UNICEF NEPAL

INTER-OFFICE MEMORANDUM

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Date: 18 March 1985

From: For Colin Glennie, UNICEF, Kathmandu

File No. NEP/H.31.52

Subject: Measuring the Impact of Drinking Water and Sanitation Programmes in Rural Nepal

I have pleasure in attaching a paper written by Mr Mark Hofferbert, a former Peace Corps Volunteer who worked in the Community Water Supply and Sanitation Programme of the Ministry of Panchayat and Local Development, which is assisted by UNICEF. Mr Hofferbert conducted this research voluntarily and on his own initiative and I believe he has made a significant contribution to our understanding of the impact of water supply and sanitation in rural areas. The fact is that we really have very little understanding of the real impact; so far we have been content with the general understanding that water and sanitation are "good", that water supply projects are highly popular, that generally they save time in water collection and hopefully they improve health. While there is no reason to doubt these general assumptions, it is important to try and find out how much time saving and health improvement we are achieving in order for us gradually to improve the effectiveness of our programmes.

As far as I know, Mr Hofferbert's research is the first attempt in Nepal actually to quantify impact. While I do not agree with all of his deductions and, on his own admission, the quality of some of the information is suspect, I nevertheless feel that there is valuable data here and his interpretation of the data gives us all plenty to talk about - which can only be a good thing. In particular, I believe his report shows the need for a lot more research into this subject.

UNICEF has typed and is distributing this report at the request of the author who has left the country. I welcome any comments, criticisms and suggestions for further research.

CG/kkr

MEASURING THE IMPACT

OF

DRINKING WATER AND SANITATION PROGRAMS

IN

RURAL NEPAL

Submitted by:

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December 1, 1984

SUMMARY/ABSTRACT

The MPLD/UNICEF water supply program regularly analyses itself in terms of technical, economic and manpower efficiency. The end results of the program and its impact on health and living standards is, however, rarely researched. Quantitative social impact data is required to make any broad-based policy decisions which are intended to have an effect on the program's final goals.

An experimental social impact survey was conducted in Surkhet and Dailekh districts in the end of September 1984. It utilized a household survey methodology aimed at program recipients coupled with a control group. Other methodologies which were considered, and still potentially viable for future data collection, were the Before-After survey, the Case Study and Time Trend Studies.

The household survey had faults which included the inability to gather data on sensitive or embarrasing topics (e.g. personal hygiene), and occasionally responses were biased due to the interview situation. The household survey did, however, collect some program impact information such as:

Water systems save 1½-2 man/hours of labor per household per day, the beneficiaries usually being young unmarried women. This freed labor, however, has had minimal or no impact on a household's daily work load or productivity.

The majority of program recipients feel that the main benefit of a water system is simply convenience and water quality. The quantity of water used in the home is not dependent on the proximity of the water source.

Children aged 1 to 2 are consistently cited as those most prone to diarrhoeal disorders (dysentery). While water systems have, statistically, minimal impact on child mortality, there is some indication that they tend to reduce the incidence of dysentery. Child mortality rates and the incidence of dysentery are, however, more dependent on the water source type than whether a water system is in use or not.

The program has had a tangible, though minor, effect on the local awareness of a need for sanitation, education and health, women having shown a greater change in attitude than men.

INTRODUCTION

Drinking water systems are very often the first large-scale development project to enter a village. They therefore have a strong potential impact on socio-economic development as well as health, sanitation and the realization of other basic needs. In Nepal, as in many third world areas, the need is there. Fortunately, to limited degrees financing, technology, manpower and the motivation is also there. But how can these development efforts be put to their most efficient, effective use?

Within the MPLD/UNICEF program are mechanisms for constant, yearly structural and economic evaluation and modification. But what of health, social and developmental evaluations and assessments? Is the program actually headed towards or reaching its final goals?

All personnel involved in water supply and sanitation realize the complexities of manpower, money and time. They must, however, occasionally step back and look at what they are actually doing and what the program is actually accomplishing.

For this, broad yet quantitative information beyond the usual structural and economic assessments is needed.

The purpose of this survey was to begin to:

1) assess the effect of the water system program on village water use and health

2) assess the effect of the program on village attitude and actions

3) identify those program recipients who have benefited the most and

4) to conduct an experiment in the collection of quantitative data relevant to future program policy decisions.

METHODOLOGY

Within a limited time, "Time Trend" and "Case" studies became impractical. In order to gather information across a single time frame a Household Survey questionnaire involving some "Before and After" questions was designed. As the data was potentially too "soft" (non-specific or biased) a Control Group of program non-participants was selected.

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In each of two districts, six panchayats with previously completed water systems and three panchayats without, were selected. Criteria for selection for the six was that the water systems should be as old as possible and have at least two taps which have been providing water continuously throughout the system's history. Selection criteria for the control group of three was simply that they had requested a water system, had been visited by competent technical persons (MPLD, UNICEF, DTO) and had been termed infeasible on purely technical or budget grounds. The selection of the two groups ("program recipients" and "control group") provided a comparison between villages with a genuine, recognized water need but who did not receive a system, and villages who previously had identical needs but did receive a system.

