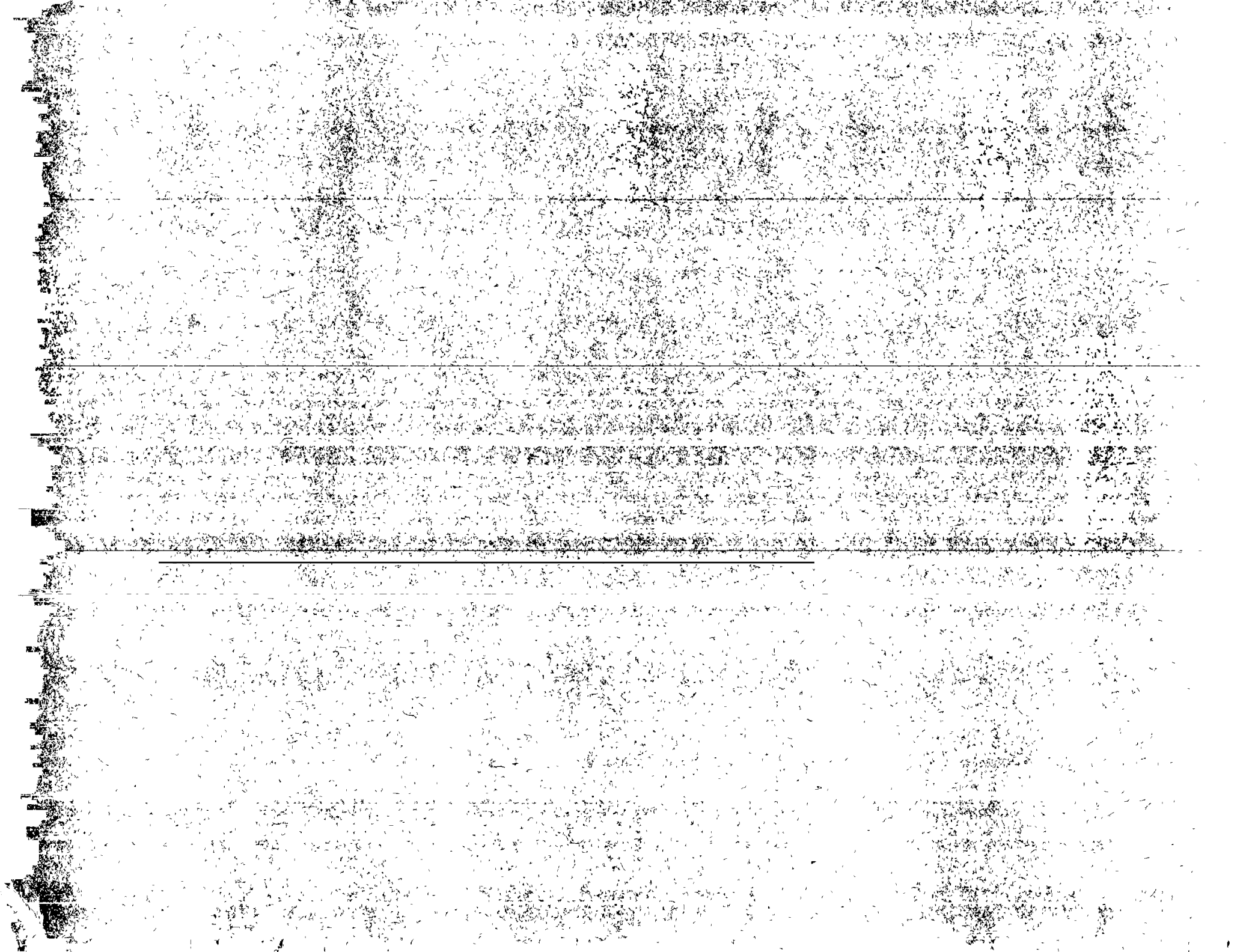

GHANA UPPER REGION WATER PROGRAMME EVALUATION PROJECT

REPORT 5: APPENDIX ONE

METHODOLOGY OF THE SOCIAL SURVEY OF WATER DRAWERS

by
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CIDA PROJECT 400/00901

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GHANA UPPER REGION WATER PROGRAMME EVALUATION PROJECT

The six evaluation reports of the project are as follows:

REPORT 1	Technological Evaluation of Urban and Rural Water Supply Systems
REPORT 2	Part I: Political and Economic Context Part II: Project Expenditures and Economic Issues
REPORT 3	Review of Programme Organization and Management
REPORT 4	Evaluation of the Education and Participation Components
REPORT 5	Results of a Social Survey of Water Drawers
Technical Appendix One:	Survey Methodology
Technical Appendix Two:	Survey Area Maps and Profiles
Appendix Three:	The Anthropology of Water, Health and Hand-pumps
REPORT 6	Summary of the Evaluation

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Figure 2 Major Variables of the Social Research

Independent Variables	Intervening Variables	Selected Dependent Variables
-access to hand-pump -access to utilization education -dry and wet season	-distance to water sources -size of household	-water usage -water volume collected -source choice -reasons for source choice -collection cycle -frequency and method of cleaning collecting containers -bathing -washing clothes -economic activities -contamination of drinking water -observed compound conditions -incidence of diarrhoea in young children -prevalence of guinea worm

1.2 Sample Design and Size

The evaluation project feasibility study had proposed a sampling procedure that used a two-stage sample design in which selected villages constituted the primary units and a sample of households from within each village constituted the secondary units. It was assumed that a maximum of 15 villages in each of the three samples could be covered in each season, and regarded a difference of 15% or more in the proportions of each sample displaying a particular characteristic as significant. To identify such differences, at a probability level of 5% (i.e. a sample difference of 15% or more would occur only 5 times out of 100 by chance even if there are no differences between the true populations, given that the sample had met the criterion of randomness) the feasibility study estimated that a sample size of about 360 was required, based on a total of eight households in each of 15 villages in each of the three samples.

