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TAG/NEP/09

UNITED NATIONS DEVELOPMENT PROGRAMME
INTERREGIONAL PROJECT INT/81/047

DEVELOPMENT AND IMPLEMENTATION OF
LOW-COST SANITATION INVESTMENT PROJECTS

REPORT ON MISSION

TO

NEPAL

July 5-15, 1983

BY

R.S. SINGH

October 1983

822-NP83-1913

ABBREVIATIONS AND ACRONYMS

DWSS Department of Water Supply and Sewerage
HMG His Majesty's Government of Nepal
MWR Ministry of Water Resources
MWPT Ministry of Water, Power and Irrigation
NEC Nepal Electricity Corporation
TAG Technology Advisory Group operating under UNDP Project INT/81/047
UNCHS United Nations Centre for Human Settlements
UNDP United Nations Development Programme
WHO World Health Organization
WSSB Water Supply and Sewerage Board

LD 4582

for Community Water Supply

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RN: ISN 1913
LO: 822 NP 83

Introduction

1. In accordance with the terms of reference dated June 24, 1983, from the Project Manager, INT/81/047, a single member mission (Singh, Sanitary Engineering Adviser, Technology Advisory Group (TAG)-Delhi), visited Nepal from July 5 through 15, 1982. The objectives of the mission were:

- (a) to review the progress made by the Department of Water Supply and Sewerage (DWSS), in the Ministry of Water Resources (MWR), in preparing the feasibility studies on low-cost sanitation in eight towns.
- (b) to discuss and obtain views of the Government of Nepal on "Appropriate Standards and Technologies for low-cost Infrastructure in Nepal", by United Nations Centre for Human Settlements (UNCHS).

2. A list of persons met is attached as Annex I. The offices of the Resident Representative, United Nations Development Programme (UNDP), the World Bank and World Health Organization (WHO) were kept fully briefed on the mission's activities. An aide-memoire (Annex II) highlighting the immediate actions to be taken by DWSS for preparing the feasibility report was left with the Chief Engineer, DWSS.

SUMMARY AND FUTURE ACTION

3. DWSS has submitted to HMG the proposal for assistance from UNCHS. Good progress has been made in collecting data for preparation of the feasibility study and installation of the demonstration units in the different project towns since the last TAG mission in May 1983. Well over half of the applications for demonstration units of pour-flush waterseal units had been fulfilled in eight towns (see para. 10). DWSS will accelerate the collection of municipal data in three more towns, the orientation and training of officials in the project towns (see para.11), and the program of monitoring of water quality. The TAG Social Scientist will continue social feasibility studies in the project towns, and have discussions with commercial banks regarding the collection of loan instalments (see para.12).

Background Information

4. Nepal is facing a rapid growth in its urban population, which now accounts for about 6% of the total population of 16 million (1981 census). The urban population had registered an average increase of approximately 5% during 1961-71 and nearly 11% per annum during 1971-81. The urban population is likely to increase to 1.5 million by 1991.

5. The nation-wide level of literacy is 19%. The urban literacy rate varies from 27% to 65% (58% in Kathmandu). About 60% of the school age population attend school regularly.

6. The major cities have been expanding also in economic terms and have played a vital role in the country's economic growth, especially as progress in the agricultural sector has been relatively slow. In future, the cities are likely to play an even greater part in the country's economy as centres of industry and commerce and of the expanding tourist trade.

7. Urban conditions are deteriorating and will become critical, unless steps are taken to plan and provide services for future population and particularly to maintain the inner city areas where the deterioration in the environment threatens the health of the residents.

8. In urban areas of Nepal about one-third of all cases treated in hospitals are fecal and waterborne diseases (dysentery, gastro-enteritis, hookworm and round worm, etc.). There is a noticeable incidence of cholera also. The infant mortality rate is 16% and it is estimated that 50% of the children die before they reach the age of five.^{1/} The crude mortality rate of 22 per 1,000 is one of the highest in Asia and Africa.