In each of the 18 panchayats, 10 or 12 houses were randomly (within the above stated criteria) selected (5 or 6 per each of two wards) and interviewed. The person most responsible for water collection was to be interviewed if possible.

The MST (Maintenance and Sanitation Technician) of each district was provided with the questionnaires and response sheets (Appendices A,B,C) and visited, by foot, his nine listed panchayats (102 homes) over the next two weeks. The MSTs were not compelled to read the questionnaire aloud but rather encouraged to roughly memorize the questions and gather the information through less formal conversation. The information they gathered was reviewed and analysed by the Maintenance Coordinator and compiled in this report.

WEAKNESSES OF THE HOUSEHOLD SURVEY

During the post-survey discussions and analysis, the strengths and weaknesses of a household survey methodology in this context became apparent. First, the responses to questions concerning personal hygiene (Q #7 app. A, #6 app. B) were, in the opinions of the interviewers (MSTs), totally unreliable. When asked "(Now that you have a water system) how often do you bathe?" answers consistently ranged from once per day to once per week when this obviously was not the case. Responses to questions concerning the bathing of children and home sanitation (Q #8, 9 app. A, #7, 8 app. B) were equally unreliable and it is unlikely that this information is available through a retrospective interview survey.

Problems stemming from the survey design and interview situation also arose. When asked "What do you use soap for?" (Q #10 app. A, #9 app. B) the unanimous response was bathing and washing clothes even if there was no soap actually used by the respondent. The more appropriate question would have been "How much soap (or its equivalent) do you use?".

A question aimed at determining the current perceived needs of people (Q #23 app. A, #19 app. B) so that a comparison could be made between program recipients and the control group, also failed. Instead of revealing any change in goals and attitudes based on sanitation and/or developmental experience, most responses included "my personal tapstand", "I don't know", "everything" and "What do you have available?".

Information concerning the effect of pit latrine construction is also unavailable at this time because of, simply, the lack of latrines. Data collected from the one project with a relatively great number of latrines, Kharigaira (Dailekh), would not provide a broad enough sample to base any generalizations.

Finally, a drinking water system in itself cannot be expected to have a major developmental impact in people's lives. It must be viewed in an integrated manner, in a wider context, in relation to other development projects and local-specific factors.

Despite the limitations imposed by time and minimal manpower, this report includes data and local-specific information which is of quality and reliability suitable for comparisons with other areas and similar situations.

ANALYSIS OF SURVEY RESULTS

1) SURVEY RESPONDENTS:

The average age of the respondents was 36.8 years (range 16-70) and they were 60% male, 40% female. The surveyors made an effort to interview the person (generally female) in each household who was most responsible for daily water collection, but as this person was often not at home or her male relatives were, a majority of respondents were male.

- SURVEY AREA -

	Panchayat	Wards	Households
Surkhet Program Recipiants.	Lekhpharsa	6,9	6,6
	Neta	1,4	6,6
	Ghumkhahare	7,8	6,6
	Malarani	7,9*	6,0*
	Dashrathpur	8	12
	Sata Khani	5	12
Control Group	Agri Gaun	4	10
	Share	4,5	9,1
	Main Tada	2,3	5,5

*Malarani Ward #9 responses eliminated because of faulty respondent selection.

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	Panchayat	Wards	Households	
Dailekh Program recipients	Dullu	5	12	
	Mehaltoli	4,8	6,6	
	Piladi	6,7	6,6	Total Respondents 198 (Program Recipients Total 138
	Kharigaira	6	12	
	Toli	1,3	6,6	
	Chhagung	-	12	
Control Group	Katti	4	10	
	Khursani Bari	1	10	
	Awal Parajul	8,9	5,5	Control Group Total 60)

Nearly all respondents were of low economic and educational status. The caste break-down, probably representative of the area as a whole, was:

Brahman	19.7%	Kaami	16.7%
Thakuri	14.2%	Damai	2.5%
Chetri	16.2%	Sunar	4.5%
Gurung	3.0%	Sarki	3.5%
Magar	19.7%		

2) MAN/HOURS SAVED PER HOUSEHOLD PER DAY WITH WATER SYSTEM: (Q #2,3,11 app. A) ("Before" time - "After" time X # of gaagros)

Surkhet District: Avg. 2 man/hrs. (118.7 min.)
Dailekh District: Avg. 1 1/2 man/hrs. (85.6 min.)

These results are given statistical validity (verification of potentially inaccurate retrospective "Before" responses) by comparison with the control group's response to Question #1 appendix B. Program recipients retrospectively claimed an average 39.9 minute walk per gaagro of water while the control group currently claims a comparable 38.3 minute walk per gaagro.