Two major changes to this proposal were required in the light of field conditions:

1. the selection of villages as a primary sampling unit was replaced by pumps;

2. the number of primary sampling units within each sample was reduced to 10 from 15, in each of which about 12 respondents were selected to maintain the total survey size at 360.

1.3 Selection Procedure for the Three Samples

1.3.1 Selection of the No-Pump Sample

The sample frame from which the N sample was drawn was compiled on the basis of field visits to all areas in the district thought by GWSC personnel to contain a community living far from a pump and who regularly used non-pump sources. These field visits to the 45 suggested areas produced a sketch map of water sources, compounds and the nearest hand-pump.

At the time of these reconnaissance visits (March-April, 1984 - the latter half of the dry season), some communities that were using surface sources were intending to begin to use pumps when their surface sources became dry. The community of Zoko Goo, for example, in mid-March was using a well which they expected would soon dry up after which they would walk about 2 km to pump 455-B32. It was decided to exclude such communities from the control sample, not because they were of no interest but because of additional analytical complications that might arise.

The N sample was chosen to include the ten areas that appeared to be 1.3 km or further from the nearest pump. In the case of N-10, an area to the south of the intended area was inadevertently included as the survey area and some compounds selected were well within 800m of the pump. In another five areas there were also respondents closer than intended (Table 1).

TABLE 1 Approximate Range of Distances to the Nearest Hand-Pump for Each N Sample Survey Area

Survey Area	Range of Distances for Survey Respondents to the Nearest Hand-Pump (metres)
N1	600-2000
N2	375-1490
N3	10 kms
N4	1470-3000
N5	440-1000
N6	440-2200
N7	4200-5300
N8	700-1400
N9	1700-2600
N10	260-1300

1.3.2 Selection of the VEW and Pump Sample

The VEW-pump sample was a simple random selection of ten of the 139 locations in Bolgatanga district at which VEWs reported having made presentations in the period between January 1983 and February 1984. The eight VEWs and ten locations of VEW presentations selected for the V sample were slightly different from the total population of VEWs and locations of VEW presentations. The sample VEWs had given slightly more presentations per VEW (16.1) than all VEWs taken together (12.2) and the number of presentations at each of the ten sample locations were slightly more on average (2.50) than at all locations taken together (2.34) (1, p.23 -26).

1.3.3 Selection of the Pump Sample

The final sample of pump without VEW was randomly selected from a listing of all 514 pumps in the Frafra District. Each selected pump was located on the map with VEW presentations and areas and included only if it lay outside all VEW areas and was at least one kilometre away from any VEW presentation (Figure 4).

