



Plan China model for total sanitation

Prakash Kumar

Is it possible to create demand for ecosanitation, and to implement it on a scale that brings down costs and subsidies? Plan China has been trying this approach in an underdeveloped rural province of western China.

Plan China is implementing a water and environmental sanitation (WES) programme in 500 communities and 200 schools in five counties of Shaanxi province in phases from July 2005 to June 2010. Shaanxi is one of the ten most underdeveloped provinces in western China.

The majority of children and their families in Plan programme areas are deprived of their rights to live in an environment that provides access to reliable year-round safe water and basic sanitation. Plan China's Baseline II data shows that in Plan programme areas, the shortage of water and lack of access to basic sanitation is significantly worse than the country's already low average. Access to potable water is available to only 2 per cent of families and only 8 per cent families dispose of excreta in a sanitary manner (the sanitation coverage for China is currently 29 per cent). These issues form a self-reinforcing poverty loop that hinders children's development. To overcome this, Plan China is implementing a water and environmental sanitation programme.

Main issues

The health of the community is directly affected by the scarcity of clean and safe water and inadequate sanitation. Women and children are more vulnerable to diarrhoea and other diseases. A widespread lack of education and hygiene awareness adversely affects the entire household and exposes family members to numerous diseases which then result in substantial spending on health treatments. The children and

their families are not able to break the faecal-oral transmission routes, which are responsible for most of the water- and sanitation-borne diseases. Most importantly, pathways for transmission of diseases from faeces to water, land, flies, fingers, food (which may be contaminated by any of the above four routes) are open and unblocked. The children and their families do not practise basic hygiene activities such as regular use of sanitary latrines, washing hands with soap after defecation and before preparing foods, use of clean water for household purposes and disposal of child and animal excreta in a sanitary manner.

Ganquanfang village, of Pucheng County in Jingyao Township, is a typical programme village, in which the programme was implemented.

Ganquanfang's background

The intervention was aimed at the entire community of Ganquanfang, consisting of 315 households in four clusters, with a population of 1300 (643 women). The annual average per capita income is US\$120–150. Agriculture and horticulture (fruit orchards) are the primary sources of income.

Sanitation conditions. Human excreta is used as a fertilizer for the crops and vegetables, which is an old



The urine-diverting toilet, showing position of the small urine-collection container and access to the two pits.



The cost of the ecosan latrines has come down as they have become more popular.

practice in China. Water is not used for anal cleaning; instead the custom is anal wiping. Fixed-point open defecation is used most of the time by the community, a practice that has become widespread among the community due to long winters which discourage open defecation outside. Where open defecation does take place, it is sometimes in an open field at a fixed place. More often, however, there is a place for defecation within the household premises, and it is commonly very unhygienic. It may be roofed or without a roof, within the front or rear courtyard, and it is often sited very close to the kitchen, thus exposing food to potential contaminants. Therefore the challenge in rural China is to promote a latrine for the safe use of human faeces as a fertilizer since it is considered a valuable resource.

The overall sanitation scenario was appalling. Due to the lack of a waste management system, the entire village was a filthy area. Waste water from kitchens, from utensil washing and from bathing often stagnates in the household courtyard, creating bad odours and a breeding ground for mosquitoes and other insects carrying harmful diseases, including malaria.

Water supply situation. The history of drinking water supplies in this village is varied. In the 1960s and '70s the

community used water from a stream which was highly polluted and also remote from the village. Then in the 1980s they started using groundwater, but then later stopped since the water was saline and also contains high levels of fluoride. After that, in the 1990s, they started to collect rain water, but this was scarce due to low rainfall and also the storage tank was not kept clean. In the 2000s they have started to have water transported from the township in tankers and stored in the underground tank. Not all households can afford to have water carried from the township by tanker, however.

Cycle of intervention

The village development committee (VDC) is the community-level partner representing all four groups of the village. Eleven members are on the committee, which includes four women. Apart from the VDC the village party committee also takes an active part in supporting programme activities. Village volunteers also supported the awareness programme for hygiene education.

Institutional partners were the Plan China country office, Plan China Programme Unit–Pucheng, the Water bureau–Pucheng County and the township project office–Jingyao. Plan engages with each village in the following phases.

Pre-planning phase

Villages are selected for the WES programme if they meet the following criteria:

- demand (willingness to share part of capital cost and pay for 100 per cent O&M costs with management responsibility);
- willingness to improve the poor sanitation conditions;
- need (future time savings, insufficient supply of water / water quality problems).

