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THE STATUS OF THE MPLD/UNICEF

COMMUNITY WATER SUPPLY AND SANITATION PROGRAMME

IN NEPAL

A FINAL REPORT BASED ON FIELD OBSERVATIONS

FEBRUARY - APRIL 1985

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INTRODUCTION

This report is based on field visits to CWSS project sites in all five Development Regions of Nepal. The dates of my visits are as follows:

- 28-30 January Mid West Region
- 4-13 March East
- 17-26 March Far West
- 1-5 April West
- 22 April Central

In total I visited 19 projects, 4 Field Offices and 2 Regional Directorate Offices. My impressions are based not only on what I saw, but also on extensive discussions with HMG, UNICEF and SATA staff during my visits. My visits to each Region were rather short and covered quite a limited geographical area, so these general impressions cannot exactly reflect the true status of the programme. Nevertheless, even if each statement is not 100% accurate, I am confident that the overall impressions are fairly representative of the state of the programme, and that the main issues that I raise are indeed the main issues facing the programme today.

Though the impressions are my own, most of the ideas for improving the programme are not mine alone, but are based on discussions and ideas coming from the field.

This being my last report, I wish to thank all those who made these field visits and my previous field visits so useful and enjoyable.

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SUMMARY

Manpower

The situation is still critical, especially with respect to engineers and overseers. There are virtually no career prospects for engineers in MPLD so young engineers are not encouraged to join or to stay. There should be more delegation of authority to engineers, to increase job satisfaction. HMG rules and regulations for Travel and Daily Allowances and Remote Area Allowances are hopelessly inadequate, so field work tends to be neglected. Incentives by donors are counterproductive in the long term - this is the responsibility of HMG. More effort could be made to fill existing vacancies and to recruit suboverseers as a temporary measure. The Technicians are the most successful category of manpower and the creation of HMG posts for them is a major step forward. However, the exact status is still unclear and morale is suffering.

Management

There is still too much misuse of UNICEF-supplied materials in non-UNICEF assisted projects, and non-UNICEF supplied materials are being sent to UNICEF-assisted projects, particularly in the Central and Far Western Regions. Regional Directorates have been instructed by the Ministry to maintain separate stores systems. This should be implemented over this monsoon period. UNICEF is willing to bear the cost of an extra storekeeper for UNICEF supplies.

Generally, the programme is no longer hampered by lack of materials, though shortages do still occur. The disbursement of cash, however is a constraint, as the Ministry of Finance releases the budget so late every year.

Decentralization will affect only 5 of the CWSS districts next year, two in the East foothills and three in the Western Region. This will have little effect on the programme next year. So far, the impression is that most districts have a good opinion of the CWSS programme and they do not want to "take it over" as they know they cannot manage. So the main impact of decentralization is likely to be more consultation, joint planning and some change in the routing of HMG's budget, which can be managed if project staff maintain good relations with District staff, and vice versa. If a district refuses to cooperate with the RD, by misusing the budget or forcing infeasible projects, then UNICEF will not be able to continue the programme in that District.

Budget

Together with manpower, HMG's budget is the main constraint on the expansion of the programme. The budgeting process is better now that there is more mutual consultation by the Ministry with Regional Directorates and UNICEF. The allocation of District Ceilings is a new development which, if done arbitrarily, will have an adverse effect on the programme. Regional Directorates must be consulted in the allocation of ceilings.

In districts to be decentralized, it may be necessary to divide the HMG budget between that portion which is to go to the district (for skilled labour) and that which is to go to the Regional Directorate (for material procurement, salaries etc).

Training

This continues to be a major function of the programme, now with less emphasis on new recruits and more on annual refresher training and courses for Village Maintenance and Sanitation Workers. One problem for training is the shortage of manpower for instructors.

Community Participation

The programme has developed considerable experience in community participation and, while it is never easy, it is no longer a major problem. However, there is still room for improvement.

Involvement of Women

There has been very little progress and this is an area that deserves a lot more attention. More effort should be made to involve Women Workers in the programme so that women villagers can become more involved in water supply, sanitation, personal and home hygiene.

Surveys

Because of the shortage of manpower, surveys are often conducted in a rush with inexperienced manpower, frequently resulting in technical and social problems of implementation. Generally 2 days are needed for a feasibility survey and 4 days for a detailed survey.

Technical

The design and construction of water system components (intakes, tanks, pipelines, tapstands) is of an encouragingly high standard, considering the problems of construction and supervision in rural Nepal. The programme has a good reputation among villagers for building the best water systems. The use of ferrocement for reservoir tanks is now widespread and successful. There could still be some more improvements to tapstand design.

Hydraulic Design

A major review is being undertaken of hydraulic design criteria. The trend in the Eastern Region is for more open or partially open systems (water flowing all the time at the tapstand) on the grounds that they are more reliable and that closed systems tend not to function as closed systems as taps are left open and float valves break. In the Western Region, by designing for 60 litres per head per day they ensure abundant water supply even if taps are left open. The extra cost is offset by the fact that transportation costs are much lower in the Western Region, so per capita costs are kept low. The purpose of the review is to give a range of options for design, with advantages and disadvantages of each, so that the designer can choose the best system for the particular case.

Maintenance

Although there has been some progress, the main pre-occupation has become to carry out repairs, whereas the policy is to set up a routine operation and maintenance system in the village. Maintenance Technicians should in general not do repair work - they should be concentrating on setting up and supporting the Maintenance Committees and Village Maintenance and Sanitation Workers. There is a need for a proper procedure for repair works, for which the request must come from the village, not the Maintenance Technicians. The Maintenance Programme is constrained by lack of supervisory manpower.

Sanitation

Progress is generally encouraging, but varies from Region to Region. In the Mid West it has been proved that it is possible to persuade large numbers of householders in a project area to build "pukka" latrines entirely at their own cost. The main factor in success is the amount of time and effort spent by the engineer, supervisors and Technicians in promoting sanitation. None of the other Regions are making enough effort in this direction, though there are individual cases which show signs of improvement.

School sanitation is not yet achieving the objective. There has been too much emphasis on the design and construction of the latrines at the expense of effort on health education and really involving the teachers and pupils. School latrine designs have become more elaborate and complicated and expensive than necessary - often there is more investment in the latrine than in the school building itself.

General Conclusion

This is one of the best rural development programmes in Nepal and highly popular at village and district levels. It is not so well regarded at Central Government level and so it suffers from lack of manpower and budget. As was pointed out recently by the Honorable Minister following His Majesty's visit to the Western Region, MPLD has much better results than

DWSS, but DWSS gets more manpower and a bigger budget. The manpower shortage makes the programme heavily dependent on UNICEF and SATA staff. The biggest threat to the programme is unplanned and arbitrary implementation of decentralization. However, if this process is carefully planned with full consultations with Regional Directorates, UNICEF and SATA, it is possible to decentralize the programme in a phased way.

The objective of improving child health is still quite far from being achieved, despite progress in sanitation. There is need for much more health education for sanitation and personal hygiene, which takes manpower, time and effort. Despite constraints there is encouraging progress in these areas.

1. MANPOWER

1.1. Engineers

Numbers

The number of HMG engineers that can be considered to be working full-time in the UNICEF-assisted CWSS programme is 8. Of these, only 2 are working full-time in Field Offices (Dandeldhura and Sanfe Bagar), the remainder being based at the Regional Directorates. The improvement noted last year in the number of HMG engineer counterparts at Field Offices has not been sustained. At the moment there are 10 UNICEF and 2 SATA engineers full-time in the programme, which means the continued heavy dependence of the programme on non-HMG staff. The situation has not improved significantly in the past five years, except in the Mid and Far West.

Almost all of the Local Development activities undertaken by MPLD are of a technical nature - in fact MPLD is a technical ministry. It is sometimes thought that, because most of the projects are relatively small-scale compared with other technical ministries, then there is no need for engineers. This is a dangerous fallacy, as would be seen if the UNICEF and SATA engineers all stopped working tomorrow! The technical weakness of MPLD at the engineer level is a major constraint, not only for the CWSS programme.

Lack of Attraction to MPLD

Yet there are vacancies for engineers in MPLD! There are many reasons why engineers are not attracted to MPLD. Compared to other technical departments there are less facilities for engineers, the work is generally more arduous, their work is often not recognized by the administrators who hold all executive posts, and there are virtually no career prospects compared to other technical departments. Five years ago an Assistant Engineer left LDD to join the Electricity Department and he is now an Acting First Class Officer, whereas his contemporaries in MPLD are still Third Class! The Technical Unit in MPLD Headquarters is very weak and virtually has no power or influence on the development of programmes implemented by MPLD.

It is recommended that MPLD conducts an internal review of the role of engineers with a view to bringing them more into the decision-making and management process, giving greater job satisfaction and creating a career structure that will encourage engineers to stay in the Ministry. In particular, the role of the Technical Unit in MPLD HQ should be changed from one of consultancy to one of in-line management.