3) TIME SAVED BY WHO?: (Q #4. app. A)

87.7% of all program recipient respondents said that the 1 1/2 - 2 man/hrs. of labor are saved by women. The remaining 12.3% claimed time savings by both sexes. Half the respondents (mostly in Dailekh) answered more specifically in terms of Daughter, Daughter-in-Law, Sister, Mother, Self or Wife. Within the household, the sister and the daughter are essentially the same person(s) depending on who is being interviewed. Likewise, the wife and daughter-in-law are the same. In all cases Self is also the mother. Regrouping the data under these three categories and by comparison with the control group's response to a similar question (Q #2 app. B) the difference between pre-perceived and actual program beneficiaries can be seen:

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	PR	CG
Daughter	66.7%	36.7%
Wife	20.8%	30.0%
Mother	12.4%	33.3%

Even though all women are expected to equally benefit from a new system, it is young unmarried women who generally do.

4) USE OF SAVED LABOR TIME: (Q #5 app. A)

Farming	41.1%
Other Farm/Home Labours	26.3%
Rest/Relaxation	12.7%
Education	9.4%
Home Sanitation	7.8%
Sewing	1.3%
Business	0.7%
Fishing	0.7%

The approximately $1^1/2$ - 2 man/hrs. saved (per house per day) by the construction of a water system is easily absorbed by traditional farm and home labors. Only one respondent claimed the ability to now open a new tea shop, though this may be more likely due to the proximity of a tapstand. 7.8%, however, claimed they now spent more time cleaning the home, 12.7% claimed free time to relax and 9.4% (avg. age 32) are now able to attend government sponsored night literacy classes (Praud Siksha) when available.

The remaining 69.4% simply spent more time on their usual farm/home work (including sewing by Damais and fishing by Magars). As it is unknown whether that much extra labor in the fields produces a greater yield, it seems that over half of the program recipients have not benefited from increased personal productivity or development though the capacity to do so may now be there.

5) WATER USED PER PERSON IN THE HOME VS. TIME TO BRING ONE GAAGRO OF WATER TO HOME:

(Q #G,2,3,11 app. A, #G,1,10 app. B) $\left(\frac{\text{No. Gaagros used X 20 Ltrs}}{\text{household size}}\right.$

	0-10	11-30	31-59	60+	Min.
Surkhet Program Recipients	11.3	7.6	-	-	lit.
Control Group	12.9	-	16.0	8.5	lit.
Dailekh Program Recipients	10.0	9.7	-	-	lit.
Control Group	12.5	9.8	9.4	12.7	lit.

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The proximity of the water source or tap is not a factor in determining the quantities of water used in and around the house. People haul about the same amount of water whether their traditional source was one hour away or their tapstand is only ten minutes. If a tap/source is closer, however, it is likely to be visited by more people including children. But, as stated earlier, this report is not able to include data on (changes in) bathing and washing practices*.

Responses to Question 13, appendix A, reveal that 28.4% of all program recipients occasionally utilize water for small-scale irrigation. The usual crop is onions which are peelable rather than potatoes or radishes which are said to become fouled by the dirty tapstand drain water. 14.2% maintain they are better able to keep livestock.

Obvious benefits come when the tapstand flow is greater than an inadequate (usually "kuwa" type) traditional source which did not even provide enough water for bathing or washing one or two articles of clothing.

6) PERCEIVED BENEFITS OF A WATER SYSTEM: (Q. #22 app. A)

Program recipients claimed that the major benefits of their system was:

Convenience	35.7%
Cleanliness of Drinking Water	27.2
Household Sanitation	8.0
Improved Health	3.3
Irrigation	0.7
Don't Know	25.1

Some respondents gave multiple answers.

Only 3.3% of respondents claimed better health as a major benefit. As it is desirable to bolster a greater awareness towards sanitation and health, the program must adopt different, on the site, education and implementation techniques.

The large (25.1%) Don't Know response is due to the interviewer's inability in some cases to get more detailed information. For example, 6 respondents who answered "don't know" are actually walking farther to get tapstand water than they would to the traditional kuwas.

7) EFFECT OF WATER SYSTEMS ON THE INCIDENCE OF DYSENTERY:

The word "dysentery" is used in this report to mean all diseases and parasites which cause acute diarrhoeal disorders.

*Please see data from the tapstand water use survey conducted by the Chaurjahari field office earlier this year.

