

DEMOCRATIC REPUBLIC OF TIMOR-LESTE AND UNICEF

WATER AND ENVIRONMENTAL SANITATION PROJECT

2003-2005



An Assessment of Project in Communities and Primary Schools

with Recommendations for the Future

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Timor-Leste district map

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ACRONYMS

AusAID	Australian Agency for International Development
CWSD	Community Water and Sanitation Division
DHOs	Department of Health Officers
EHD	Environment Health Department
EMIS	Education Management and Information System
FMA	Field Monitoring Assistants
IEC	Information, Education and Communication
km	kilometer
MDGs	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MOH	Ministry of Health
MPO	Master Plan Operation
NDP	National Development Plan
NGOs	Non Government Organizations
PRA	Participatory Rural Appraisal
PTA	Parents-Teachers Association
TOR	Terms of Reference
UNICEF	United Nations Children's Fund
USAID	United State Agency for International Development
VEs	Village Entrepreneurs
WES	Water and Environmental Sanitation
WSS	Water Supply and Sanitation

Timor-Leste district map



EXECUTIVE SUMMARY

UNICEF Master Plan of Operations (MPO) 2003-2005 incorporates a Water and Environmental Sanitation (WES) Project as part of its Health and Sanitation Programme. The project is implemented in four of the thirteen districts of the country, and targets both selected rural communities and primary schools. The fund allocation was US\$ 425,000 for 2003 and US\$ 250,000 for 2004. The expenditure was about 70 percent and 90 percent respectively. The purpose of the present assessment is to evaluate the extent to which the Project has been effective in attaining the set objectives, and to define a roadmap for the future role of UNICEF in the sector.

Timor-Leste has a population of 924,642 according to the July 2004 census, out of which 78 percent reside in the rural areas. The Gross National Income per capita is estimated at US\$ 430 (World Bank, 2004), and 40 percent of the population lives under the national poverty line of US\$ 0.55 a day. The social indicators are disturbing, as per a survey conducted in 2002 (GOTL-UNICEF, MICS, 2003). Out of every thousand live births, 125 children die before they reach five years of age, and 83 before the age of one. The maternal mortality rate is very high at 800 per 100 thousand live births. Only 48 percent of primary school children reach grade 5. Diarrhoea among children is frequent. Forty-nine percent of children under age of five years are stunted, 13 percent are moderately wasted and 45 percent are underweight. Access to safe water supply and safe sanitation in the rural areas is respectively 30 percent and 19 percent (SIP, 2005). Situations in the four districts supported by UNICEF Project, namely Dili, Ermera, Liquica and Manatuto are close to the national norms, although district-based statistics are not available.

Since 2001, UNICEF has supported the Government, particularly the Community Water and Sanitation Division (CWSD), in developing Guidelines for programme design and in building knowledge through several study tours in neighbouring countries. However, with the downsizing of UNICEF Water and Sanitation unit in mid-2003 to a single staff member, the capacity of UNICEF to influence Government policies and strategies has been severely reduced. The assessment has recommended a stronger UNICEF WES team, and a new WES programme cycle to effectively contribute to the Millennium Development Goals

Following the selection of the rural project areas by the Government and UNICEF, with a view to converge in areas where other UNICEF interventions are provided, the community leaders are oriented on the programme framework. As a result of community consultation led by the village and hamlet leaders, needs assessments are carried out. During the period 2003-2004, 384 open dug wells and two gravity-piped systems were constructed or rehabilitated, thus benefiting 6,041 families. In addition, 413 families received a rainwater jar of 1,200 litres capacity each. A total of 4,184 families constructed sanitary latrines using concrete latrine parts provided under the Project.

The facilities provided under UNICEF support have generally been utilised, although some shortcomings were evident. As dug-wells are open, and water is drawn by buckets, the risks of well water getting contaminated are high. As the families provided with the

water jars used the stored water for all domestic purposes, and the supply lasted them for about 7 days, they returned to the drudgery of walking long distances for water since the dry season is very long. The sanitary latrines provided to the individual household have been effectively used where water for ablution and cleaning of the pans is readily available. However, the facilities were not used or under-utilised where collection of water is problematic.

In order to supplement the inadequate staffing in CWSD at the sub-district level for implementing and monitoring activities, 15 Field Monitoring Assistants (FMAs) were recruited by CWSD and paid by UNICEF in 2003, and reduced to eight FMAs in 2004. Water and sanitation components, namely the latrine parts and water jars are manufactured by Village Entrepreneurs (VEs), after being trained, and they are paid by the Project on the basis of parts manufactured. Two VEs, a man and a woman, are selected in each of the project hamlets.

The exploitation of groundwater is appropriate in large areas of the country. However, the digging of wells by manual labour often limits the depth of the well, such that wells can dry up or have significantly reduced flows at the peak of the dry season. In addition, each well serves less than 25 families. The assessment recommends the re-introduction of tubewells fitted with hand-pumps to ensure water reliability; each hand-pump can serve 30-40 families. The use of drilling rigs, including the one-man operated rig, is proposed. A good maintenance system for hand-pumps with community involvement and ownership, backed by availability of hand-pump spare parts and a back-up service for major repairs is necessary.

Gravity-piped systems have proved to be quite expensive, as much as US\$ 330 per household. In some cases, systems have remained non-functional as nobody attends to the repairs. This option should be considered for situations where the more cost effective tubewells with hand-pumps are not feasible, and community participation ensured. In cases where the cost per capita is very high, the provision of water jars can be considered for drinking purposes only. In such situations, two rainwater jars are recommended per family. Besides, community rainwater tanks can be explored, along with a good system for community management of the water.

The cost of providing concrete latrine components at US\$ 53.7 per household is substantial, and unlikely to be sustainable. It is estimated that US\$ 2.4 million would be required for some 45,000 families without sanitary latrines in the four project districts. The MICS data have shown that about 38 percent of rural households use pit latrines, though many have unprotected pits. This assessment recommends a “do-it-yourself” approach where households would be motivated to build their own systems using local know-how and materials, as water is provided to their villages. This should be supported by a well articulated social mobilisation drive and good hygiene education programme, as demonstrated in other countries, such as Myanmar and Bangladesh.

The water and sanitation facilities in 24 schools have been rehabilitated during 2003-2004. A survey of a very small sample of the schools supported since 2001 showed that

less than half of the water systems were properly functioning, and the lack of convenient water access has affected the use and maintenance of the toilets. The tapping of water from gravity-piped community systems which are poorly managed was a major contributing factor. While the Parents-Teachers Associations (PTAs) have been active in most schools, they have given inadequate attention to minor repairs of water and sanitation facilities. The PTAs should refocus to ensure attention to both academic and lifestyle education.

The assessment recommends the provision of tubewells fitted with hand-pumps for water supply in schools, as this technology is feasible in most areas. Where piped water is considered, it should be planned in the context of the community water supply. In situations where the above options are not viable, rainwater harvesting should be explored, and the use of the water should be properly managed to last the dry season.

The monitoring of the project, particularly on the usage and maintenance aspects has been limited and inadequate. It is recommended that more focus be given on systematic information gathering via fieldtrips, sample surveys and meetings, to analyse usage of facilities provided, trends in behavioural changes and health benefits. Significant amounts of materials provided by UNICEF and stored in warehouses for distribution to the field are not adequately monitored. Attention should be given to improve the management of the warehouse, including training of the warehouse manager.

ASSESSMENT OF UNICEF WATER AND ENVIRONMENTAL SANITATION PROJECT AND RECOMMENDATIONS FOR THE FUTURE

1. BACKGROUND

UNICEF Master Plan of Operations (MPO) 2003-2005 incorporates a Water and Environmental Sanitation (WES) Project as part of its Health and Sanitation Programme. The project is implemented in four of the thirteen districts of the country; the four districts cover about 40 percent of the population. This was preceded by an early intervention which was of an emergency and rehabilitation nature that started in late 1999, and covered all parts of the country. The purpose of the present assessment is to assess the extent to which the project has been effective in attaining the set objectives, and to define a roadmap for the future role of UNICEF in the sector. Another major assignment of the consultancy is to assist in the development of a proposal for funding. This is treated separately. The Terms of Reference of the assessment is given in Appendix 1.

1.1 Situation Analysis

Timor-Leste has a population of 924,642 according to its first national census conducted in July 2004, out of which an estimated 718,300 reside in the rural areas. The Gross National Income per capita is estimated at US\$ 430 (World Bank, 2004), and 40 percent of the population lives under the national poverty line of US\$ 0.55 a day, making the country one of the poorest in the region. Situations in the four districts supported by UNICEF project, namely Dili, Ermera, Liquica and Manatuto are close to the national norms, although district-based statistics are not available.

Access to safe water supply and to safe sanitation in Timor-Leste is amongst the lowest in the region. Different studies have produced different statistics due to differences in measuring concepts. Based on various sources, the estimated values at 2003 (SIP, 2005) put access to safe water in rural areas at 30 percent and to sanitation at 19 percent. The Multiple Indicator Cluster Survey (MICS) conducted in 2002 (GOTL-UNICEF, MICS, 2003) puts access to safe water at 51 percent. Households spent on average about 23 minutes daily to collect drinking water and the task is largely undertaken by women and children. Poor environmental sanitation has provided good breeding grounds for mosquitoes, leading to the widespread of malaria, and to a lesser extent, the incidence of dengue.

The inadequate water supply combined with poor sanitation and hygiene practices are major contributors to the water and sanitation related diseases affecting children. This has in turn led to malnutrition and non-optimal development of their intellectual capacity. According to MICS, 25 percent of rural children under age 5 years had at least one episode of diarrhoea during two weeks preceding the survey, 49 percent are stunted, 13 percent are moderately wasted and 45 percent are underweight based on WHO standards. Out of every 1,000 live births, 83 children die under the age of one year and 125 die

before the age of five years. The maternal mortality rate is high at 800 per 100 thousand live births.

Only 48 percent of primary school children reach grade 5. Water and sanitation facilities are non-functioning in many schools, requiring the children to fetch water from outside the school premises and going to the bush for toilet use. Of the 213 primary schools in the four Project districts, 133 require the provision or rehabilitation of water supply systems, and 97 require the provision or rehabilitation of sanitation facilities.

1.2 Project Objectives

The Project objectives, as outlined in the Terms of Reference for the assessment, are as follows:

- Improving hygiene practices and access to water and sanitation in rural communities
- Improving hygiene and sanitation in primary schools

The project is designed to serve as a demonstration model for bringing changes to the Project and non-project areas. Furthermore, school water and sanitation is meant to increase girl's enrolment, and community participation and management is seen as an essential element of the project.

1.3 Project Outcomes

The expected outcomes, from the MPO, are:

- Families in selected rural areas use safe water and sanitation facilities, and pregnant women and young children sleep under treated bed nets. Implementation will be in 50 villages to benefit 6,000 families.
- 50 percent of the primary schools in selected areas are healthier and safer places for children, particularly for girls.

1.4 Project Outputs

The expected outputs, from the MPO, are:

- National rural water supply and sanitation policies, strategies and plans are developed in accordance with National Development Plan (NDP).
- Community Water and Sanitation Division (CWSD) staff, District Health Officers (DHOs) and others have technical and managerial capacity to implement WES project.
- Field Monitoring Assistants (FMAs) facilitate village level Participatory Rural Appraisal (PRA) to mobilise community demand for WES facilities in 50 villages.
- FMAs and Village Entrepreneurs (VEs) have the skills to make WES components, and support families to rehabilitate, build and use WES facilities in 50 villages.

- Village Entrepreneurs promote use of insecticide-impregnated mosquito nets to all pregnant women and families with children under age five in 50 villages.
- Eighty selected primary schools have better access to clean water and latrines, and capacity to promote safe hygiene practices as well as selected school children dewormed.

1.5 Geographical Focus

The WES Project is to be implemented intensively in four districts, namely Dili, Ermera, Liquica and Manatuto, which cover about 40 percent of the total population. However, in year 2003, at the request of the Government to continue support in the larger project areas prevailing under the emergency phase, the activities continued in the districts of Aileu, Manufahi, Ainaro and Baucau.

1.6 UNICEF WES budget allocation

The allocation for the WES Project was US\$ 425,000 for 2003 and US\$ 250,000 for 2004. The estimated expenditure was about 70 percent and 90 percent respectively.

2. METHODOLOGY OF ASSESSMENT

The assessment started on 21 April 2005 with the arrival of the international consultant, Philip Wan, and joined by Marcos da Cruz, a national consultant on 26 April 2005. The assessment was completed on 1 June 2005. The international consultant was in Timor-Leste in October 1999, as a UNICEF staff member providing emergency and relief to the returning population after the war of independence.

The assessment was conducted based on intensive review of literature, complemented by interaction with key partners in the sector and field studies. Literature review included the various Policy and Planning documents, Plans of Operation and Action, and Technical Guidelines. A list of materials read and referred to is given in Appendix 2. Discussions were held with staff in UNICEF, development partners including the relevant Government departments, major donor agencies, and NGOs. A list of people/agencies met appears as Appendix 3.

Seventeen days have been spent in the field, covering the four project districts, as outlined in Appendix 4. The areas were selected by UNICEF to reflect villages with good and less good performance. The initial field visits provided the team with a good basis for the development of Questionnaires for more in-depth field evaluation undertaken subsequently. Eight sets of Questionnaires were developed, as given in Appendix 5, to elicit information from schools, village leaders, village entrepreneurs, households on use of water and sanitation facilities, and shops in Dili selling water and sanitation components.

A total of 15 schools were visited in the four Project districts. Eight villages were visited where the village leaders and entrepreneurs were interviewed and the community water

systems were observed. In addition, 40 families provided with pour-flush latrines, 15 with water jars and 6 who built their own pit latrines were interviewed. In Dili town, 5 shops were visited in connection with the sale of water and latrine components.

Appendix 6 shows some of the Project activities through photographs.

3. PROJECT IMPLEMENTATION IN RURAL COMMUNITIES

3.1 Selection of the communities

The selection of the Project sub-districts and villages was carried out by the Community Water and Sanitation Division in consultation with UNICEF, with focus on convergence in areas where other UNICEF interventions were provided.

3.2 Capacity building of implementation agency

3.2.1 Human Resources

The Community Water and Sanitation Division (CWSD), operating under the Director of Water and Sanitation Services, is headed by a chief and supported by three persons, namely the programme coordinator, assistant programme coordinator and the monitoring officer. One officer operates in each of the 13 districts, except for vacancies in Aileu and Baucau, and they generally have good background in mobilising communities and promoting the software programme components, and less strong in the technical aspects. No staffs are available at the sub-district levels, thus exposing a gap in providing support to implementation at the community level.

Under the Project, CWSD has recruited 15 Field Monitoring Assistants (FMAs) on annual contracts, whose salaries are paid by UNICEF. They operate at the sub-district levels. At the community level, 64 Village Volunteers (VEs), one man and one woman for each hamlet, have been recruited by CWSD to construct water and environmental sanitation (WES) facilities, and are paid by UNICEF on tasks basis. The roles of the FMAs are to assist and facilitate the VEs to undertake promotion and mapping activities, and rehabilitation and construction works, as well as to report on progress of implementation to CWSD via the CWSD district officers for their certification. Since 2003, 15 FMAs were oriented on the implementation guidelines through a two-day workshop, and participated, along with the VEs, in a five-day training on manufacture of WES components. In 2004, only 8 FMAs were retained. None has been retained in 2005, pending the findings of this assessment. UNICEF also pays the per diem of four district officers and of the four CWSD staff in Dili, when they are on field visits

UNICEF has supported CWSD staff and selected FMAs and VEs in study tours to exchange experiences, as well as in training programmes on water technologies. .

3.2.2 Development of guidelines

A good number of guidelines and manuals have been developed to facilitate implementation of WES programmes in the country. CWSD in collaboration with other partners, including AusAID and UNICEF, have developed guidelines on Community Water and Sanitation and on Hygiene and Sanitation Promotion through Schools in 2001, with revisions made in 2003. Two manuals for Village Entrepreneurs, one on operations including forms to use for activities, and the other on manufacture of WES components, were developed and revised in 2003.