Incentives

The issue of incentives often crops up when discussing this issue. In my opinion, donors should not provide financial incentives as this distorts the whole Government staffing structure, favouring certain activities at the expense of others. It is a selfish reaction by donors who want "their" projects properly staffed and do not care about other HMG programmes and activities which may be more important from a national perspective. However, it is clear that the present HMG salary structure, despite improvements, is woefully inadequate and is not sufficiently biased in favour of field workers and rural development. If HMG could come up with a decent salary structure with generous allowances for field work, I believe many donors would be willing to contribute towards the extra cost. For example donors may agree to a levy of, say, 5% of their aid contribution being used to support a more generous field allowance structure for all HMG staff.

Financial remuneration alone is not enough to encourage the high levels of performance and dedication required for rural development in Nepal. Even more important are job satisfaction and career prospects. These are more difficult issues to resolve, but one major factor in job satisfaction is responsibility. The present HMG system is so reluctant to delegate responsibility for fear of "something going wrong" that staff are not allowed to do anything on their own initiative. This results in the tendency only to do what one is told which is not exactly the best way of tackling the problems of rural development. Individually, there are of course notable exceptions, but their initiative tends to be stifled by the "system", which leads to frustration and job dissatisfaction.

1.2. Overseers

Numbers

The number of overseers working full-time in the CWSS programme is as follows:

<u>East</u>			<u>Central</u>			<u>West MidWest</u>			<u>FarWest</u>		
L'danda FO	Ilam FO	RD	C'kot FO	H'da FO	RD	RD	C'ri FO	FO	D'ra FO	Sanfe FO	RD
3	3	3	4	3	(2)	11	5		3	0	(2)

TOTAL: 35(+4)

At any one time the number is less than this because of study tours, special leave, examinations etc. The situation has not significantly improved (except in the Mid Western Region) despite continuous pressure from UNICEF and despite the provision by UNICEF and SATA of scholarships for one overseer from each Region to attend the degree course at the Institute of Engineering. The scholarships have actually reduced the number of overseers working in the programme, though their posts could be filled on a temporary basis.

Each RD has an establishment of 17 overseers, who have to be distributed between CWSS, Irrigation, Special Programme, Royal Command, Sanitation and Tubewells. The demand in CWSS is not only for project construction, but also for survey, design and estimate, maintenance, training and sanitation. Not surprisingly, because of the shortage of overseers, priority is given to construction at the expense of all other activities. For project construction an experienced overseer can handle about 3 projects, an inexperienced overseer 1 or 2, giving an average, say, of 2 projects per overseer. If manpower and budget were available, each RD should be able to undertake at least 20-25 new projects per year. Assuming 50 per cent carry overs from previous years, this would mean 30 projects under construction, requiring 15 overseers. If to this we add 5 overseers for survey, training, maintenance and sanitation duties, this means each RD (except Mid West, which is rather smaller) needs at least 20 overseers for the UNICEF-assisted CWSS gravity programme alone, quite apart from sanitation, tubewell and non-UNICEF assisted activities. Decentralization will not change this fundamental requirement for manpower. So clearly, the number of overseer posts available to the CWSS programme is a major constraint on the expansion of the programme. In fact, based on experience to date, it is unreasonable to expect the CWSS programme to be able to expand in the foreseeable future (five years?) - it is already operating beyond its capacity.

Vacancies

However, despite the desperate needs of the RD's, most of them actually have vacant overseer posts! This may occur either because the incumbents of the posts are on deputation or training, or because the posts were never filled (as in the Far West). This problem can be solved, at least on a temporary basis, by recruiting overseers locally if they can be found (as has been done in the East) or by recruiting sub-overseers in the overseer posts until overseers can be found.

Suboverseers

There has been no follow up yet of the suggestion to recruit sub-overseers from Technical Schools such as the one in Jumla. They should probably be recruited initially as Technicians but their higher qualification gives them the potential of becoming overseers after some years of experience.

It is worth noting that in the Western Region they have recruited two draftsmen in vacant overseer posts - a measure that other Regions might consider.

Performance

It should be stressed that, despite the overseer shortage, the programme is able to operate because there is a core of experienced and hard-working overseers who are loyal to the programme despite the fact that they get little reward or recognition.

1.3. Technicians

Numbers

HMG has at last recognized the importance of this category of staff by creating 252 posts in the current fiscal year. This is a major step forward. I have often said that the technicians are the backbone of the programme and this is no less true today. The number of Technicians in each Region is as follows:

<u>East</u>	<u>Central</u>	<u>West</u>	<u>Mid West</u>	<u>Far West</u>	<u>Total</u>
62	31	75-80	30	45	243-8

It is clear that even for the existing level of implmentation there is a need for more posts to be created. It is hoped that the quota may be increased next year. There is a need to establish an annual ceiling of posts for the Seventh Five Year Plan.

Status of Appointments

Despite the creation of the posts, there are still problems with the status of the existing Technicians. Most of the Technicians do not have SLC, so they are not eligible for Non-Gazetted Second Class posts except with special dispensation. So far MPLD has not managed to persuade the Public Service Commission that the great experience of the Technicians gives sufficient grounds for such a dispensation. This problem and the lack of clear directives from the Ministry has caused chaos and confusion in the RD's, with each Region giving a different type of contract to the Technicians. The Technicians themselves are confused and in some cases morale has suffered. Most Technicians could easily get a job as a suboverseer in a District Technical Office, where they would earn more money, but so far they prefer to stay in the CWSS programme out of loyalty and better job satisfaction. If the confusion is not resolved by next fiscal year, it is likely that many Technicians will leave the programme, which would be disastrous (what happens when you take pieces out of backbone?).

Conditions of Service

In UNICEF's opinion, the Technicians should receive their basic salary with appropriate increments for years of experience, plus remote area allowance for the District plus full TA for every trip plus full DA for every day spent away from the District Centre. They should also be employed 12 months of the year. In other words they should get exactly the same as other HMG staff of the same status. Then they will be earning the reasonable amount which they deserve as competent and experienced front-line workers.

HMG Share of Cost

Up to now, UNICEF has been paying the cost of Technicians salaries and allowances. From next year it is proposed that HMG should take over 25% of the cost each year, so that by 2045/46 fiscal year HMG will be paying 100% of the manpower costs. To balance the extra cost to HMG, UNICEF is willing to take over a similar amount of material procurement hitherto undertaken by HMG.

Sanitation Technicians

The Community Sanitation Worker category of staff was created by the Ministry on a trial basis at the suggestion of UNICEF. Experience suggests that they should not be a separate category, but should be considered as Technicians. Within the Technician category, most will be working on project construction, but some on Maintenance, Sanitation and any other activities that may be justified. It should be stressed, however, that at least one Technician works on Sanitation in water projects for every four projects under construction. Additional Technicians may be needed for special sanitation projects outside the CWSS programme.

1.4 Volunteers

Role

Despite complaints by volunteers of improper utilization, poor job satisfaction and lack of Government counterpart, the volunteer agencies continue to respond to MPLD's requests for more volunteers. Volunteers in the past have definitely made a very major contribution to the development of the programme. They can continue to contribute in certain areas and in certain special fields such as sanitation, maintenance, technical developments, training etc. However, HMG basically views volunteers as substitute overseers for project supervision. This role is only really justified in the Central and Far West Regions which are still relatively underdeveloped. There is no need for volunteers for project supervision in the East or Mid West Regions, which are now capable (as the Western Region has been for some years) of managing without volunteers.

Even in the Central and Far Western Regions, volunteers should only be used for project supervision in their first year (one project) and second year (two or three projects). In their third year they should be working on programme development activities such as maintenance, sanitation, training, or technical development. If there are more third year volunteers than can be employed properly in these two Regions, they could be posted to the East or Mid West for that year.

Coordination of Requirements

It is recommended that MPLD calls an annual meeting of volunteer agency staff to discuss volunteer requirements, and to work towards better utilization of volunteers.

Performance

Compared to previous years, there seem to be less complaints by RD staff about volunteers being absent from their posts or ignoring HMG rules and regulations. On the other hand there are still complaints by volunteers about being inadequately briefed at the Regional Directorate on arrival. RD's and UNICEF staff report better performance of Peace Corps volunteers now that more of them have technical backgrounds.

Training

One Japanese volunteer complained that they receive no training or orientation in CWSS like the other volunteers. Although volunteers tend to come at different times, it should often be possible for volunteers of different agencies to attend the same training course. To save duplication of effort, perhaps volunteer agencies could take it in turns to conduct such training/orientation courses, and each course could be open to volunteers of all agencies.

Qualifications of Volunteers

While there are exceptions, it is very unlikely that non-technical staff can contribute much to the programme. Even for technical volunteers practical experience is more useful than theoretical knowledge. There is scope for specialist volunteers in other appropriate fields such as health education, women's participation etc within the CWSS programme, which volunteer agencies might consider taking up with MPLD.

2. MANAGEMENT

2.1. Stores

Misuse of UNICEF Supplies

Despite instructions issued by MPLD to all RD's last year to keep UNICEF-supplied materials separate, the situation has not improved significantly in the Central and Far West Regions. UNICEF and non-UNICEF materials are kept mixed together and when, for example,

a Field Office asks for more supplies, the RD is likely to send non-UNICEF materials, even though UNICEF materials are in stock. Conversely, UNICEF materials are sometimes used for non-UNICEF projects, either by mistake or because HMG materials are out of stock.