9. Although approximately 80% of the urban population is served by piped water supplies, this is mainly through the public standpipes and only 30% have private house connections. Services are intermittent and average urban water consumption is only about 50 lcd. It has been estimated^{2/} that about 15% of the population in 1980 were served through sewerage or individual systems in urban areas, and in rural areas the coverage is less than 1%. His Majesty's Government of Nepal (HMG) aims to increase the coverage to about 35% in urban areas and 13% in rural areas during the International Water Supply and Sanitation Decade (1980-1990) (the Decade). With a view to fulfilling the targets of the Decade, HMG approached the UNDP Global Project (GLO/78/006, now redesignated as INT/81/047) on low-cost water supply and sanitation in 1979, seeking assistance in the preparation of a feasibility report on a low-cost latrine project for eight small and medium towns of the country. These towns are: Bhairawa, Birendranagar, Doti, Ilam, Janakpur, Kirtipur, Mahendranagar and Pokhara. The objectives of the project are:

1/ Country profile: Nepal HMG/WHO 1979.

2/ Ten-year plan: Provision of drinking water supply and sanitation.

(a) Long-term objectives:

To provide low-cost sanitary latrines in the towns and villages of the country covering its entire population, so as to eliminate the health hazards created by the use of bucket latrines and open air defecation.

(b) Immediate objectives:

- (i) to prepare a feasibility study, preliminary engineering and master plan report on low-cost sanitation for eight small and medium towns by providing low-cost pour-flush waterseal latrines to every household, which could be replicated in other towns;
 - (ii) to construct 1,600 demonstration units of low-cost waterseal latrines in eight towns, to train DWSS staff, nagar^{3/} and village panchayat^{4/} authorities in constructing and maintaining such units, and make use of the feedback in preparing the feasibility report.
10. (a) By June 1983, 839 demonstration units of pour-flush waterseal units were installed (Bhairawa-1, Birendranagar-25, Doti-15, Ilam-45, Janakpur-40, Kirtipur-583, Mahendranagar-10, and Pokhara-120) in the eight project towns. About 500 applications are still pending with DWSS for construction of such units;
- (b) household surveys in the remaining seven towns were completed before the mission arrived and the data collected were analyzed by the mission;
- (c) municipal data in respect of sullage and garbage collection and its proper disposal, and income and expenditures of five out of eight towns were collected by DWSS. These data were analyzed by the mission;
- (b) soil samples from all the eight towns were collected and analyzed by the Agricultural Ministry, for grain size distribution, uniformity co-efficient, and effective grain size of the soil;
- (e) field tests of permeability of soils in the eight towns were conducted by DWSS;
- (f) analysis of a few water samples at the source, standpipes and individual houses to study the pollution effect on piped water supplies, due to installation of leaching pits, was done by the Water Supply and Sewerage Board (WSSB);

3/ Town.

4/ Council.

- (g) town and village panchayat acts, rules and by-laws were translated from Nepali to English for further study regarding their adequacies and inadequacies for the implementation of low-cost sanitation programs in the country; and
 - (h) DWSS intends to expand the implementation of the program in these eight towns during 1983/84, for which provision of NRs. 12.17 lakhs^{5/} has been made in the current year's budget.
11. Further immediate steps to be taken by DWSS are:
- (a) collection of municipal data concerning Kirtipur, Mahendranagar and Birendranagar;
 - (b) monitoring of quality of water in Kirtipur;
 - (c) orientation and training: continued promotional and education activities will be needed for successful implementation of the program in the country. In addition to communication support, orientation of the Pradhans^{6/}, Up-pradhans^{7/}, and training of engineers, overseers of DWSS and masons of the towns would also be necessary.
12. Steps to be taken by the TAG Social Scientist are:
- (a) study of the social feasibility (local preference for siting, orientation and design of latrine; use of living space and land ownership and its consequences on the locations or sharing of latrines; traditional sanitation practices and the effect of these on the new practices and attitudes towards pit emptying and re-use of pit contents) of the technology in the remaining seven towns (such a study has already been done for Kirtipur) would be essential. The study will also include affordability, community participation and communication support required for providing household and public latrines in the eight towns;
 - (b) discussions with the commercial banks to see if they can undertake the job of collection of loan instalments from the householders. If so, on what terms and conditions;
 - (c) follow-up actions required for collection of data by DWSS for completion of the preparation of the feasibility study.
13. Continued support from TAG and UNCHS by providing technical support from time to time in evaluation, training facilities and the organization of workshops in different places for wider acceptance of the program will be essential.

5/ One lakh = 100,000.

6/ Chiefs.

7/ Vice-chiefs.