There was a genuine demand and need in Ganquanfang village. The community was willing to contribute 20–25 per cent of capital costs (cash and labour) for the water supply scheme and 50–60 per cent contribution towards constructing individual household latrines. On this basis the village was selected for water supply and sanitation improvements to be carried out in 2006. The community participated in a meeting and contributed towards a programme for the improvement in water supply and sanitation.

Planning phase

The main objectives of this phase were:

- community mobilization;
- choice of technology;
- preparing a community development plan;
- collection of community cash contribution.

A comprehensive feasibility study was conducted by the community with active facilitation from Plan China and the township project office. First of all a feasibility study was conducted to identify the critical problems faced by the community and to explore the solutions and resources available within the community. Township project office and Plan China staff conducted health, hygiene and environmental sanitation awareness activities, using different mobilization tools for community members to work better together in a group. These activities helped the community to take charge of their situation and come up with creative solutions to solve their problems. The community was also assisted in selecting technically and financially viable water and sanitation options. Water supply options were discussed with the

Groundwater in Emergencies

community and it was decided to lay a pipeline from a deep well located 2 km from the village. The O&M cost would be approximately \$1–1.25/month/household, which includes the salary of one village maintenance worker. Likewise latrine technology was discussed by the community and three options were presented to them:

- Biogas latrines
- Twin-pit latrines
- Urine-diverting latrines

The community selected the urine-diverting ('ecosan') latrine.

After completing these activities, the community prepared a development plan for implementing the programme.

Implementation phase

After collection of upfront cash for the water supply scheme and preparation of the project outlines covering the design and cost details of the scheme with other activities, the implementation phase commenced. Twelve community members were trained in latrine construction and also in laying the water supply pipeline from the well point. The training team visited each household to disseminate information personally regarding the construction of the household ecosan latrines and to help the household to identify the appropriate and suitable positioning.

After completing 80 per cent of the latrines, the community started laying a water supply pipeline from the well point to the village. This was in line with the identified priority and the community commitment to sanitation preceding water supply.

The village development committee was primarily responsible for the quality of the construction materials, with support from Plan International and the township project office. The whole community mobilization process in the planning and implementation phases was a capacity-building exercise in itself, and the VDC and the community took part in a number of training sessions to build their capacity (see Table 1).

The community contribution for the water supply scheme was \$25 per household in upfront cash and \$12.5 per household towards labour. The total cost of the water supply scheme was \$36,800 out of which the total commu-

Table 1. Training for villagers

<i>Name of Training/Activities</i>	<i>Phase</i>	<i>Participants</i>
General information about the programme and roles and responsibilities of VDC	Beginning of planning phase	VDC members
Feasibility study	Planning phase	Community
Village environmental action plan, including latrines, drainage and water supply scheme (for community development plan)	Planning phase	VDC members
Cash and labour contribution plan, monitoring and evaluation plan and operation, maintenance and expansion (OME) plan (for community development plan)	Planning phase	VDC members
Implementation training to VDC members including book keeping and accounting	Implementation phase	VDC members
HHESA session for community members and children	Implementation phase	Community members, children
Village-level mason training for latrines, water supply schemes and other facilities	Implementation phase	Village masons/ community members
Safe use of human and animal excreta as fertilizer	Implementation phase	Community members
Healthy home surveys	Post-implementation phase	Community members

nity contribution was \$11,800, which was 32% of the total cost. The average cost of a basic urine-diverting latrine was \$94 and Plan China provided a subsidy of \$45 to each household. Some of the households chose their own latrine design and spent more money on the interior, but the subsidy was limited to \$45.

Monitoring and evaluation phase

The water supply and sanitation programme in Ganquanfang was completed in June 2006. The VDC is doing internal monitoring of uses of latrines. Plan China has trained the VDC and community to conduct regular household surveys for monitoring the use of latrines, water supply schemes

Box 1. Ecological sanitation (ecosan)

The world is facing water shortages and in the coming years they will be intensified in almost all regions. By the year 2025, 50 per cent of the world's population will face a water shortage. The requirement of water in conventional sanitary systems is huge and also the resulting wastewater pollutes the existing resources. A conventional flush latrine requires almost 15,000 litres of water per year per person for flushing faeces and urine. The flushing system has been termed as one of the worst inventions in terms of its negative effect on the conservation of water resources.

To address this critical problem, the concept of ecological sanitation has been developed, based on three fundamental principles: it promotes health and prevents disease; it protects the environment and conserves resources; it recovers and recycles nutrients.

Suitability in China

A number of factors make ecosanitation particularly well suited in China:

- It is not new to China: in the past Chinese people used this type of sanitation in which urine was diverted from faeces.
- The customary cleaning habit in China is wiping, which complements ecosan.
- The climate and shortage of water supports ecosan.
- Chinese people have used human excreta from ancient times as a fertilizer and thus their attitude is positive.
- Modern ecosan latrines (dehydrating) have been in use since 1950 in neighbouring northern Vietnam.