It is essential that this situation is rectified over this monsoon period. I propose a) that all non-UNICEF materials be separated out from UNICEF stock and either returned to the RD or stored separately; b) that the separate stores book be amended to show only UNICEF-supplied stock; c) that the equivalent quantity of UNICEF-supplied materials be requested so as to re-establish the original stock; d) that separate colour forms be used for the paperwork relating to UNICEF-supplied materials and e) that those Regions which are not doing so should employ an extra storekeeper on contract basis just to look after UNICEF-supplied materials. UNICEF is willing to bear the cost of this storekeeper. UNICEF engineers should personally follow up with the Regional Directors and stores staff to ensure that a separate system is fully operational in RD stores and Field Offices before the start of the next construction season.

I saw numerous cases where non-UNICEF materials had been supplied to UNICEF-assisted projects - particularly HDP pipe, gate valves and stopcocks. Most stopcocks were leaking, being of inferior quality.

Cement

Cement is proving a problem. UNICEF is trying to ensure better reliability of cement supply by procuring about half locally and importing the other half. This policy seems justified because sometimes cement is plentiful locally and sometimes it is scarce. But the locally procured cement is turning out to be short-supplied by the supplier, so bags of 35-40 kg are supplied instead of 50 kg. If the purchaser insists on having the consignment weighed, the supplier refuses to supply, because there are plenty of other purchasers who are willing to buy cement when it is in short supply. There is no easy solution, but at least if UNICEF is involved in purchasing, the consignment should be weighed after receipt (or random bags weighed) and if there is any shortage a written report should be made. At least the supplier will then know that they are being watched. If possible, suppliers with a bad record should be avoided.

Apart from the supply problem, there are problems at project level when they run out of cement because the bags contained less than 50 kg. To avoid this, bags should be weighed at the field office so that the actual weight required is sent to the project site, not the number of bags.

2.2. Material Quality Feedback

Apart from heating plates (whose handles break), there have been no complaints of poor quality materials currently supplied by UNICEF. In particular, there are no complaints of problems with HDP pipe manufactured in Nepal. Some of the old Indian pipes are still giving trouble in the Western Region. We still have not succeeded in finding the best tap - in my opinion self-closing taps should no longer be supplied as invariably they break or are jammed open. It is better to supply good quality brass bibcocks and to teach the villagers that if taps are left running there will not be enough water for everyone. The latest consignment of brass bibcocks from Talbot (UK) seem to be very robust, though their disadvantage is that the water stream is not vertical. Talbot stopcocks are also reported to be functioning well - the first time there have been no complaints about stopcocks leaking or altering their setting under pressure.

2.3. Stores Availability

With the exception of the Central Region, there are no reports of serious delays to implementation due to lack of supplies, either UNICEF- or HMG-supplied. This must be quite a good record in Nepal! Basically, this is due to the maintenance of good stock-levels in stores and our practice of ordering well in advance to replenish stocks. UNICEF policy on local procurement has also been liberalized somewhat, enabling a bit more rapid action to meet miscellaneous requests that sometimes come in at short notice.

2.4. Cash

The programme still suffers from the slow disbursement of cash to the Regional Directorates. This applies both to UNICEF and HMG contributions. The problem is worst in the first few months of the fiscal year, when there is no money to pay technicians or for the various activities, such as maintenance, sanitation and training, that are usually conducted in this period. There is little that can be done apart from representation to the Ministry of Finance, or "borrowing" money from various sources such as District Panchayats or UNICEF.

2.5. Revised Estimates

When a project needs cash or materials beyond the original estimate, the different Regions have very different ways of responding, varying from the very rigid to the very flexible. In the Eastern Region, to obtain approval even for a small extra item can take weeks, plus quite a lot of paperwork. In the Western Region they have developed a Revised Estimate Form which certainly facilitates the bureaucratic requirements - other Regions could take up this idea. But even a form which has to be signed in advance by the RD can cause a lot of delays in the other Regions with Field Offices. Therefore it is recommended that RD's adopt the policy of delegating authority to the Field Office to issue materials to projects up to

a total value of 10% of the original material estimate, without prior consent of the RD. The form should still be submitted but should automatically be approved by the RD. In most cases, revised estimates for cash will still have to be approved by the RD in advance as Field Offices are not involved in cash disbursement.

To reduce the load on the Field Office engineer, it should be the duty of the Project Supervisor to prepare the revised estimate form. The engineer need only check and initial for the stores to be issued. The form then goes to the RD for his signature.

2.6. Project Requests

In some Regions Field Offices and RD's have obtained copies of the Seventh Five Year Plan for project districts, which indicate the projects to be requested for construction under the MPLD/UNICEF programme. While the list will undoubtedly change somewhat over the next five years, it will probably be reasonably adhered to for the first two or three years and it is likely that District Panchayat will be less able to change their plans in future as Decentralization goes ahead. Such a list will greatly facilitate forward planning and the conducting of surveys well in advance.

The system whereby Application Forms have to be completed by the District and forwarded to the RD should be continued, even as Decentralization is implemented.

2.7. Decentralization

HMG is planning to decentralize in the fourteen zonal headquarter districts in the next fiscal year. This will affect the programme in the following districts: Jhapa, Morang, Kaski, Rupandehi and Baglung, which fall only in the Eastern and Western Regions.

The degree of decentralization possible will obviously depend on the capacity of each district - particularly the technical strength of the DTO. My own guess is that LDO's and DTO's will be so overworked that they will be very happy for the RD's and Field Offices to continue to implement the programme - the main change will be more consultation and joint planning and the routing of HMG cash component for skilled labour and village portering through the District Panchayat.

If decentralization is to take place with minimum negative impact on our programme it is essential that RD and UNICEF staff develop good relations with LDO's and District Panchayat officials. The seminar held at Chaurjahari last year was very successful in informing the District officials of how the MPLD/UNICEF programme works and in engaging their constructive cooperation to make it work. From their point of view it is not a question of the Districts taking over the programme - it is more one of how can they help our programme, which is seen as one of the best programmes operating in the district. In fact, in Accham District in the Far West,

the LDO and District Chairman even suggested the District Panchayat budget for water projects should be made available to the RD so that more projects could be implemented by the RD/UNICEF programme, which has such a good reputation!

2.8. Use of Technical Staff in "Off" Season

Originally Technicians were employed just for the period of the construction season. In recent years, the trend has been to keep more and more Technicians employed in the off-season for special activities. With the new contracts under HMG terms and conditions, all Technicians should have 12 month contracts. This will permit a number of activities to be undertaken which are currently not being given enough emphasis. This includes:

- a) pre-feasibility surveys - most experienced technicians can judge whether a project is likely to be feasible or not, enabling those projects which are certainly infeasible to be deleted and allowing more time to be spent by the feasibility survey team on projects which are most likely to be feasible.
- b) maintenance and minor repair work
- c) sanitation - conducting sanitation campaigns, both in recently completed projects where sanitation was not very successful and in projects to be taken up in the new construction season.
- d) training and exchange visits
- e) communication campaigns - to prepare communities in projects to be taken up in the new construction season, including forming committees, getting village agreement form signed
- f) support to DTO projects or other local projects (eg: Seti Project, SFDP, PCRW, BSLD, IRD's etc).

2.9. Functioning of Field Offices

The smooth functioning of most of the Field Offices is still very heavily dependent on the UNICEF engineer. Even in those Field Offices where there is a counterpart HMG engineer, decisions are made or regulations enforced to the letter which are not in the interest of the programme. The HMG engineers tend to fill the role of "controllers" and "guardians of the rules" rather than as problem-solvers and leaders of their team. This may be because not enough authority is delegated to them by the RD's, so they are concerned only not to make "mistakes".

In Field Offices where there is no counterpart, particularly in the East where bureaucratic demands are high, the UNICEF engineers are too bogged down with routine administration and have little or no time for programme development and supervision. To some extent the workload could be reduced by more delegation of authority to the Subba.

3. BUDGET

3.1. Budget Process

The closer involvement of UNICEF Kathmandu in the budget preparation process has led to less budget problems than in previous years, particularly concerning UNICEF's cash component. With closer collaboration with the RD's it is possible to make budget cuts in a more rational way and to ensure that certain budget items are not neglected.

As the Ministry of Finance places a financial ceiling on the programme, it is important that budgets are kept as near as possible to what will actually be spent. The following measures can ensure this:

- 1) New projects which are expected to take more than one year should only be budgetted according to expected expenditure percentage in the year.
- 2) Carryover projects from the previous year for which the material cost (HMG and UNICEF) has already been reflected in the previous year's budget, should not have the material repeated in the new budget. It should be assumed that all material previously budgetted has already been delivered to site.
- 3) Projects for which a detailed estimate has already been prepared should include a 10% contingency for the cash component but not for the material component.

3.2. Transportation Costs

In the East, Mid West and Far West Regions, due allowance must be made for the fact that approximately 25-30% of project cost is for portering (except Terai foothill projects). So per capita costs in these regions will generally be higher than in the Central and Western Regions.

