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## **ENVIRONMENTAL HEALTH IN EAST TIMOR**

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## **1. PURPOSE OF ASSIGNMENT**

- (1) To assist in the development and implementation of environmental health programmes including solid waste management, and community water supply and sanitation;
- (2) To establish plans for maximizing the benefits of water supply and sanitation to health, assisting in water resources development and preparing proposals for interagency cooperation;
- (3) To advise and assist in the assessment, preparation, and development of plans for control of major environmental health hazard;
- (4) To prepare technical reports giving critical analysis of programme impacts, and
- (5) To advise the WHO Head of Office on all matters pertaining to environmental health activities as required.

## **2. INTRODUCTION**

Immediately after the referendum in September 1999, East Timor experienced extensive destruction of most of the infrastructure facilities, public buildings, thousands of private homes and business. With the re-establishment of the government institutions under UNTAET (United Nations Transitional Administration in East Timor) at present, the general administration and rebuilding of the ruined infrastructures are being streamlined.

Drinking water supply, wastewater and drainage, solid waste management, and hygiene and sanitation are four major areas of priority that need special attention and improvement at present for promoting environmental quality and reducing diseases that are related to the poor environment. The effect of air pollution (both ambient and indoor air), chemical use in agriculture and business, and food safety measures are other environmental parameters that need to be grouped under the next priority in East Timor.

## **3. SITUATION ANALYSIS**

A health profile of East Timor that was prepared in the year 1998 has shown that the overall population not having access to safe drinking water was 52% and that without access to the sanitary disposal of waste was 62%. A KAP survey on water and sanitation had indicated that there exist a low level of understanding among the people about the importance of safe drinking water and good sanitation for better health and livelihood.

The Department of Health Services, Department of Water and Sanitation Services, Environmental Protection Unit, and District Administration Offices of UNTAET including UN agencies (like WHO, UNICEF, and UNDP), World Bank, Asian Development Bank, INGOs, NGOs, and some other private agencies are various actors and partners working in their own capacities in the field of environment and environmental health in East Timor. Post referendum (Sept 1999) activities of the UNTAET was initiated with identification and implementation of quick programmes on restoring infrastructural facilities for services in East Timor. The above agencies are now more

concentrated on institutional strengthening and capacity building with resource generation and mobilization for programme planning, formulation, and implementation in a more sustainable manner.

An emergency repair of ruined water supply systems was carried out through WSS and some other INGOs during the end of 1999. This included immediate rehabilitation of the existing supplies in district and sub-district towns including Dili. Water supplies to the rural villages are arranged from community owned and operated piped systems, protected springs and shallow wells (dug wells and tube wells). Coastal communities have problems of salt-water intrusion into the wells. Most of the piped systems to the towns and rural communities are unreliable, with low level of service, as they have intermittent supply; high level of unaccounted for water, and poor maintenance. Water quality is equally poor due to either inadequate treatment practices (rapid sand filters in Dili) or no treatment (in other towns), or cross-connections that takes place in the distribution network. WSS Department of ETTA has started a laboratory set up within its own institution for periodic testing of water in Dili and maintaining a database with information to its operational unit, which needs further strengthening. Almost all the piped water supply systems in urban or semi-urban areas need rehabilitation of varying degree. JICA has made a study for urgent rehabilitation of 15 piped water supply systems in different district or sub-district towns including Dili. UNICEF, OXFAM, and some other agencies are working for the rehabilitation of existing wells and springs in villages. Asian Development Bank has prepared a water supply and sanitation sector management and investment framework for East Timor and working further on it.