3.2.3 Material support

UNICEF provides material support to CWSD. Since 2001, it has supplied construction materials, such as pipes and accessories, cement and iron bars. In addition, it has provided one pick-up, 30 motorcycles for use for FMAs, furniture, computers and printers for Dili and district offices, 50 sets of mason's tools for VEs, and tools and moulds for making water and sanitation components

3.3 Mobilizing the community

The protocol for the implementation of the community project is detailed in Appendix 7. The key elements are the following:

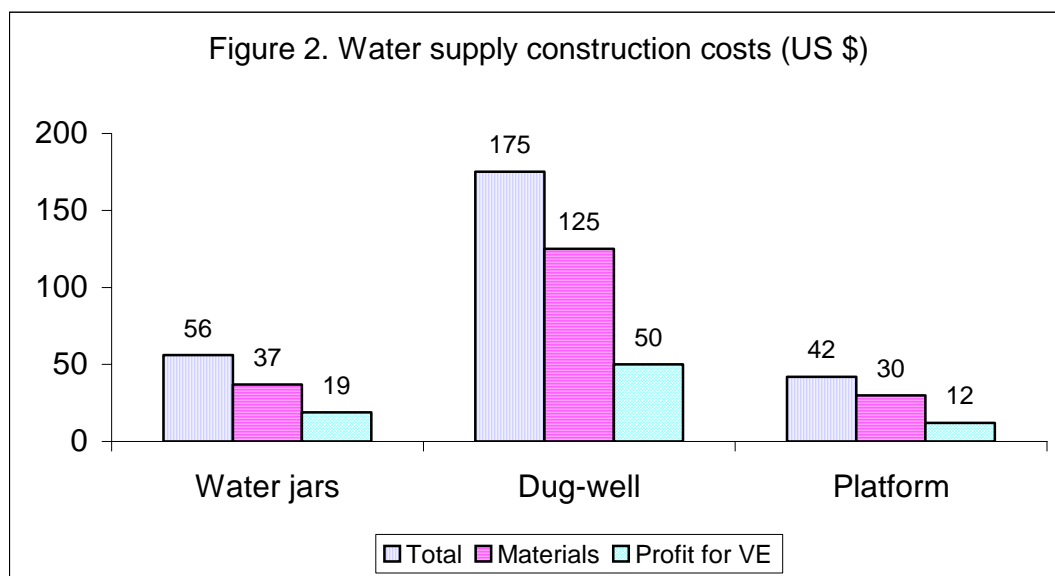
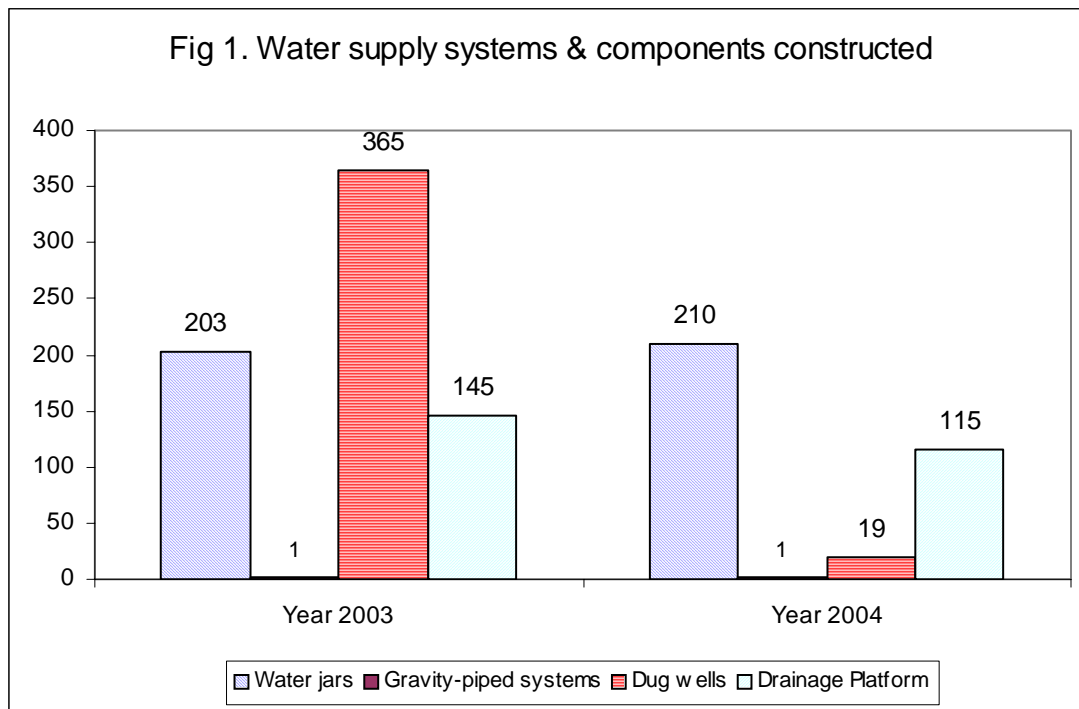
- Two-day orientation workshop on the proposed project is conducted by CWSD and UNICEF for the project community leaders, health staff, and staff from NGOs operating in the areas.
- A community meeting is organised by the community leader, with support of the FMA, during which a mapping of the needs of the people is conducted, and two Village Entrepreneurs (VEs), one male and one female, are selected.
- A hygiene and sanitation survey is conducted on a household basis by the VEs to revise the previous mapping, followed by the development of a proposal with support from the FMA. The proposal is submitted to CWSD via the FMA for approval.
- Non-local material supplies and cash advances for labour, transport and local materials are provided by UNICEF to CWSD.
- Materials are supplied to the VEs to implement the schemes, with quality monitoring performed by the FMAs and supervised by the CWSD district officer.
- Community manages the facilities provided and develops hygienic habits.

3.4 Technologies for water supply

The types of systems/component provided are given in Figure 1, and their cost given in Figure 2. The systems are the following:

- Concrete water jars of 1200 litres capacity
- Hand-dug wells of average depth of 5 metres
- Gravity-piped water system from spring sources

- Concrete platform for drainage (component)



3.4.1 Water Jar

The technology for the construction of concrete family-size water jars was imported from Vietnam when a training team consisting of 2 FMAs (one man and one woman), one female VE, and one UNICEF staff, went for a 7-day training in year 2000. Each water jar has a capacity of about 1200 litres, taking into account the dead storage volume. A jar

is provided to each of the selected project families. A total of 413 jars have been provided to households in the rural communities.

The rainfall pattern in the northern zone where the four project districts are located is characterised by a dry period of five months from June to October. In the central mountainous zone, the dry period of four months is between July and October. The southern zone has a dry period of three months from August to October. (website www.GOV.TL)

3.4.2 Gravity flow systems

Spring sources with reliable and perennial supply and located at reasonable distances from villages can be harnessed and supplied to rural communities. Two systems were implemented. In the first system, which was newly built, the spring sources were located at 5 km from the villages. It cost US\$ 45,000 and served 136 households and one school with 270 students. In the second system which was rehabilitated, the sources were 2.7 km away and benefited 145 households and one school. The cost per household of the longer system, excluding the school population, is about US\$ 330. No guidelines have been established by the Project on how far spring sources are located from communities for designing a gravity-piped scheme.

3.4.3 Dug wells

During the period 2003-2004, a total of 384 wells were provided by the Project, comprising of new and rehabilitated systems, thus providing water access to an estimated 5760 families. The dug-wells were constructed manually by the villagers under the guidance of the FMAs. They were dug in the dry season, and were lined with pre-cast concrete rings provided under the Project. As part of the platform construction described below, a pulley system incorporating a common bucket was erected for each well for drawing water. The wells are open.

3.4.4 Platforms

The provision of platforms by the Project is essentially to help create a more hygienic environment at the water collection point. UNICEF provides 5 bags of cement and iron bars for constructing a platform around a dug-well, and a pulley system for drawing water with a common bucket. A smaller platform requiring 2 bags of cement is built around a borehole fitted with a hand-pump. These tubewells were sunk prior to independence and are fitted with suction “Dragon” pumps available on the local market.

3.5 Water Quality

The detection of arsenic in drinking water supplies in several countries in the East Asia and Pacific region in recent years has raised awareness on testing the presence of this element. Arsenic is included in the WHO/Timor-Leste guidelines for water quality testing. Water quality testing is not undertaken by the Project. However, Water and Sanitation Service laboratory has carried out tests for AusAID. Water samples collected from open wells, springs, public taps and reservoirs in the AusAID districts of Viqueque, Bobonaro and Cova Lima showed no trace of arsenic.

During the present assessment, CWSD was requested to take samples from four water points, two from piped and two from well systems, and four at the homes of the users for bacteriological tests. The results showed that all eight samples contain a high level of total coliforms, and six had E.coli ranging from 4 to 52 per 100 ml of water, indicating that the water was polluted. It was surprising that the quality in the homes were better than at the collection points. Details are provided in Appendix 8.

3.6 Environmental Sanitation

3.6.1 Sanitation facilities

During the years 2003-2004, a total of 4,184 pour-flush sanitary latrines were constructed as a result of support by the Project. Each of the participating households is provided with latrine parts consisting of a pan, base of closet, five concrete rings for pit lining, drain block and a cover for the pit. A concrete ring is provided and installed next to the user to serve as water storage. The household digs the latrine pit, collects local materials, and assists in construction. The cost of each system is US\$ 53.7, out of which US\$ 21.6 represents the fees of the VEs. The pit alone costs US\$ 24.3. The construction of the superstructure is left to the household, and generally is made of palm branches, bamboo or leaves; some are without superstructures and with or without roofing. Water for flushing is carried by the users from the regular source. The Project does not promote other latrine options.

3.6.2 Hygiene Education

This activity is being undertaken in a limited way in the communities, largely by the Village Entrepreneurs and village leaders with Information Education and Communication (IEC) materials supplied by the Health Centre Clinic and UNICEF/CWSD. In 2001, two posters used in Indonesia were reprinted in Indonesia, after receiving permission, with the language revised to Tetun. In 2004, a designer contracted by UNICEF modified the posters by changing the faces on the posters. Currently, a flipchart and posters are being finalised for use in the planned de-worming project. Several booklets were produced jointly by CWSD and UNICEF, based on existing booklets from Indonesia. Field-testing of the products is not being undertaken.

3.7 Storage and distribution of materials

Eight containers were bought by UNICEF and located on the premise of CWSD for use as warehouse, in addition to a garage space belonging to CWSD. They house the smaller items, a few motorcycles, tiles for school latrine, reporting forms, pipe fittings, jerry cans, solar pumps, and hand-pump spare-parts procured during the emergency phase. Pipes are laid out in the open compound opposite the CWSD office which also serves as storage area for the urban water supply.

The management of the UNICEF-supplied materials is very inadequate. During a visit of the place by the international consultant with the WES staff, there were signs of pipes having been stolen via a big hole made in the wall compound. The conditions of the

stores were lacking. There is no proper inventory of the parts, or a systematic system of inflow and release of materials. The planned training of the warehouse clerk has not taken place. The quantities and values of the stored items are not recorded and known.

3.8 Monitoring

The progress on the implementation of the community project is monitored during the monthly meetings organised by CWSD with the participation of the CWSD district officers, FMAs and UNICEF. Each FMA reports verbally on the number of facilities completed and in progress, and submits the forms indicating the number of components completed for payment. Quarterly reports by CWSD to UNICEF on progress of implementation are sometimes not submitted on time. No field trip reports by CWSD staff who receive per diems are prepared and sent to UNICEF. The UNICEF Assistant project officer visits the field several times to monitor progress.

No data have been collected or sample surveys conducted to assess levels of usage of facilities and indications of other behavioural changes such as washing of hands before meals or after usage of toilets

4. ASSESSMENT OF PROJECT PERFORMANCE IN RURAL COMMUNITIES

The Project is assessed from the basis of field observations and analysis of other programme components. The results of the field observations and the data analysis are contained in a separate folder left with the WES section.

4.1. Field observations

It is worth noting that the observations are not representative of the whole population, since they were limited to a small sample.

Village leaders. Of the eight villages visited, seven village leaders placed water among the three top priorities for their village, and three mentioned sanitation. Other priorities included health care centres, schools, housing, agriculture and roads. Environmental cleaning, primarily to combat malaria, was the major focus in terms of hygiene education in the community. The use of IEC materials was found in half of the villages, and they came from the Health Department. The village leaders saw the benefits of water and sanitation in terms of ease of water access and health. However, one village leader stated that the information from the Village Entrepreneur was unclear, while another observed that the monitoring by the Field Monitoring Assistant was inadequate.

Village entrepreneurs. The entrepreneurs are made up of a team of a man and a woman. The majority of the entrepreneurs are farmers. The major problems they have faced were in convincing people to dig holes for their latrines, and carrying water and sand to the site. Some have observed that no cement was provided by the FMA (Village Lauana, Ermera), only half payments of their fees were received (Village Ducurai, Ermera), and no pipes, taps and gutters for water jars were received.

Community water supply systems. A concrete water tank fed by a piped system to serve some 40 families in each of two villages was visited in Dili. One village had perennial water, with reduced flow in the dry season, while the other was dry from June to November, requiring users to walk a kilometre to the spring source. In Ermera, the water supply in the two villages were piped systems, and available all the time and served between 8 to 80 families. In Manatuto, the villages and hamlets were served by either dug-wells fitted with pulley and bucket, or with hand-pumps, and served between 2 to 20 families. In the months of October and November, when some wells were dry, the users had to fetch water from other wells; when the pumps could not suck water, the users used their rope and bucket to reach deeper into the wells. The water supplies in Liquica were from piped system, serving about 80 families, tubewells with hand-pump serving about 6 families, or dug-well without pulley serving about 0 families. Water was available all the time.

Water Jars for rainwater collection. Fifteen families were contacted in Dili and Ermera districts. Each family consisted of 6-7 persons, and were each provided with a water jar. The villages visited in Manatuto and Liquica were not given jars. Two of the jars, started in 2004, were uncompleted, without lid, tap or gutters for collecting rain from the rooftop. The workmanship was generally good, although the outlet pipe for one jar had no tap and a piece of wood was used to block the water, and one had an outlet pipe too near the ground surface, making collection difficult. Twelve of the jars were found to be full to half-full, as the water was collected from 2 nearby piped system. Each full jar provided water for about seven days, which is too inadequate for long dry periods. Four families had to fetch spring water one km away in the dry period of June to October. During a discussion in UNICEF, it transpired that the primary intention was for the users to store water only for drinking, but the users were told that they could use the water for other purposes.

Household pour-flush concrete latrines. Ten pour-flush latrines provided by UNICEF were visited in each district. Only six of the 40 latrines were not used, for various reasons including no superstructure, the latrine pan blocked, and no water nearby. All used latrines had a superstructure made of a wide range of materials, such as bamboo, tin sheets, bricks or palm branches. The latrines were found to be clean, and reported to be used by all family members. Water was available from piped sources in all the districts, except in Manatuto where dug-wells and boreholes provided the water.

Household dry latrines. Six families in all four districts using dry latrines were interviewed. Three families built their own latrines because they did not get a pour-flush concrete latrine from the Project. Two latrines were used by adults only, and four by all family members. Four were found to be clean. Three mentioned smell as a nuisance. The international consultant, accompanied by the WES Assistant Project Officer, UNICEF, visited several dry latrines in the districts of Ermera and Manatuto. The pits were about 2 m square and 2 m deep, unlined, and covered with wood, except for the latrine hole. The superstructures were well constructed; the latrines were well

maintained, and the smell was not too offensive. The users claimed that the pit would fill up over 10 years.

Private sector selling WES components. Five hardware shops in Dili selling water and sanitation components were visited. The shops sell latrine pans made of PVC, costing about US\$ 6, and ceramic pans costing about US\$ 9. They also sell the “Dragon” suction pumps imported from Indonesia at US\$ 30. The buyers for both products are the community members, and NGOs. The quantities sold were not provided by the shop owners. However, during a visit by the internal consultant and UNICEF WES officer, one shop owner stated that he sold 1000 “Dragon” pumps in 2004, and about the same quantity in 2003.

4.2 Other aspects of Project

4.2.1 UNICEF’s Capacity to deliver

The downsizing of UNICEF WES staff in mid-2003 from a 2-person team to one national Assistant Project Officer was highly detrimental to the organisation’s ability to properly develop and manage a good WES programme. This has inevitably affected severely its intention to build the capacity of CWSD and help to build a good foundation to the young national WES programme. The staffing of UNICEF requires careful review in order to make an impact on national policies and strategies, leading to improved lives of children and women in the country.

4.2.2 Influencing national and sub-national policies and strategies

UNICEF has been one of the key donor partners in developing guidelines on Community Water and Hygiene and Sanitation Promotion through Schools since their inception in 2001. Some of the technologies supported by UNICEF have been replicated by other agencies, e.g. the use of same moulds for construction of concrete latrine parts. However, with the reduced staff in UNICEF since 2003, the impact of UNICEF in influencing policies and strategies has been minimal.

4.2.3 Families served

About 6,100 families have been reached through the construction/improvement of dug-wells and gravity-piped water supplies, against a planned target of 6,000 families. However, a good number of the facilities were improvements, and have not increased access to water. Against the same target, 4,184 families constructed sanitary latrines. The facilities provided with UNICEF support have generally been utilised, although some shortcomings were evident. The sanitary latrines provided to the individual household are effectively used where water for ablution and cleaning of the latrine pans is readily available. However, the facilities are not used or under-utilised where collection of water is problematic.

4.2.4 Effectiveness of technologies

Dug-wells. Since the wells are dug manually, the depth to which they penetrate the water table is limited. Hence, at the peak of the dry season, some wells can be dry or have

inadequate flows to meet the needs of the users. As dug-wells are open, and water is drawn by buckets, the risks of well water getting contaminated are high.

Rainwater jars. Rainwater jars can be considered as increasing access if the supply from rain meets the overall demand. Providing each family a rainwater water jar of limited capacity which meets only a 7-day requirement, as observed from the field, has not significantly reduced the drudgery of fetching water since the dry season is very long. For a prolonged duration of 120 days of dry weather, it is estimated that over 15 jars would be required per household, for a domestic demand of 20 litres per person per day. However, if only drinking water requirements are to be met, two jars should be provided for each target family. Historical rainfall data are not currently available to analyse the frequencies, intensities and their reliability during the dry period, as they can reduce the design required storage capacities.

Gravity-piped water supply. The cost of gravity-piped water can be high, as described earlier at US\$ 330 per household. The high figures are in line with the cost of systems implemented by AusAID in other districts. Other alternatives should be explored when cost per household or person is comparatively high. Another disturbing aspect is the fact that some systems are not functioning because there is no ownership, and community members do nothing when systems break down.

Concrete pour-flush latrine. The cost of providing a latrine at US\$ 53.7 per household is quite substantial. With 81 percent of the rural families without a sanitary latrine, or some 45,000 families in the four project districts, the investment required is US\$ 2.4 million. The approach is not sustainable. In addition, once the pit is filled up, a similar pit would cost another US\$ 24.3. An alternative strategy has been proposed in this assessment.

4.2.5 Provision of bed-nets

The Project will not provide bed-nets as planned. AISMI, an international NGO funded by USAID, as well as another NGO funded by Global Funds are providing the bed-nets, and the modalities are still being developed.