3.3. Decentralization

One of the main effects of decentralization is that, theoretically, project budgets should be sent direct from the Ministry of Finance to the District Treasury. In practice, that part of the budget that must be spent by the RD must go to the RD, including material procurement and transportation, and only the budget to be spent by the project committee itself, including skilled labour, portering, wood etc, should go to the District. For this reason, it will be necessary to separate the HMG budget into two portions, one for the RD and one for the District. The portion should be fixed by the RD at the time of budget preparation, otherwise it is likely to be decided by the Ministry without full knowledge of the requirement or, worse still, all the budget may go to the District.

3.4. District Ceilings

Under the Seventh Five Year Plan document each District has been allocated a ceiling which in many cases is ludicrously low. This might severely reduce the normal implementation of our programme. Furthermore, the programme is much more established in some districts than in others. For example, it is possible to do more projects in Accham than in Bajura, yet the ceiling for Accham is lower than for Bajura. It is recommended that Regional Directorates be consulted in the allocation of district ceilings. The present ceilings must be revised if the programme is not to be affected.

3.5. Maintenance and Sanitation

The cash components for maintenance and sanitation activities must continue to be sent to the RD's and it is quite beyond the capacity of the Districts to implement these activities properly.

4. TRAINING

4.1. Refresher Training

Many of the problems of construction quality and management at village level can be overcome by refresher training. All Regions conduct some form of refresher/upgrading training, but the effort varies considerably. In general, even more preparation is needed to make sure important topics are covered. During the season supervisors and engineers should note down topics that need to be revised during the refresher course. Many topics are minor points of detail which nevertheless can make the difference between a well-constructed project and an average quality project.

Refresher training still seems to contain rather too much teaching and not enough discussion. For example, it is better to get technicians to discuss the problems of, say, implementing sanitation than to tell them only what they have to do for sanitation. The latter will inevitably come out of a discussion of the former.

Supervisors also need refresher training. Normally they should be involved in the Technicians training, but there should be extra time allocated for issues affecting supervisors only.

4.2. Village Maintenance and Sanitation Workers Training

All Regions are now conducting such training and this should now be done on an annual basis. The course duration varies from one to four weeks. Ideally VMSW's should also be given refresher training both to improve knowledge and to encourage motivation. The example of the Community Health Leader programme may be followed whereby they get an initial training followed by shorter annual courses. Obviously such training will add to the workload, but it may be worth the effort in the long term.

An initial training of two weeks followed by an annual or bi-annual training of 3-4 days may be a reasonable answer.

4.3. Orientation/Refresher Training for Administrative Staff

There is clearly a need for new administrative staff to receive some kind of orientation training and in some Regions for staff to undergo refresher training. For example, a new subba may be appointed to a Field Office without any knowledge of HMG procedures or water supply materials. Just as there are annual refreshers for Technicians, it is recommended that RD's conduct annual refreshers particularly for storekeepers and subba's in Field Offices.

4.4. Exchange Visits

The experience of exchange visits between Regions conducted in the last two years shows that they can be useful but that more preparation is needed to improve their usefulness. They are certainly extremely popular with the participants and serve as an incentive and reward for better-performing staff. Rather than general sightseeing of projects there should be more discussion of procedures and methods.

5. COMMUNITY PARTICIPATION

5.1. Improved Performance

While community participation is rarely easy, there are very few reports of major problems compared with a few years ago. This is because of better supervision, more use of standard procedures, more experience among staff, better selection of projects and better understanding by the villagers of what is expected of them. Even in the Far West, particularly Mahakali Zone, where community participation was a problem, there seems to be a significant improvement this year. This may be because most of the old "headache" projects, which should never have been started, have now been finished and the new projects have been selected more carefully. Another reason for improved sramadan in the programme may be that over the last few years projects are less frequently delayed by a lack of materials, which is always a major factor in the supply of sramadan.

5.2. Need for Better Communications

Project implementation is sometimes delayed, and projects that could be completed in one year become carry overs, because of what is seen as a sramadan problem, but which may actually be a problem of the community's different sense of time. For the programme, it is most efficient to complete the project in one year. For the community, however, although they may be totally committed to the project, they do not necessarily share the same sense of urgency. They may prefer to take

two or three years so that they can give time to other activities as well. I do not think it is feasible for the programme to slow down to the different pace of each village, so we should try to explain to the villagers why the project must be completed in a certain time and include a clause in the Village Agreement Form to the effect that they will complete the project in so many months or years. In that way, their willingness to complete the project within a certain time becomes a condition for receiving the project in the first place.

5.3. Training of Project Staff

Project staff could do with more training in how to encourage community participation and, particularly, how to conduct themselves at meetings. The tendency is for the Supervisor or Technician to conduct the meeting, which results in less popular commitment to the outcome of the discussion. Project staff should guide discussion, raise issues, explain problems, but not dominate the meeting.

5.4. Workshops for Committee Members

The practice in the West and Eastern Regions of holding short "workshops" for committee chairmen and members at the RD or Field Office undoubtedly improves community participation, which is so much a factor of successful communication. It is recommended that other Regions follow the same practice. To inform communities still further, it would be very useful to prepare a short booklet which describes the process of constructing a water supply, and defines who is responsible for what.

5.5. Village Contract Labour System

The system of village contract digging (whereby the committee collects money from each household and gives the trench digging and pipelaying to a group of villagers) seems to be quite popular in the Mid and Far West, but is not practised in other Regions. It certainly ensures a good quality trench. In one project in the Far West, 80 households had each contributed Rs.100 for the digging and laying of 4 km of pipeline. There were 16 villagers in the contract. The average cost is Rs.2 per metre; each villager had to dig 250 metres.

5.6. Increasing Proportion of Village Contribution

As the programme completes the "easier" projects, systems are tending to become longer as sources become scarcer. This tends to increase the burden on community participation and we are already experiencing situations where projects are declared infeasible because the population is too small to be able to dig the pipeline. In special cases, it may be justified to put a maximum limit on the contribution expected from the community, and for HMG to pay the balance. For example, the limit

could be set at 100m per household and, if the system is longer, HMG would contribute cash for paid labour to dig the extra length at the local labour rate. In practice the paid portion should be from the source downwards. There are undoubtedly complications with this proposal. How can you explain to the other villages why one village is getting help towards trench digging when they are not? And the system would also be liable to abuse. Nevertheless some such proposal may have to be considered some time in the next few years.

6. INVOLVEMENT OF WOMEN

6.1. Little Progress

There has been very little progress in the involvement of women in the CWSS programme. The policy of having at least 2 women members on the construction committee is not being followed, and it is still very rare to see women at village meetings. Tapstand caretakers are hardly ever women, and I have not heard of a single female Village Maintenance and Sanitation Worker. Women are the main beneficiaries and are likely to be the main motivation behind sramadan, but generally they are not informed about the project or involved in discussions.

6.2. Proposals for Improvement

It is not easy to change this situation quickly, but certainly a lot more must be done. The names of the two women members of the committee should be specified in the Village Agreement Form' project staff should make special efforts to ensure that as many women as possible attend all public meetings during survey and construction periods; at least two women should also be represented on the Maintenance Committee.

6.3. Women Workers

In an effort to communicate more easily with women, Women Workers of the Women's Development Section of MPLD should become involved in the CWSS programme. Many districts now have Women's Development Officers (WDO's) and Women Workers. The best way is for coordination to take place at District Level. If WDO's were asked to provide the services of one or two Women Workers for new projects under construction, I am sure they would be willing to oblige. Obviously it would take time for the Women Workers to learn the special requirements of the CWSS projects, but this can be achieved by on-the-job experience with the assistance of Technicians and the Supervisor. Initially, one WW might be limited to support one or two projects. They would concentrate on getting the women actively involved in the implementation of the project, particularly in the decision-making process, and they would also promote sanitation, personal and home hygiene. The initiative should come from RD's and field engineers to contact WDO's in the Districts.

As far as the health benefits for children of water supply and sanitation is concerned, we cannot hope to have much impact unless women are more involved. This should be given a high priority over the next few years and will need continuous follow up.

7. SURVEYS

7.1. Problems of Manpower

Despite improvement, many of the technical and social problems that projects experience could have been avoided if more time and trouble had been taken at the time of survey. The fact is that surveys are still being done in a rush, with inadequate manpower. Often inexperienced overseers and volunteers have to do surveys, although we know that experience is essential, not only for the technical but also for the social aspects. Obviously the main problem is manpower, but we cannot wait for manpower to improve before improving surveys. One idea is to make more use of experienced Technicians (as is already being done) for pre-feasibility surveys. This reduces the workload for the survey teams by eliminating some of the obviously infeasible projects. Some Technicians can even do Abney level surveys. Technicians can also be used more for dry season flow measurements. It is usually not possible to conduct all feasibility surveys at the driest time of year, but it is essential that flows are measured at that time.

I saw one project where the system had been designed for 2.0 Lps, based on the safe yield assumed at the time of survey in December, whereas the flow in March had already dropped to 1.0 Lps and may well continue dropping to 0.5 Lps before the monsoon rains.

If surveys have to be conducted by inexperienced people, at least they should conduct one survey in company with more experienced staff to learn what to look out for. Several pipelines seen had excessive "ups and downs" because of bad route selection.