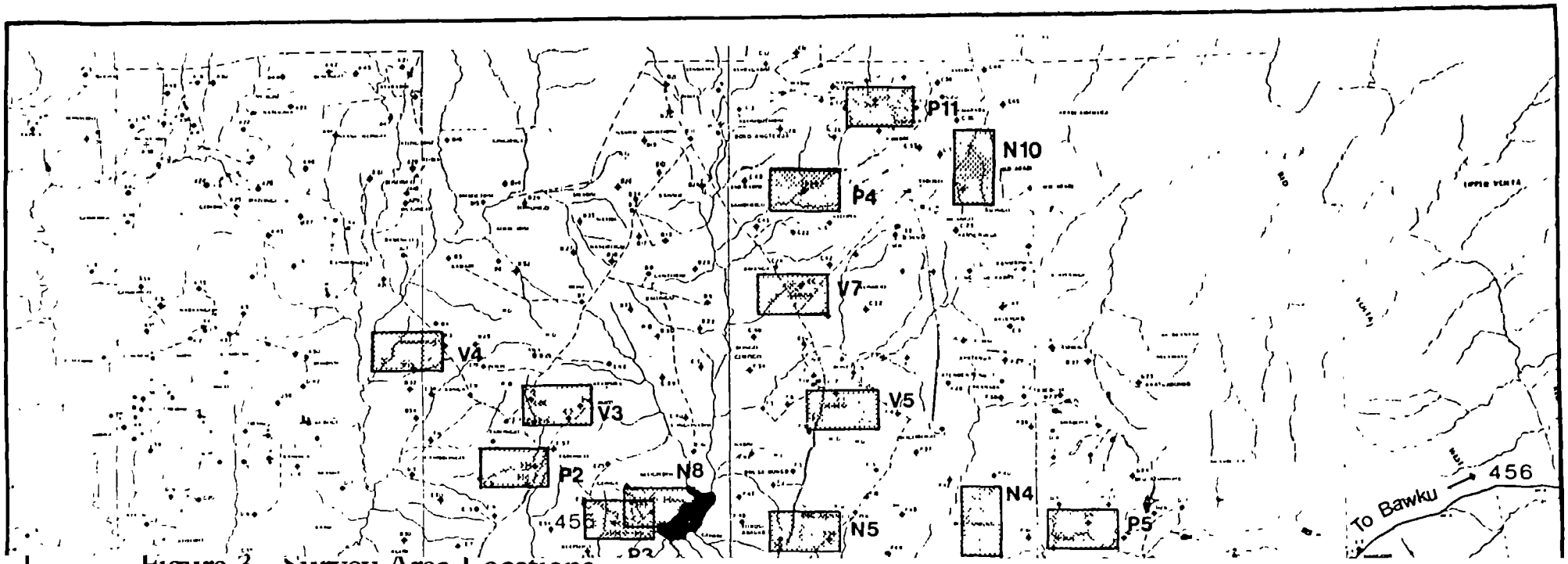


Figure 3 Survey Area Locations

NO-PUMP VILLAGES	PUMP VILLAGES	VEW AND PUMP VILLAGES
N1 Agiadone	P1 Winkogo-Akonkongbisi, 453B-8	V1 Amogrebisi, 455G-9
N2 Anatim Kulbia	P2 Zoko Tarongo, 455E-14	V2 Kologo, 455G-11
N3 Biung	P3 Vea Tendongo, 455E-22	V3 Atanseka, 455E-18
N4 Beo Tankoo	P4 Amanga, 455C-49	V4 Kodorogo (Zoko) 455B-3
N5 Bongo-Ayeskabisi	P5 Sapero, 456D-4	V5 Bongo-Bonzue, 455F-7
N6 Guose and Nkunze	P6 Kumbelingu-Yipala, 455G-21	V7 Gorigo Atanzore, 455C-23
N7 Pwalugu	P7 Dachiu-Tenganore, 455I-57	V8 Zuarungu-Moshie, 456D-29
N8 Vea Tendongo	P8 Dachiu-Nabisi, 455F-24	V9 Gari, 456G-9
N9 Tengzug	P9 Bosiyar-Yarikabisi, 455I-54	V10 Ghambie Bombea, 453C-28
N10 Soe Arabe	P10 Damulgo-Dazamdabo, 456G-23	V11 Nyogbare, 456H-13
	P11 Feo-Soboko, 455C-27	

SCALE:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Kilometres

N

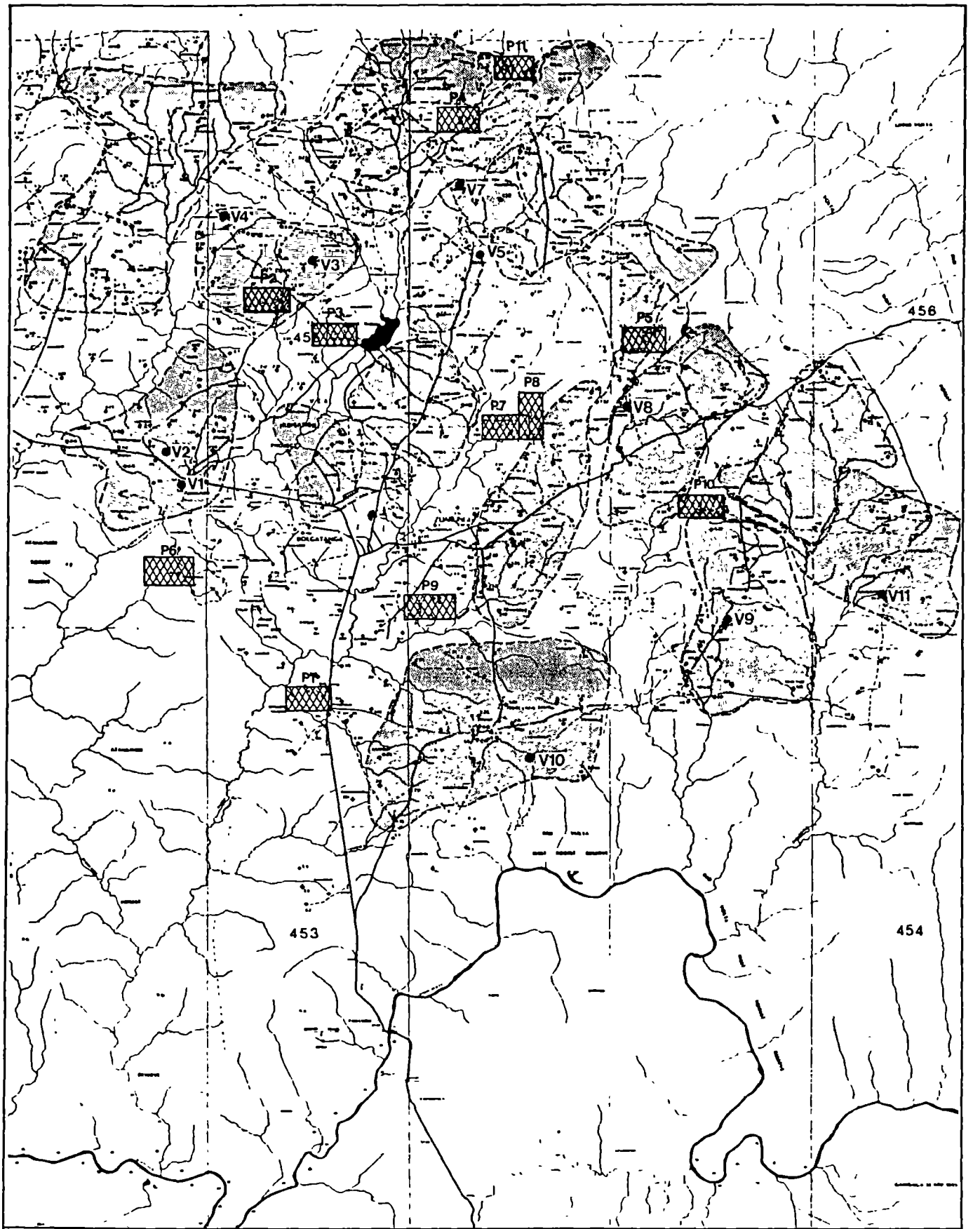


Figure 4 P and V Survey Area Locations

Note: VEWs have not made presentations at all pumps included in each VEW presentation area

1.4 Location of the Survey

This survey was located within the Bolgatanga district of the Upper East Region of Ghana. The Frafra tribe reside in this area - one of seven major language groups of the Upper Regions (Figure 5).

1.5 Timing of the Survey

The wet season survey was mostly carried out between July to September 1984 and the dry season survey between January to March 1985.

1.6 Language of the Survey

Although all interviews were conducted in Frafra, the interviewers had to adjust their vocabulary to the appropriate dialect. The differences among the four dialects of certain key words concerning water sources are given in Figure 6.

1.7 Field Procedures

1.7.1 Explaining the Research and Obtaining Permission to Proceed

The first task before beginning the field work was to explain the research to the Chief or headman and his elders and obtain their permission to proceed.