14. The draft proposals on "Appropriate Standards and Technology for low-cost infrastructure in Nepal" prepared by UNCHS were discussed with the Chief Engineer, DWSS, who agreed to them in principle. However, some amendments suggested by the Chief Engineer, keeping in view the changed situation, were made. The proposals were submitted to HMG for onward transmission to UNCHS.

The Eight-town Sanitation Project

15. The eight towns selected for study by HMG, to represent the different geographical, physical and cultural diversities of Nepal, are spread over in all the five development regions of the country (Far Western development region: Doti and Mahendranagar; Mid Western development region: Birendranagar; Western development region: Pokhara and Bhairawa; Central development region: Kirtipur and Janakpur; Eastern development region: Ilam). Out of these eight towns, three (Mahendranagar, Bhairawa and Janakpur) are situate in the Tarai^{8/} area, where the sub-soil water table is high, while the remaining five towns are situated in the hilly regions. The populations of these towns at the times of the 1971 and 1981 censuses are:

Table 1

<u>Town</u>	<u>Population</u>	
	<u>1971 census</u>	<u>1981 census</u>
Bhairawa	17,272	30,084
Birendranagar	n/a	13,885
Doti	n/a	10,500 ^{9/}
Ilam	7,299	9,354
Janakpur	14,294	35,248
Kirtipur & Bhagbharab	n/a	14,000
Mahendranagar	n/a	41,580
Pokhara	20,611	48,456
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Total	59,476	200,107
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Data analysis

16. **Water Supply:** Although all the eight towns are served with piped water supply, the household survey reveals that about 25% of the total populations are served through house connections (ranging from 2% to 60% in

8/ Foot hills.

9/ Census figures not available. These are estimated figures.
n/a - not available.

the individual towns), about 43% get their domestic supplies from standpipes (ranging from 13% to 83%) and the percentage of population depending on handpumps and open wells is 32 (ranging from 13% to 82%). This percentage is comparatively high in Bhairawa, Birendranagar and Mahendranagar, as these towns are situated in the Tarai region (where the water-table is high).

17. **Sanitation facilities:** Sample household surveys of the project towns reveal that about 5% of the total populations have access to waterflushed latrines (ranging from 0.03% Birendranagar to 21.25% Pokhara) against a national average of 15%; about 27% use pit/bucket latrines (pit latrines are prevalent in Doti-61.73% and Ilam-85.56%. These two towns are situated in hilly regions) and 68% of the population do not have any kind of latrine in the houses and therefore resort to open air defecation.

18. The household survey further reveals that about 64% of the households will need five users' latrines; 30% would need 10 users' latrines and the remainder (6%) households would need 15 users' latrines.

19. Cultural factors and preferences of the community have played a very important role in the success of the program in the country. People in the hilly region are more disposed towards sanitation than people in the Tarai region. This is clearly demonstrated from the household surveys and the installation of the demonstration units. People in urban areas use water for anal cleansing, and have therefore widely adopted the pour-flush technology.

20. In the hilly regions where people are more conscious about sanitation, pit latrines are used, while in the Tarai region people use bucket latrines (the human excreta from the bucket privies from individual households is collected at different sites in the towns and disposed of in the dumping grounds).

21. The garbage collection and disposal system is unsatisfactory in almost all the project towns. The collection and disposal is irregular and need improvement.

22. Sullage and storm water find their way into open ponds and ditches through open drains. Because of lack of funds as well as managerial capability and technical manpower in almost all the project towns, the existing drainage systems are inadequate. Wherever some skeleton system exists, it is generally blocked up due to poor maintenance - creating health hazards.

Administration and Financial Situation of The Local Authorities

23. Services in the urban areas of Nepal are provided by a variety of agencies. This is because of managerial and financial weakness of the local authorities. The municipal authority in urban areas, the Town Panchayat, is primarily a political body and in most cases has neither sufficient staff nor funds to provide more than basic street cleaning and, sometimes, solid waste collection and disposal services. Maintenance of public utilities would

normally be the responsibility of the municipal authorities but, in practice, the maintenance of the utilities is undertaken by national agencies such as WSSB; WSSD; NEC (Nepal Electricity Corporation) and the Ministry of Water, Power and Irrigation (MWPT).