4.2.6 Village Entrepreneurs and Field Monitoring Assistants

The Village Entrepreneurs have been instrumental in introducing technologies at the community level. Their workmanship is generally of good standard; however, it was observed in one hamlet that no outlet pipe was fitted to the water jars; for certain water jars, the tap was located well above the base thereby reducing the effective capacity of the jars. With the Project shifting from the concept of introducing two VEs per village to two VEs per hamlet since 2003, the cost of training larger numbers increased sharply. Furthermore, after the completion of the activities of the Project, the VEs returned to their past employment, mainly farming, and much of the know-how is not fully applied thereafter. However, it might turn out that some real entrepreneurs could emerge as rural development expands in the future creating a demand for technical skills in WES and other sectors. In the recommended new project cycle described later, the role of VEs is not foreseen.

The concept of Field Monitoring Assistants (FMAs) to monitor the activities at the community is good. However, it has been reported that FMAs do not undertake regular field visits to the project areas. The interviews of village leaders also revealed that some FMA were found inadequate. As the FMAs are the only key Project presence at the sub-district levels, they play a critical in the project implementation and monitoring. Hence, better monitoring and reporting mechanism are required at the CWSD district offices.

4.2.7 People's participation

Both males and females have been involved in the Project. The quality and extent of their participation have been determined by the design of the different inputs. In both water and sanitation, people's contribution was largely in providing labour and locally available materials. They were involved in the initial mapping of the needs of their communities. Their continued involvement is crucial for the sustainability of the inputs and reaping beneficial outcomes.

4.2.8 Promotion of hygiene education

The promotion of hygiene education in the rural communities is very limited. The Village Entrepreneurs are the ones primarily promoting hygiene education in the community, and this activity comes to an end once the physical activities for which they are paid are completed. In the communities, the focus is largely on environmental cleanliness to combat mosquitoes. The development of IEC materials in UNICEF WES is still in the early phase, and requires increased attention. A social mobilization plan needs to be formulated and resources developed, including training of mobilisers and production of IEC materials, to sustain the provision of physical facilities and behavioural changes. As part of the monitoring system elaborated below, simple data collection can be developed to monitor behaviour change.

CWSD does not have the capacity to effectively promote a hygiene education programme. The tapping of resources from other agencies and departments is a distinct possibility, as elaborated later. However, CWSD can and should play an effective role to coordinate the efforts of other partners, who are better equipped for the tasks.

4.2.9 Intersectoral collaboration

The project has been designed to enhance collaboration among relevant sectors in order to maximise the impact. It has both achieved a good level of integration, including the promotion of WES in primary schools and the planned de-worming of children, as well as convergence in districts with heavy focus on child survival. As the implementation of the Project progresses, it becomes increasingly important to monitor the impact of the interventions. Hence, the collaboration should result in joint efforts by the WES, Health and Education sectors collecting regular data on key elements including behaviour and health indicators, such as the functionality and use of WES facilities in schools, hand-washing practices, use of sanitary latrines and incidence of diarrhoea. Greater interaction with the Communication section will benefit the WES staff in the development of IEC materials.

4.2.10 Storage and distribution of materials

The supplies provided by UNICEF and stored in warehouses before delivery to the project sites are not being properly monitored, as described earlier. Urgent actions should be taken to ensure that the materials are safely stored and accounted for. It is important that the manager of the warehouse be properly trained.

5. PROJECT IMPLEMENTATION IN PRIMARY SCHOOLS

The protocol for the implementation of the project in schools is detailed in Appendix 9. The key elements are the following:

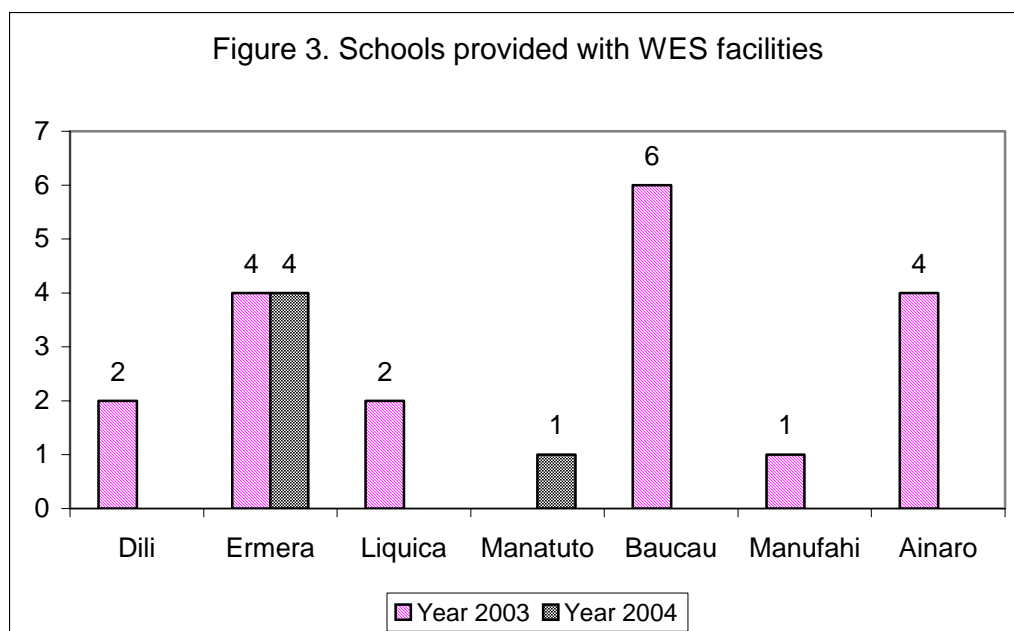
- Development of project guidelines on Hygiene and Sanitation Promotion through Schools, with the participation of main partners, including Education Department, CWSD and UNICEF.
- Selection of schools, coordinated by Education Department, followed by an orientation workshop for Headmasters, Education superintendents, and staff of CWSD.
- Development of proposal by Headmaster, with technical support of CWSD staff.
- Support by UNICEF on supply of non-local materials and cash advance to CWSD for labour, transport and local materials.
- Implementation of the plan by local masons, and supervision of the works by the Headmaster
- Management of the facilities by the Parents-Teachers Association (PTA) and the students.

5.1 Capacity building

The headmasters of Project schools were given an orientation on the Project guidelines, including ideas on how to prepare and submit a proposal for their schools. Four technicians recruited by CWSD, but paid by UNICEF, were also given orientation on the project. Their roles are to facilitate and supervise the construction of the water and sanitation facilities by local masons, and report progress to CWSD. In 2004, only two technicians were retained, and none has been retained in 2005, pending the outcome of the present assessment.

5.2 Schools benefiting from Project

Nineteen schools were provided with water and sanitation facilities in 2003, and five schools in 2004, as shown in Figure 3. The interventions involved a combination of rehabilitation of certain facilities, and the building of new facilities. The Project promotes three designs for toilets, as shown in Appendix 10. Separate toilets are constructed for boys and girls. Each latrine seat serves 30 girls and 50 boys respectively, and in one design, a urinal is provided for boys.



The Project promotes basically 3 types of water supply, namely, piped system, hand-dug well fitted to a mechanical or solar pump, and rainwater harvesting from rooftops. Of the 24 schools provided with the facilities, 11 are served with pipes connected to an existing community piped water supply; 11 rely on rainwater collection, and 2 have dug-wells from which water is drawn by buckets. A ferrocement storage tank of 4,500 litres is provided for rainwater harvesting from rooftops during the rainy season. In some earlier schools supported, water is drawn by electrical pumps, or from 18 solar pumps. Twenty solar pumps were brought in, each costing US\$ 5,000, since there is no running cost. Electrical pumps require the schools to pay for the running cost, and are of limited use as rural electrification is only 13 percent.

5.3 Cost of WES system in schools

The cost of each of the three type designs of sanitary latrine blocks is given in Appendix 11. The costs include provision for rehabilitation works, which would vary from school to school, as well as water tanks and plumbing works. The type chosen for a particular school depends on the available and conditions of existing facilities. In situations where no latrine exist, only one unit of Type I latrines is provided. The estimated total cash requirements for labour and local materials for 172 schools supported by UNICEF since 2001 were made available to the consultant. The other materials, such as cement, are reflected in the sanitary latrine design. Hence, it is not easy to differentiate the cost of water and sanitation facilities separately. Using the value of cash advances by UNICEF on new WES systems for labour and materials, averaging about US\$ 4,000, and the cost of other materials of about US\$ 1,500, the cost per school is about US\$ 5,500, excluding the cost of pumping water. On the basis of 300 students per school, the cost per student is US\$ 18.3, excluding cost of pumps and pumping water.

5.4 De-worming of children

One of the Project outputs pertaining to primary schools referred to the de-worming of school children in selected schools. In 2003, UNICEF supported the Government to develop a plan to de-worm children in schools as an entry point for behavioural change and to create demand for safe water and sanitation in the community. Four representatives from Ministry of Health (MOH) and Ministry of Education, Culture, Youth and Sports (MECYS) attended a training workshop in Bangkok on school-based parasitic control, following which five schools were selected for this pilot scheme, with one serving as control. The schools are each located in Dili, Ermera, Liquica and Aileu, with the control in Liquica. The plan is designed to last two years.

To-date, guidelines are being developed for training of teachers on de-worming, and the manual is due for finalisation in 2005. Action plans have been developed, consisting of training of teachers, orientation of PTAs, training of MOH laboratory technicians on examination of stools, testing of stools of selected students and younger children from the community, and de-worming of children by teachers supplying tablets received from MOH. The stools of the children will be tested before the assessment and at intervals of six months.

6. ASSESSMENT OF THE PROJECT PERFORMANCE IN PRIMARY SCHOOLS

The project is assessed from the basis of field observations in 15 schools, and other programme components.

6.1 Field observations

It is worth noting that the observations are not representative of the whole population, since they were limited to a small sample.

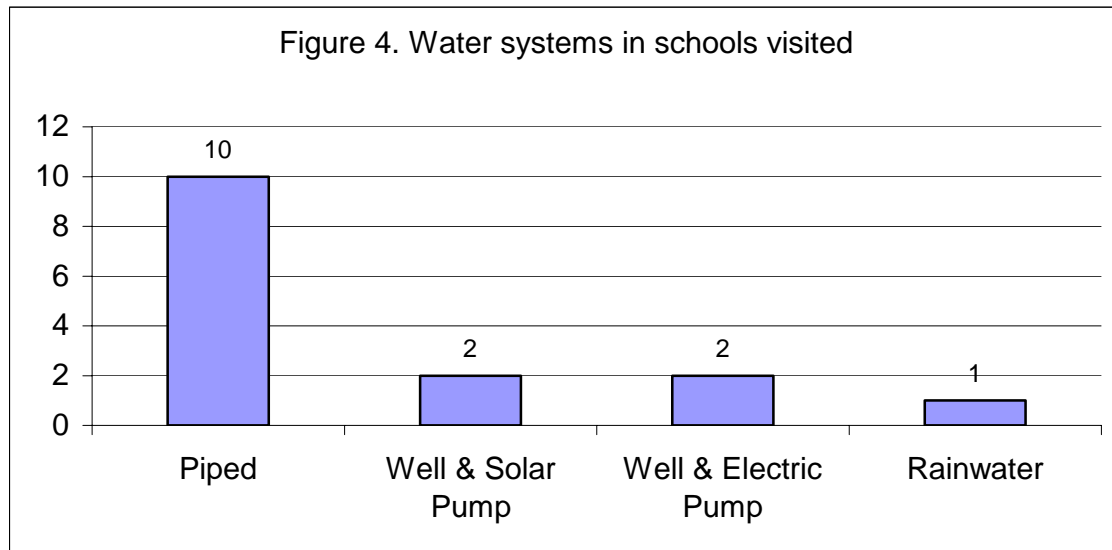
6.1.1 Enrolment of students

The TOR requested an assessment of any increase in girls' enrolment due to WES interventions. Data have been collected on the enrolment of boys and girls from year 2000 to 2005. The data did not show any trends in the enrolment rates, but rather fluctuations within the years. Hence, there is no clear correlation showing any increase in enrolment rates and the provision of facilities. However, the benefits accrued from improvement of WES facilities, as viewed by the headmasters and students, have been very positive and are discussed later.

6.1.2 Functional level of the water facilities

The types of water supply systems in the 15 schools visited are shown in figure 4. The systems have been installed no later than year 2002. Less than half of the systems are functioning. The piped systems run dry as the community systems to which they are connected are not functioning, due to a combination of factors, such as reduced flows from the spring sources, or pipes have been disconnected upstream. In two cases in

Ermera, (Lauana Grutu, EP Katri Leten), the works started in 2004 remained uncompleted. Other problems included broken valves and blocked pipes that are not attended to. Rainwater tanks are dry for three months. One of the solar pumps was inoperative as one solar panel was stolen. One of the two electric pumps is not functioning. When systems become non-functional, students have to bring their own water or draw water by buckets from the school wells, if still yielding water, for hand-washing and latrine use.



6.1.3 Functional level of sanitary latrines

Five of the sanitation facilities were not used due to lack of water supply. In four schools with no water supply, children carry water in buckets to use the latrines. In one school in Liquica (SD Vatuboro), 8 latrine blocks were provided, and some were later used as stores. There was no report of bad design of the toilets.

6.1.4 Environmental sanitation and hygiene

All the schools teach hygiene education for one to two hours every week in all classes. IEC materials, mostly in the form of posters were provided by the Department of Health, UNICEF and AusAID. Garbage is disposed of in a pit dug in the school yard, where the garbage is either burnt or buried for composting.

6.1.5 Parents-Teachers Association (PTA)

All the schools have a PTA, with membership ranging from 30 to 280 parents. The coordination between parents and teachers is reported to be good, and the PTAs meet every three months. Parents pay between 30 to 50 cents per students per month, and the funds are used for buying papers, ink and salaries for teachers hired on contracts. Some PTA members were also active in tasks such as installing fencing around the school or repairing school furniture.

6.1.6 Views of Headmaster

The headmasters were very positive about the provision of water and sanitation facilities. They remarked that students do not have to go to the bushes anymore for toilet needs,

they are cleaner and hand-washing becomes easier. Some also pointed to the habit formation of the students. With the provision of latrines, girls do not have to leave school earlier to ease themselves or bear the pain until school ends. And girls no longer have to go to the fields. As to the problems that the headmasters saw, they related largely to the repairs of water systems.

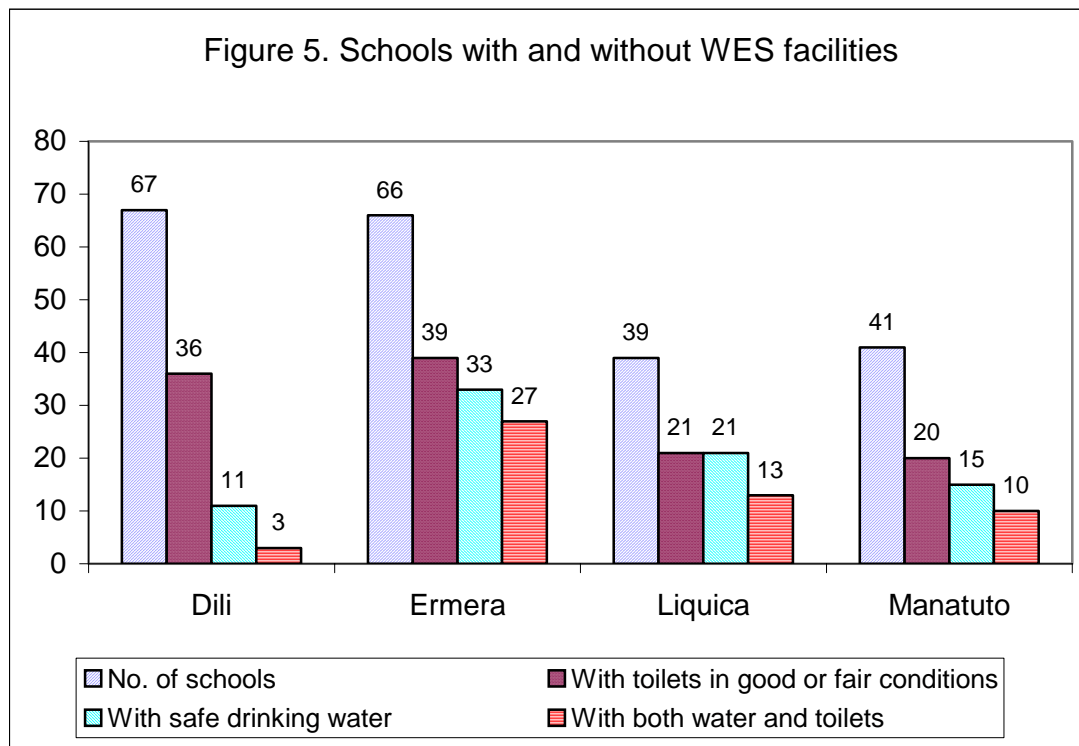
6.1.7 Views of students

Through interviews of two boys and two girls in each school, all remarked that a reliable supply of water is necessary for drinking, hand-washing and use of toilets. Some asked for the provision of kettles for boiling water to drink. The girls were very positive about the benefits of the latrines, and a few pointed to the fact that they have to revert to bushes when no water was available, especially in schools with non-functional piped water and no wells. They stated that carrying of water by buckets from wells is a strenuous task. A good number were not satisfied with the poor maintenance of the systems

6.2 Other aspects of Project

6.2.1 Number of schools provided with WES facilities

Against a target of providing 80 primary schools with water supply and sanitation facilities by end 2005, UNICEF has supported implementation in only 24 schools, with significant reduction in 2004. The reason given was that the budget is limited. The data from EMIS, 2005, as given in Figure 5, shows that over half of the 213 primary schools in the Project districts do not have adequate water and sanitation facilities. It is recommended that a systematic information gathering be conducted in each of the schools with inadequacies to allow proper assessments of needs and cost of rehabilitation work, as well as to gauge the interests of the headmasters and PTAs.