7.2. Time Required for Surveys

Apart from very small systems, most projects require at least two days for feasibility survey and at least four for detailed survey. Some time can be saved by combining the two, but on average for most projects at least a week is needed for the two surveys, plus travel time. If a Region starts 25 new projects a year, one survey team would have to work six months to do all the surveys required! Such facts are not always appreciated by planners and administrators! In fact, we do not have full-time survey teams and this extra workload has to be squeezed in on top of the other work of construction.

7.3. Population Estimates

One area where more care is needed is in the estimation of population. One project I visited had a design based on a population of 90 households, whereas during construction it turns out there are only 55 - similar problems were noted on some other projects. There is a natural tendency during survey for villagers to inflate the number of households in the hope they will get more taps or more water. So surveyors should insist on writing down the family name of each household as this is most likely to give a more reasonable figure. It may also be an idea to involve the panchayat sachib and the electoral register at the time of estimating population.

7.4. Marking Pipeline Route

The proper marking of pipeline during survey is very important if mistakes are to be avoided. The best way is to use paint. The inaccurate digging of pipelines is probably one reason why systems perform differently to design. On one project, several days of sramadan was wasted by the villagers digging the wrong line in the absence of the Technician.

8. TECHNICAL

8.1. General Observation

The designs and quality of construction of components of a water system have improved quite dramatically over the last five years, to the point where technical quality is no longer a major problem in the programme. This has been achieved by the consolidation and application of experience to improve the designs of system components and, particularly, by the increased numbers and experience of Technicians who provide on-site supervision of project construction. In all districts, the MPLD CWSS programme is undoubtedly regarded as the best water supply programme.

However, this does not mean that technical quality cannot be improved still further.

8.2. Intakes

In general, most intakes seen were of good quality. Spring intakes are usually better constructed than stream intakes, which can be quite difficult. There is often a dilemma for the designer as to whether to build a permanent structure in the stream bed, with the danger of all being lost if it is washed away, or to build a local kulo type of intake in full knowledge that it will break every monsoon, but will easily be repaired by the villagers, as they do for their irrigation kulos. Where it is very difficult to build a permanent structure such as in a loose stream bed, the kulo system (an open channel leading off to an intake box) has much to recommend it, but its life can be prolonged by careful placing of concrete.

Spillways

If the kulo system is used, more water must be taken off than required by the system, so that there is a permanent spillway over the offtake pipe in the intake box, otherwise all the leaves and debris tend to clog up the offtake strainer rapidly. If the pipe is laid directly in the stream through a small weir, there must also be a good spillway over the pipe so that maximum water velocity occurs over the strainer, reducing clogging. This is better than putting the strainer in dead water.

Air Problems

The design should be such that the offtake strainer in the intake box is always covered with water to avoid air ingress into the pipe. Many air problems in top sections of pipeline could be avoided if the pipe was kept covered. Aerators are usually expected to prevent air being sucked down the pipe, but in some cases where the initial gradient is steep they actually increase the chance of air entering the pipe, air being sucked through the aerator.

Strainers

The size of the holes of strainers can also present a dilemma. In one project I saw an intake in which a strainer with large holes was laid in the stream bed. The advantage was that it would hardly ever clog, but the disadvantage was that the intake box was rapidly filling up with stones. One solution is to make the strainer as long as possible so as to be able to drill as many holes as possible, so that the open area is much greater (3 or 4 times) than the open area of the pipe, thus reducing suction at the holes and prolonging the period before the holes get clogged.

Infiltration Gallery

In one project in the Far West I saw a very successful and well constructed infiltration gallery for a "spring" in which water was seeping out of the hillside over quite a large area. Collection trenches were dug, perforated 63mm HDP pipe was laid and covered with gravel and fines, the whole being covered again with impervious soil.

Time Required for Design

One of the main lessons learnt is that it takes a lot of time and thought to design the best intake layout for the situation. At one stream intake site we were three engineers, one overseer and two Technicians and yet we took over an hour of discussion before agreeing on the best possible layout. Normally such decisions are made in much less time with much less consideration and virtually no opportunity for discussion. Intakes are so important that the engineer and the supervisor should discuss on site and a reasonably detailed

sketch should be made. The Technician cannot be expected to remember every detail merely from a discussion - and details are important in an intake. Intakes also need specially close supervision during construction.

8.3. Tanks

Ferrocement

Ferrocement tanks seem to be universally successful in all Regions with so far no reported cases of failure. In the Far West experience among Technicians is still a bit limited but that will change over the next year or two. In the Western Region they place a plastic liner around the outside of the tank before backfilling, to minimize the danger of attack by acidic soils. They are also gaining good experience with bamboo cement, which is much cheaper than ferro. Bamboo cement is not used for designed components of new water systems, but is useful on minor repair projects where an extra or replacement tank is needed. Maximum tank size is about 4 m³. It has the advantage that it is much more suitable for local construction as there is less dependence on outside materials.

Ferrocement can also be used to repair leaking masonry tanks, either by patching or by plastering a complete shell inside the tank. Most of the old masonry tanks are leaking, sometimes seriously.

Manhole Covers

Manhole covers have improved now that all Regions use metal frames, but the method of fastening can still be improved. In most cases where bolts are cast into the tank, the nuts are lost and the threads become damaged; this is virtually impossible to repair. A better system is for the frame in the tank roof to have a plate metal lug standing up, which matches with a similar lug on the cover frame. Both lugs have a hole through which a bolt is passed horizontally. The bolt threads are unlikely to get damaged and if they are, or if the nut is lost, the bolt and nut can be replaced, or a makeshift repair can be effected using wire.

Washouts

Washouts in tanks only require an end plug. The practice of combining washout and overflow pipes requires a gate valve, so it is simpler and cheaper to keep them separate.

Sedimentation Tanks

Sedimentation tank designs seem too elaborate and complicated. In the East the design is of reinforced concrete, in the Central it is of stone masonry. To maximise sedimentation performance we have sacrificed

the construction, management and cost efficiency of sticking to ferrocement. Although rectangular tanks are best from a sedimentation point of view, perfectly adequate sedimentation can be achieved in a standard circular ferrocement tank with suitably modified pipework. Water should enter low in the tank either into a baffle box to minimize turbulence or through a perforated HDP inlet strainer to distribute the flow. The offtake could be a similar perforated strainer at top water level on the opposite side of the tank. A mean retention time of about 1 hour is probably sufficient in most cases.

When a stream source is quite close to the reservoir tank, then it is cheaper and easier to combine the functions of sedimentation and storage in one tank. For example, for a flow of 1 Lps an 8m³ tank with the outlet half way up would give about 1 hour's retention plus 4m³ storage.

8.4. Pipeline

Trench Digging

Trench digging has improved generally, but is still rather a weak point. There has been dramatic improvement where this point has been emphasized by supervisors - in other areas Technicians and Supervisors are allowing the pipe to be laid in trench that is too shallow. The deepest trenches seen were those that had been dug by the village contract labour system. The mistake is still being made of laying pipe "temporarily" before the trench is fully dug, and when water is reaching the village sramadan suddenly becomes a problem! Another mistake often seen is to allow work to progress on to the next stage before the previous stage is completed; for example, the reservoir may be under construction before the intake, pillars for gully crossings and other construction features are completed, or branch lines are being dug before the main line has been completed and backfilled. The approach that "we will finish off later" invariably leads to a poor quality job.

Washouts

Generally, not enough washouts are installed in pipelines between the intake and reservoir, especially in profiles where there are several low spots. This should be checked more thoroughly at the design stage. Washouts usually require a gatevalve. If an end plug is used, the force of water is usually too strong for it to be replaced, and it is necessary to close off the water at the source.

Air Valves

The performance of air valves is questionable. I have seen cases where there are air locks in pipelines with air valves. In profiles where there are likely to be priming problems it may be more reliable to install a gate valve on a tee, which has to be manually operated while the line is being filled.

GI Crossings

Gully crossings are a weak point in pipelines; often the weight of GI pipe is taken by the brass unions. GI pipe should extend at least one metre (more for larger sizes) into the bank either side. When surveyors are measuring GI crossings they should add at least two metres. Supporting pillars are generally required on each bank. These pillars are often neglected and perhaps should be included in the standard design folio. Suspended crossings on the other hand are being well constructed. The use of GI pipe for towers is a good idea, although in many cases such high towers are not needed.

HDP Pipe

There are some reports of difficulty with welding 16mm pipe, because of the small area. Otherwise there are no problems with HDP pipe except the "hangover" of poor quality Indian pipe supplied to the Western Region, which is still bursting under quite low pressure.

8.5. Tapstands

Design

I consider the best tapstand design is the one used in the Western Region. It has a large platform area, uses flagstones for the floor, the central pillar is of cement masonry, the rest is mud stone masonry with cement plaster. The drain is through a large sump under the tap, with a grid of reinforcing bar, and through HDP pipe under the floor. In the Eastern Region the latest design is said to consume 7 bags of cement, which is definitely excessive. The sump for the drain is too small, so that the water stream often does not enter the sump but erodes the floor instead. The floor is concrete, which is strong, but the use of large flat stones would be just as strong and cheaper. The pillar is concrete and the rest is cement masonry. It is certainly strong, but consumes too much cement. In the Mid and Far West, the drain runs from one side of the platform and a flat stone is placed under the tap to take the impact of the water. (Disused grind stones or pounding stones are excellent for placing under the tap). This is also a satisfactory arrangement but the sump system seems to be better.