Sanitation is very poor in East Timor. Open defecation is common in rural communities. On-site sanitation with pit latrines (with direct or off-set pits) is widely used with limited number of septic tanks. There does not exist a sewerage system even in Dili. Concentrated on-site toilets in Dili and other towns pose a high risk of contaminating ground water and surface drains. The situation some times become even worse when the low level ground is flooded with the surface run off. Kangkung is one of the most common vegetables cultivated in wet fields or drains that have more possibilities for free accesses to the wastewater (both black and gray), and a high risk of contamination with eggs of intestinal worms emanating from human and animal excreta. A temporary arrangement has been made in Dili for cleaning and desludging of the septic tanks using vacuum trucks through contractors and treating them collectively in a small lagoon constructed near Dili. A preliminary master plan for sewerage and drainage for Dili has been prepared by AQUAPOR, an INGO from Portugal, however it needs further working on system design and estimates. Existing drains for surface water runoff in Dili and other towns are blocked with siltation and are left open without a proper cover on them. It provides a good place for mosquito breeding. Some of the water service pipelines are often aligned together with the drains indicating a high possibility for cross connection when the pipes are leaking and the supply is intermittent.

There does not exist a formal collection of garbage in the urban areas of East Timor, as there is no institutional capacity built so far within the government institutions. Currently, there are a few local and international contractors including peacekeeping forces working for municipal waste collection under a special contract with UNTAET and some other agencies. A large portion of the municipal waste still constitutes debris of building materials collected from cleaning of the destroyed buildings in the town prior to the renovation or reconstruction. The collected wastes are dumped freely on Tibar, a site in use for municipal waste disposal for Dili. The overall arrangement on waste management is not enough for the complete removal of the daily waste from the city; as a result the wastes are either burnt in open places or will remain piling up on road verges and dry riverbeds for several days till another collection is attempted.

The presence of uncontrolled and stagnant liquid waste and piles of solid wastes at several places in the town is creating an environment more favourable for the growth of disease vectors like rodents, flies and mosquitoes.

Hazardous waste from health care activities from some of the clinics in Dili and outside are handed over to the private contractors engaged in collecting municipal waste. The clinics that do not contract with the private party for waste disposal usually burn the waste in open air inside their own premises. ICRC is the only hospital in Dili that has got an electric incinerator for the treatment of the waste before disposal. Used sharps are usually collected in special plastic containers and are either handed over to the parties/agencies for safe disposal or are buried under the ground within own premises. It has been estimated that about 100 tonnes of hazardous wastes are produced every year in Dili from health care activities. There is no centralized treatment or disposal facility available for such waste; therefore they are quite often disposed with municipal waste in Tibar near Dili.

There were very few programmes conducted in the past on public awareness for personal hygiene, safe drinking water and household sanitation. Therefore there exists a low level of understanding among the people about health benefit that is achievable from adopting better sanitation practices in daily life with minimum cost and effort. A participatory survey conducted by UNICEF in East Timor in 2000 has indicated that most of the rural communities drink water without boiling it, and there were 100 latrines constructed in one occasion in past with the government support, only eight were currently being used. Support to the villagers on water and sanitation facilities and training on environmental health was arranged in the past through environmental health promoters called 'sanitarians' working under community health centres of the Department of Health Services. Motivation to the people towards personal hygiene and sanitation require a lot of interaction between outsiders and the community through formal and informal education or training and social marketing programmes. Local sanitarians, if prepared adequately now, can be employed effectively for such promotional activities.

A database from the Disease Surveillance & Epidemic Preparedness Work that has been started with WHO in East Timor for last one and half years since September 1999 has shown that there are altogether 252 093 number of consultations related to water and wastewater related infections in East Timor (which comes to be 26% of the total consultations) which include 69.39% of malaria, 18.56% of watery diarrhoea, 3.07% of bloody diarrhoea, and 8.86% of febrile illness. Proper environmental management is inevitable with improved water supply and sanitation to reduce this disease burden in East Timor.

#### **4. ACTIVITIES UNDERTAKEN**

The consultant concentrated more on waste management and minimization of its effect in East Timor because a lot of government and nongovernment institutions working at present are already focused on drinking water works in district and sub-district towns including Dili.