In the light of experience from the pilot this included:

1. formal greetings and gift of kola nuts;
2. explanation of the selection procedures, utilizing a map of the Upper Regions to explain the selection of the Bolgatanga district, and a map of the pumps to explain the selection of the local pump and, using these examples, an explanation that only selected compounds would be included in this area;
3. a description of all the different activities to be conducted by the field workers - mapping, interviewing, a

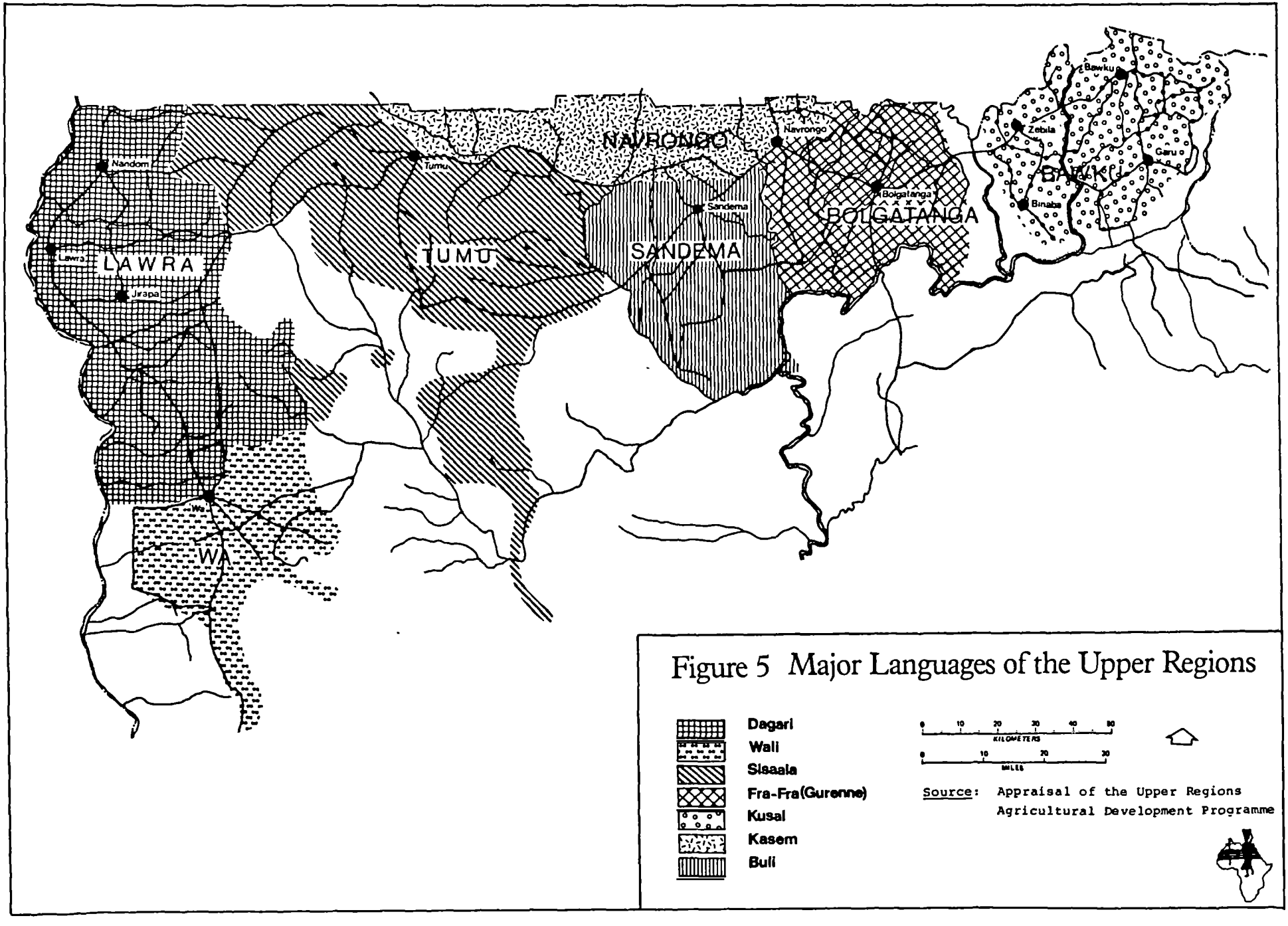


Figure 5 Major Languages of the Upper Regions

Figure 6 Vocabulary Differences Among Four Dialects of Frafra

English	Gurunne	Bawsi	Nabt	Talne
Pump	pompii pompe	pompi	pupii pompii	pompi
Dug-out	buliga bulga pwridl bulsii	bulga	kolig	kolteeh
Dam	mogre mɔri	mogri	mogri	moɣhar
Well	luowa lowa	lu-o	bulig nasaa-bulig	bulig
River	kulaa kulka	kulga	ko-zotim	kolig
Stream	bolka borlsa	kulaa	bogloo	bɔk
Spring	ko-nori yinne buliga	*	ko-nori	kolkii
Pond	buliga	*	kuloog	biéuɲ

* these sources are named after tingani's fairies, ancestors or elder, or a nearby house.

ɣ gh from back of throat

ɔ a short y (hard)

é ă

ɲ ng

dusk to dawn surveillance of the major water source(s) of the village and collecting water samples for bacteriological analysis;

4. emphasis that this was a research project, and did not imply that more pumps would be installed.

A general discussion was also held at this meeting about water-related issues and problems in the area; some results from these are recorded in the Survey Area Profiles (Report 5, Technical Appendix 2).

1.7.2 Selection of a Survey Area

A general reconnaissance was then made of the area around the pump or presentations, or within the control area. A survey area was selected to provide 30-35 compounds, an adequate size to yield 12 appropriate respondents. In larger villages or sections, selection of a survey area was done by starting from the water source and moving out in two directions between 90 degrees and 180 degrees apart until the section boundary was encountered (Figure 7, Method 1). In smaller communities, particularly some of the no-pump survey areas, it was possible to include the complete section (Figure 7, Method 2). A final model was used in a handful of survey areas where a hand-pump and major dugout was only a moderate distance apart. The path between the two sources was taken as the centre of the survey area and was extended out on both sides by 100-200 metres until enough households were included. It was thought that such a survey area would allow source choice boundaries to be investigated.