Flag stones are not available everywhere, so perhaps there should be 2 standard designs for tap-stands - one with and one without flag stones.

Valve Boxes

GI valve boxes for stopcocks are now standard except in the Western Region, where stone masonry valve chambers with full size manhole covers are still being used. GI valve boxes are cheaper, quicker and easier to install and the stopcocks are less liable to be tampered with as a special key is needed to operate the valve.

9. HYDRAULIC DESIGN

9.1. General Impressions

The issue of hydraulic design procedures is currently under review. Some of my observations may be confirmed or denied by the review. Generally, hydraulic design is one of the weakest parts of the programme. It is undoubtedly quite difficult in Nepal and ultimately, the quality of each design depends on the experience and competence of the surveyor and the designer. The design review will not produce a single revised standard set of criteria, but will show the advantages and disadvantages of a few design options.

9.2. Open vs Closed Systems

One of the biggest issues is the dilemma between open and closed flow systems. In the past most systems were designed for closed flow, because 45 Lcd and high peak factors were taken as a rigid requirements and for most sources this requires a reservoir to store the night flow. In recent years there has been more use of open systems; in the Lamidanda Field Office only one of the eleven projects currently under construction is a closed system, and next year none of the new systems are closed. One of the main reasons behind the trend towards open systems is to improve reliability. Closed systems depend on the successful operation of taps and float valves. In Nepal, taps are usually left open and float valves are not completely reliable, so closed systems often become open anyway, by default. When that happens, the hydraulic profile changes and several taps may dry up completely, while others get more than their share.

Another factor affecting design is that we base the design on the minimum safe yield, which actually may only occur for 2 or 3 months of the year. Thus we design for the "worst case" situation to be able to supply water exactly when people want it at the driest time of the year. In actual fact this situation hardly ever happens, largely because we do not really know when people want to take water.

The use of the "timed open flow" system is becoming more common in the East. Instead of designing for the safe yield, an open system for the required supply is designed, but a reservoir is built for the dry months of the year when the yield will drop below the design flow. The reservoir tank is opened and closed manually morning and night so that the night flow is stored to augment the supply. For the rest of the year, it operates as an open system. This is a very attractive compromise between an open and a closed system, and has potentially quite wide application.

9.3. Alternative Criteria

One result of the Design Review may be that we will no longer use per capita consumption as the basic criteria, but other criteria may be more important, such as the number of persons per tapstand and the flow per tapstand. For example, we should be trying to improve water accessibility as well as quantity, which means more tapstands. We might adopt a criterion to design for an average of 1 tapstand per 75 people and a second criterion to provide an average of, say, 0.1 Lps per tapstand. On an average flow basis calculated over 12 hours this would still theoretically give an average of 58 Lcd. This would mean that 750 people could be served for every 1 Lps in the source. This seems a simplistic way of calculating, but really any system is so arbitrary and consumption surveys are so confusing, that one is just as likely to be correct by adopting a common sense approach of "what seems reasonable" than by trying to cater for conditions which we are not even sure exist.

9.4. Peak vs Average Flow

I would scrap the practice of designing for peak demand as an unnecessary complication and a luxury for village water systems - villagers can and do adjust their water collection pattern to the supply available. Of course health benefit is related to water quantity, but I believe a tap giving a continuous 0.1 Lps for every 75 people is sufficient quantity for personal hygiene and the missing link is not water shortage but health education. At the moment consumption surveys generally indicate much less than 45 Lcd, so we have quite a lot of health education to do before we find they really need more water!

9.5. Residual Heads

Several designs seen showed very high residual heads at tanks and taps, which is very unreliable as it depends on the correct setting and long-term functioning of a globe valve to "burn-off" the excess head. Often a smaller pipe size was feasible, especially the use of 16mm pipe. As from next year all Regions except the West will be using the full range of pipe sizes (except 75mm) which leads to much more efficient and cost-effective hydraulic design, and experience has

shown that the extra logistics burden is negligible, despite initial worries. But even with the full range, there will be occasions when high residual heads cannot be avoided. In these cases the use of orifices should be encouraged. So far the use of orifices has been limited but the feedback on their effectiveness is very positive.

9.6. Break Pressure Tanks

Generally there is a continuing excessive use of Break Pressure Tanks. Inexperienced designers tend to "automatically" insert a BPT when the maximum static pressure reaches the pressure rating of the pipe, but in fact pressures can be allowed to go over by 10-20% without any problem. In many cases this can reduce the number of BPT's required in a system by 50%. When a BPT is necessary the siting of it at a suitable point in the profile (a high spot or point of increase in gradient) is more important than its siting at the point of exact pressure difference. These points can easily be checked by the engineer at the design stage.

9.7. Distribution and Interruption Chambers

On the other hand, there could be more use made of distribution and interruption chambers. They can be the same design as a BPT, but their purpose is either to distribute flow evenly (which might be difficult using a tee) or to break up a long section of pipeline into more manageable units. The interruption chambers are particularly appropriate for long lengths of line with irregular profiles between source and reservoir. If the hydraulic profile touches or almost touches a high point in the profile, it is a good idea to put in an interruption chamber at that point.

9.8. Use of All Sources

One encouraging trend is the increased use of all available sources in a project area, to divide the supply up into a number of small systems whenever possible, thus facilitating management, community participation and reliability. This could be extended to the upgrading and protection of kuwa's and small spring sources currently in use, even if no piping is required.

9.9. Changes During Construction

Whenever changes are made to the design during construction, it is important that these are properly recorded. Sometimes one supervisor decides to make a change, but does not record it, or the reason for it, and then a new supervisor may take over the project and not even realize the change has been made. It may even be appropriate to develop a form for design changes - blank forms could be left with each project and the supervisor would have to make copies to distribute to those who need to know. Where a revised estimate is required, this could be incorporated in the same form.

10. MAINTENANCE

10.1. Maintenance, Not Repair

The agreed policy from the Pokhara Conference in 1982 states that the priority is to set up a maintenance system for recently completed projects, not to get bogged down in repair work. What seems to have happened in most Regions is that Maintenance and Sanitation Technicians (MST's) conducted surveys of completed projects and came up with a list of repairs needed on each project. From this list, estimates were made and the MST's are now supervising these repair activities. They tend to spend most of their time on repair work in a few projects, thus ignoring their duty to set up committees and maintenance workers and to visit them on a regular basis. The follow-up is most important.

We should delete the words "Maintenance Project" from our vocabulary. They are really "Repair Projects", which should be implemented by ordinary Technicians, not MST's.

10.2. Procedures for Repair Works

In many cases, repairs are being carried out with very little involvement of the Maintenance Committee or VMSW. In the Western Region they have the system that repair work must be requested by sending a copy of the appropriate minutes of the Maintenance Committee to the RD. This at least ensures that a Maintenance Committee exists and that the initiative for repair work comes from the villagers, not the MST.

Ultimately, the policy is for minor repair work to be the responsibility of the District Panchayat. While this is not likely to happen in the foreseeable future, I believe the procedure for Repair requests should involve the District Panchayat, in the same way as requests for new projects. Maintenance Committee should have to send a copy of their minutes requesting repair work to the District Panchayat, who should in turn forward it to the RD. The RD should send a Technician (who may or may not be an MST) to do a survey and prepare an estimate, which must be approved by the RD. Once approved, materials and cash can be released out of the Maintenance budget and a Technician sent to supervise the work. This is the sort of activity that can be done outside the main construction season or even within the season if the repair village is near a project under construction.

Larger Repair projects should require a Village Agreement Form to ensure the village contribution. In this way, the MST's function is limited to supporting the Maintenance Committee and the VMSW, helping to identify repair needs and making estimates when necessary. He should not carry out repair work himself.

10.3. Policy for Minimum Repairs

It is obviously unrealistic to repair every project to the original standard. The policy should be to carry out repairs to ensure at least a minimum level of service at reasonable cost. Each case must be considered on its merits and some sort of priority assigned. Obviously it is more important to repair a system where the main line has been cut by a landslide than to repair a branch line serving only one tap. There will probably be more requests than can be served.

10.4. Village Maintenance and Sanitation Workers

Some ideas to increase their motivation include:

- a) annual or bi-annual "refresher" courses
- b) maintaining records of names and addresses and sending periodic booklets, postcards, calendars, etc.
- c) using the pre-paid, pre-addressed postcard system for VMSW's to report problems to the RD or Field Office.

One example, where the VMSW's have been working well keeping the system going to the best of their ability without any support for the last five years, was seen in Deusa in the Eastern Region. Two VMSW's were paid approximately Rs.30 per month by collection of Rs.1 per month from each household - actually collected annually at a public meeting. This proves that VMSW's can work adequately for quite a small reward and it is important to ensure that contracts for new VMSW's are within the capacity of the villagers to pay. In their enthusiasm, some committees say they will pay Rs.300 per month; when they fail to collect it the VMSW is disappointed and neglects his work - whereas if they had agreed to Rs.30 per month in the first place he would probably have worked quite happily.