JICA has planned for a rehabilitation and upgrading of water supply system for Dili. They have mentioned in a technical report that once the new system will be in operation, the increased water supply in the absence of proper drainage and sewerage systems may give rise up to 2 mm of wastewater flowing free and spreading in the distribution area every day. This would not be a desirable condition, as more and more wetlands are likely to be developed that favour mosquito

breeding with contamination to the land and underground water. \* A concept paper was developed and disseminated to promote a sewerage system for Dili together with rehabilitation and extension of the existing surface water drains in parallel to the ongoing water supply works so as to achieve a maximum health benefit out of those new developments.

A thorough review of the existing documents and reports was made to visualize challenges that are being faced in the area of environmental health in East Timor. Establishment and strengthening of the government institutions to work and coordinate on water and sanitation services are first priority actions. Programmes on hygiene and sanitation awareness together with water quality improvement and monitoring fall under this priority group. \* All the important activities that need to be carried out at the central and district levels including Dili area were identified and listed in a paper.

\* A paper on sustainable management of wastewater in East Timor was prepared for an International Conference on Sustainable Development that was organized by Timor Aid in Dili from 25-31 January 2001. The paper highlighted various statistics on sanitation, health concerns of wastewater, wastewater management need in Dili, technology options for rural sanitation, and sustainability issues on wastewater management in the long term. A Task Force formed after the Conference has constituted a Central Sanitation Committee for East Timor with seven members from different key agencies including WHO, working for health and environment.

Hazardous waste generated from most of the health care facilities except the ICRC Hospital are either burnt in the open air or are handed over to the private contractors engaged for collection of municipal wastes. At present, there is no institutional capacity built for the implementation of garbage collection and disposal. A survey of for ongoing works on waste management (both solid and liquid wastes) in various clinics and hospitals in Dili was carried out with visits to the individual centres and discussions with the persons concerned. It was found that if separated from total solid waste, the quantity of hazardous wastes in most of the clinics is very little (around 10 kg/day) with around 300 kg in whole Dili. The handling of hazardous solid wastes should be either centralized at an incineration facility in Dili or decentralized with small and cheap incinerators constructed with firebricks in those centres that can afford space for such construction. \* A report on health-care waste management with a tentative cost estimate of US\$ 800 000 was prepared suggesting alternatives with centralized or decentralized system of incineration with ultimate disposal to the municipal dump site. If the proposed electric incinerator is also replaced by brick incinerators, the above estimates can be brought down to about US\$ 650 000.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

The first six recommendations are for immediate action and the rest for long term plan and programme on EH in East Timor.

- (1) A situational analysis on various aspects relating to environmental health in East Timor needs to be carried out in near future. It would help in fixing baselines for different activities and allocating available support for priority actions on suitable time frames. The

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\* Available with technical unit in SEARO

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analysis should be conducted as a joint effort of the institutions or agencies working for health, infrastructure, environment and administration, and be coordinated by WHO.