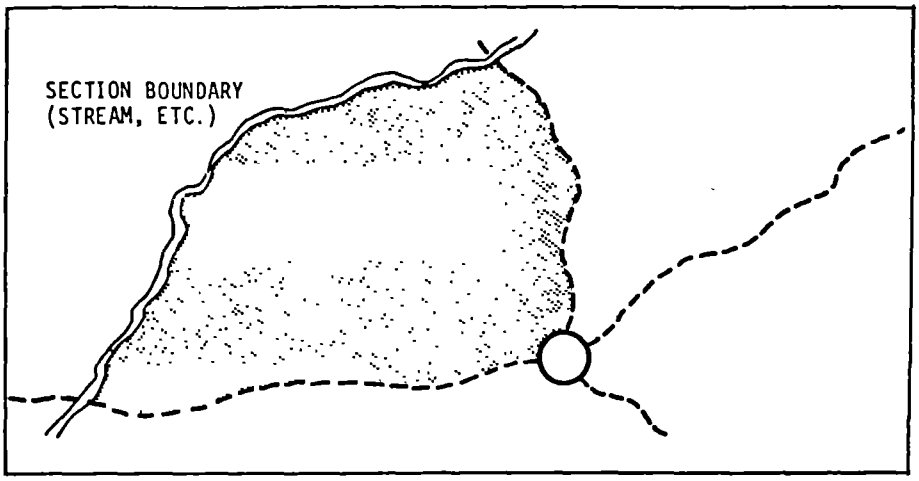
1.7.3 Mapping the Survey Area

A map of each Survey Area was required to record the location of each compound - respondent and non-respondent - water sources and other landmarks. This was done in some detail for a variety of reasons:

1. to produce a visual representation of both the water source options available to women and the source decisions they made in each season;

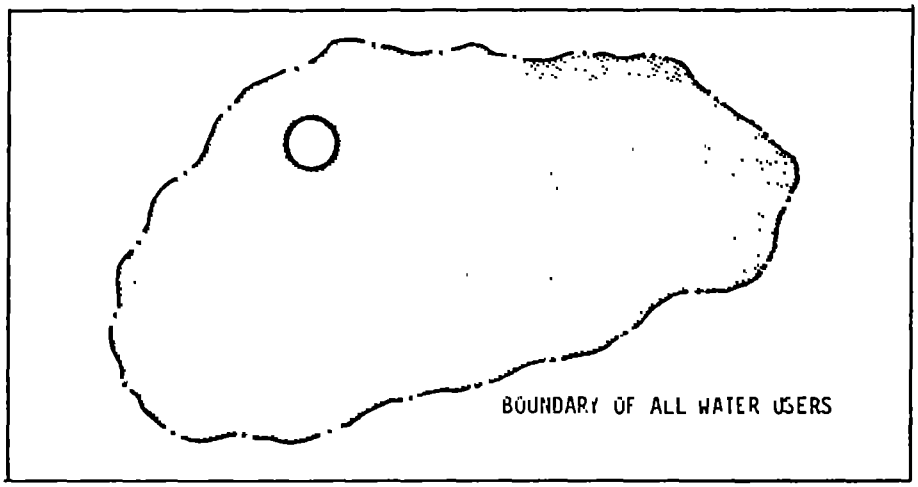
METHOD 1

SAMPLE SELECTION FOR LARGER VILLAGES USING PART OF A SECTION



METHOD 2

SAMPLE SELECTION FOR SMALLER VILLAGES USING ENTIRE SECTION



METHOD 3

SAMPLE SELECTION WHERE HAND-PUMP AND DUGOUT ARE IN CLOSE PROXIMITY

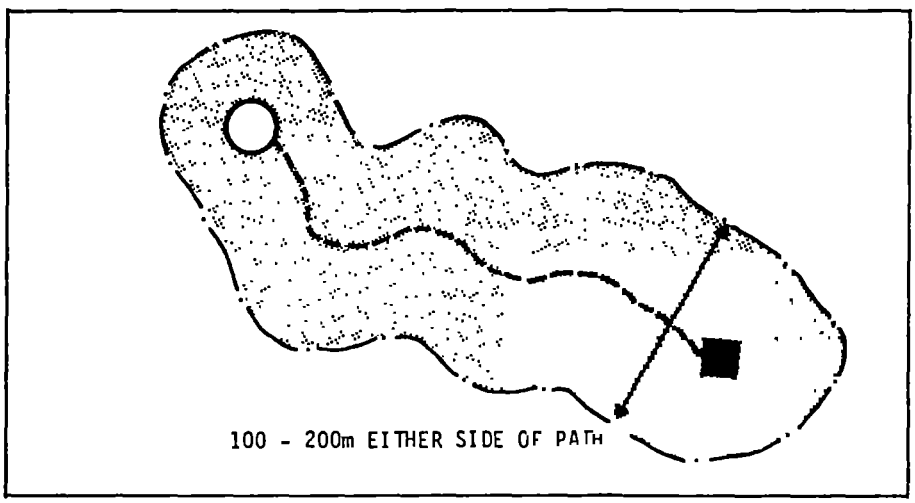


Figure 7 Methods of Defining Sampling Areas

SAMPLE AREA FROM WHICH COMPOUNDS ARE CHOSEN

TRADITIONAL WATER SOURCE

PATHS

HAND-PUMPS

AREA BOUNDARY

2. to allow source boundaries, lines that indicate the boundary of compounds using each source, to be drawn

3. to facilitate location of respondents in the second season survey.

Mapping was done by triangulation (using pacing and compasses) with water sources added then and at later points throughout the research after identification in the survey. Maps from all 31 survey areas showing the source choice decisions made by respondents are included in Technical Appendix 2.

