and shelter formation) and through monetary contributions for the wells and ceramic water filters.

To increase the efficacy of the installed infrastructure, the following additional hardware was provided:

- 68 concrete water jars for water settling for secondary treatment
- 61 community education boards (installed on each well)

To achieve the overall aim of improved health and livelihoods, the subject communities were also supported in the creation of household composts (15 – 130 composts in each village) and well gardens (to date, installed on 80% of wells). These interventions contributed significantly to the Project aim and created a sense of empowerment and tangible dietary, hygiene and economic benefits for the large number of households involved.

### **Hygiene Promotion and Education**

Hygiene education, promotion and training were seen as vital to ensure uptake and correct usage of the installed hardware and improve overall hygiene behaviour. Accordingly, the hardware element of the pilot project was supported by an extensive array of ‘software’ comprising:

- Formation of community based groups for the management of water points and monetary contributions
- Extensive health and hygiene promotion and education at a household, school and community level
- Operation and maintenance training of community based groups
- Promotion and training in the use of ceramic water filters
- Training in human and animal waste composting

### **Project Outcomes against Indicators**

Key indicators used to measure achievement of the objectives were stipulated at the Project outset as follows:

- Improved availability of safe drinking water (number of households that have access to safe drinking water within 15 minutes walking distance)
- Improved availability of adequate sanitation facilities (number of households with access to a latrine within 15 minutes walking distance) and;
- Improved understanding of safe hygiene practices

Outcomes of the pilot project as measured against the indicators and goals proposed at the Project outset are as follows:

## Improved Latrine and Well coverage

Indicator	Prior to Project	Project Goal	After the Project
Latrine coverage	1%	50%	98%
Well coverage	11%	50%	100%

**Table 2: Project outcomes against key indicators**

## Improved Hygiene Understanding

The indicator of improved hygiene behaviour is hard to quantify although follow up evaluation of the Project impacts indicated significant change in hygiene and sanitation behaviour throughout the four pilot villages. Key behavioural changes included:

- Correct use of household filters and filtering of all water sources
- Widespread use of wells and safe storage of collected water
- Widespread construction and use of latrines
- Composting of animal and sometimes human waste
- Burning of rubbish

## 4.2 Capacity Building

Capacity building of WVC ADPs in the area of sustainable WatSan interventions was the final outcome actioned under the Cambodia Water and Sanitation Management Project. Ensuring the sustainability of the WatSan infrastructure installed was achieved through a mixture of staff recruitment and training, and resource development.

### Training

The Project facilitated the formation and training of a network of WatSan ‘point people’ within WVC operations areas. A number of central and locally based training sessions were held focusing on community engagement and WatSan technical and project management skills transfer.

### Resource Development

The Rural WatSan Manual formed the key resource output from the Project. Designed to support the existing WVC ADPs by improving their capacity to provide high quality, sustainable RWSS interventions, the Manual comprised a combination of theory and extensive supporting appendices of practical resources. The Manual, where possible, utilised simple language and along with all appendices has been translated into Khmer and produced in both hard and soft copy for ease of distribution and replication.

The Manual was developed iteratively through the course of the Project with extensive input from the WVC Core Team. Upon completion, the Manual, in concert with

training, was distributed to WVC staff throughout Cambodia and a national level workshop convened to share the results of the Project and present the finalised document.

## 5 KEY TECHNICAL FINDINGS

Key findings derived from the pilot project regarding water supply, sanitation and water treatment infrastructure.

### **Water Supply**

- Water point proximity, the provision of a cover, and the convenience of a pump are key features influencing the community acceptance of new water supply infrastructure.
- Design of the concrete pad surrounding the well head to allow room for clothes washing and bathing makes the infrastructure much more useable.
- Creation of a drainage channel leading to a garden to utilise 'waste' water increases productivity and minimises wastage of a valuable resource.

### **Sanitation**

- Latrine use and community participation in latrine construction is predicated upon extensive health and hygiene promotion.
- Use of a dual pit system allows for ongoing use and thus greater sustainability.
- Latrines need to be of sufficient depth to allow composting of waste before removal.

### **Water Treatment**

- Ceramic water filters are a well known and robust technology that show successful uptake at both a school and household level.
- 

## 6 CONCLUSIONS

Feedback from the village communities and WVC staff, and findings from an internal WVC audit suggest that the Project succeeded in achieving the desired aims of poverty reduction, improved health status and livelihoods in rural communities, and further enhanced capacity of WVC ADPs to implement sustainable and consistently high quality rural water supply and sanitation interventions. The Project also far exceeded the goals defined at the project outset of improved water supply and sanitation coverage and improved hygiene understanding and practice.

It is hoped that the benefits accrued from this project will be widely replicated as WVC implements further WatSan interventions throughout Cambodia utilising the standard designs, methodology and techniques specified in the rural WatSan Manual, developed through the course of this Project.

Such success and the sustainability of any intervention is however dependant on the following factors:

- Holistic approach to water supply and sanitation intervention that sees the inclusion of health initiatives, education, water treatment, gardening, composting and rubbish management. Effectively a triple bottom line approach to sustainability.
- Commitment to community ownership and engagement through training, education, the formation and encouragement of village level management structures. Getting community buy in to our infrastructure interventions is vital to ensure they continue in the long term.
- Community and counterpart participation and gender awareness throughout all project stages.
- Smart infrastructure design drawn from local knowledge and local context to ensure it is maintainable, useable and replaceable in the long term.

The improvement of WVC's capacity to implement sustainable water supply and sanitation interventions is anticipated to even further increase through the implementation of the Manual Roll out Plan ensuring the uptake of the Rural WatSan Manual. This will in turn facilitate ongoing improvement in WVC's capability to implementation sustainable RWSS interventions and achieve improved livelihood and poverty reduction in the rural Cambodian setting in the long term.