6.2.2 Assessment of water supply technologies

Rainwater collection. Given the long dry season, storage capacity to provide the needs of the students to last the long spell has to be large. If properly designed, the rainfall amounts and roofing areas can supply the requirement. However, this system is generally costly, and has to be considered after careful analysis of alternative sources. In addition, the application of rigid rules on using water and minimising wastage is crucial to avoid returning back to trekking for water. As an example, for a population size of say 300 students, using a very modest quantity of 2 litres per day, the daily requirement is 600 litres. Assuming that the dry period lasts 4 months, and there are 80 school days, taking into account the holiday period, the storage required is about 48 cubic meters, or a massive tank of 6 m long by 4 m wide and 2 m high, excluding the dead storage. The cost of a storage tank of this capacity is estimated at US\$ 1,900. The present norm of providing a tank of 4.5 cubic meters is very inadequate. As mentioned earlier, this estimate is made on the absence of historic data on any reliable rainfall days and amounts within the dry period.

Piped water supply. Taking water from existing and reliable piped water system by pipe extension is, in theory, the most practical and possibly most cost effective way, especially when no water charges are levied. This is particularly true when the main water line passes close to the school. However, it is important to find out if the existing piped water system has the extra discharge to serve the school. In the present context, the water is highly unreliable as it is from gravity-piped system serving the whole community, and the school has no control of its operation and maintenance. Cases of cutting of pipes on the upstream reaches by farmers to irrigate their lands or water their animals, or by users to facilitate collection of water are not uncommon. These practices are further enhanced when the flow is reduced during the peak of dry seasons.

Dug-wells fitted with power pumps. The reliability of water supply from dug-wells, in terms of quantity and perennial supply, depends on the soil conditions and the depth of the well. Wells can sometime dry up at the peak of the dry season, forcing the students to fetch water from outside the school premises. It is important to ensure that the well penetrates adequately the water bearing soil formation. Hence, the viability of mechanical well drilling should be explored. With the use of an electric pump, the reliability of power supply is a major consideration, as well as the cost of electricity. As rural electrification has reached only 13 percent of the population, diesel or petrol operated pumps would have to be used. However, the regular running costs would be a burden on the school.

Solar pumps drawing from dug-wells. This high-level technology is high cost, but efficient and requires a low level of maintenance. Due to cost consideration, only twenty units were brought in. As for any technologies, the quantities in operation determine the availability and cost of repair services. Hence, when systems breakdown and requires spare parts that are not available in the country, maintenance cost can be high, especially when the number of pumps installed are few and scattered in wide locations. Solar pumps are expensive, and the non availability of spare parts or replacement parts when units are stolen can disrupt the water supply for a long time.

Recommended Design of water supply facilities. The high non-functioning rate of water supply demands a review of the systems to be provided. Alternative water supply technologies have been recommended in section 9.

6.2.3 Design of sanitation facilities

The three type designs are reasonable, with separate units for girls and boys, and urinal for boys. It is noted that the drawings provided to field staff do not indicate the dimensions, although the units have been priced; presently, only verbal instructions are provided to the implementers for construction. It is advised that each drawing should show clearly the dimensions, both in plan and elevation, so that oversized structures are not constructed at higher costs.

6.2.4 De-worming of school children

The initiation of the de-worming scheme has been delayed. With the expected finalisation of the guidelines in 2005, and the approval of the action plans in the pipeline, the earliest start would be in the latter half of 2005. The scheme can be promoted as a de-worming intervention to reduce the child's worm load and enhance nutritional status, or as an educational tool for hygiene promotion, or as both. As a nutrition intervention, the extent of the programme expansion to benefit large numbers of children has to be examined in terms of sustainability and cost.

6.2.5 Environmental Sanitation and Hygiene practices

The disposal of garbage is generally well taken care of, with the use of garbage pits. Regular hygiene education classes are given; this can be further supported by appropriate IEC materials. The practice of hand-washing is largely determined by availability of water.

6.2.6 Role of the Parent-Teachers Associations

Where PTAs have been proactive, they have played an effective role in improvement the environment of the schools. However, minor repairs to some WES systems that could be undertaken using local skills were not attended to. It is important for PTAs to realise that lifestyle education, such as the use of WES facilities, is as vital as academic achievements.

6.2.7 Benefits to girls

As mentioned earlier, there are no data to show that enrolment of girls has increased as a result of the introduction or improvement of WES facilities. However, the views expressed by the girls on the benefits of the facilities in removing the burden of fetching water, and the privacy of latrines, are sufficient to continue the Project.

7. JUSTIFICATION FOR A NEW WES PROJECT CYCLE

Timor-Leste is far from reaching the Millennium Development Goals (MDGs), particularly in the provision of safe water and sanitation facilities, thus affecting the

quality of lives of children and women. As one of the major UN development agencies, UNICEF can play a critical role in contributing to the achievements of the MDGs.

7.1 National Development Plan and Millennium Declaration

The April 2005 National Development Plan (NDP) is built on two overriding objectives: to reduce poverty; and to promote economic growth that is equitable and sustainable and improves the health, education and well-being of everyone. The Government recognises that water supply and sanitation can have an impact on the achievements of the 8 Millennium Development Goals (MDGs). As articulated in the Sector Investment Plan (SIP, 2005) for Water supply and Sanitation, these interventions can have an impact on the achievement of each of the goals, as shown in brackets:

- Less time in collecting water by women and children can help to eradicate extreme poverty and hunger (MDG 1), help to achieve universal primary education, particularly amongst girls (MDG 2), and help to promote gender equality and empower women (MDG 3).
- Safe water and sanitation facilities will reduce deaths caused by diarrhoeal diseases leading to reduction in child mortality (MDG 4), and will reduce the chances of infection during labour leading to improved maternal health (MDG 5).
- Improved sanitation will reduce environmental contamination, and breeding grounds for mosquitoes, helping to reduce malaria, dengue and other diseases (MDG 6, 7).
- Better water and sanitation can attract tourism and other job creating investments (MDG 8).

7.2 Objectives of Water Supply and Sanitation in the National Development Plan

The NDP objectives for the rural sector, with longer term targets in brackets, are:

- Provision of adequate, safe and sustainable water supply and sanitation through community owned and managed water supply and sanitation facilities. (By 2020, 100 percent of peri-urban areas with access to water; 80 percent of villages with access to water supply and effective sanitation facilities).
- Informing the public of safe water and sanitation practices that systematically improves the environment and enhances human health and welfare. (By 2020, 100 percent of population informed on safe water and sanitation practices; 100 percent of schools with programmes on safe use of water and sanitation facilities).

7.3 Estimated investment to achieve objectives

The progression to achieve the MDGs and NDP targets, as well as the estimated cost, as indicated in the NDP is summarised in table 1. The SIP estimated that US\$ 40 million is required to achieve the goal of reaching 80 percent coverage. The costs are provisional and are subject to periodic revision. The cost is based on current implementation approach, and inclusive of capacity building.

Table 1. Progressive targets and estimated required investment

	2004	2010	2015	2020
% population with access to safe water	30	47	64	80
% population with access to safe sanitation	19	33	60	80
Unit cost of water per household (US\$)	230	230	230	230
Unit cost of sanitation per household (US\$)	70	70	70	70
Required incremental investment for water (US\$ '000)	-	7,650	9,959	11,822
Required incremental investment for sanitation (US\$ '000)	-	2,075	4,193	3,948

7.4 Why Rural Communities?

Timor-Leste is still a long way from achieving the Millennium Development Goals and providing its rural population with basic human needs. The provision of water supply and sanitation to rural communities will help reduce the high incidence of morbidity and mortality of children under the age of five years as well as the high maternal death rate. It will alleviate the drudgery of and time spent in collecting water, restore the dignity of the people, particularly women in having the privacy of a toilet, and provide a healthier population to combat poverty.

7.5 Why Primary Schools?

After the family, schools are the most important places of learning for children. Schools can also influence communities, since through their students, schools reach out to a large number of families. A survey among school children in India revealed that about half of the ailments found are related to unsanitary conditions and lack of personal hygiene (UNICEF, 1998). It is also generally recognised that childhood is the best time to learn hygiene behaviour. Children are future parents, and what they learn is likely to be applied in the rest of their lives, thus enhancing the sustainability of the programme impact.

The observations from the field assessment revealed very positive impact on the lives and attitudes of students, particularly the girls, after the rehabilitation or provision of water and sanitation facilities, supported by hygiene promotion.

Over 50 percent of schools are still devoid of basic water and sanitation facilities in the four project districts, as shown in Figure 5 earlier.

7.6 Role of UNICEF

As one of the leading international agencies in promoting universal access to safe water and sanitation, and a credible partner to governments in supporting the countries' efforts to achieve the MDG goals, UNICEF can play a vital role in supporting the CWSD to formulate a roadmap for the national WES programme. In addition, strategic support for provision and use of water and sanitation facilities in primary schools will help to achieve universal primary education. The areas of support would include:

- Capacity building in the government sector for formulation of policies and strategies and development, implementation and monitoring of programmes.
- Support to CWSD in the development/updating of guidelines on choice of technologies, with emphasis on appropriateness, effectiveness, affordability, sustainability, replicability and people's participation.
- Support to CWSD in developing good inter-agencies collaboration to enhance programme harmonization.
- Monitoring of the effectiveness of the Project inputs to assess the usage level of facilities provided, the hygiene behavioural changes, and impacts on health and quality of life.

Since 2001, AusAID has been the major aid agency in the rural water supply and sanitation sector, and has been instrumental in supporting the government in policy formulation, and in development of programming guidelines. It has invested heavily in capacity building of communities in participatory planning and implementation, including the development of water and sanitation district plans. In embarking on a new programme cycle, strong collaboration between UNICEF and AusAID will benefit the sector.

7.7 Geographical Areas

The draft UNICEF Programme Country Document Timor-Leste for 2006-2007 chose the 4 districts of Dili, Ermera, Liquica and Manatuto, where the Child Survival Project would be located, as the geographical areas for the WES project. This will provide continuity to the efforts made in 2003-2005, and cover the remaining large number of families and schools deprived of good water and sanitation facilities.

8. RECOMMENDED APPROACH TO WES PROMOTION IN RURAL COMMUNITIES

8.1 Definition of access to safe water supply

The guidelines on Community Water Supply and Sanitation mentions "water available within 100 metres from home" in the section dealing with levels of service. As for the quantity, "enough water for basic needs, i.e. drink, wash, hygiene and cleaning" is given but with no mention of amounts. However, in the section dealing with Technology Assessment, reference is made to a minimum of 30 litres per person per day for water from tanks and tap-stands. Users are generally satisfied with lesser water amounts, when

where more energy is required, such as hand-pumps. The UNDP Human development report 2003 mentioned 20 litres per person per day in describing “reasonable” access. Hence, it is suggested that access to water supply be defined as follows: the availability of 20 litres of water per person per day from a source within 100 metres.

8.2 Definition of access to safe sanitation

In developing countries, the most appropriate sanitation facilities are the on-site excreta disposal systems. A safe latrine is defined as a system where the human excreta are discharged such that it effectively prevents human, animal and insect contact with excreta. In the present context, a covered pit for the excreta is the most appropriate option. Since the depth of a pit latrine is rarely more than 2 to 3 meters, and usually do not penetrate the groundwater table, a pit located over 7 meters away from a water source is generally acceptable. The guideline is based on researches which show that the safe distance between a latrine pit and a water source is a function of the travel times of pathogens in the excreta between the two systems and the survival time of the pathogens.

8.3 Development of a district WES workplan

CWSD, with the support of AusAID, has developed district WES plan for all districts, with participation of the communities. It is advised that, at the outset of the new project cycle, a district WES workplan be formulated for each district, with the active participation and ownership by district officials, led jointly by the district Administrator and CWSD district officer, and supported by Health officers, school superintendents, and other relevant partners. Major NGOs operating in the districts can be invited to participate. The main objective is to bring all relevant partners together and encourage them to work in partnership. The CWSD district WES plan will provide valuable inputs in the formulation of the workplan. Based on an analysis of the situation of women and children, the workplan should outline the objectives, inputs and expected outputs and outcomes. The workplan should also define clearly the roles of respective partners and their outputs, with a timeframe. The workplan should integrate both WES interventions in the primary schools and the community.

8.4 Water supply technology options for rural communities

8.4.1 Tubewells fitted with hand-pumps

The WSS guidelines on Technology Assessment, Version 3 of September 2003 noted that hand-pumps are not included as a reliable system, as spare parts, commercially or otherwise, are not available in any districts of the country. It added that proactive maintenance is required, which has not yet been demonstrated in district communities.

The international consultant had several meetings with Mr. Elias Moniz, chief of CWSD, who was heavily associated with the earlier rural water supply programme, to obtain a picture of the earlier programme. During the pre-independence period, five heavy duty drilling rigs were in operation in addition to 14 one-person operated drills (Hydra-Drill). Drilling was appropriate in large areas of all districts; drilling was more difficult in some

parts of Aileu and Ermera which have hard rock formation. In the absence of historical record, it was estimated that some 2000 tubewells were constructed, with 50 percent fitted with India Mark II hand-pumps lifting water at depths of 30 to 50 meters, 25 percent fitted with Baruna (from Indonesia) hand-pumps for water depths of 20 to 30 meters and 25 percent with Wavin hand-pumps for water depth of 15 meters. Apparently, many of the tubewells and pumps have been damaged, and not rehabilitated. Many individual households had their own shallow boreholes fitted with Dragon suction hand-pumps.

With a good supply of spare parts combined with people's participation and technical support from the government at that time, practically all the hand-pumps were functioning. Except for spare parts for Dragon pumps which were available on the market, all other spares were imported by the Government and sold to the users.

8.4.2 Gravity-piped systems

The cost of harnessing spring sources, particularly for gravity-feed system, is generally higher than provision of hand-pumps fitted to tubewells. Gravity systems, where appropriate and cost effective, have the advantages that water distribution to users is easy via taps that are fitted to stand-posts. The choice of gravity systems should be guided by various considerations, including the distance of the spring sources, and the minimum discharges measured at the peak of a typical dry season.

8.5 Recommended strategy for water supply

Based on an analytical review of the current approach, as well as considering the experiences during pre-independence days, the following are proposed:

8.5.1 Tubewells fitted with hand-pumps

Wherever feasible, preference should be given to the sinking of tubewells that are fitted with hand-pumps. Each pump can serve about 30 to 40 families, or one or two per small hamlet. A good hand-pump caretaker programme should be developed, including the production of a simple user-friendly booklet for the caretakers. A team of volunteer pump caretakers, a man and a woman, selected on the basis of their interest and enthusiasm, should be trained on the operation and maintenance of the pump, as well as the promotion of hygiene education to the villagers. A good supply of hand-pump spare parts should be readily available, and a technical support team should be available to handle major technical problems. The spare parts would be imported. More details are provided in Appendix 12 dealing with some key elements of a tubewell and hand-pump programme.

8.5.2 Rehabilitation of tubewells and hand-pumps

As a significant number of past tubewells and pumps are non-functional, it might be worthwhile initially to investigate a sample of them to assess the type and extent of damage, and determine the viability of a rehabilitation programme.

8.5.3 UNICEF's inputs to tubewell programme

It is proposed that, initially, UNICEF provides a one-person operated rig to each of the four project districts for sinking boreholes into the soft formation, and a Down the Hole (DTH) Hammer drill rig for the medium and hard rock formation. A fifth small rig is proposed for the school programme. Depending on ground conditions, a DTH rig can drill about 20 tubewells per year, while the Hydra-Drill can produce about 30 to 40 tubewells per annum. UNICEF would also procure the hand-pumps, the casing materials for the borehole, cement and gravel for the pump platform, and the spare parts for the rigs. A set of geophysical instruments for locating groundwater reserves should be procured. Provision of a vehicle for ensuring effective repairs of pumps is also proposed. In addition, UNICEF should play a major role in providing training to build the technical capabilities of the personnel associated with drilling and installation of hand-pumps, as well as training for the head of the geophysical investigation unit.

8.5.4 CWSD inputs to tubewell programme

It is proposed that CWSD establishes a drilling section and supports the operation by providing the drilling crew, the fuel for the running of the rigs, and cost of regular maintenance of the rigs. A team of six persons will manage the DTH rig from Dili, while a one-person team will be set at the district level for the small rig. A two-person team of pump mechanics should be established operating from Dili to respond to major repairs. In addition, a two-person unit should be created to manage the geophysical investigations to locate potential groundwater bearing formations.

8.5.5 Choice of hand-pumps

The choice of hand-pumps will be determined by the standing water level in the well. Since each hand-pump will be used by a large number of families, a robust public domain pump, e.g. India Mark III, should be considered. (Refer to Appendix 12)

8.5.6 Rainwater jars

It is proposed that the provision of jars be limited to special situations, for example, isolated households located on higher elevation where low cost systems are not feasible, and users have to trek down for fetching water. The family can be provided with two jars of 1,200 litres, for drinking purposes, at 2 litres per person per day to last the long dry season. The management of such an operation should be carefully examined, as fewer families would be targeted, raising the issue of logistics, production cost, and use of scarce technical resources.

8.5.7 Gravity-piped system

It is proposed that gravity-piped system be continued wherever appropriate, after an analysis of the other lower cost options. At the very outset, emphasis should be placed on involving community participation to ensure good community management, operation and maintenance. This will include an effective transfer of the system to the community, including necessary skills and basic tools for repairs.

8.6 Sanitation technological considerations

8.6.1 The pit latrine

The MICS showed that one out of every three rural households use a pit latrine, as depicted in Figure 6. However, most of these facilities were found to be unhygienic as the pits were not adequately protected. Some users have mentioned smell as an inconvenient factor. Nevertheless, the MICS data as well as the field assessments showed that rural families have used these facilities over the years, moving to new pits as old ones got filled up, and have developed the latrine habit. A study (TIDS) in AusAID-supported district of Viqueque showed that about 20 percent of households built their own pit latrines. It shows that a significant section of the rural population built their own latrines, using the local know-how and locally available materials, although some falling short of protecting the pit. Hence, there is clear indication that much can be built on the current practices.