This was a labour-intensive and time consuming task, and one major reason for reducing the original sample size from 45 survey areas to 31. Simple technical aids such as a stadia rod, a graduated rod used with a transit instrument to measure distances, might have saved much time.

1.7.4 Selection of Respondents

After mapping the area, each compound was given a number. With reference to a table of random numbers a sample of 12 compounds was drawn, together with five or six reserve compounds.

At each selected compound, the interviewer briefly described the research and explained that we wanted to interview a woman who regularly collected water and who had one or more children. If no such woman was at the compound or likely to be there on the next day this compound was replaced by one on the reserve list.

Generally this appeared to work well. There was negligible resistance to being interviewed although there was some substitution of compounds from the reserve list.

1.7.5 Quality Control of Fieldwork

Maintaining a high quality of interviews was a continuing priority throughout the fieldwork period. Among the tactics employed to promote this were:

1. having senior Ghanaian staff attend interviews and complete a questionnaire based on the respondents replies and then compare their results with that of the interviewer;

2. organizing classroom "tests" which had all inteviewers complete a questionnaire based on the fabricated responses given by one of the researchers and including the additional probing questions they would pose; and

3. an immediate review of each questionnaire for completeness and internal consistency, with omissions and ambiguities dealt with during the "three visits" procedure to measure water-drawing;

Through such efforts and the efforts of the interviewers themselves, it was felt that the project reached as high a level of quality as an inexperienced team could sustain and one that provided a reasonable to good approximation of actual water-related behaviours.

Some of the reasons for not attaining a higher level of quality lie within the social survey approach. The interview was an unusual and ambiguous situation to most women. Many respondents appeared to have genuine problems for example, in replying to the questions that asked about the usual number of collecting trips made by her yard. For a woman, the number of trips she makes is determined by need, other activities of the day, storage capacity, visitors, how strong she feels, etc. For some there may simply be no such thing as a usual number of trips.

There were problems also with questions that investigate such areas as bathing and children's health. Bathers use much water but the respondent's reply may be over-stated because there are social norms that lead some respondents to exaggerate the number of baths which they and their families take. When asked about the health of their children, an expectation is created that medicines are available to dispense which again distorts replies.

Despite attempts to be culturally sensitive, the questionnaire incorporated a different way of looking at life from what the respondents (and possibly some of the interviewers) had.

Two out of twelve interviews done in a survey area were repeated as a measure of quality control a week or so after the first interview. This was also an opportunity to collect water quality test samples and another opportunity to ensure that all the water sources mentioned in the questionnaires were located on the map.

1.8 Project Staff and Staff Selection

This survey was a labour intensive activity. It utilized 34 different individuals for a total of about 20 person-years.

Figure 8 Survey Personnel

	Ghanaians	Others
Feasibility study and design		4
Survey managers	1	1
Researchers	3	6
Research assistants	11	1
Driver	1	
Data analysis and report writing		4
Support Services		6

Ghanaian staff were recruited from a variety of sources;

1. four by internal transfer from within Ghana Water and Sewerage Corporation (GWSC)

2. five on secondment from Ghanaian ministries and departments;

3. five by direct recruitment, through GWSC.

Expatriates were recruited primarily from the Peace Corps(4) and CUSO(2) with one short term volunteer already in Ghana through the Christian Youth Exchange scheme of Denmark.

In general most of this worked out well. GWSC demonstrated a commendable flexibility in hiring and paying wages or allowances to a significant number of new staff, at a time of organizational retrenchment. Other problems with secondment were resolved with the assistance of the Regional Administrative Officer - the senior civil servant in the Upper East Region and the chairman of the Evaluation Project Steering Committee.

Some difficulties arose with the use of North American volunteers.

It was initially planned that the volunteers would each work as interviewers with the assistance of an interpreter. However, as it

was possible to recruit and train Ghanaian fieldworkers to do the interviewing and other fieldwork, the North American volunteers were assigned to logistical support, fieldwork supervision and other activities. While it has undoubtedly been highly cost effective to use volunteers, there appear to be two major drawbacks. Firstly, the project was too dependent on these inexperienced volunteers. None had any prior experience in programme evaluation and only one volunteer had any previous experience in social research. As this experience was in anthropological methods, it was not relevant to the major research method of the survey. This inexperience limited the volunteer's ability to supervise fieldwork and ensure a high quality of data collection.

A second drawback concerns the Peace Corps selection method. Peace Corps do not allow agencies or projects to interview newly arrived PCVs or see their CVs before they arrive to start work, though this can be arranged when PCVs already in the country transfer to a project. This was done by CHC staff for two of the first PCVs. A major contradiction of the project was that while over 40 Ghanaians had been carefully interviewed to recruit 14 interviewers, 2 Canadians to recruit one, the project staff interviewed no PCVs to recruit 5.

These are cautionary words to be considered by any future project. It must also be remembered that the project essentially met its targets and that this was only due to the fact that this imperfect system did produce some volunteers able to learn quickly and display a real sense of responsiblity.

A better staffing arrangement would have been a project manager and a social survey organizer employed by the consultant, with the possibility of utilizing any appropriate volunteers that might be located. This would have allowed a less centralized project, with more resources available to follow up other aspects of the water programme, and by reducing dependency on volunteers, would have allowed them to be placed on a probationary period that gave each party a chance to get to know the other before making longer-term commitments.

2.0 DATA REQUIREMENTS

2.1 Data Requirements as Defined by the Feasibility Study

The required data from the social survey were defined by the feasibility study as:

1. to determine if the pattern of daily water use has changed with the provision of clean water and/or health education; the quantity of water used; the choice of water source used for various needs both human and animal;

2. to determine, if possible, some definition of adequate water quality in the Upper Regions;

3. to determine to what extent convenience is a factor in the selection of a water source and establish the maximum distance that women will walk to get pump water when another source of water is closer;

4. to determine time saving results to water collectors and to examine the possibility of an increase in income earning activities when time-saving occurs;

5. to determine if there is a change in health-related knowledge as a result of the Village Education Programme;

6. to determine if hygiene and sanitation practices are altered among village women and children by the provision of clean water and an education programme;

7. to determine the level of knowledge the women have of Water Users' Committees as an indicator of their involvement in decision-making about water; and

8. to determine villagers' willingness to take on greater responsibility for maintenance and improvement of water supplies, either through payment or involvement.

