Training in low-cost water supply and sanitation — an Indonesian experience

by Juli Soemirat Slamet

Training conducted at the International Training Centre at Bandung has resulted in calls for changes in education and attitude about low-cost water supply and sanitation.

THE GOVERNMENT of Indonesia has given priority to water supply and sanitation for more than 20 years. To provide services, Indonesia has followed the methods used by the developed nations. In urban areas a piped water-supply was installed, and in rural areas simple systems were introduced. The high costs of this approach in the urban areas had the unintended effect of providing the rich with services, leaving the low-income population with no money and deficient or no services. Also, in rural areas, the importance of having safe water-supply and sanitation services was not fully understood, and so 40 to 50 per cent of the rural systems were no longer functioning one year after construction. These conditions were accentuated by a rapid population growth of 2.1 per cent (from a population of 176 million in 1988), thus the percentage of people covered remained the same despite the increased investment.

Training networks

The International Drinking Water Supply and Sanitation Decade encouraged the search for low-cost solutions which were more suitable to the local socio-cultural conditions. To support the goals of the Decade, UNDP and the World Bank developed a series of modules on Low-Cost Water Supply and Sanitation (LCWSS) Technologies. They include implementation approaches, which suggest integrative ways of implementing LCWSS technologies (hardware) with the software of management, community participation, health, hygiene education, and other related aspects. This way the technologies will become effective, affordable, and culturally acceptable to the people. These modules were meant to be used to teach water supply and waste management in those training centres throughout the world which are part of the International Training Network (ITN). The ITN is a joint initiative of UNDP and the World Bank in support of the goals of the Decade. Its principle objective is to promote needed improvements in both the effectiveness of water-supply and sanitation investments, and the extension of service coverage, particularly to low-income population groups in the urban fringe and rural areas of developing countries.

Most of Indonesia's population is in rural areas where high-cost technologies are not affordable, and where habits, customs, and traditional beliefs could adversely affect the use of good water supply and sanitation. There are institutional weaknesses and an extreme shortage of staff trained to promote rural services, so the Government of Indonesia was very enthusiastic about developing an ITN Centre here. In 1987, two centres were established in Indonesia, one at the Directorate General of Human Settlement, Cipta Karya, Ministry of Public Works, which is called the ITN-Cipta Karya (CK) Centre, and another at the Environmental Engineering Department of the Institute of Technology Bandung (ITB), called the ITN-ITB Centre. The ITN-CK Centre will train within their own department, while the ITN-ITB Centre will train all other

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An expensive piped water-supply was installed in urban areas, but as the cities grew there was no money left to extend the system.

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engineers outside the ministry of Public Works, such as those in the Ministry of Health, Home Affairs, Non Governmental Organizations, and the engineering students.

Training activities

The education of sanitary engineers in Indonesia incorporates the technology and approaches used in the developed nations, so most of the existing curricula offer courses related to conventional water-supply and sanitation systems. At the ITB, however, there is a course offered on rural sanitation. Up to 1987 the approach had been traditional, and only the hardware aspects of these technologies were taught. To improve the effectiveness of these alternative technologies, training should be provided to all levels in the organization, starting from the decision-makers, instructors, and continuing through to the practical engineers. Table 1 shows the training activities conducted, for different target groups, during the first two-year phase of the Centre.

The decision-makers attending the workshops were those working in the water supply and sanitation sectors, the instructors came from universities, academies, and polytechnics, and the practicing engineers were from various target organizations. All of them had already had teaching and/or field experiences in water supply and sanitation, and they represented all the provinces of Indonesia.

Table 1: Training at ITN-ITB Centre, 1987-9

Target group	*Number of participants*	*Activity*
Decision-makers	60	one-day seminar
Instructors	80	ten-day workshop
Practicing engineers	160	five-day workshop
Community	unknown	discussions, presentation, etc.

Seminar objectives

The main objective of the decision-makers' seminar was to create an awareness of the existence of various LCWSS alternatives, and to suggest ways to implement them. The instructors learned to discuss LCWSS technologies and its approaches, and to use the teaching (AV) materials so that they could apply them in their own classes. The practicing engineers' workshops main objective was that they were expected to demonstrate some basic skills in the construction principles of LCWSS technologies.