An improved version of the simple pit latrine, called the Ventilated Improved Pit (VIP) latrine has been promoted with varying success in some countries. A vent pipe is fitted to the pit. It requires the construction of a superstructure to provide a cool area in the toilet which will create a flow of air via the squat hole down the pit and up the vent pipe.

8.6.2 The pour-flush latrine

This technology is a significant improvement on the pit latrine, as it reduces the inconveniences of smell, particularly with the water-seal component, and is more hygienic. In communities where people use sticks and other hard materials for anal cleaning, the water-seal is likely to get blocked and hence is not appropriate, unless cleaning practice is changed. However, the easy availability of water for proper maintenance is vital. Beside the concrete pans, as promoted by the Project, pans made of plastic, HPDE or fibreglass have been developed, look attractive, and used in many countries in the region. The prices are very competitive.

8.6.3 Lining of latrine pits

The provision of concrete rings for a total length of 2 meters is intended for lining of each pit. The necessity of pit lining depends on the soil conditions. In some designs where a concrete slab is used as pit cover, the top of the pit is lined. In many areas, the soil is stable enough and lining would not be required.

8.7 Recommended Approach to Promotion of Sanitation

The key factors for consideration, in defining an appropriate strategy, are as follows:

- Safe latrines that are appropriate, acceptable and affordable by the users
- An approach that is sustainable and can be replicated nationwide

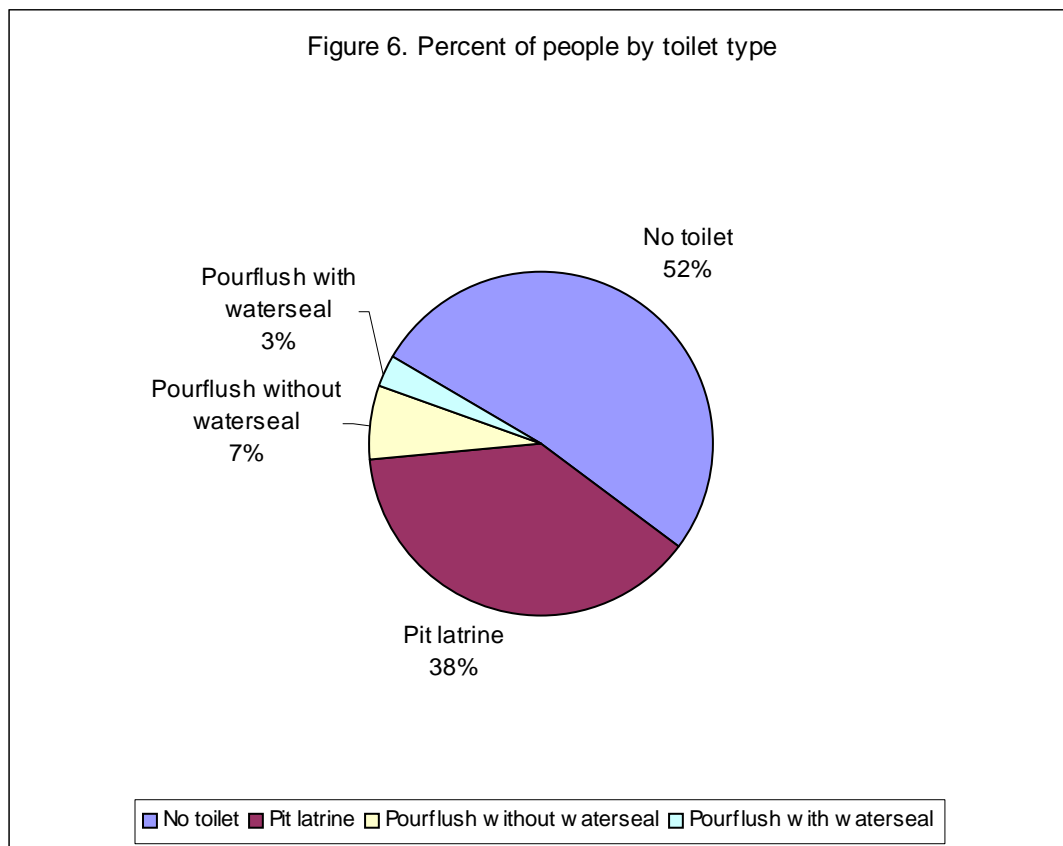
The assessment, as discussed above, concluded that the current approach has the following limitations:

- The cost per unit of US\$ 53.7 for each household borne by the Project alone is high and not easily replicable district-wise or nationwide as a model.
- The donation of a latrine on demand would raise great expectations from non-users, even in non-project areas, to the extent that motivation to construct one's own facility may be suppressed.
- The technology promoted is totally dependant on easy availability of water for proper usage and maintenance.

Based on the above consideration, the following strategy is proposed, and a modality for implementation is given in Appendix 13:

8.7.1 Do-it-yourself concept

The “do-it-yourself” concept is that users will be motivated to construct their own sanitary latrines, using the local know-how and materials. A range of technological options, from simple pit to the pour-flush systems, as described above, should be promoted, encouraging the users to select their system, based on their affordability and preference. Referring back to MICS data in Figure 6, there is potential for a significant portion of the non-latrine users to become pit latrine users through mobilization drive, while the Project brings water supply to the community.



8.7.2 Intensive social mobilization drive

A basic difference between the latrine users and non-latrine users is the attitude to hygiene appreciation, partly attributable to differential levels of income and education. A

well planned social mobilization initiative through well oriented village leaders and closely supported and monitored by CWSD district officials and collaborating partners, including MOH staff is essential. Learning from the experiences from other countries, such as Myanmar and Bangladesh would be useful.

8.7.3 Distribution of tasks on a village basis

Since the technology is very basic and technical know-how is already in most if not all villages, it is feasible to motivate each village or hamlet to act. In 1998, Myanmar launched a sanitation week, which in effect lasted for a month, with a set national goal of building one million latrines. An enormous task – however, the agenda was that each of its 66,000 villages motivate 15 families to construct a latrine on a self help basis. With small targets for large number of villages, the tally at the end of a month was the construction of about 660,000 latrines, which was short of the target but was a tremendous achievement. Subsequent field visits confirmed the quality of construction and the scale of achievement.

8.7.4 Political will

The success in Myanmar, which prompted similar campaigns in the following years, was largely the result of good political support. The design of the scheme in distributing the tasks to large number of villages, the “do-it yourself” approach, and the IEC plans appealed to the policy makers and planners who eventually “owned” the programme.

8.8 Role of the private sector

The survey of the hardware shops selling suction parts and latrine pans indicates that the market is fairly well established and growing numbers of households are paying for their own water and sanitation facilities. Their presence facilitates the expansion of the national programme, as community resources are mobilised. In some neighbouring countries, such as Bangladesh and Myanmar, construction of water and sanitation facilities by households themselves represents a significant proportion of the population. As a result, the local manufacture of hand-pumps and latrine parts has developed.

8.9 Capacity building and Collaboration with Partners

With resource limitations, the capacity of CWSD to pursue the MDGs is severely constrained by inadequate staff, particularly at the district and sub-district levels, and logistic support. CWSD will rely significantly on donor agencies to help build progressively a good base for programme delivery. This will include drafting of new policies, revision of existing policies, updating of guidelines for programming and implementation. At this critical juncture, effective collaboration of all relevant partners should be ensured. The current practice of donor agencies meeting at irregular frequencies under the leadership of CWSD should be formalised with clear agenda.

Since human resources in UNICEF, Timor-Leste, is limited, UNICEF WES can consider contracting the services of the Environmental Health Department (EHD), and some NGOs as potential partners for training programmes and delivery of the hygiene

education component of the project. It should be noted that these agencies need to upgrade themselves to improve the quality of their services. Hence, this collaboration can also be seen as UNICEF building the capacity of these agencies through joint collaboration over time. Appendix 14 gives some key information on some potential partners.

At the community level, it appears that the spirit of volunteerism is not very strong. For the promotion of hygiene education, the potential of the religious leader, the catequist, should be fully explored. The catequist holds weekly prayer meetings, and this could be a good venue for hygiene promotion. Dialogue with the Parish priests could be initiated to explore avenues for collaboration. It is reported that the Red Cross is recruiting volunteers in the community as their members, thus opening further opportunities for social mobilisation activities.

8.10 Monitoring and Evaluation

A good Monitoring and Evaluation Plan should be developed at the start of the Project, with revisions during the implementation phase, as necessary. A participatory monitoring process can be developed, where the community members themselves will play a key role in monitoring their own activities and behavioural changes. In developing the plan, which should be simple but effective, considerations should be given to how field visits can help in building a good data base, determining which indicators to monitor, and how the data can be collected, such as using case studies and sample surveys.

9. RECOMMENDED APPROACH TO PROMOTION OF WES IN PRIMARY SCHOOLS

9.1 Selection of Project schools

According to statistics indicated in Figure 5 above, 133 schools in the four districts will require the provision of water facilities, and 97 will require sanitation facilities – either new or rehabilitated. Since most of the schools were earlier supported through the ECHO funds, it is necessary to collect information on the exact nature and extent of the problems in each school. Based on the data, UNICEF could assign priorities on possible interventions and the cost of new systems or rehabilitation. The selection of schools in terms of priorities could be done in conjunction with planned interventions in rural communities.

9.2 Recommended water supply technologies

Taking into consideration the unreliability of existing gravity-piped systems in rural communities, the risks of hand-dug wells drying up at the peak of the dry season, the low level of rural electrification, the running cost of petrol or electric pumps, it is recommended that, where feasible, water supply comes from drilled tubewells fitted with hand-pumps. This technology is applicable in large areas of the country. The water can

be pumped directly into a storage tank that feeds the latrines, as well as provide water for hand-washing via taps.

Where the tapping of groundwater is not feasible due to unfavourable hydro-geological factors, the piped-water system should be examined as part of the village water supply.

9.3 Recommended sanitation facilities

The designs of the sanitary facilities being promoted are good, and no adverse reports have been received from the schools. It is important to ensure that the quality of the construction is good, through close supervision of the works by the headmasters, with the support of the technicians.

9.4 De-worming

Experiences in some countries have shown that de-worming can be a very effective tool for hygiene promotion. The excretion of round worms by the children, as a result of poor hygiene practices and polluted environments, can create dramatic effects on children and parents for behavioural changes. The laboratory test results, hopefully showing a decrease in worm loads in children, will complement the visual observations. While the project goes on in the four selected schools, it is recommended that the progressive lessons learnt be shared with headmasters in other project schools through a workshop, so that they can be used as educational tools in these schools.

9.5 Hygiene education

Continued emphasis should be placed on hygiene education. As part of their regular classes on hygiene education, it is suggested that the Education Department looks at the possibility of inviting the health personnel at the district level to visit schools, say at monthly intervals, to complement the teachings of the curriculum. Headmasters and teachers should be encouraged to monitor behavioural changes by using simple indicators, such as counting the number of children washing hands, and the number of parents building their latrines.

9.6 Role of PTA

Field observations have revealed that the PTA can play a vital role in supporting the smooth running of the school. At present, the resources collected from the students are largely used for enhancing the quality of the academic education, e.g. through payment of salaries of contracted teachers, materials for the schools. However, the PTAs should be encouraged to give adequate attention to some financial needs that may arise to attend to minor repairs of WES facilities, and promote both academic and lifestyle education.

10. SUMMARY OF KEY RECOMMENDATIONS

Capacity building

- UNICEF should significantly strengthen its staffing capacity in order to play an effective role in influencing national and sub-national policies, guidelines and strategies, collaborate with other aid agencies for harmonisation of programmes, and build the capacity of the government as well as the private sector. It is recommended that at least one international staff and one national staff be recruited at the earliest. The added capacity will also facilitate external resource mobilisation for programme/project funding.

Planning

- It is advised that a district WES workplan be formulated for each district, with the active participation of relevant district officials, jointly led by the district Administrator and CWSD to generate intersectoral collaboration and joint ownership. The workplan should integrate both WES interventions in the primary schools and the community.

Community Water supply and environmental sanitation

- Groundwater. Re-introduce the strategy of exploiting groundwater resources for rural water supplies through the drilling of tubewells fitted with hand-pumps. The collaboration between UNICEF and the government could be on the basis of shared contribution, and progressively with larger inputs by the Government as the programme expands beyond the Project districts to other districts.
- Maintenance of pumps. Building from the past experiences in the country, it is necessary to develop a good maintenance system for the hand-pumps, involving community participation and ownership, ensuring reliable supply of spare parts and good back-up service by CWSD for major pump repairs.
- Rehabilitation of earlier tubewells and pumps. It might be worthwhile investigating the extent to which the large number of tubewells and hand-pumps can be rehabilitated, and the cost effectiveness of such a venture.
- Gravity systems. The design of gravity-piped systems, which is generally quite costly, should be limited to situations where the more cost effective tubewells with hand-pumps are not feasible. The transfer of the system for community management should include transfer of necessary skills and basic tools for maintenance and repairs.
- Rehabilitation of gravity-piped systems. A reconnaissance survey should be conducted on the non-functioning gravity-piped systems with a view to rehabilitate them and empower the communities to manage the systems.
- Rainwater jars. It is recommended that the provision of water jars of 1200 litres capacity be considered in limited situations where no other options are feasible. In such cases, two jars could be provided for drinking water only, and properly

managed to last the long dry season. The provision of community rainwater tanks can be explored, provided it can be managed well by the community.

- Concrete latrine parts. It is recommended that the present approach of providing concrete parts to build a sanitary latrine at US\$ 53.7 per household be phased out. In order to provide the needs of some 45,000 families without adequate sanitation facilities in the four Project districts alone, about US\$ 2.4 million will be required, and this is not sustainable.
- Proposed sanitation approach. Building on the earlier experiences when families were motivated to build their own pit latrines, using local building materials and their own resources, while water supplies were brought to the villages and hamlets, it is recommended that a good social mobilisation and hygiene education drive be undertaken in the communities to motivate families to build their own latrines, and improve hygiene practices.
- Hygiene education. As part of the social mobilisation drive, hygiene education should be given high priority. The motivation of the local leaders as well as community volunteers is necessary to sustain the activity. The change agents should be well orientated, and supported by well tested IEC materials.

Water and environmental sanitation in primary schools

- Survey. A systematic survey should be conducted in schools lacking good WES facilities to analyse critically the rehabilitation needs, prepare estimates and gauge the interest of the headmasters.
- Water supply by tubewells. Tubewells fitted with hand-pumps are recommended where exploitation of groundwater is feasible, thus making the school self sufficient. Otherwise, in cases where water is taken from existing community piped system, this has to be integrated into the rehabilitation of the community system. Where rainwater harvesting is the only alternative, a reduced water requirement can be met by providing a large storage tank.
- PTAs. The Parents Teachers Associations, which are generally quite active, should be motivated to give adequate attention to maintenance and repairs of water and sanitation facilities, and recognise the importance of lifestyle education, beside the academic requirements.

Monitoring and evaluation

- The best formulated programme can prove disastrous if implementation and quality monitoring are poor. A Plan should be developed to facilitate the monitoring of Project implementation, as well as information gathering, by sampling studies, case studies, or evaluations of project components, in order to analyse trends in behavioural changes and health benefits.

Storage and distribution of materials

- Significant amounts of materials have been supplied by UNICEF. Urgent attention should be given to ensure the security of the materials and their proper management, including proper storage and regularly inventory.

Appendix 1

Terms of Reference for the Project Assessment on Hygiene and Sanitation Promotion at grass-root level and through schools components of WES Project

I. **BACKGROUND**

Water and Environmental Sanitation (WES) is supported by UNICEF in the Timor-Leste/UNICEF Country Programme of Cooperation (2003-2005) under the Health and Sanitation programme. The WES project has been implemented since the emergency in 1999 covering all parts of Timor-Leste. Since 2003, the project has focused on 4 districts: Dili, Ermera, Liquica & Manufahi.

Project objectives

The main objective of the WES project is to contribute to the health status of the rural population by

- Improving hygiene practices and access to water and sanitation in rural communities.
- Improving hygiene and sanitation in primary schools.

The project should serve as a demonstration model for bringing changes to the project and non-project areas. School water and sanitation is meant to increase girl's enrolment.

Strategic approaches

The following strategic approaches are used to achieve the objectives:

- Capacity building: Strengthen the capacity at the national, sub-national and community levels in the planning and management of WES activities.
- Improvement of water and sanitation access: Strengthen the development and standardization of appropriate sanitation technology. Within project areas, promote access to water and sanitary latrines at households and schools, as well as their effective use and maintenance through participatory hygiene education.
- Information, education and communication: Develop communication strategies and IEC materials to promote proper hygiene practices in rural areas through social mobilization. Promote awareness on the importance of improved environmental sanitation and hygiene at the national and sub-national level, resulting in plans of action.
- Monitoring and evaluation: Monitor activities, their efficiency and long term impact on sanitation practices at the community level.

Achievements

The main thrust of UNICEF support for water and sanitation since year 2001 until 2002 was to build the local capacity to implement water and sanitation activities. 43 East Timorese former sanitarians carried out the UNICEF-supported water and sanitation activities throughout the country in collaboration with East Timor Public Administration (ETPA). By late December 2004, 152 villages in all 13 districts were equipped with water and sanitation facilities.

Activities include hygiene and sanitation promotion followed by the rehabilitation of simple water and sanitation facilities, such as family latrines, public stand-posts, dug-wells and water jars using participatory approaches. At the village level, teams each consisting of a trained couple (called "village entrepreneurs") manage the casting of components made of cement mortar such as latrine closets, drain blocks, concrete rings, and water jars, which are provided to needy families with an aim to improve their water and latrine facilities.