(2, p.63-64)

2.2 Data Collected in the Field

After development and refinement of the research instruments in Canada and in the field the final data collected by the social research are listed in Figure 9.

2.3 Revisions in the Data Requirement

The most significant points in this revision included the following:

1. Measuring Quantity

The complexity of measuring the quantity of water used by a household includes the following factors:

a) Most water consumed is collected and taken to the compound, but some water is utilized at the source, for instance for bathing, washing clothes and watering animals.

b) Many yards have more than one drawer, some of whom will use different collecting containers. The trips made by each collector must be recorded and the volume of each container estimated by measurement with a tape measure (see 2 below).

c) Some yards have a cycle of water collection based on markets (held every three days in this district) or domestic division of labour. The trips made by all collectors must be recorded for all three days so that an average daily collection volume can be estimated.

d) A few yards have major water-consuming activities (such as pito brewing). These must be allowed for in the calculation of per capita domestic water consumption.

2. Measuring Container Volumes

A variety of different containers are used to collect water - buckets, clay pots, headbasins, drums. Each of these is found in a variety of sizes with clay pots and headbasins coming in a particularly large variety.

Where possible, the volume of each container was measured at the source by filling it from a bucket graduated in litres.

As this was not always possible, data on both the volumes and measurements of containers were used to prepare charts to estimate volumes. These are reproduced in Figure 10.

3. Water Quality Testing

Water quality testing with a membrane filtration process is a demanding procedure within the Ghanaian context. Problems were encountered with the following:

a) power supply - eventually the project utilized an automobile battery with a battery charger located in one of the staff houses; and

b) interpretation of results - only colonies with a "blue-green" sheen are indicators of faecal coliform; some results were ambiguous.

One way to increase confidence in the test results was the inclusion of control samples of distilled water and water with a faecal content. Test results were only considered valid if both controls gave the expected results.

4. Measuring Distances

Measuring Distances from compounds to water source.

a) No recent aerial photographs were available and maps had to be drawn by triangulation using pacing and compasses;

b) The distance walked by a collector from compound to source is influenced by topography and cultivation. Wet season distances tend to be longer as women have to walk around fields and muddy patches. In the dry season paths cross the fields and allow for more direct access. Distances in both seasons were measured by pacing and motorcycle odomoter.

c) Maps had to include the locations of all non-pump sources. Some compounds use different dugouts in different seasons, and unless this is clearly understood, inter-season comparisons of distance can appear to be incorrect.

5. Time

Time used to collect water consists of four components:

a) time to walk from compound to source;
b) waiting time at source;
c) drawing time; and
d) time to return from source to compound.

Items B and C depend on the number of other drawers already waiting at the source. This number fluctuates throughout the day.

Time spent on water collection is also logistically difficult to measure as ideally it requires a research worker to accompany the collector on her collection trip. There were inadequate resources for this and data on time were largely dropped (some data on waiting time at different sources were collected), and replaced by distance.

6. Health Related Knowledge

No questions on health-related knowledge were asked after a review of the utilization education materials suggested that their content was more behavioural than informational. Moreover there were other educational media in the district, with wider coverage than the village education workers. It was decided to inquire about recall from all eduation and to observe specific hygiene behaviours where possible and ask about others.

7. Water User Committees

Discussions during the pilot on Water Users Committees with headmen, elders, and female respondents revealed:

a) considerable confusion by the headmen between WUCs and other committees that the village or section had been encouraged to form such as Workers Defence Committees; and

b) deference by the women to any man present at the interview when it came to discussing any political or village organizational activity.

It was decided to investigate WUCs only where there was specific mention of their existence.

8. Health Indicators

The fundamental goal of the Upper Region Water Programme was to improve the health of the Upper Region through the provision of clean water supply (4, Appendix A). The health status of a community is

extremely difficult and costly to measure. The original Logical Framework Analysis for the programme had proposed that its impact be measured with reference to health records. This method suffers from various drawbacks. Most importantly, only clinics and hospitals issue health records and these records cover only those who present themselves for health services - in other words the records cover a self-selected sample, the results of which cannot legitimately be used to make inferences about the health status of the whole community. Within the particular context of the Upper Region there were the additional problems of:

a) many health records are kept by the patient or, in the case of children, by their parents and are only available for analysis when patients have presented themselves for treatment

b) where records are stored centrally there is inadequate information on the location of the individual's residence to confidently assess whether the family has access to pumps or VEW presentations.

Inspections of local health data by both the feasibility study and the evaluation staff also revealed problems with the presentation of information which was inappropriate for our purposes and unexplainable aberrations in the information.

The feasibility mission initially proposed a major health study utilizing qualified medical personnel. This was subsequently changed to an investigation of water-related behaviours on the argument that no changes in health could occur without changes in behaviour. However, any such behavioural changes could not of course guarantee that improvements in health had occurred.

When the evaluation team was in the field, this question of measuring direct indicators of health was reviewed resulting in the inclusion of two sets of indicators - guinea worm prevalence and selected measures of the health status of young children in the yard. Utilizing a research procedure attempted elsewhere in Africa with non-health workers, the survey interviewers were instructed to ask about any diarrhoea, fever, skin problems etc. that the children were currently experiencing.

Because of its associated pain and scar, reporting of the prevalence of guinea worm incidence was judged likely to be both reliable and valid. Further evaluations should make more attempt to utilize health indicators through such tools as childrens' growth charts, diaorrhea diaries and simple anthropometic measures.