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In response to Question #17, appendix A, program recipients claimed that the incidence of dysentery after completion of the water system (as compared to before) was:

More	4.3%
Less	66.7
Same	23.9
Don't Know	5.1

As a full two thirds of the respondents claimed to be less affected, a bias due to the interview situation could be suspected. A comparison, therefore, must be made to the control group's response to a similar question (Q #15, app. A, #14 app. B): Average Incidence of Dysentery per Respondent per Year:

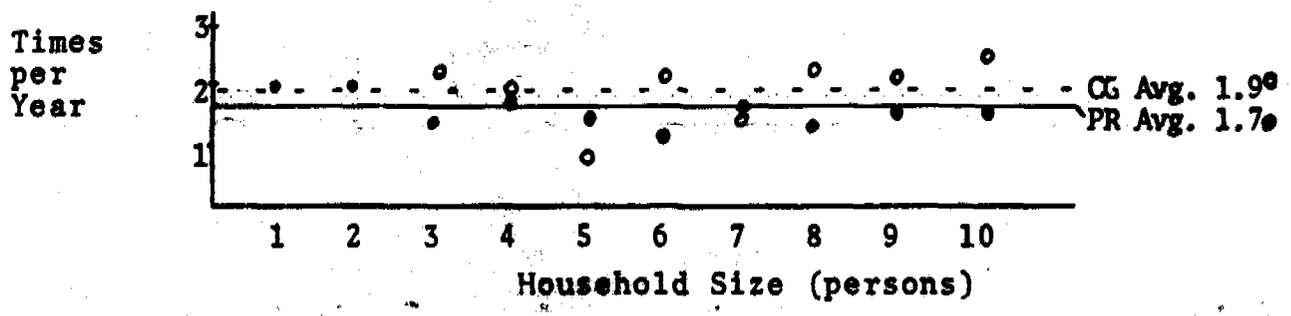
	PR	CG
Surkhet District	2.0	2.2
Dailekh District	1.2	1.4
Total	1.7	1.9

Persons using drinking water systems do seem, statistically, to be slightly less affected by dysentery than those without. A greater factor, however, is source type:

	CG				PR	
Type of Source	Stream	Spring	Bheri river	Kuwa	Stream catchment	Spring catchment
Incidence of Dysentery	insuff. data	1.6	2.6	2.3	2.4	1.5

Though there is little difference between those with systems and those without, the health benefits of a spring catchment over a stream catchment are obvious. Those persons who drink from water systems with a stream catchment are affected with dysentery nearly twice as often as those persons who drink from water systems with a spring catchment. Control group respondents who drink from spring sources are similarly less than those who do not.

8) INCIDENCE OF DYSENTERY VS. HOUSEHOLD SIZE.



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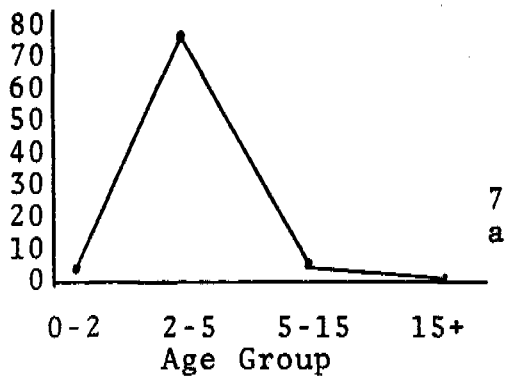
There appears no correlation between household size (as might affect household sanitation practices) and the incidence of dysentery.

The average household size in Surkhet and Dailekh districts is 7.0 members.

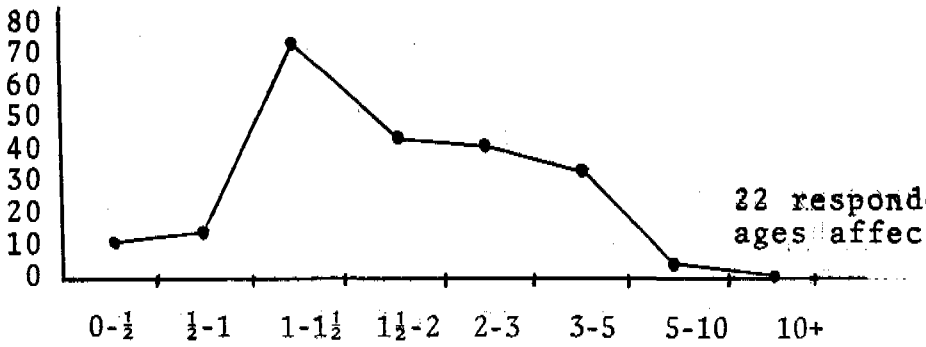
9) INCIDENCE OF DYSENTERY VS. AGE:

The survey response sheets (appendix C) were set up to categorize into standardized age brackets answers to the question "Who is most affected by dysentery?" (Q #16 app. A, #15 app. B). The results from Surkhet district are presented in the following graph as simply the number of respondents who picked that particular age group as the most susceptible to diarrhoeal disorders.



7 respondents said all ages affected equally.

Because of the diversity of responses encountered and the prevalent practice of withholding water from infants until their first birthday, the Dailekh surveyor felt the data could be better represented by half-year age groupings. The data from Dailekh when displayed graphically states the number of respondents who included that, among other age groupings, in their answer.



22 respondents said all ages affected equally.