Materials and modules

The modules presented and used during the workshops were those concerning LCWSS technologies, management and community participation, and health and hygiene. The materials were taken from the World Bank's AV training modules, existing pilot projects on LCWSS, and the demonstration models. To be able to reach the course objectives, several sessions have always been used to introduce the participants to the existing problems in Indonesia. Resource people who will be able to become discussion leaders and facilitators, and who will be able to provide more detailed information on the subject matter should be selected.

The workshops were assessed by both the instructors and the participants. The participants were asked to complete questionnaires before and after each workshop, and between two to 15 months thereafter. To get feedback from resource persons, the ITN-ITB Centre arranged meetings right after the completion of each workshop.

Instructors' evaluation

Instructors were expected to report on the unusual events, difficulties and the inhibitions, as well as the successes in handling their sessions. In general no difficulties were found during sessions discussing technologies, but it was somewhat different during the 'software' sessions. Most engineers felt that aspects of LCWSS technologies other than the technical ones were not their concern. When asked about this attitude, they explained that each aspect was being handled by the respective department. So, health aspects, for instance, are the responsibility of the Health Department, and an engineer will have practically nothing to do with it. It was also the same with instructors

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from engineering schools. They also admitted that they have difficulties, since they had neither the right background nor the experiences to discuss these matters. Again, this is due to the existing engineering education systems.

Participants' evaluation

The post-workshop questionnaires consisted of four parts: organization and administration; objectives, design and contents; teaching materials, quality of resource persons; and recommendations on future activities. In general the results were positive, and several interesting points were raised.

Most participants would like to see the modules translated into Indonesian, adapted to Indonesian conditions, and would prefer to use Indonesian case studies.

Despite the fact that the participating engineers were not very interested in the 'software' of the training materials at the beginning of the workshop, the post-workshop evaluation consistently showed that one of the most interesting and relevant modules was always one of the software ones, either user participation, hygiene education, or management and community participation (see Tables 2 and 3).

Another evaluation by participants, carried out 2 to 15 months after the workshop and conducted by mailed questionnaires, achieved a 70 per cent response within 50 days. The results were in general positive again. Most respondents felt that they had actually learned new techniques and attitudes. The instructors were able to apply their knowledge in their class, and felt more self-confident. Some found that there were too many constraints however: insufficient budget and teaching materials was one, and insufficient support from their employer was another.

Constraints identified by the practicing engineers were a result of the rigidity of the budget-year concept, which makes it impossible to involve the community in their project, and left little time for hygiene education. Sectoral co-operation, e.g. between the health, home affairs, and public works office turned out to be difficult as well, and most of the local staff in rural areas were used to work based on instructions from above in a well-defined hierarchy.

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Decision-makers on the training course recognized that no one technology is applicable in all areas of the country. Practicing engineers identified a rigid budget year as a major hindrance to community involvement.

The conclusions made by the decision-makers were in general very good. They felt that there is no one technology that is applicable in all areas of this country — presently all systems are standardized. Another conclusion was that the community should be allowed to take a major role in LCWSS projects. Up until now, the project manager or the government decides what is good for the people. They also recognized the need for the collection and dissemination of information about LCWSS technologies and their approaches.

Table 2: Participants' interest in different workshops

Subject	*Average number of participants*	
	Before	*After*
Handpumps	1.6	4.5
Low-cost sanitation	5.1	10.8
Waste-water treatment	13.5	0.5
Low-cost water treatment	7.1	1.6
Hygiene education	1.0	5.2
Project management	7.5	5.0
Economic appraisal	4.8	0.3
Community participation	2.9	8.5

Recommendations

From the previous descriptions, two conclusions can be drawn:

- A massive reorientation of knowledge and attitude on LCWSS technology alternatives is needed.
- A change of programme and policy at the highest level is needed to allow flexibility, com-

Table 3: Most impressive and relevant modules

Modules	*Most impressive (%)*	*Most relevant (%)*
User participation	29.4	25.0
On-site sanitation	11.7	19.5
Hygiene education	23.9	13.9
Wells and handpumps	11.7	11.1

munity participation, and multi-disciplinary approaches.