By the end of 2004, 10,058 families had benefited with latrines, 1,519 families with 1330-liter capacity water jars, 10,250 families benefited with 1,025 new or rehabilitated dug-wells, and 3,470 families benefited with 347 rehabilitated public stand-posts and hand pump platforms.

UNICEF also collaborated with six international NGOs in carrying out hygiene and sanitation promotion through schools. Between 2001 and 2004, 146 schools had gone through participatory school assessments, rehabilitation/construction of water and sanitation facilities, and IEC activities.

By end of 2005 UNICEF is expected to have invested about \$3 million in the WES project.

Project Counterparts, Management and Implementation

UNICEF's counterpart for the community-based WES

UNICEF's direct counterpart is the Secretary State for Water and Electricity, which is under the Ministry of Transportations, Communications and Public Works.

Agreement UNICEF – Secretary for Water and Electricity

According to the Water and Environmental Sanitation Project Plan of Action signed by the UNICEF Representative and the Secretary of State for Water and Electricity, UNICEF provides technical assistance, cash and construction materials to the government of Timor-Leste for the implementation of the Plan.

Project management

The implementing partner and project manager is the Community Water and Sanitation Division (CWSD), which in turn is under the Water and Sanitation Services Department of the Secretary of State for Water and Electricity.

The Project

The project consists of providing village entrepreneurs with non-local materials (*ie*, cement, iron bars) and training to produce components for the construction of water and sanitation facilities (latrines, water jars, dug wells, platforms for public taps and hand pumps). The village entrepreneurs then assist the family or community members to assemble the unit. Families and communities participate with labor and some local materials. Village entrepreneurs are only paid for their work after confirmation that the facilities are actually in use.

Stakeholders

The main stakeholders in the project are the families, the village entrepreneurs, and the field monitoring assistants (FMAs).

Scheme of the UNICEF supported project through CWSD

Role of UNICEF, the CWSD, the Field Monitoring Assistants, and the Village Entrepreneurs

UNICEF and the CWSD jointly prepare the annual Project Plan of Action. CWSD requests and UNICEF advances cash for the activities to take place on a quarterly basis.

CWSD staffs identify and train the Village Entrepreneurs on hygiene and sanitation promotion, on the casting of the WES facilities components, and assemble the water or sanitation facility.

CWSD hires and trains Field Monitoring Assistants (FMA) to monitor and assist the village entrepreneurs on hygiene and sanitation promotion, casting the components and the construction of the facilities.

CWSD pays the village entrepreneurs based on the components installed provided they are being used by families or communities.

When the agreed work is completed, the village entrepreneur reports to the FMA, who confirms that facilities are completed and used by the community. The FMA then reports to the Community Water and Sanitation District Officer (CWSDO). The CWSDO certifies the report and submits it to CWSD.

Payment. Using cash advanced by UNICEF, CWSD pays the FMA, who in turn pays the village entrepreneurs.

Settlement of accounts. The village entrepreneurs sign receipts for their payment and delivers to the Field Monitoring Assistants, who submits to the Community Water and Sanitation Division at National Level. CWSD submits to UNICEF for liquidation.

II. PROJECT ASSESSMENT

Objectives of the project assessment

In view of the end of the current programme cycle, a need for an assessment has been identified to determine to what extent the project has met its proposed goals and objectives as well as its impact on policy, capacity building and behavioural change.

The assessment will identify good and bad practices that contribute towards a positive or otherwise outcome of the project, and will provide a set of recommend actions to improve the overall impact and sustainability of the project.

Expected outcome of the assessment

Specifically, the assessment will determine:

Project efficiency and effectiveness

- Assess project efficiency through the analysis of financial inputs and practical outputs. Assess the working conditions of a sample of UNICEF-supported school water facilities, community water and sanitation installations, knowledge of the village entrepreneurs, and community member's knowledge and practices regarding the water and sanitation facilities.
- Assess the appropriateness of the technology introduced and the contribution of the project toward the development of new technologies.
- Identify what inputs the community has actually provided and what additional areas the community could contribute.
- Assess the role of the village entrepreneurs in monitoring the utilization status of the facilities.
- Assess whether training through the project has contributed towards capacity building, upgrading knowledge and skills in areas related to sanitation and hygiene, leading to behavioural change. Identify areas that need to be further enhanced.
- Assess the project's effectiveness of communication and social mobilization strategies using IEC materials, and their links to behavioural change.
- Assess the maintenance of school facilities, and the involvement of the Parent-Teachers Associations (PTAs), teachers and children in school sanitation and hygiene education projects. Assess the behaviour change among children.
- Assess whether the project has addressed gender issues, and whether it has been successful at increasing girls' enrolment rate in primary schools.
- Assess the effectiveness and transparency of the implementation structures and project management described above (CWSD – FMAs – village entrepreneurs).

- Assess the reporting system village entrepreneur - FMA - Community Water and Sanitation District Officer (CWSDO) - CWSD.

Project outcomes/benefits

- Identify lessons learned from the project implementation
- Assess replication of the project to the non-project areas and adoption of elements by other organizations with regards to model building, capacity building, etc.
- Assess the sustainability of the project, especially after UNICEF support ends in 2004.

Influence on national and sub-national policy and strategy:

Contribution to national and sub-national policy dialogue: Assess the success of the project in influencing the government's policies and strategies on rural sanitation by way of "advocacy by demonstration".

Contribution to planning, budgeting/resources mobilization: Assess and analyze the contribution of the project in strengthening the planning, resource allocation and implementation of rural sanitation.

Contribution to multi-sectoral coordination and collaboration: Assess the project's contribution in bringing together multi-sectoral collaboration and identify additional areas and action points needed to strengthen the collaboration.

Case study on good practices

If possible, the assessment will include a case study on good practices, to document a situation in which the project has achieved the original objectives at the community or school.

Methodology

Although the consultant will determine the final methodology to be used, the assessment will include:

1. Desk review including:
 - Review of related documents such as those that are related to policy and projects.
 - Timing of desk review is tentatively set at late February.
2. Field assessments including:
 - Assessment of project inputs and outputs using related indicators for data collection.
 - Meeting/interviews with leaders, sector and other sector staff to review policy, strategy and impact related issues.
 - Interviews/questionnaire/focus group discussions with village committee, households, PTA, school teachers and children on their response to the project.
 - Criteria for selection of visit sites to be finalized by consultant and H&S Section.
 - Timing of field assessments tentatively through early March.

Consultants

Desk review and field assessment will be carried out by a team consisting of one international and one national consultants. The international consultant will serve as team leader. With support of the national consultant, the international consultant will produce the field assessment report and recommendations for the future directions.

Qualifications of the consultants:

The external consultant, as the team leader for the assessment, should be a highly qualified person with a strong professional background and practical experience in the field of water, sanitation and hygiene.

Experience and knowledge of UNICEF's programmes will be an advantage. English language required, Portuguese an asset.

The national consultant should possess substantial background and knowledge in environment, sanitation, hygiene and social development programmes in Timor-Leste, including practical experience in these fields, preferably with international NGOs. Some experience in project assessments/evaluations using quantitative and qualitative methods will also be needed. English and Tetum / Bahasa required. Portuguese an asset.

Key Assignments for consultants

Key assignments for the international consultant:

Under the general supervision of the Health and Sanitation project officer and with the assistance of the WES assistant project officer:

1. Plan, organize, and participate in the project assessment for the WES project.
2. Design the assessment framework, tools and methodology (sampling frame, questionnaire, interview/discussion guidelines, data analysis).
3. Work with the national consultant and UNICEF Timor-Leste staff to plan and conduct the field work for the assessment and guide the national consultant in the interviews, focus group discussions, case studies, inspection of quality of services, etc.
4. Guide the data collection and analysis during both the desk review and field assessment.
5. Based on the results of the review, make strategic recommendations for the next programme cycle.
6. Lead the writing of two component assessment report, one for community WES and one for school WES components.
7. Lead the project assessment presentation on key findings to the government counterparts, UNICEF staff, UN agencies and development partners.

Key assignments of national consultant for environmental sanitation and hygiene education projects:

Under the guidance and general supervision of UNICEF staff and based on requirements of the international consultant:

1. Collect, review and organize relevant information related to policy and project as well as relevant surveys, studies and reports. Translate and summarize key documents for the team leader.
2. Work with the international consultant in the design of the assessment framework and research tools for the field assessment. Translate questionnaires, interview guides, etc.
3. Conduct the field assessment in selected project sites based on the agreed design and methods.
4. Work with the international consultant on data analysis and assist in the writing of the project assessment report. Translate the report into Tetum or Portuguese.
5. Participate and assist the international consultant in the preparation of the presentation of the findings to government counterparts, UNICEF, and development partners.

Time required:

One International consultant:

- 1) Planning and design phase: 15 working days
- 2) Field assessment and data analysis and report writing and presentation in the meeting: 30 working days

One National consultant

- 1) Planning and design phase: 15 working days

- 2) Assist in desk and field assessment and data analysis and report writing and presentation in the meeting: 30 working days

Supervisor: Alejandro Gonzalez Richmond
Funding source: SC/04/3269/01

Appendix 2. Reference materials

AusAID, Various Guidelines and Reports

Community Water Supply and Sanitation Division, AusAID, ADB, 2003, *Guidelines: Community Water and Sanitation*

Government of Timor-Leste and UNICEF, 2005, *Country Programme Action Plan 2006-2007*

Ministry of Education, Culture, Youth and Sport (MECYS), 2005, *Education Management Information System (EMIS)*

Ministry of Planning and Finance, April, 2005, *Overview of Sector Investment Programs*

Ministry of Transport, Communication and Public Works, et al, April 2005, *Water Supply and Sanitation: Priorities and Proposed Sector investment Program*

Timor Institute of Development Studies, February, 2005, *Water and Sanitation Coverage in East Timor: A study on the conditions of Uatocarbau and Viqueque sub-districts*

UNICEF & Democratic Republic of Timor-Leste, May, 2003, *Multiple Indicator Cluster Survey (MICS) Timor-Leste 2002*

UNICEF & Democratic Republic of Timor-Leste, 2002, 2003, 2004, *Annual Reports*

UNICEF, September, 1998, *A Manual on School Sanitation and Hygiene*

UNICEF, March 2003, *Master Plan of Operations: Country Programme of Cooperation between Government of Timor-Leste and UNICEF*

World Bank, May 2004, *Background Paper for the Timor-Leste and Development Partners Meeting*

Appendix 3. People met

Ms. Shui-Meng Ng, UNICEF Country Representative
Ms. V. Jitjaturunt, Programme Coordinator, UNICEF
Mr. A. Gonzalez-Richmond, Chief of Health and Sanitation Programme, UNICEF
Mr. E. Redden, Chief of Basic Education Programme, UNICEF
Ms. M. Ashok, Chief of Advocacy and Communication Programme, UNICEF
Mr. R. Pereira, Assistant Project Officer, Water and Environmental Sanitation Project, UNICEF
Mr. S. Deeble, Assistant Project Officer, Water and Environmental Sanitation Project, UNICEF

Mr. Egidio de Jesus, Secretary of State for Electricity and Water, Ministry of Transport, Communication and Public Works
Mr. J. Jeronimo, Director, Water Supply and Sanitation Division, Ministry of Transport, Communication and Public Works
Mr. E. Moniz, Chief, Community Water and Sanitation Division, Ministry of Transport, Communication and Public Works
Ms. Tomasia, Chief, Environmental Health, Ministry of Health
Ms. D. Borges, Assistant Director of Primary schools, Ministry of Education, Culture, Youth and Sport
Mr. M. Soares, Superintendent of Primary Schools, Liquica District

Mr. A. Smith, Team Leader, Community Water Supply and Sanitation Program, AusAID, Australian Government
Mr. G. Costin, Team Leader, Integrated Water Resources Management Technical Assistance, Asian Development Bank
Ms. I. Nephram, Deputy Director, Oxfam

Appendix 4. Field visits conducted

No	Date of travel	Location			Name of School Visited	Purpose of travel	Consultants
		District	Sub-district	Village			
1	22 April 05	Liquica	Bazartete	Lauhata Mota Ulan		Reconnaissance visit	Philip Wan
2	29 April 05	Dili	Metinaro	Hera	EP Hera	Reconnaissance visit	Philip Wan
							Marcos da Cruz
3	2-4 May 05	Manatuto	Natarbora	Aubeon	EP Uma Boko	Assessment on WES project	Marcos da Cruz
				Uma Boko	EP Aubeon		
					EP Abatoan		
4	5-7 May 05	Liquica	Maubara	Lisadila	EP Vatuboro	Assessment on WES project	Marcos da Cruz
				Vatubor	EP Siamado		
					EP Guguleur		
					EP Kasait		
5	10-12 May 05	Ermera	Letefoho	Ducurai	EP Ducurai	Assessment on WES project	Marcos da Cruz
					EP Olopana		
				Launan	EP Lauana		
					EP Katrai Leten		
6	13 -14 May 05	Dili	Metinaro	Hera	EP Hera	Assessment on WES project	Marcos da Cruz
			Vera Cruz	Hanso Hatora	EP Akanunu		
					EP Camea Raihun		
					EP Bidau Masau		
7	17-May 05	Liquica	Bazartete	Tibar	EP Kasait	Assessment on WES project	Philip Wan
							Marcos da Cruz
8	18 May 05	Dili	Around Dili			Shop survey on WES components	Marcos da Cruz
9	18 May 05	Ermera	Railaco	Liho Tokoluli		Assessment on WES project	Philip Wan
10	19 May 05	Manatuto	Laclo	Umakaduak Nakleo		Assessment on WES project	Philip Wan

Appendix 5. Questionnaires for field surveys

Form A.	School survey on Water and sanitation
Form B.	B1: Village Leaders B2: Village Entrepreneurs
Form C.	C1: Water jars C2: Pour-flush latrines C3: Dry latrines C4: Water supply facilities
Form D	Survey of shops selling WES components

Schools Survey on Water and Sanitation**

Form A

Name of district: _____ Name of sub-district: _____
Name of village: _____ Name of school: _____
Name of respondent/headmaster: _____

Number of students: Total = _____ Boys = _____ Girls = _____
Number of teacher: Total = _____ Male = _____ Female = _____

Water Facilities

1. What type of water facilities did this school get from UNICEF?

2. When was the facility constructed or provided _____

3. Describe how functional are the systems?

4. Any period of the year when no water is available? _____

5. When water is available, is it adequate (yes/no)? _____

6. If not, what are the problems?

1) _____

2) _____

7. How is the quality of drainage (good/bad)? _____

8. Who are using the facilities? _____

9. Who is doing the maintenance of the facilities? _____

Sanitary Latrines

10. Does the school have sanitary latrines provided by UNICEF (yes/no)? _____

11. If yes, how many units were provided?

1) for Boys = _____ 2) for Girls = _____

12. How many are operating now? _____

1) for Boys = _____ 2) for Girls = _____

13. If some are not operating, why?

1) _____

2) _____

14. Who are using the latrines? _____

15. Do all students use the latrines (yes/no)? _____

16. Who are doing the maintenance? _____

17. Are latrines under lock during school hours (yes/no)? _____

18. If yes, why?

1) _____

2) _____

3) _____

Parent and Teacher Association (PTA)

(interview member/chief of PTA)

19. Does the PTA exist in this school (yes/no)? _____

20. If yes, when was it formed? _____

21. How many members in the PTA? _____

22. How is the coordination between parents and teachers (good/bad)? _____

23. If bad, why?

1) _____

2) _____

24. If good, how often does the PTA have meetings? _____

25. Do the PTA members contribute cash/labour? (describe):

26. What activities did the PTA do?

1) _____

2) _____

Garbage Bins

27. Are there garbage bins (yes/no)? _____

28. If yes, what type of garbage bins does this school have?

1) = pots 2) = dug holes 3) = other _____

29. If no, why?

1) _____

2) _____

30. Who provided the garbage facilities?

1) = students 2) = NGOs 3) = other _____

31. How is garbage disposed of? _____

Hygiene

32. Is hygiene education structured in the school curriculum (yes/no)? _____

33. If yes, which classes is the subject taught?

1) _____ 2) _____

34. How often is the subject taught in the school? _____

35. Does the school provide/promote handwashing before having meals (yes/no)? _____

36. If yes, how?

1) _____

2) _____

37. If no, why?

1. 1) _____

2) _____

38. Did school receive any IEC¹ material from UNICEF (yes/no) _____

39. If yes, describe types:

1) _____

2) _____

Headmaster/teacher's Impression on Water and Sanitation Facilities

40. Do you think the facilities (water & sanitation) provided by UNICEF have good benefits for students (yes/no)? _____

41. If yes, please mention two examples of the benefits.

1) _____

2) _____

42. Have facilities benefited girls (yes/no)? _____

43. If yes, how?

1) _____

2) _____

44. What are the problems or issues to be addressed to improve the water and sanitation in the school?

1) _____

2) _____

Other comments (by consultant)

**** The comments from students, and the enrolment rates from 2000 to 2005 were added after the first of the four visits ; some data were later collected from schools visited in first visit.**

Appendix 5.

Village leaders

Form B1

Name of district: _____

Name of sub-district: _____

Name of village: _____

How many families in the village: _____

1. If your village is considered for a development program, what are the most three important needs for community in the village in priority order?