Box 2. Design of urine-diverting ecosan latrines

Average quantity of faeces and urine per adult:

- 400-500 litres urine per year i.e. 33-42 litres per month i.e. 1.10-1.36 litres per day.
- 50 kg faeces per year i.e. 4.16 kg per month

Urine-diverting latrines are twin-pit alternating latrines and urine is collected in a separate container sometimes placed under the stairs for safety and space utilization. Urine-diverting latrines require less space in comparison to conventional twin-pit latrines. The small urine container is regularly emptied into a big container placed at a convenient place in the household for use in agriculture, and this can be used directly in the kitchen garden. The construction of these types of latrine is very simple and also there is no risk of the pit leaking, so waterproofing of the pit is not required. It can be constructed entirely above ground. For a household of 5 persons it should consist of two processing chambers each of volume 0.25 m³ (50 kg per person per year x 5 adults = 250 kg = 0.25 m³). The following are building guidelines:

- Construct entirely above ground with chamber placed on a solid floor.
- The size of pit may be 0.90 m x 0.70 m x 0.60 m (depth) which provides enough volume for 0.25 m³, plus 0.20 m free space above the surface of excrement (i.e. a total depth of 0.40+0.20= 0.60 m) Two pits of size 0.90 m x 0.70 m x 0.60 m are sufficient; for a smaller household the size may be reduced.
- Two openings of size 0.25 m x 0.25 m must be provided in each pit for the removal of dehydrated material.
- The first pit can be used for about 6-7 months by a household of 5 persons. Since materials are also added after defecation (ash, urea or lime) and soil is placed on the bottom (0.03 m depth) and also on top for sealing (0.05 m) when it is full, the effective depth would be 0.6 - 0.08 - 0.20 (free space) = 0.32 m. When it is roughly full up to 35cm depth, the contents must be levelled by stick and then the pit is filled to the top with dried powdered earth. It is then sealed for processing. The second pit now comes into use. When the second pit is nearly full, the first pit is emptied.
- A vent pipe (10–15 cm diameter) is needed for the processing chamber for ventilation and aeration. To remove odours and to dry the contents the pipe should be as straight as possible, since bends reduce flow. It should extend above the roof by a minimum of 50 cm. If necessary the vent pipe can be fitted with a small electric fan.

further in reducing the household latrine subsidy.

There are a number of important long-term benefits derived from the success of ecosan latrines. The average subsidy of the ecosan latrines has come down from the high of \$118 in 2004 to \$48 in 2006 and will further reduce to \$44 in 2007. The unit cost of the standard urine-diverting latrine is only \$94 which is 20–25 per cent more economical than pit latrines (\$113). Moreover, the community is also adopting local designs for the super-structure so in future the unit cost will reduce further. The latrine subsidy has gone down to \$37.5 in two programme units where the promotion of ecosan is particularly successful and where the community has adopted it in large numbers.

Plan China is committed to gradually reducing their subsidy through the development of low-cost ecosan latrines, and the results are encouraging. Plan China is promoting these latrines in programme areas integrated with health and hygiene awareness programmes with appropriate communication materials aimed at children and communities. Extensive training is being provided to facilitators and communities for promoting these latrines and also to integrate it with agriculture.

Last fiscal year (July 2005 to June 2006), Plan China worked in 122 villages and supported the construction of 8457 urine-diverting latrines. In the current fiscal year Plan China is scheduled to work in 125 villages and to construct 8680 urine-diverting latrines.

About the author

Prakash Kumar is a water and environmental sanitation consultant with Plan China.

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and changes in unhygienic behaviours. A set of community-friendly indicators have been developed with the community for monitoring and evaluating water supply and sanitation schemes.

Achievements of the programme

The total project cost for Ganquanfang village was \$69,926, which was made up of a community contribution (labour and cash) of \$41,353, and a Plan contribution of \$28,573. With these funds the following was achieved:

- The construction of 300 household urine-diverting latrines and household water supply connections
- 11 public garbage pits for collection of solid waste
- Planting 1700 trees
- O&M plan developed by the community

- Community members understand the link between unsafe water supply, poor sanitation and health, and are aware of environmental protection
- Better environment for child development
- Community understands its own strength, the value of the VDC and the benefits of participatory working.

Scaling up

The conditions in most of the Plan China programme villages are similar to Ganquanfang. The success of this model and the process followed in the villages covered in 2006 is being replicated in a number of villages in 2007. In addition, the acceptance of ecosan latrines has reduced the unit cost of household latrines in Plan China's programme area and is helping