The fact that 1 to 5 year old children are consistently noted for their susceptibility to diarrhoeal disorders comes as no surprise to persons involved in health development. This data simply quantifies the current situation in these two districts. Likewise, when asked (Q #14 app A, #13 app B) which seasons they (the respondents) were most affected, the months of Chaitra/Baisakh (April) were consistently mentioned, followed by Saun/Bhado (August) and occasionally Jesth/Asar (June).

10) HOW TO CONTROL DYSENTERY? (Q #19 app A, #16 app B)

	PR		CG	
Sex:	M	F	M	F
Don't know	55%	40%	62%	25%
Household Sanitation	14	16	15	8
Pit Latrine	13	12	0	0
Medication	6	12	15	63
Diet	8	11	8	4
Education	3	2	0	0
God	0	7	0	0
Dhami Jhankri	1	0	0	0

Double responses are also included here.

This data should prove helpful in assessing the water supply program's impact on local health and sanitation attitudes.

Only program recipients mention pit latrines and education as a means of controlling dysentery. Program recipients are also much less likely to mention medication than the control group. Female program recipients are more likely to mention household sanitation and diet than males and females in general seem to display a greater change in attitudes.

As most of the "pit latrine" and "education" respondents seem confident in their answers, it is unlikely that many of the "don't know" respondents would have mentioned those in a more concrete answer.

Finally, it is unclear why program recipients would claim religious (God, Dhami Jhankri) methods while the control group did not.

11) CHILD MORTALITY; PROGRAM RECIPIENTS vs CONTROL GROUP

Because of the practice of withholding water from infants until their first birthday and the subsequent increase in diarrhoeal disorders, rural drinking water systems can have a direct impact on a village's child mortality rate.

The following figures represent the average child mortality rate experienced over the respondent's reproductive years to date. (no. alive/total no. born) (Q #20, 21 app. A, # 17,18 app. B).

Surkhet Program Recipients	27.3%	Child Mortality
Control Group	28.0	
Dailekh Program Recipients	17.9	
Control Group	18.9	

As the average number of births-to-date per respondent is 5.5 (implying an average reproductive span of several years) new water systems cannot be expected to have much statistical effect on the child mortality figures. The data from older systems is, however, statistically more valid as they were in use during a greater number of the respondent's reproductive years.

	New Systems (0-2 years)	Old Systems (2-6 years)	Control Group (no system)
Surkhet	25.9%	28.3%	28.0%
Dailekh	12.8%	22.1%	18.9%

Villagers who drink from water systems which are over two years of age have as much or more child mortality as those without water systems. This and the minimal impact of the program as a whole, is most likely due to a lack of maintenance, contaminated tanks, and the insufficient change in local attitudes towards sanitation and health.

12) CHILD MORTALITY VS. SOURCE TYPE:

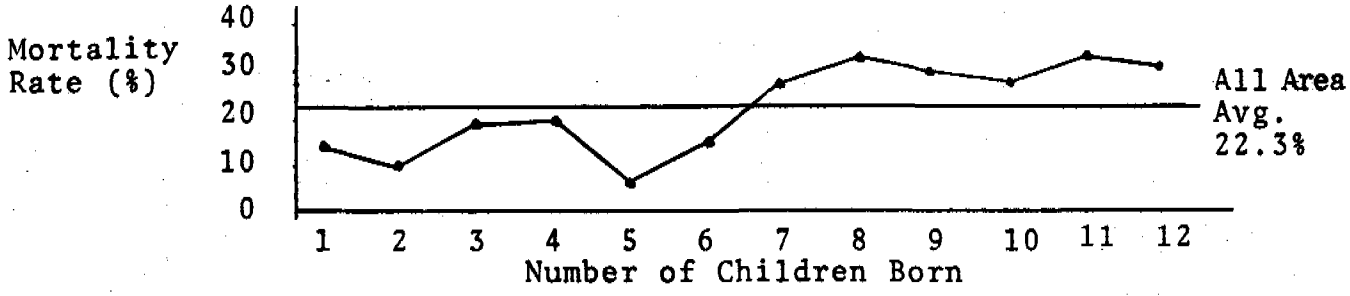
	CG				PR	
Type of Source	stream	spring	river	kuwa	stream catchment	spring catchment
Child Mortality	35%*	18%	28%	30%	26.5%	19.1%

The benefits of spring sources are obvious. The program recipient results, however, are statistically somewhat deceiving because most of the stream-source systems are in Surkhet (with a naturally higher mortality rate) while most of the spring source systems are in Dailekh. Nevertheless, as with the Dysentery vs. Source Type analysis, it is clear that it is not whether a village has a water system, but what type of water source is used that determines the health of that village.

*The CG stream source mortality figure is an average of only 3 responses.