- (2) WHO should support the Departments of Health Services and Water and Sanitation Services in their initiative to establish, strengthen, and institutionalize an environmental health unit within each of the Departments. WHO should assist those units in the beginning in developing national policy, long-term plans, technical proposals and guidelines, new technologies, and manpower training programmes on various aspects relating to EH. WHO guidelines and framework for action should be suitably referred when and where needed.
- (3) Any new development project in East Timor should take into consideration the possible impact of the development on the health of the people. A provision should be made for obtaining clearance from the health authority for such development. This should be incorporated into the overall system of the government from now onwards.
- (4) Criteria should be set to identify high-risk communities or groups in different districts of East Timor in the context of prevailing sanitation and environment around them. Sanitation programmes oriented towards the specific need of those communities should be developed and implemented by the government. A WHO published framework for action based on the South-East Asia Regional Consultation on New Approach to Sanitation and others could be referred as guidelines and applied suitably for this work.
- (5) It is expected that the population in Dili will continue to increase and cause a rapid increase in the flow of wastewater, overloading the existing septic tanks or excavated pits further. Wastewater in such situation should be efficiently handled by constructing a sewerage system with waste treatment plant. Raising awareness for a sewerage system and seeking commitment for its implementation should receive continuous attention. The construction of a sewage reticulation can be easily broken up into different phases with the first phase started for Dili core area.
- (6) There is an urgent need for drainage rehabilitation or new construction in the low-lying areas like Caicoli to drain out stagnant pools of water. The existing drains are not adequately sized, constructed and maintained to cater surface run-off during the rains. Cleaning of the drains and putting new covers where needed should be started without any delay. A layout for drainage system in Dili prepared by AQUAPOR needs further development by addition of complete design and estimates. The drains if constructed together with the sewerage system, may reduce a lot of earthworks and save money.
- (7) Institutional arrangements for solid waste management in Dili need strengthening with necessary logistics and manpower support. Dumping site at Tibar needs an urgent upgrading from the current crude dumping to a controlled tipping situation. Programmes on community awareness and motivation for reducing waste with appropriate recycling and reuse at the source need to be conducted on a pilot scale in different localities of Dili. Local NGOs, clubs or groups can be mobilized to work on this and arrange for a systematic household waste disposal system up to the nearest primary collection point in the town.
- (8) Hazardous waste without treatment should never go to the municipal dumping site in any case. Almost all the health care centres in Dili are practising incineration or open burning of the waste. Treatment with incineration using standard brick incinerators should be introduced either individually in each of the hospitals and the clinics, or centrally in a certain location of the town, making the facility common for all users. This should be based on the present field study on hazardous waste management in Dili carried out by the consultant.

- (9) Rural water supply and sanitation programme can run effectively when the users accept it from the early stage of its development. It needs more interaction with the community and all the decisions on planning, implementation, and use should be made with a participatory approach. The district profile on water and sanitation should be made available for prioritizing and implementing district level plans and programmes. Different hardware and software options on water and sanitation outlining standard steps and procedures suitable to the rural communities of East Timor should be made available to the government as soon as possible.
- (10) Urban and rural environmental health issues are different and need to be viewed differently. They need long-term planning, programme and implementation rather than quick fix solutions. The institutions are not prepared so far to work on long-term objectives. Working for institutional capacity-building to the concerned government departments is very essential at this stage through formulating basic strategy, policy and procedures on EH.
- (11) Programmes for mass awareness on different environmental issues should be initiated through the development of IEC materials in local languages and organizing social marketing in the communities. Sanitarians should be adequately prepared and posted at village and sub-district levels to work for awareness, education and motivation on health, water and sanitation activities. A school sanitation programme is an effective approach for reaching parents through children on social mobilization for better hygiene practices and should receive a good momentum in East Timor.
- (12) Many national and international NGOs are currently providing basic services to the communities in East Timor. An arrangement should be initiated to network with those NGOs and bring them under a single umbrella, for better coordination and uniformity in programme implementation, avoiding any possible duplication of the efforts. Capacity building of those NGO's needs to be arranged through different training programmes, workshops and exchange visits.
- (13) Water quality monitoring and surveillance programme should be developed at the central level and introduced as one of the routine activities in urban and rural piped water supplies. This work combines a sanitary survey of the system with a simple microbial analysis of water for timely remedial actions.
- (14) Solar water disinfection could be introduced and promoted as one of the appropriate water treatment technologies applicable to the households in rural areas through mobilizing different NGOs working for water and sanitation in East Timor. It is a very simple and cheap new technology and is being successfully adopted in different communities of developing countries in Asia and Africa. Drinking water collected at household levels is usually put in transparent plastic or glass bottles half painted with black and exposed to the sun for about five hours under bright or up to 50% cloudy sky, or for two consecutive days under 100% cloudy sky. Solar radiation inactivates and destroys pathogenic microorganisms present in water.
- (15) Swampy fields are extensively used for growing vegetables in East Timor. Mostly the vegetables from such fields or roadside drains are contaminated with sewage. Field studies should be conducted and pilot programmes initiated to introduce scientific approaches on wastewater reuse for agriculture or aquaculture based on WHO guidelines on this specific issue.

## **6. ACKNOWLEDGEMENTS**

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