1) _____ 2) _____ 3) _____

¹ IEC = information, education & communication

2. What is the livelihood's composition of the people in the village?

1) _____ 2) _____ 3) _____

3. Do you or the villagers have a hygiene education program for the village (yes/no)? _____

4. If yes, how is the program promoted in the village?

1) _____

2) _____

3) _____

5. Do you use IEC materials for hygiene education (yes/no)? _____

6. If yes, what type do you use and source?

1) _____ source: _____

2) _____ source: _____

7. What do you consider as the two biggest benefits from UNICEF project?

1) _____

2) _____

8. What do you consider to be two weaknesses of the program?

1) _____

2) _____

9. Are you personally involved in the school activity (yes/no)? _____

10. If yes, how?

1) _____

2) _____

11. Does dengue fever or malaria exist in your village (yes/no)? _____

12. If yes, how many children were affected last year?

1) Dengue = _____ (person)

2) Malaria = _____ (person)

13. If yes, how many children died last year? _____

1) Dengue = _____ (person)

2) Malaria = _____ (person)

14. How do you (villagers) address the mosquito problem?

1) _____

2) _____

Other comments (by consultant)

Form B2

Village Entrepreneurs

Name of district:_____

Name of sub-district:_____

Name of village:_____

How many family in the village:_____

1. What is your background?_____

2. When did you receive your training?_____

3. How many systems (facilities) have you completed?_____

4. What problems have you encountered/found? _____

1)_____

2)_____

3)_____

5. What are your plans after project ends?

1) _____

2) _____

6. Personal observation (by consultant) on quality of work of entrepreneur (good/average/bad) _____

Other comments (by consultant)

Appendix 5

Water Jars
(interview beneficiary households)

Form C1

Name of district: _____ Name of sub-district: _____

Name of village: _____

1. Name of household: _____

2. No. of persons in household: _____

3. When was jar constructed? _____

4. Has construction been completed (yes/no)? _____

5. If not, why:

1) _____

- 2) _____
6. Quality of construction (Good/Bad)? _____
7. Any observations on construction:
- 1) _____
- 2) _____
8. How full is the jar? _____
9. How many days of use to empty the jar when full? _____
10. What period of the year when jar is empty? _____
11. Any other observations:
- _____
- _____
- _____

Latrines
(interview households received)

Form C2

Name of district: _____ Name of sub-district: _____

Name of village: _____

1. Name of household: _____
2. Number of persons in household: _____
3. When was UNICEF latrine completed? _____
4. If not completed, why not?
- 1) _____
- 2) _____
5. Type of superstructure: _____

6. Is latrine used (Yes/No)? _____
7. If No, why not?
 1) _____ 2) _____

8. Is latrine clean (Yes/No)? _____
9. Latrine used daily (Yes/No)? _____
10. Latrine used by (adult/children/all)? _____
11. Where water for flushing collected? _____
12. Any comments (from users/observations)

Dry latrines

(interview households have pit latrines)

Form C3

Name of district: _____ Name of sub-district: _____

Name of village: _____

1. Name of household: _____
2. How many family members: _____
3. When was dry latrine constructed? _____
4. Since when has family used a dry latrine? _____
5. Condition of latrine (Clean/dirty)? _____
6. Usage by (all/adults/children)? _____

7. What has the family to say on use of dry latrine?

8. Observations:

1)Construction_____

_____2)Usage_____

Existing Water Supply Facility Observation
(interview with some users at water source)

Form C4

Name of district:_____ Name of sub-district:_____

Name of village: _____

10. Describe the type of existing water supply facility?

11. When was the water supply facility constructed?_____

12. Who financed the construction of the water supply facility?_____

13. What is the physical condition of the facility (good/bad)?_____

14. If bad, how (drainage/collection system)?

1)_____

2)_____

3)_____

6. How many

families are taking water from the existing water supply?_____

7. How water is collected (bucket/tap/pump/etc)

1)_____

2)_____

8. Is the water supply available all day (yes/no)?.....

9. If no, why?

1)_____

2)_____

10. Any period of the year when no water available?_____

11. What problems users have encountered?

1)_____

2)_____

3)_____

12. Do families boil water before drinking (yes/no)?_____

13. If no, why not?

1)_____

2)_____

14. Who are doing the maintenance for the facility?_____

Other comments (by consultant)

Survey of shops selling WES components

(interview WES component shops sellers)

Form D

13. Name of shop: _____

14. Location of shop: _____

15. Types of hand pumps sold?

1) _____ price _____

2) _____ price _____

3) _____ price _____

16. Number of hand pumps sold in 2003? _____

17. Number of hand pumps sold in 2004? _____

18. Who are the main buyers?

19. Types of latrine pans sold?

1)_____ price _____

2)_____ price _____

20. Number of latrine pans sold in 2003? _____

21. Number of latrine pans sold in 2004? _____

22. Who are the main buyers? _____

Other remarks by interviewer

Appendix 6. Glimpses of Project Activities

Solar cell dug well pump in Primary School Aubeon, Natarbora-Manatuto



Storage & latrines in Primary School Aubeo, Natarbora-Manatuto



Latrine for community in Natarbora, Manatuto



Dug well in communities of Natarbora, Manatuto



Dry latrine in communities of Natarbora, Manatuto



Standing tap in communities of Lisadila, Maubara - Liquica



Water jar in household of Sabuli village (Metinaro)



Teachers & students Abatoan school



Appendix 7. STEPS OF COMMUNITY WES IMPLEMENTATION**
(HYGIENE AND SANITATION PROMOTION AT COMMUNITY LEVEL)

1. Workshop on the development of guidelines on Community Water and Sanitation, which involved participants from UNTAET, NGOs, UN Agencies, Education Department, Health Department, Water and Sanitation Services (WSS) Department and former sanitarians (Year 2001 and revised in 2003).
2. Workshop on the development of a manual for Village Entrepreneurs (VE), outlining their roles and including forms to be used for various activities (Manual revised in 2003)
3. Workshop on the development of a technical manual for VEs on manufacture of WES components (Manual revised in 2003)
4. Two-day orientation workshop for Field Monitoring Assistants (formed sanitarians) on the Guidelines established.
5. Five-day technical training for Field Monitoring Assistants on to manufacture WES components using moulds.
6. Study visit outside the country for Village Entrepreneurs, Field Monitoring Assistants and government staff (Years 2000 and 2002).
7. Selection of the district, sub-district and village by the government, Community Water and Sanitation Division (CWSD).
8. Two-day orientation workshop on the guideline established for the Community Leaders, NGOs, Health staff and Community Water and Sanitation Division (CWSD) staff.
9. Mapping & Selection of the village entrepreneurs (1 male & 1 female) through the community meeting organized by the community leader facilitated by Field Monitoring Assistant (FMA).
10. Five-day technical training for village entrepreneurs and FMAs by CWSD and UNICEF..
11. Hygiene and Sanitation Promotion survey, repair the previous map done during community meeting and proposal by village entrepreneurs facilitated by FMAs.
12. Non-local material supplies and cash advance by UNICEF to the government for the labor, transport and local materials. Also technical support for the salaries and monitoring allowances.
13. Community water and sanitation project implemented by village entrepreneurs, monitored by FMA who are supervised by Community Water and Sanitation District Officer.
14. Whole community WES implementation managed by CWSD with support of UNICEF.

** Provided by WES officer, UNICEF

Appendix 8. Water Samples tested for bacteriological quality

* TNC means “too numerous to count”

Appendix 9. STEPS OF SCHOOL WES IMPLEMENTATION **
(HYGIENE AND SANITATION PROMOTION THROUGH SCHOOLS)

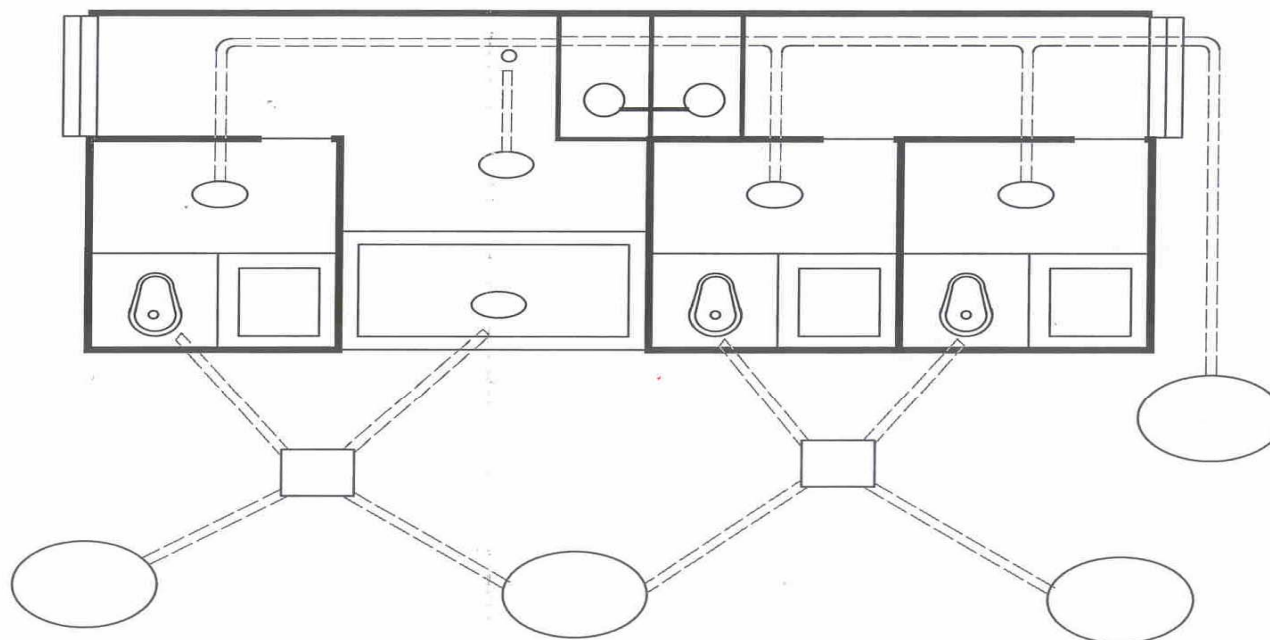
15. Workshop on the development of guidelines on the Hygiene and Sanitation Promotion through Schools, which involved participants from UNTAET, NGOs, UN Agencies, Education Department, Health Department and Water and Sanitation Services (WSS) Department (Year 2001 and revised in 2003).
16. Selection of the schools with the coordination of Education Department.
17. Orientation workshop for the Education Superintendents, Head Master of Schools, and Community Water and Sanitation Division (CWSD) staff on the guidelines established
18. School assessment and proposal by Head Master facilitated by CWSD staff with support from UNICEF staff.
19. Non-local material supplies and cash advance by UNICEF to the government for the labor, transport and local materials. Also technical support for the salaries and monitoring allowances.
20. Supervision the implementation by Head Master of the school with the facilitation from the CWSD staff.
21. Whole school WES implementation managed by CWSD with the involvement of the teachers and support of UNICEF.

** Provided by WES officer, UNICEF

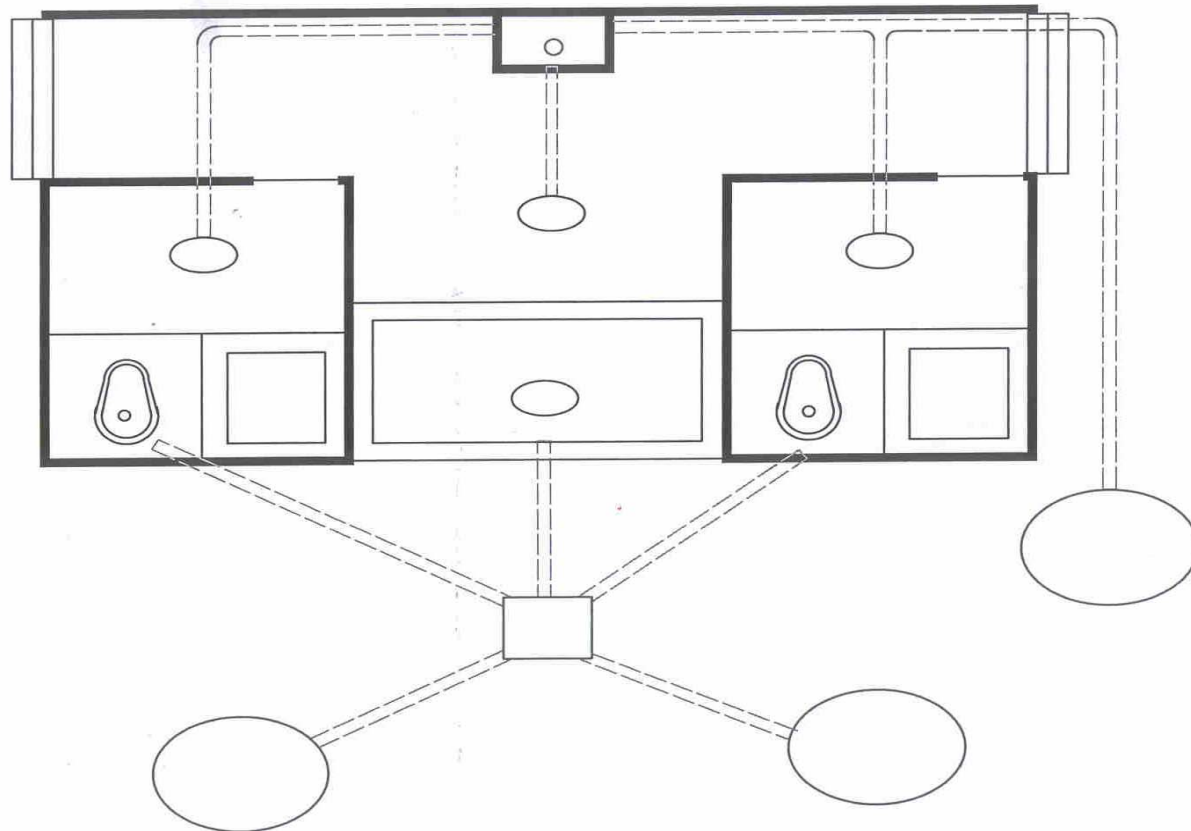
Appendix 10. School latrine types

4.3.3.1. KONSTRUKSI JAMBAAN SEKOLAH BARU

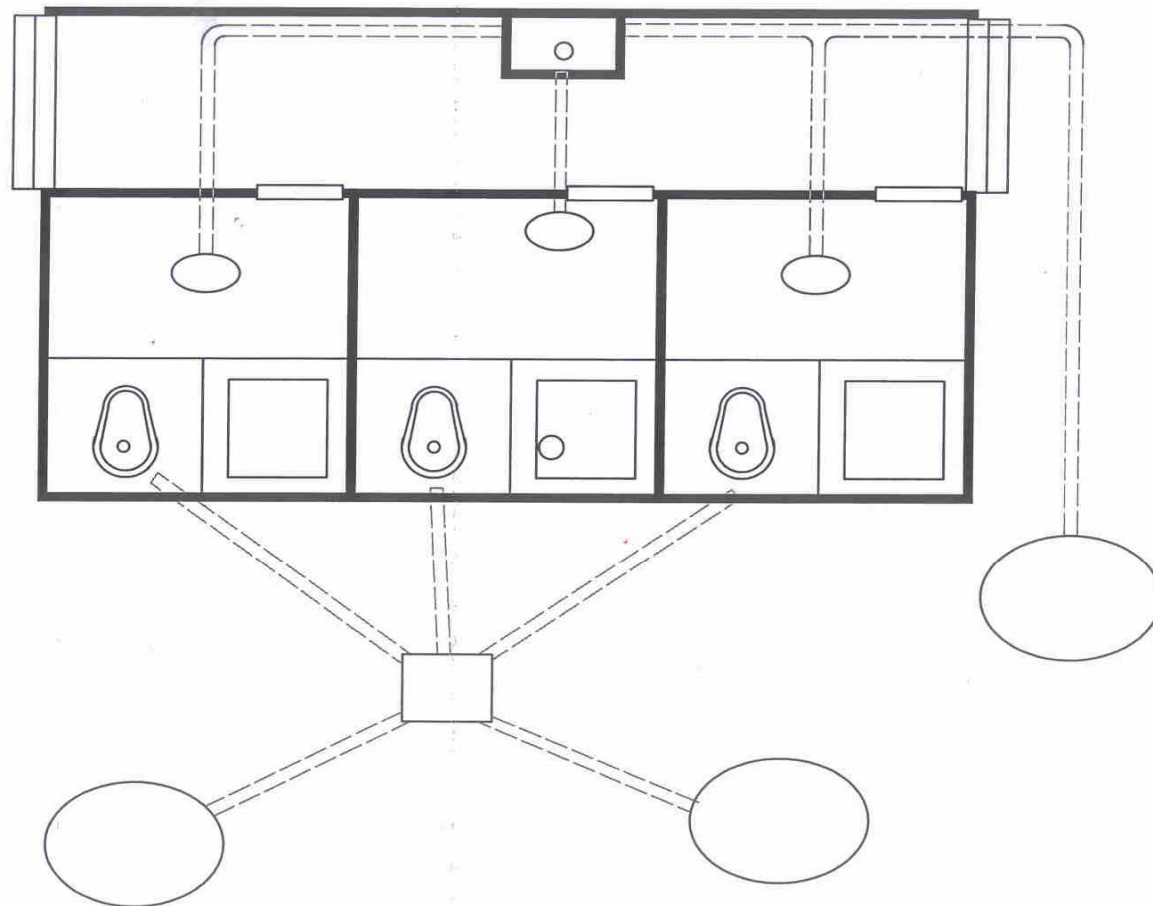
4.3.3.1.1. GAMBAR JAMBAAN SEKOLAH BARU TIPE I