10.5. Maintenance Booklets

The Western Region has produced a much-needed maintenance booklet for Village Maintenance and Sanitation Workers, which is applicable to all other Regions. Although most VMSW's cannot read, there is usually someone on the Maintenance Committee who can.

10.6. Project Completion and Handover

In most cases projects are not being formally inspected on completion. There is a need for a more rigorous procedure to ensure projects are properly completed. The first stage should be for the Supervisor to complete a Project Completion Form, which should have a checklist of all components of the project. The project should not be declared officially complete until the engineer has inspected and countersigns the

completion form, which should be entered on the project file. The handover should take place after the inspection, and should include a handover form signed by the committee and the project engineer. This will probably take place in the year following construction.

10.7. Estimates for Repair Work

At the moment there is no uniform practice for issuing materials and cash to a repair project. In the East RD a special estimate has to be prepared at the Field Office and sent to the RD for approval, even for one item such as a gate valve. It is more efficient if each Field Office has an allocation out of the RD's maintenance budget so that materials and cash can be issued by the Field Office up to this limit, once the request has come from the committee through the District Panchayat.

10.8. Supervision of MST's

MST's are not getting enough supervision. This will always be a problem as long as we have a shortage of supervisors. One way of increasing supervision is for MST's to meet with the Field Office (or RD) engineer at least once every three months on a routine basis. It is obviously essential that at least one overseer be responsible for maintenance in each Region, but until that happens supervision will have to be provided by engineers.

11. SANITATION

11.1. General Impression

The sanitation component of the programme continues to show encouraging development. From admittedly superficial visits, I was most impressed by progress in the Mid West and Far West Regions. The progress seems directly related to the emphasis and push given by the engineer to Technicians to motivate them for sanitation promotion. I no longer believe excuses such as "the people are not ready for sanitation", "we have no time for sanitation", "we try but nobody listens to us", because I have seen what can be done if the Technicians try hard enough. From projects seen in the East and Central and Western Regions, Technicians are not being pushed hard enough and are being allowed to get away with excuses.

The school sanitation component is also still at an early stage of development and there is a lot to be done to improve its effectiveness. So far, the emphasis has been on technical construction - I believe it should move now to health education and encouraging utilization of school latrines.

11.2. Demonstration Latrines

Quality

In too many cases, Technicians are building very poor latrines (or no latrine at all). It is essential that the Technician's latrine is built - no excuses should be permitted. The latrine must also be the best quality that can be built out of local materials, and strong enough to last several years. The tendency is for some Technicians to build a "token" latrine that is only good for the few months that the Technician expects to be in the project. There must be a cover for the squatting slab, there must be stone footrests and there must be a reasonably sturdy superstructure. In the Mid West most demonstration latrines have stone masonry superstructures, and that is the type copied by the villagers. If properly constructed, even grass or bamboo superstructures can last several years, but they usually only last one year if a "temporary" job is made.

Cost

The issue of who should bear the cost of the demonstration latrine frequently arises. In the Western Region, a Technician gave as his excuse for not building a latrine that the villagers would not give "sramadan" to dig the pit. A good demonstration latrine is so essential that it should not rely on "sramadan". In some Regions, the labour costs are paid out of the project estimate, though it is not directly included in the estimate. In other Regions where a watchman is employed out of project funds, the watchman builds the demonstration latrine. The Technician should not have to pay out of his own pocket - on the other hand the cost of the latrine must be within the capacity of any householder. In most cases, a good demonstration latrine should cost no more than Rs.150-200 - and for a householder to copy it there should be virtually no financial cost, the cost being in the form of labour and locally gathered materials.

11.3. Household Latrines

Quality

The quality of household latrines built by the villagers is very closely related to the quality of the demonstration latrine. Experience in the Mid and Far West shows that the quality of latrines built is more important than quantity. In villages where numerous latrines were built of a "temporary" nature, most of the superstructures collapsed and fell into disuse within a year or two. As a result of this experience there is a strong trend towards building "pukka" latrines, with stone masonry/mud mortar superstructure and slate or properly thatched roof. In some cases the pits need to be lined. In the Mid West most household latrine being

built are now "pukka". We have generally assumed that the more work required to build a household latrine, the less willing the villagers would be to build one; but this does not seem to be true in the Mid West where in most cases the majority of householders build a latrine because genuine demand has been stimulated. I was particularly impressed to see some villagers building their latrine one year after the project was completed - nobody was pressing them, they were building them because most other people had already built one and they saw that it was a good idea.

Household latrines (all latrines) must have a cover for the hole - it is very noticeable the difference in fly population between latrines with covers and those without. This should be emphasized by the Technicians.

Progress

Progress is particularly encouraging in the Far West where, in most projects, at least a few household latrines are being built (compared with virtually none up to this year). One reason may be that the pressure is finally getting through to the Technicians. The latrines themselves are not of very good quality, but at least there is a start. Although we know that "kuchha" latrines do not last, it may be necessary for communities and Technicians to go through the learning process themselves - it should only take one or two years - rather than to insist on "pukka" latrines from the very beginning.

I was disappointed with progress of household sanitation in the Eastern Region, where the programme is more developed and one would expect the people to be more receptive. Although sanitation work is going on, it does not seem to have developed much beyond its initial stage. Undoubtedly there are some exceptions, but the general impression is that sanitation is not being pushed enough.

The Western Region has adopted a slightly different policy. Although Technicians are supposed to build a demonstration latrine of local materials, the main effort seems to be to concentrate on certain areas where there are, or have been water projects, and intensively promote latrine construction. A full-time Technician is assigned and he makes a ferrocement or concrete squatting slab for each householder. The cement and materials are free but the householder has to porter them from the roadhead. Though this policy can work on a limited scale, I doubt that it can be replicated on a wide scale even in the Western Region. The technology is not affordable by the majority of householders, and it is inconceivable that the government or donors can subsidise the cost on the scale necessary. It also is a technology dependent on outside support, whereas a latrine only using local materials is a policy of self-reliance. I saw very reasonable latrines in the West built of bamboo by retired Gurkha soldiers; stone is

available in many areas. I think an opportunity is being missed to promote a technology that can be universally applicable. Also, I think it is important that sanitation is integrated as far as possible into every water project as this has a far greater chance of success on a larger scale than treating sanitation as a separate activity. These observations are based on rather limited knowledge of the Western Region, but I believe here is a case where the experience of other Regions, particularly the Mid West, should be considered.

In the Central Region, progress is inevitably slow. Technicians are mostly inexperienced and the programme is grappling with many problems. Nevertheless there are encouraging reports from some projects of household latrines being constructed.

11.4. School Latrines

Progress and Problems

The purpose of building a school latrine is mainly to encourage the children to become habituated to using a latrine. Naturally, this also requires some education, which is why the school sanitation kit has been developed. In all Regions, we have succeeded in building good school latrines, but we are still a long way from success as far as sanitation is concerned. This is an understandable process - the construction of a latrine is the easy part and our programme is competent to do this, but in most cases, latrines are either not used at all (often they are locked) or they are used but never kept clean. Of course, it is much harder to ensure proper use, so this aspect tends to be neglected.

Design and Construction

On the technical side, I believe our school latrine designs are too complicated, too expensive, use too many imported materials and consume too much time and energy. Our designs certainly cannot be copied by any other school outside our programme. For example, the standard design in Far West requires 4 bags cement, 7 cu.ft. wood, 6 CGI sheets, 40 carpenter-days, 43 mason-days, 47 semi-skilled days plus 325 kg of transportation, making a total cost of Rs.9738. The cement and CGI sheets, including portering, represents over 50% of the total cost. In the Seti Education project, we see the other extreme - schools are given a grant of Rs.260 if they build a latrine, but the latrines are naturally of very poor quality and are often unsanitary. I believe the answer lies somewhere in between the two approaches. As far as possible, the design should rely on local materials. The roof should be of local material, not GI sheets; the slab should only be of concrete or ferro-cement if no other material is available. In many cases, large stones can be used to form the slab, or wood can be used to span the hole and stone paving set in mud mortar can be used to form an easily cleanable surface. If necessary,

a bit of cement mortar can be used to point the stone paving. The main factor is not so much the materials, but the skill and care that goes into construction. It is worth finding a skilled mason to do a really good job. One possibility is for the programme in each Region (or Field Office) to train and develop a team of "mistris" to specialize in school latrine construction, and send it from project to project building school latrines.

Technicians generally find it easier to build single pit latrines rather than the trench latrine. The trench latrine requires careful lining to prevent collapse and also concrete beams to support the slabs and superstructures. Single pits are more easily lined and do not need concrete beams. In the East and Central Regions, the trend is towards two or more single pit latrines (VIP), depending on student population. One latrine is allocated for the teachers. I think this is more practical than the trench latrine design. Vent pipes should be of bamboo or chimney type. Doors should be simpler - at the moment we go to quite a lot of expense to make pukka doors which are unnecessary and only make it easier for them to be locked. A blanking wall hiding the entrance may be cheaper where wood is expensive - or the Zimbabwe spiral design could be tried. Most of these ideas are not yet tried and will need some experimentation. I suggest each Region over the next season should try to develop a good quality school latrine design made entirely of local materials. Ideally the cost should be less than, say, Rs.1500. In practice, more than one standard design would be necessary, depending on the type of local materials available.