24. The town Panchayat's main source of income is the octroi^{10/} and trade tax and is supplemented by other taxes, fees and land and building rents. Octroi is levied on all goods consumed in the city. This source is particularly important in towns of Tarai areas and Pokhara. The analysis of income figures for three (Janakpur, Bhairawa and Pokhara) of the five towns analyzed shows that 63% of the total income of the local authorities is from octroi and trade tax.

25. Urban property, an important source of municipal revenue in other countries of the subcontinent, does not yield significant income to the local authorities, because of a very narrow tax base and assessed property values being much less than market values. There appears to be considerable scope for increasing the revenue from this source, by updating assessed property values and by extending coverage to urban properties, including commercial and industrial establishments.

26. An analysis of the income and expenditure figures of the local authorities reveals that, out of the five towns, the financial situation of three towns (Janakpur, Sidharthnagar and Pokhara) is satisfactory. But none of these towns can finance the project through its own resources. Therefore, the funds for the implementation of the project should be arranged by HMG, through DWSS (the implementing agency). The local authorities should, however, be involved in selecting the target households and in the recovery of the loan instalments. The recovered amount should be retained by the local authorities for meeting the expenditures on the maintenance of the public latrines and pit emptying. This will further increase the revenue of the local authorities, which will also provide an incentive for loan recoveries from the beneficiaries.

10/ A form of local custom duty.

PERSONS MET

Ministry of Water Resources

- | | | |
|----|----------------|--------------------------------------|
| 1. | D.B. Rayamajhi | Chief Engineer, DWSS |
| 2. | P.M.S. Pradhan | Deputy Chief Engineer, DWSS |
| 3. | M.L. Chaudhary | Divisional Engineer, Sanitation Cell |

WHO

- | | | |
|----|-------------|--------------------------|
| 4. | A.P. Hirano | Sanitary Engineer |
| 5. | G.B. Vadiya | Senior Programme Officer |

World Bank

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|----|---------------|-------------------|
| 6. | Kedar Methema | Programme Officer |
|----|---------------|-------------------|

Proctor & Redfern International Ltd.

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|----|--------------|--|
| 7. | C.D. Couzens | |
|----|--------------|--|

R.S. Singh,
Consultant,
World Bank,
Washington, D.C.
Camp - Kathmandu.

Dated: July 14, 1983.

Dear Mr. Rayamajhi,

Thank you very much for the kind help and courtesy extended to the mission. The mission is also grateful to you for taking keen interest in providing necessary data concerning project towns quickly which would enable us to prepare the feasibility report on low-cost waterseal latrines for the 8 towns. However, following informations still remain to be collected from the field, which the mission hopes will be done within a fortnight and forwarded to Delhi office at an early date.

- i) Soil samples of all the towns, excepting Mahendranagar have been collected and sent to the Soil Laboratory of the Agriculture Department. It is hoped that the soil sample of Mahendranagar town would also be made available to the lab within a fortnight - and as soon as the analysis of the sample already sent to the soil lab is completed, will be forwarded to Delhi office.
- ii) Municipal data concerning Kirtipur, Pokhara, Mahendranagar, Birendranagar is still to be collected. It might be desirable to get it collected by sending some special messenger, as that complete informations are available for submission of the feasibility report well within the scheduled period.
- iii) Only a few water sample from Kirtipur town were collected and analysed in WSSB laboratory in Kathmandu to study the pollution effect of leaching pits on the piped water supply system. it was decided that some more sample would be collected and analysed and results sent to us.

Draft proposals sent by UNCHS were also discussed with you. It was suggested that the Draft proposals may have amended under the changed circumstances (the feasibility report would be completed by September 1983) and the amended and updated draft will be forwarded by you to the Ministry of Water Resources, His Majesty's Government Nepal. The UNCHS proposal was however agreed to in principle. The mended draft proposals as discussed with you shall be sent to you shortly.

With kinds regards,

Yours sincerely
Sd/-R.S. Singh

Mr. D. B. Rayamajhi,
Chief Engineer, DWSS,
Panipekhari, Kathmandu,
Nepal.

cc: Mr. Richard N. Middleton,
Project Manager,
INT/81/047,
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Washington DC 20433

Mr. A.K. Roy,
Regional Manager,
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N. Delhi.

Dr. Hikmat Bista,

for following up and arranging to send the
required information quickly, so that the
preparation of the feasibility report is
not delayed.