To achieve these, several recommendations should be followed:

- To enhance training, an internal network should be developed within the country.
- The curricula of environmental/sanitary engineering courses should be adjusted to cover both the hardware and the software aspects of these LCWSSs.
- New policies and programmes should be adapted, so that LCWSS technologies and its approaches can be implemented effectively.
- An information system should be developed to support the needed flexible programme.
- A monitoring agency should be developed to assess the real benefit of these activities using morbidity rates of water-borne diseases.

References

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13-18 May 1991. **IWRA World Congress on Water Resources**, Rabat, Morocco. The theme of the seventh conference is 'Water for suitable development in the 21st Century'. Details from: *Administration de l'Hydraulique, Rue Hassan Benchekroun, Agdal-Rabat, Morocco.*

25-31 May 1991. **18th Congress of the International Water Supply Association**, Copenhagen, Denmark. Technical sessions will include water supply management, the effects of air pollution on drinking water, interaction of water with pipes, and the possibilities of influencing water demand. For further information contact: *Kurt Keeley, AWWA Director of Information Services, 6666 W. Quincy Ave., Denver CO 80235, USA.*

4-10 August 1991. **Fifth International Conference on Rain Water Cistern Systems**, Keelung, Taiwan. In rural areas, rain water cistern systems may prove to be the only alternative to groundwater unfit for human consumption. The conference will focus on rainwater harvesting research needs and expanded applications. Further information from: *Professor Sho-Chyuan Chu, Department of River and Harbor Engineering, National Taiwan Ocean University, Keelung, Taiwan 20224, Republic of China.*

19-23 August 1991. **International Conference on Infrastructure, Environment, Water and People**, Nairobi, Kenya. The objective of this conference co-organized by WEDC and a local committee of Kenyans, is to enable those involved in provision, management, operation and maintenance of services to exchange information and ideas. Offers of discussion notes will be accepted up to 31 July and should be addressed to: *Dr J.S. Kilani, Department of Civil Engineering, University of Nairobi, PO Box 30197, Nairobi, Kenya.* More details from: *Mrs Rowena Steele, WEDC, Loughborough University, Leicestershire LE11 3TU, UK.*

2-20 September 1991. **IRC Course on Water Supply and Environmental Sanitation for Low-Income Urban Communities**. More details from: *Ms Izabella Wimmers, IRC, PO Box 93190, 2509 AD The Hague, The Netherlands.**

9-13 September 1991. **International Seminar for NGOs Working in the African Water Supply and Sanitation Sector**, Abidjan, Ivory Coast. Subjects under discussion include: the application of resolutions agreed at Safe Water 2000; promoting partnership between NGOs in North and South; strategies for the next decade; contributions to the UN Conference on Environment and Development. More details from: *Dr. Mansour A. Franck, Convergences LIEPSC-Diepa 90, Compte No. 36410065 A Biao-Cocody, BP V 34 Abidjan, RCI.*

14 October-1 November 1991. **IRC Course on Management for Sustainability in Water Supply and Sanitation Programmes in Rural and Peri-Urban Areas.** (See above address for details).

18-23 November 1991. **8th Afro-Asian Regional Conference on 'Land and Water Management in Afro-Asian Countries'**, Bangkok, Thailand. The three main topics to be discussed in terms of problems encountered and solutions offered are: planning, design and construction; operation and maintenace management; and changes in agricultural production. More information from: *Secretary-General, ICID, 48, Nyaya marg, Chanakyapuri, New Delhi 110021, India.*

25-8 February 1992. **5th African Water Technology Exhibition and Conference**, Nairobi, Kenya. Further information from: *International Conferences and Exhibitions Ltd., 51-3 High Street, Kings Langley, Herts WD4 9HU UK.*

*Readers requiring information on IRC's 3-5 day 'Briefing Programmes' for staff working in water supply and sanitation programmes or projects should write to the above IRC address.