13) CHILD MORTALITY VS. FERTILITY RATE:

The average number of living children per mother is 4.3. The number born vs. the rate of mortality is represented below:



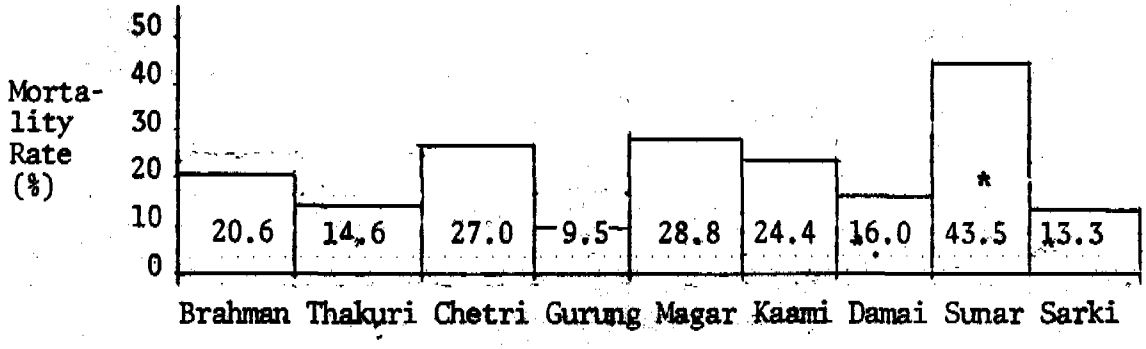
It appears that families which produce a large number of children run a greater risk per child. The reverse, however, is more probably the case: families affected by high child mortality tend to produce more children.

14) CHILD MORTALITY VS. TIME REQUIRED TO COLLECT HOUSEHOLD'S DAILY WATER:

Time	Mortality
0-10 min.	19.3%
11-20	20.9
21-40	21.6
41-60	34.8
60+	22.0

There is possibly some correlation here especially considering that 62% of those people who walk more than one hour succeed in collecting clean spring water.

15) CHILD MORTALITY VS. CASTE:



This data is presented to describe the current situation in these two districts. As with much of the data included in this report, it could be useful in identifying target groups which may be given special consideration during future feasibility surveys.

*One extreme response eliminated; actual average is 50.9%.

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RECOMMENDATIONS ON METHODOLOGY FOR FURTHER DATA COLLECTION

The collection of quantitative field information is a first step towards understanding the full impact of any development program. Policy decisions on how a program should be expanded, modified or maintained must be based on accurate field data, not just the potentially biased observations of field workers and staff. Program objectives, strategy, delivery organizations and intended recipients should all have a quantitative basis.

To do this in a simple and flexible manner within a limited time and with minimal manpower, the household survey is a viable option. Though easily biased by a poorly conducted interview situation and even though reliable responses to certain sensitive or embarrasing issues are probably unattainable, the household survey is capable of covering a great number of integrated variables at once. Furthermore, responses will often reflect opinions and perceptions of the program and a large enough sample of opinions may be considered "hard" data.

Other methodologies are also available. They may be used in their own right on local-specific problems or in combination on larger, program-wide investigations. For example, Before-After Studies often reveal the details of these effects on daily life. Both of these methodologies, however, if taken alone, are subject to outside influences and Case Studies in the past have tended to produce only publishable "success stories". Time Trend Studies would evaluate the program recipient's change versus either a control group's change or the program's intended targets. As with other techniques, Time Trend Studies are best incorporated into a more integrated methodology. Also, they require a lot of time.

Whatever the methodology, representativeness is the key. The greater the sample, the greater the representativeness of the data. Representativeness may be improved by comparisons with data from other organizations (WHO, USAID, SCF, RCUP, CARE, UMN etc.).

Quantification of response should always be considered. Instead of asking "What is best?" responses should reflect an order of preference with an idea of how much better the "best" is than, say, the "second best". Such a technique would have greatly improved the detail of the data presented in this report.

Finally, attention must be paid to the Level of Analysis. At the first level are inputs (budget allocations, foreign aid arrangements) then come the activities of personnel (overseers and technicians per region, systems constructed per year). Within the village, involvement of people (committees, free labor) is followed by their reactions and changes in their knowledge and attitudes. Ultimately, at the bottom-line level of analysis is a change in practices (sanitation, water use) and the End Results of the program (increased standard of living, improved health).

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Multi-level assessments will provide data on variable cause-effects and cost/benefits. The deeper the level, however, the more indicative the data. For example, a field office which constructs ten new systems per year does not necessarily provide clean, continuous water to those ten villages.

The MPLD/UNICEF water supply program consistently analyzes its own impact on the levels of manpower, technology and economics. Rarely has anyone quantitatively looked at the actual impact of the program. It has been the main purpose of this survey and report to conduct an experiment in the collection of such data and to begin to demonstrate a methodology which would provide information relevant to future policy decisions.