3.0 RESEARCH INSTRUMENTS

The survey included three major research instruments: a questionnaire, source measurement and a three visits form. One of the objectives of each was to obtain information that could be compared with similar data obtained from different research instruments. The characteristics and intended comparable outputs of each of the three research instruments may be summarized as:

Instrument	Characteristics	Comparable Outputs
1. Questionnaire	one interview with each respondent each season	. usual source and alternative source(s) . usual number of trips . usual collectors . usual containers . usual number of baths each day . trips yesterday by respondent . baths yesterday by respondent
2. Source Measurement	one dawn to dusk observation of who draws water, how many times, with which container for each respondent and her yard	. observed collectors . observed number of trips . observed volumes taken at the current source of most respondents yards
3. Three Visits	three visits to each yard during the day of source measurement and the next morning to ask who has collected water, from which source and with which container and who has bathed since wake-up or last visit	. reported collectors . reported trips . reported containers . reported baths over the last 2-12 hours to provide a complete record between wake-up and sleep

The questionnaire and source measurement may be considered standard components of social research on water-related behaviours (3, pp.49-53). The addition of the three-visits data collection

arose as an attempt to solve a number of problems. Firstly, during the wet season in the no-pump villages the variety of current sources among the twelve or so respondents was too great to mount a dawn to dusk source measurement at each source. Secondly, in the pre-test there appeared to be a large discrepency between the "usual" number of trips reported on the questionnaire and the significantly lower number of trips recorded during the source measurement. It was unclear if this arose from over-reporting the usual number of trips or omissions during the source measurement arising from the exclusion of trips made by some members of the yard, such as small girls and males, or from trips made before dawn or after dusk. Thirdly, there was some anecdotal evidence that during any one day, one yard's members would go to more than one water source - selected on the basis of use, accessibility and appropriate quality. As the source measurement was located at only one water source, visits to other sources were not recorded. Moreover, as the source measurement was conducted at one source for one day, some yards were totally omitted in the source measurement, either because this was not their current source or because they had not made any trips that day. Finally, there was some suspicion by the evaluation staff that reporting of daily bathing was subject to social expectations and thus had a tendency to be over-reported in the interview.

A series of three visits to the yard during mid-morning, late afternoon and early the next morning to ask about collection trips and bathing was judged to be one solution to some of these problems. While these visits still relied upon reported information rather than observed, it offered the advantages of asking for the recall of two specific activities - collecting water and bathing - over relatively short periods of approximately 2-4 hours (wake-up to first visit) 5-8 hours (between first visit and second visit) and of 4-6 hours (between second visit and going to bed) some 12 hours later (next morning). This system allowed the use of all water sources to be investigated and let an estimate of daily bathing for each yard member be made from three separate periods rather than considered as the usual number of baths per day.

In addition, the village research generated information from the following sources:

Instrument	Method	Outputs
4. Source Observation	one dawn to dusk observation of the total number of drawers leaving each hour; the waiting period at the source, other water related activities	. hourly traffic at source . waiting period for 10% of drawers . number of bathers, clothes washers etc.
5. Water Quality Testing	collection of 100ml samples from compound drinking pot and pump and other sources of drinking water and testing for faecal coliforms	. FC counts for drinking water at compounds and at sources
6. Maps	Survey area maps	. distances from compound to current water source and to alternative water sources

4.0 DATA MANAGEMENT AND ANALYSIS

Data from five of the six sources* listed in Section 3.0 were assembled for each respondent in each season, coded onto coding sheets in Ghana by the research workers and analyzed by SPSS at the computing facilities at McMaster University in Hamilton. Each season's data produced over 700 variables per respondent, a volume so large that a separate file had to be allocated to each season.

A more useful means of organization would have been to have both season's data assembled next to each other for each respondent. Inter-season comparisons could then have been performed in one run of the computer.

The analysis has mainly sought to identify differences in proportions among the different samples and seasons.

An edited tape and code book has been produced to facilitate further analysis by other researchers.

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* all but #4, Source observation

5.0 LESSONS TO GUIDE OTHER SURVEYS

Reflection on this survey experience suggests a number of lessons that may be useful for other similar projects.

1) A meaningful structured questionnaire can only be designed with reliable knowledge of what is relevant and appropriate. A period of participant-observation, key-informant interviewing and open- ended interviews are required to guide the selection of indicators and questions(5). In this survey the time-schedule required that this cultural familiarity be obtained while the draft questionnaire was being pilot-tested!

2) The major indicators of personal hygiene (bathing frequency) and domestic hygiene (frequency and method of cleaning collecting containers) were subject to socially prescribed norms and widely practiced among all groups. As such, they were not indicators likely to be influenced by access to pumps or utilization education. The fact that the utilization education had promoted these and other widely practiced behaviours also indicates the value of social research before the design of the programme, as well as any evaluation.

3) The scale of the social survey was too large with respect to the logistics of conducting research in rural Ghana, the limited survey experience available and the other aspects of the evaluation which merited more resources.

4) Although an evaluation had been discussed since the beginning of the URWSP in the early 70's, no preparations had been made for it through either the collection of baseline data or the guided allocation of the interventions. A more appropriate, random allocation would have been particularly easy to have organized with respect to the utilization education, and made the selection of the VEW and Pump, and Pump samples significantly easier and allowed its impact to be more clearly measured without speculation about the influence of confounding variables.

5) Collecting and analyzing data on water collection volume is very complicated, requiring the collection of a large number of variables. Now that it is known that pumps have probably not made any significant difference in volumes consumed, this should be downplayed in future evaluations and more emphasis placed upon indicators of health and economic activites.

6) The URWSP also invested considerable resources to improving urban water supply. When these are functioning well and utilized any future evaluation should consider adding an urban sample to investigate water consumption and health in these areas.

References

1 Malone Given Parsons Ltd. Report 4: Evaluation of the Education and Participation Components, Ghana Upper Region Water Programme Evaluation Project, 1985.

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5 Simpson-Herbert, M. Methods for Gathering Socio-Cultural Data for Water Supply and Sanitation Projects, 1980.