Latrines Without Superstructure

There has been no experimentation with the idea of building a school latrine without superstructure for younger kids, for whom a dark interior may be a deterrent. It certainly works in a school I have seen in the Kathmandu valley, and I think it is worth trying. Instead of a full superstructure there could be low wall, say 60-70 cm high. The cover for the hole is particularly important for such a latrine. Covers are a bit of a problem - they tend to get stolen, or are not used. Perhaps someone could experiment with a hinged cover that flaps down over the hole like a trap door. The hinge would have to be well away from the squatting hole, or it would get foul, and the cover could be opened and closed by a string and pulley arrangement or, more simply, by a handle that sticks out from the cover so hands do not have to touch the cover itself, which will inevitably become quite dirty.

Involvement of School

As important as the design is the way in which the school latrine gets to be built. At the moment there is generally quite little involvement of the school, either teachers or pupils, in deciding whether they want a latrine

and in helping to construct it. The latrine is seen as something provided by the project. Theoretically the Technician is supposed to use the sanitation kit to raise awareness of sanitation among teachers and pupils, leading to their own decision to build a latrine. In practice the Technician comes along and says "we've got to build a latrine, where do you want it?" In the Western Region, schools have to make written request for the latrine. I think this is a good idea - some sort of School Agreement Form may even be developed. The latrine construction should become a project implemented by the school, not a gift presented to them by the programme. Staff and pupils should give "sramadan". There should also be a written statement as to how the latrine will be kept clean. If there is no interest it is better not to build a latrine at all.

Time and Effort Required

One problem is that the full process of engaging the school and ensuring a process of health education takes quite a lot of time and effort. Normally the Technician is too busy to give enough effort, yet the latrine usually has to be built during the few months of the construction season. One solution may be to try to start the process much earlier, even at the time of the Detailed Survey. But more important is the need for special manpower to concentrate on the whole school sanitation process. This could be solved by appointing special Sanitation Technicians to work only on schools.

Importance of Success

I believe successful school sanitation is potentially the most effective way of promoting long term sanitary improvement in Nepal. Children are more easily convinced than adults, and within one generation one could expect a dramatic improvement in village and household sanitary conditions. So it is essential that we make the school sanitation component of our programme work.

11.5. Sanitation Promotion

Push by Supervisors and Engineers

Experience has proved that Technicians can be successful in promoting sanitation if they are given enough encouragement and push. This is particularly important at the early stages - once sanitation has "taken off" it acquires a momentum of its own, as is the case of the Mid West. Every time an engineer or supervisor visits a project he should make a point of inspecting the demonstration latrine, and any household latrines that have been built. Sanitation should be discussed at any meeting or discussions with villagers. The Technician should be made to feel that his performance is being judged just as much on the sanitation component as the water supply component of the project. Just as there is no excuse for a badly constructed tapstand, there should be no excuse for failing to get at least some householders to build latrines.

Special Campaigns

One idea for promoting sanitation is to conduct a special campaign either at the very beginning of the project or soon after it starts. In the East they are thinking of conducting the campaign before the construction season starts. In the Mid West they conduct the campaign soon after the project starts. The campaign approach is certainly a good one as it concentrates the minds of the villagers and the Technicians on sanitation. There has to be follow-up, of course, but hopefully during the campaign some sort of momentum is generated and at least a few people build latrines. In one project in the Central Region, several latrines were built because pipe materials were delayed and the Technician concentrated on sanitation.

Other Ideas

Other ideas for promoting sanitation include: having one committee member nominated to be "in charge" of sanitation; concentrating on a few key leaders who are most likely to be persuaded, rather than trying to spread the message equally to everyone; Technicians to reserve one day each week to work only on sanitation promotion; listing all households and marking off as each household completes each stage of construction - this generates some sort of competition between households and has been used successfully in the Mid West; more use of slide shows, film shows and other forms of public communications; preparation of a booklet for Technicians describing what they can do if people seem not to be interested in sanitation.

Slide Shows

On the subject of slide shows, the film strip format seems much easier to operate than mounted slides, especially with the new solar-powered projectors which do not have slide carousels. And experience shows that Technicians need some training not only in how to operate the equipment but also in how to conduct the show so that it is an effective means of communication. Often villagers are so fascinated merely by seeing pictures that they do not listen to the message at all. There is also a need for a spare battery for each projector.

Use of Flipcharts

The new sanitation flip charts are very popular but do not seem to be used very much by Technicians. Maybe the individual posters could be stuck up on walls of the village - at least that would be better than their being hidden in the Technician's "dera".

One suggestion for improving the flip chart is to put a template of a squatting hole and footrest positions on the back page. For school latrines, it would be better to prepare wooden forms for the hole shape and locating the footrests - the forms could go from project to project as school latrines are built. At the moment there is a wide variety of hole sizes and shapes and footrest positions.

11.6. Sanitation Technicians

Performance of CSW's

The experience with Community Sanitation Workers has not been good. Generally they are not well supervised and their training and background has been inadequate. On top of that their morale has suffered because of the difficulties over their status and pay. One effect tends to be that ordinary Technicians think that the CSW's are responsible for sanitation, so they do not have to do it themselves. This is a natural reaction, even if Technicians are officially told they still have to do sanitation work.

Need for Sanitation Technicians

The practice of having special manpower devoted full-time to sanitation must be continued - in fact much more manpower is needed - but I believe management will be easier if they are not considered a separate category of staff, but are considered as Technicians, just as we have Technicians working exclusively on maintenance. The best Sanitation Technicians will probably come from the ranks of our Technicians, but there may also be other people identified who can become Sanitation Technicians, though they may not be competent to build a water system. The main criteria should be that all Sanitation Technicians are competent both technically and as communicators. The old CSW's were generally not competent technically and so had little credibility either with other Technicians or with the villagers.

Division of Responsibility

To avoid the conflict of responsibility, which tends to result in each blaming the other for lack of progress, I suggest that Sanitation Technicians be used exclusively for school sanitation and for sanitation campaigns, while the ordinary Technicians remain responsible for household sanitation. This division will solve the problem of not enough time and effort being given to ensuring the success of the school sanitation components.

Supervision

To improve supervision, Sanitation Technicians should be specifically assigned to the Supervisor of the projects in which they are working - at the moment they operate more or less on a free-lance basis directly out of the Field Office and nobody knows exactly where they should be assigned for fixed periods to each. They should also prepare a work programme which must be approved by the Supervisor.

11.7. Other Sanitation Activities

All Regions have some form of sanitation activity outside the CWSS programme - usually for school latrine construction. At first this seemed a good thing, indicating a growing demand for sanitation. However, I believe that these activities are being carried out at the expense of the regular sanitation in the CWSS programme. Usually they are not well supervised (except in Western Region). I think the first priority must be to get the sanitation component of the CWSS programme working, particularly the school sanitation, and only after that has been achieved should we develop other activities. One problem is that once a provision for sanitation is put in the budget, it becomes a "target" to be achieved at all costs, so time and energy are diverted to building so many school latrines out of the sanitation budget, while the school latrines in the CWSS programme are neglected because the budget is included in the water project estimate and is therefore not seen as a "target".

Now that these activities have started it is obviously very difficult to stop them, but I definitely feel that they should not be expanded.

12. MISCELLANEOUS

12.1. Vegetable Seeds

There has been no real progress in the distribution of vegetable seeds through the programme. This is mainly because the issue is being neglected both in Kathmandu and in the field. Seeds are sent out periodically, but we never get requests for more, so we are not sure if they are being distributed or not. Field visits show that some Technicians get seeds whereas others do not. This is quite a simple issue that just needs a few man-hours to sort out a system. Perhaps a job for a retiring volunteer?

12.2. Smokeless Chulos

The Western Region is engaged in active promotion and distribution of smokeless chulos through the CWSS programme. The relative ease of distribution from a Central supply point makes it easier in the West compared with other Regions, but nevertheless there should be scope for local manufacture in at least some areas of other Regions. In the West they employ some Technicians exclusively for chulo propagation. The chulos are transported to a roadhead/supply point where villagers can collect them free of charge. If the chulos are portered by the project to the village they are sold for Rs.40. Each project gets an allocation of 10 chulos which the project Technician has to try and "sell". The Technicians also help the householder with installation.

12.3. Forestry

There has been very little follow up of the initiative last year to link up with the Community Forestry Project to try to protect sources. This could be implemented quite easily by consulting the District Forestry Officer with a list of new projects for next year and noting the projects which coincide with CFDP areas. Those project committees should then be obliged to apply for the services of the CFDP by letter on a form, and the project supervisor should then follow-up the request with the DFO. The Village Agreement Form could also be amended to require the committee to submit the request to the DFO before the form is signed.

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