APPENDIX A

PROGRAM RECIPIENTS' QUESTIONNAIRE SHEET

A. District
B. Panchayat
C. Ward No.
D. Type of Cathment
E. Sex
F. Age
G. No. of Household Members
H. Economic Status
I. Educational Status
J. Caste

1. How far is your drinking water source?
2. How long does it take to bring water to your house?
3. How long did it take to bring water when there was no water system?
4. After building the water system, who got free time or otherwise benefitted?
5. What is that benefit/free time used for?
6. (Begin discussion on village/home sanitation)
7. How often do you bathe?
8. How often do you bathe the children?
9. What is your method/schedule for washing clothes?
10. What do you use soap for?
11. How many gaagros of water do you use per day?
12. In which season do you use the most/least water?
13. Because your water system provides extra water, what do you use this extra water for?
14. In which season is dysentery most prevalent?
15. How many times does dysentery affect you per year?
16. What people does dysentery affect most?
17. Since completing the water system, is there more or less dysentery here?
18. If more or less, why?
19. What must be done to control dysentery diseases?
20. How many children do you have? 21. How many were born?
22. What is the main benefit of the water system?
23. For this area, what developments are most necessary?

APPENDIX B

CONTROL GROUP'S QUESTIONNAIRE SHEET

A. District
B. Panchayat
C. Ward No.
D. Type of Water Source
E. Sex
F. Age
G. No. of Household Members
H. Economic Status
I. Educational Status
J. Caste

1. How far is your drinking water source?
2. Who would benefit if the source was closer?
3. How would that benefit/free time be used?
4. If there was more water, what could it be used for?
5. (Begin discussion on village/home sanitation)
6. How often do you bathe?
7. How often do you bathe the children?
8. What is your method/schedule for washing clothes?
9. What do you use soap for?
10. How many gaagros of water do you use per day?
11. In which season do you use the most/least water?
12. (Begin discussion on village health)
13. In which season is dysentery most prevalent?
14. How many times does dysentery affect you per year?
15. What people does dysentery affect the most?
16. What must be done to control dysentery diseases?
17. How many children do you have? 18. How many were born?
19. For this area, what developments are most necessary?

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APPENDIX C

Example of the survey's response sheets showing responses from Mehaltoli Panchayat, Dailekh.

सि.नं →	१	२	३	४	५	६	७	८	९	१०	११	१२
(क) जिल्ला	दैलेख											
(ख) गा० पं०	मेहलतोली											
(ग) योजना वार्ड	[illegible]	८	८	८	८	८	४	४	४	४	४	४
(घ) योजना	[illegible]											
(ङ) उत्तर दिने व्यक्तिको उमेर	३७	१८	१७	१६	[illegible]	३५	४०	[illegible]	१८	१७	[illegible]	[illegible]
(च) . . . . लिङ्ग	स्त्री	स्त्री	स्त्री	स्त्री	पुरुष	स्त्री	स्त्री	पुरुष	पुरुष	पुरुष	स्त्री	स्त्री
(छ) . . . . जाति	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	कामी	कामी	कामी
(ज) परिवार संख्या	७	५	८	४	८	४	५	८	१२	३	४	७
(झ) आर्थिक स्तर	[illegible]	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न
(ञ) शैक्षिक स्तर	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न	निम्न
२. मिल्न लागेको	१०	२०	२५	५	१८	८	५	१०	५	२०	१५	२०
३. पहिला कति मिल्ने लाग्ने	४५	४०	२५	६०	[illegible]	[illegible]	२५	४५	[illegible]	[illegible]	[illegible]	३५
४. फाइदा पाउने व्यक्ति	[illegible]	धेरै	धेरै	धेरै	धेरै	[illegible]	धेरै	धेरै	समिति	[illegible]	धेरै	[illegible]
५. [illegible] को फाइदा	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
६(क) [illegible] दिन [illegible]	०.५	०.५	०.५	१	१	१	१	२	२	२	१	१
७(ख) [illegible] दिन [illegible]	०.०५	०.०५	०.५	१	१	१	१	१	१	१	१	१
८ [illegible]	१	१	२	२	२	२	४	२	२	१	१	१
९(क) [illegible]	१	१	१	१	२	१	१	२	२	१	१	१
(ख) [illegible]	५	२	४	४	४	२	२	४	४	२	२	२
ग) [illegible]	०.५	०.५	१	१	१	२	१	१	२	१	१	१
१० साबुन को प्रयोग	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
११ कति अघि	४	४	४	२	४	२	३	४	६	१	२	४
१२ क [illegible]	४	४	४	२	४	२	३	४	६	१	२	४
ख [illegible]	४	४	४	२	४	२	३	४	६	१	२	४
१३ पानी को प्रयोग	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
१४ [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
१५ [illegible]	१	२	१	१	१	१	२	१	१	१	२	२
१६ (क) [illegible]	१-५	१-५	१-२	१-५	१-२	०.५-१.५	०.५-१.५	१-२	१-५	१-२	०.५-१.५	०.५-१.५
(ख) [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
१७ [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
१८ किन	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	बराबर	[illegible]	[illegible]	[illegible]	[illegible]
१९ कैफियत	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
२० [illegible] को संख्या	५	२	६	२	६	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
२१ [illegible] को संख्या	२	६	८	२	६	२	३	६	४	१	३	[illegible]
२२ [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	६	४	४	७	५	३	३	६
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX D

Original program recipient questionnaire (Nepali)

खानेपानी योजना भएको ठाउँमा
सोध्ने प्रश्न-पत्र

प्रश्न नं. १ तपाईं हरूले पिउने पानीको मूल कति टाढा छ ?