4.3.3.1.2. GAMBAR JAMBAAN SEKOLAH BARU TIPE II



4.3.3.1.3. GAMBAR JAMBAAN SEKOLAH BARU TIPE III



Appendix 11. Cost of school latrine

NO	URAIAN	Satuan	Harga satuan	Jamban Sekolah Baru Type-I			Jamban Sekolah Baru Type-II			Jamban Sekolah Baru Type-II		
				Volume	Biaya	Rounded total	Volume	Biaya	Rounded total	Volume	Biaya	Rounded total
1	Semen 50 kg	Sak	4.71	55.34	260.65	260.00	38.86	183.03	183.00	39.09	184.11	184.00
2	Besi betong 8 mm	btg	2.35	32.00	75.20	75.00	22.00	51.70	52.00	22.00	51.70	52.00
3	Besi betong 6 mm	btg	2.12	20.24	42.91	43.00	14.12	29.93	30.00	14.12	29.93	30.00
4	Kawat ikat	Kg	1.20	7.48	8.98	9.00	5.46	6.55	7.00	5.46	6.55	7.00
5	Keramik 20/20	Dos	6.47	12.00	77.64	78.00	9.00	58.23	58.00	9.00	58.23	58.00
6	Keramik 10/10	Dos	6.47	40.00	258.80	260.00	30.00	194.10	194.00	30.00	194.10	194.00
7	Kayu 5/10	btg	5.88	20.00	117.60	120.00	13.00	76.44	77.00	15.00	88.20	88.00
8	Kayu 5/7	btg	3.29	12.00	39.48	40.00	8.00	26.32	26.00	8.00	26.32	26.00
9	Kayu 4/6	btg	2.35	16.00	37.60	38.00	12.00	28.20	28.00	12.00	28.20	28.00
10	Seng 0.25 %	lbr	4.12	34.00	140.08	140.00	23.00	94.76	95.00	23.00	94.76	95.00
11	Cat kolam	klg	5.90	0.36	2.12	2.00	0.24	1.42	2.00	0.36	2.12	2.00
12	Pasir halus No.1	Ret	29.41	8.67	254.98	255.00	5.69	167.34	168.00	5.71	167.93	168.00
13	Pasir kasar No.2	Ret	23.53	7.62	179.30	180.00	5.31	124.94	125.00	5.31	124.94	125.00
14	Batu kali/batu gunung	Ret	41.18	1.88	77.42	78.00	1.28	52.71	53.00	1.28	52.71	53.00
15	Kerikil	Ret	41.18	3.20	131.78	132.00	1.76	72.48	73.00	1.77	72.89	73.00
16	Papan 2/20	lbr	4.12	8.00	32.96	33.00	6.00	24.72	25.00	6.00	24.72	25.00
17	Papan 3/20	lbr	5.88	3.00	17.64	18.00	2.00	11.76	12.00	3.00	17.64	18.00
18	Batako	bh	0.29	950.00	275.50	275.00	685.00	198.65	200.00	685.00	198.65	200.00
19	Saringan wc	bh	1.76	4.00	7.04	7.00	3.00	5.28	5.00	3.00	5.28	5.00
20	Tripleks 3 mm	lbr	4.12	8.00	32.96	33.00	6.00	24.72	25.00	6.00	24.72	25.00
21	Tripleks 4 mm	lbr	5.29	3.00	15.87	16.00	2.00	10.58	11.00	3.00	15.87	16.00
22	Engsel pintu	bh	1.47	6.00	8.82	9.00	4.00	5.88	6.00	6.00	8.82	9.00
23	Grendel pintu	bh	1.00	3.00	3.00	3.00	2.00	2.00	2.00	3.00	3.00	3.00
24	Kunci pintu	bh	5.29	3.00	15.87	16.00	2.00	10.58	11.00	3.00	15.87	16.00
25	Seng halus L: 90	m	2.94	6.00	17.64	18.00	4.00	11.76	12.00	6.00	17.64	18.00
26	Paku tripleks	Kg	1.18	3.50	4.13	4.00	2.50	2.95	3.00	3.00	3.54	4.00
27	Paku seng	Kg	1.76	2.00	3.52	4.00	1.50	2.64	3.00	1.50	2.64	3.00
28	Paku 10 cm	Kg	0.88	5.00	4.40	5.00	3.50	3.08	3.00	3.50	3.08	3.00

NO	URAIAN	Satuan	Harga satuan	Jamban Sekolah Baru Type-I			Jamban Sekolah Baru Type-II			Jamban Sekolah Baru Type-II		
				Volume	Biaya	Rounded total	Volume	Biaya	Rounded total	Volume	Biaya	Rounded total
29	Paku 7 cm	Kg	0.88	6.00	5.28	5.00	3.50	3.08	3.00	4.50	3.96	4.00
30	Paku 5 cm	Kg	0.88	3.00	2.64	3.00	2.00	1.76	2.00	3.00	2.64	3.00
31	Cat tembok 20 kg	klg	9.41	4.00	37.64	38.00	3.00	28.23	28.00	3.00	28.23	28.00
32	Cat kayu 1 kg	klg	2.94	4.00	11.76	12.00	3.00	8.82	9.00	3.00	8.82	9.00
33	Kuas rol besar	bh	1.76	4.00	7.04	7.00	3.00	5.28	6.00	3.00	5.28	6.00
34	Kuas biasa 3"	bh	1.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00
35	Kertas amplas	lbr	0.29	8.00	2.32	3.00	6.00	1.74	2.00	6.00	1.74	2.00
36	Ember 10 liter	bh	1.80	8.00	14.40	15.00	6.00	10.80	11.00	6.00	10.80	11.00
37	Kloset LA	bh	2.73	-	-	-	-	-	-	-	-	-
38	Dudukan kloset LA	bh	2.22	-	-	-	-	-	-	-	-	-
39	Saluran beton	bh	1.65	3.00	4.95	5.00	2.00	3.30	4.00	3.00	4.95	5.00
40	Penutup saluran beton	bh	1.38	3.00	4.14	4.00	2.00	2.76	3.00	3.00	4.14	4.00
41	Oli bekas	ltr	0.12	56.36	6.76	7.00	30.24	3.63	4.00	32.24	3.87	4.00
42	Tanah putih	kg	0.01	-	-	-	-	-	-	-	-	-
43	Bambu kulit tua	btg	1.20	4.60	5.52	6.00	3.40	4.08	4.00	3.40	4.08	4.00
44	Untung BBS	unit	-	-	-	-	-	-	-	-	-	-
45	Biaya gali lubang	unit	3.20	15.00	48.00	48.00	10.00	32.00	32.00	10.00	32.00	32.00
46	Biaya tukang batu	hari	12.00	43.00	516.00	516.00	31.50	378.00	378.00	31.50	378.00	378.00
47	Pembantu Tukang Batu	hari	12.00	43.00	516.00	516.00	31.50	378.00	378.00	31.50	378.00	378.00
48	Biaya tukang kayu	hari	12.00	17.00	204.00	204.00	12.00	144.00	144.00	15.00	180.00	180.00
49	Pembantu Tukang Kayu	hari	12.00	17.00	204.00	204.00	12.00	144.00	144.00	15.00	180.00	180.00
50	Pipa & aksesoris untuk BPA	unit	60.75	-	-	-	-	-	-	-	-	-
51	Pipa & aksesoris untuk WC/Urinoire	unit	54.15	5.00	270.75	270.00	4.00	216.60	220.00	3.00	162.45	163.00
52	Pipa & aksesoris untuk tempat cuci tangan	unit	59.45	2.00	118.90	120.00	1.00	59.45	60.00	1.00	59.45	60.00
53	Pipa & aksesoris untuk bak saringan air	unit	12.15	-	-	-	-	-	-	-	-	-
54	Biaya tukang pipa	hari	12.00	7.00	84.00	84.00	5.00	60.00	60.00	4.00	48.00	48.00
55	Miscellaneous	Unit	-	-	288.01	278.00	-	228.71	216.00	-	228.71	170.00
SUB TOTAL BIAYA :				-	4,500.00	4,500.00	-	3,200.00	3,200.00	-	3,252.30	3,200.00

Appendix 12. Some key elements of a tubewell and hand-pump programme

1. Hand-pump selection and standardization

As the drilling programme is being re-introduced, it is important to select, as far as possible, pumps whose operating procedures are familiar with users. Timor-Leste is already familiar with lift pumps. It is appropriate to limit the brands of pumps to a few. Although the Dragon suction pump is used, especially by individual households sharing with some others, the Project should consider using more robust public pumps, as each hand-pump will be used by over 30-40 families. India Mark III can be considered even at shallow depths of 8 metres and above; however, it will need a short and light handle to work properly at shallow depths of 8 to 20 metres. (Communications with R. Daw, Project officer, HTN, UNICEF, New Delhi)

The project should pay particular attention to the maintenance of the facilities, ensuring adequate supply of spare parts for the pumps. It is recommended that, after two years, the programme is carefully evaluated in terms of pump performance, users' views, and maintenance procedures.

2. Proposed Support from UNICEF

The following items can be considered as UNICEF contributions (costs are tentative):

- One medium capacity Down the Hole (DTH) Hammer drilling rig (e.g. PAT –Drill 301T, or Hydreg, used earlier). The cost could be around US\$ 60-80,000
- Four one-person operated drill (e.g. Hydra-Drill), one for each of the project districts. One unit for the school programme. The cost is about US\$ 4,500 each.
- One small truck for drilling crew of DTH rig, and one pick-up vehicle for the hand-pump maintenance crew based in Dili. Estimated cost US\$ 35,000
- One set of geophysical instruments. Estimated US\$ 30,000
- Offshore procured components for tubewells, namely, hand-pumps, casing pipes, screen, bentonite for drilling, cement for pump platform, and spare parts for hand-pumps and rigs.
- A one-week training of DTH drilling crew by a trainer from the rig manufacturer at the commissioning of the rig, local training of operators for the small rigs. Cost estimated at US\$ 4,000. A 2-3 week overseas training for the head of the geophysical investigation unit. Cost estimated at US\$ 10,000.

3. Proposed Support from CWSSD

The support would consist of the following:

- Recruitment of a team of six persons to operate the DTH rig (some staff may be hired as daily workers at site), and one person for operating each of the four small rigs (an additional person can be hired as daily worker at site)
- Recruitment of two persons to form the geophysical investigation unit
- Running cost of the rigs by providing fuel and oil for the machines
- Maintenance of the rigs

4. Examples of Costs of tubewells with platform (for UNICEF)

<u>Tubewell depth of 20 metres</u>		<u>Tubewell depth of 40 metres</u>	
<u>Items</u>	<u>Cost (\$)</u>	<u>Items</u>	<u>Cost (\$)</u>
Hand-pump	200	Hand-pump	200
Casing (17m)	220	Casing (37m)	475
Screen (3m)	65	Screen (3m)	65
Cement (2 bags)	10	Cement (2 bags)	10
Bentonite (100kg)	50	Bentonite (200kg)	100
Total	545	Total	850

(For tubewells in schools, add say US\$ 150 for fuel and oil to be paid by UNICEF)

5. Hand-pump maintenance by village caretakers

The past experiences in the country, as well as experiences of neighbouring countries such as Bangladesh, Myanmar and India can be tapped, by requesting UNICEF country offices to forward their booklets outlining the procedures. In outline, the key steps are as follows:

- Selection of a team of volunteer caretakers, consisting of a man and woman who are reliable, mature, enthusiastic and can devote quality time
- Development of a user-friendly handbook for caretakers comprising both technical aspects and hygiene promotion.
- Training of the caretakers in both technical aspects of pump repair and motivation of community members for hygiene behaviour change. The technical training requires hands-on experience on dismantling the whole pump, assessing each of the pump components, and reassembly.
- Supply of adequate critical spare parts to attend to prompt repairs of the pump
- Simple reporting form on pump working status from caretaker team to CWSD maintenance team in Dili (the back-up team described below)

6. Hand-pump backup maintenance team

A backup team of two persons will be established based in Dili to handle major repairs to pumps that are beyond the capacity of the village caretakers. The team should be well versed with the operation and maintenance of the pumps operating in the area. They will be equipped with the necessary tools, hand-pump spare parts and a pick-up vehicle.

7. Monitoring of hand-pump and maintenance performance.

In the early years of a new programme, it is important to prepare and implement a monitor plan which will provide the project with good data to allow for early and effective attention to any emerging problems.

Appendix 13. A proposed model for the implementation of the do-it-yourself latrines

The district of Dili, Ermera, Liquicia and Manatuto has 6, 5, 3 and 6 subdistricts respectively. Each sub-district has between some 3 to 10 villages, and each village has about 5-6 hamlets.

For a two-year project, it is suggested that all the four districts be taken up in year 1, and year 2. During year 1, half of the sub-districts in each district are taken up for implementation, and the remaining sub-districts are taken up in year 2. The selection should be synchronised with the planning of the water supplies to be provided to the communities.

Project implementers are: CWSD at district level, with strong support from CWSD Dili, Field Monitoring Assistants (hired by CWSD for each sub-district), village and hamlet leaders, volunteer change agents and communities. In year 1, 10 FMAs will be recruited for each of the 10 sub-districts selected. In year 2, another 10 FMAs will be recruited for the remaining 10 sub-districts to reach a total of 20 FMAs.

The local leaders will be given orientations on what to do. Experiences to date have shown that “volunteerism” is not emerging, but can be further tried. The Red Cross is launching a programme to recruit volunteer workers at the community level. It is proposed that the religious leader in the community, the catequist, who holds weekly prayer meetings, be motivated to play a lead role in hygiene education. The catequist can be invited for the orientation.

The following steps are suggested:

1. Guidelines are prepared for the orientation of the FMAs, village and hamlet leaders and key change agents in the hamlets. Booklets are prepared for use by the hamlet leaders and change agents. These are elaborated below.
2. Resource persons who will orient village and hamlet leaders and field level change agents are first oriented by CWSD and UNICEF on how to conduct orientation sessions for village and hamlet leaders and change agents. The Resource persons could be CWSD district officers, Environmental Health Department and Education department staff, and recruited NGOs to manage the overall orientation programmes, if considered by the project.
3. The village leaders and the leaders of the hamlets in the selected sub-districts are invited for an orientation on the concept and various aspects of the project. Selected change agents in the hamlets can be invited as well.
4. The Village leaders and hamlet leaders go back to their respective places, and organise a meeting with all community members to discuss on the implementation of the scheme. At the meeting, a few persons can be encouraged to be volunteers for motivating communities.
5. To ensure focus and good outcomes in the construction of latrines, it is suggested that simple and achievable targets be set, and efforts made to realise them. For example, each hamlet can be challenged to motivate say 3 families to construct their own latrines each month. A seemingly small task, but if realised systematically over the year, the results could be substantial. The hygiene education campaign should be pursued for larger number of families every month, through group gatherings, e.g by the village leader and the catequist.
6. The hamlet leader records the names of the persons who have constructed their latrines in a register book.
7. Each FMA organises a monthly meeting inviting all the village and hamlet leaders and the catequist to monitor the progress. At the meeting, the progress of each village and

hamlet is shared with all others to encourage them, in a healthy competition, to produce good results. Based on the records in the register book, the FMA checks at random some of the households in the register book, and discusses with the household on use of latrine and hygiene practices.

8. The FMAs send a monthly progress report to the CWSD district officer, detailing the number of persons having constructed their sanitary latrines.
9. UNICEF and CWSD will monitor progress through the reports submitted by CWSD district officers, and by going to the hamlets, according to a schedule that covers many villages during the year. During the visit, several household will be selected at random in the register book, and these households will be visited. It is important to share with the FMAs and the village and hamlet leaders how the monitoring will be done so that they are aware about the procedure to be applied.

Guidebooks.

Two books are proposed:

- Guidebook for Resource persons conducting the orientation sessions. They should be simple, not voluminous, and outline the concept of the do-it-yourself approach, the technical aspects of the latrine construction, latrine choices for those who can afford plastic or other types of latrine pans, hygiene promotion, the expected roles of the village and hamlet leaders, the expected outcomes, and the field monitoring to verify accomplishments. The sessions are outlined, allowing adequate time for interactions of the participants. The FMA should also have a copy of the Guidebook for regular reference.
- Booklet for the village and hamlet leaders. This could be a booklet outlining the key elements of the motivation activities. They would include designs of the latrines, the regular organising of meetings with community members, the information to be collected, and how the data will be verified.

Appendix 14. Agencies with potential for providing training to field level workers

1. Environmental Health Department (EHD), Ministry of Health

(Could be suitable for training on promotion of sanitation and hygiene)

- 2 officers at central level, and one District Public Health Officer (DPHO) in each of the 13 districts
- Involves in community programmes, both rural and urban, with focus on four elements: food safety, water quality, clean home and clean environment, and sanitation in public places
- EHD staff train/orient Clinic Health Centre staff to impart hygiene messages and motivate visitors attending the clinics for change
- The DPHOs participate at meetings organised by NGOs, on invitation, for motivation of community members
- EHD works with CWSD, on irregular basis, and provides IEC materials
- EHD helps Education Department to improve curriculum to incorporate environmental health

2. Timor Institute of Development Studies (TIDS)

(Could be suitable for training of motivators on motivation skills & on promotion of sanitation and hygiene, as well as assessment studies)

- (The local consultant for this assessment is a staff of TIDS)
- Focus on Research and Training
- Involved in three programmes: Economics; Democracy and Social Changes; Agriculture and Applied Technology
- Top management includes one person with PHD, 3 with Masters degree
- Researchers include 3 Bachelors in Economics, one with post-graduate diploma in Agriculture and one PHD candidate in Agriculture
- Undertake consultancy works, e.g. a study on WES programme in Viqueque for AusAID in 2005
- Training on leadership, marketing and book-keeping

3. Biahula

(Could be suitable for training of technical persons, e.g pump caretakers, and undertaking technical assessment studies)

- Established in 1997 as an NGO specialising in water supply, although were involved earlier as contractors in Water Projects.
- Headed by a director, and has 2 Field Coordinators and 2 technical support staff currently involved in an AusAID funded project in two districts.
- Existence highly dependent on available of work from Aid agencies.
- Involved in surveys for gravity-piped water system, design and monitoring works.
- Involved in training on construction of ferrocement tanks, solar pumps and hand-pumps.