" " २ तपाईंको घरमा पानी ल्याउन कति समय लाग्छ ?

" " ३ योजना नहुँदा तपाईंलाई पानी ल्याउन कति समय लाग्थ्यो ?

" " ४- खानेपानी योजना बनाएर कसलाई फुर्सद (फायदा) भयो ?

" " ५- त्यो फुर्सद भएको समय कुनकाममा प्रयोग गरिन्छ ?

" " ६- खानेपानी योजना भएपछि गाउँघर सर-सफाईमा के कति फरक भयो ?

" " ७- तपाईं कुन मौसममा कति पटक नुहाउनु हुन्छ ?

" " ८- एक हप्तामा बच्चा हरूलाई कति पटक नुहाई दिनु हुन्छ ?

" " ९- तपाईंको कपडा सर-सफाई गर्ने तरिका कस्तो छ ?

" " १०- प्राय: साबुन कुन काममा प्रयोग गरिन्छ ?

" " ११- एक दिनमा कति गाग्रो पानी प्रयोग गर्नु हुन्छ ?

" " १२- तपाईं हरू कुन सिजनमा बढी पानी प्रयोग गर्नु हुन्छ ?

" " १३- खा. पा. यो. भएकाले कुन काममा बढी पानी प्रयोग गरिन्छ ?

" " १४- पखाला रोग कुन सिजनमा बढी लाग्छ ?

" " १५- तपाईं हरूलाई एक वर्षमा कति पटक पखाला लाग्छ ?

" " १६- घरको कसलाई बढी पखाला लाग्छ ?

" " १७- खा. पा. योजना बनाएर यस ठाउँमा पखाला रोग केहि कम भयो कि बढी पखाला लाग्यो कि केहि फरक भएन ?

" " १८- पखाला रोग बढी अथवा कम भयो भने के कारण होला ?

" " १९- पखाला रोग कम गर्नको लागि के गर्नु पर्ला ?

" " २०- तपाईंको बच्चा कति छन ?

" " २१- जन्मेको कति हो ?

" " २२- खा. पा. योजनाको मुख्य फायदा के रहेछ ?

" " २३- यस ठाउँमा अरु आफ्नो लागि के को बढी आवश्यक छ ?

APPENDIX E

Original control group questionnaire (Nepali)

खाने पानी योजना नभएको ठाउँमा

सोधन प्रश्न-पत्र

प्र. नं. १ तपाईं हरूले पिउने पानीको मूल कति टाढा छ?

" " २ नजिक पानी भर्नमा कसलाई बढी सुविधा हुन्थ्यो?

" " ३ पानी नजिक भएको भए बाँकि समय (फूर्सद) के काममा प्रयोग गरिन्थ्यो?

" " ४ नजिकै पानी प्रसस्त भए के काममा ज्यादा प्रयोग गरिन्छ?

" " ५ (अन्तर्वार्ता लिने व्यक्तिले उसको घरको सर-सफाईको तरिका पत्ता लगाउने)

" " ६- तपाईं कुन मौसम मा कति पटक नुहाउने गर्नु हुन्छ?

" " ७- १ एक हप्तामा बच्चा हरूलाई कति पटक नुहाई दिनु हुन्छ?

" " ८- तपाईंको कपडा सर-सफाई गर्ने ~~कस्तो छ~~ तरिका कस्तो छ?

" " ९- प्रायः साबुन कुन काममा प्रयोग गरिन्छ?

" " १०- १ दिनमा कति गाग्रो पानी प्रयोग गर्नु हुन्छ?

" " ११- तपाईं हरू कुन सिजनमा बढी पानी प्रयोग गर्नु हुन्छ?

" " १२- (अन्तर वार्ता लिने व्यक्तिले बढी लाग्ने रोग पत्ता लगाउने)

" " १३ पखाला रोग कुन सिजनमा बढी लाग्छ?

" " १४- तपाईं हरूलाई एक वर्ष मा कति पटक पखाला लाग्छ?

" " १५- कस्तो मानिस लाई बढी पखाला लाग्छ?

" " १६- यो पखालारोग कम गर्नको लागि के गर्नु पर्ला?

" " १७- तपाईंको बच्चा कति छन?

" " १८- जन्मका कारण के ?

" " १९- अब यस ठाउँमा सुविधा को लागि के को बढी आवश्यक छ?