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EVALUATION OF HEALTH AND SOCIAL BENEFITS OF SPRINGS CAPPED FOR IRRIGATION, FURTHER ADAPTED FOR DOMESTIC USE IN CENTRAL TUNISIA

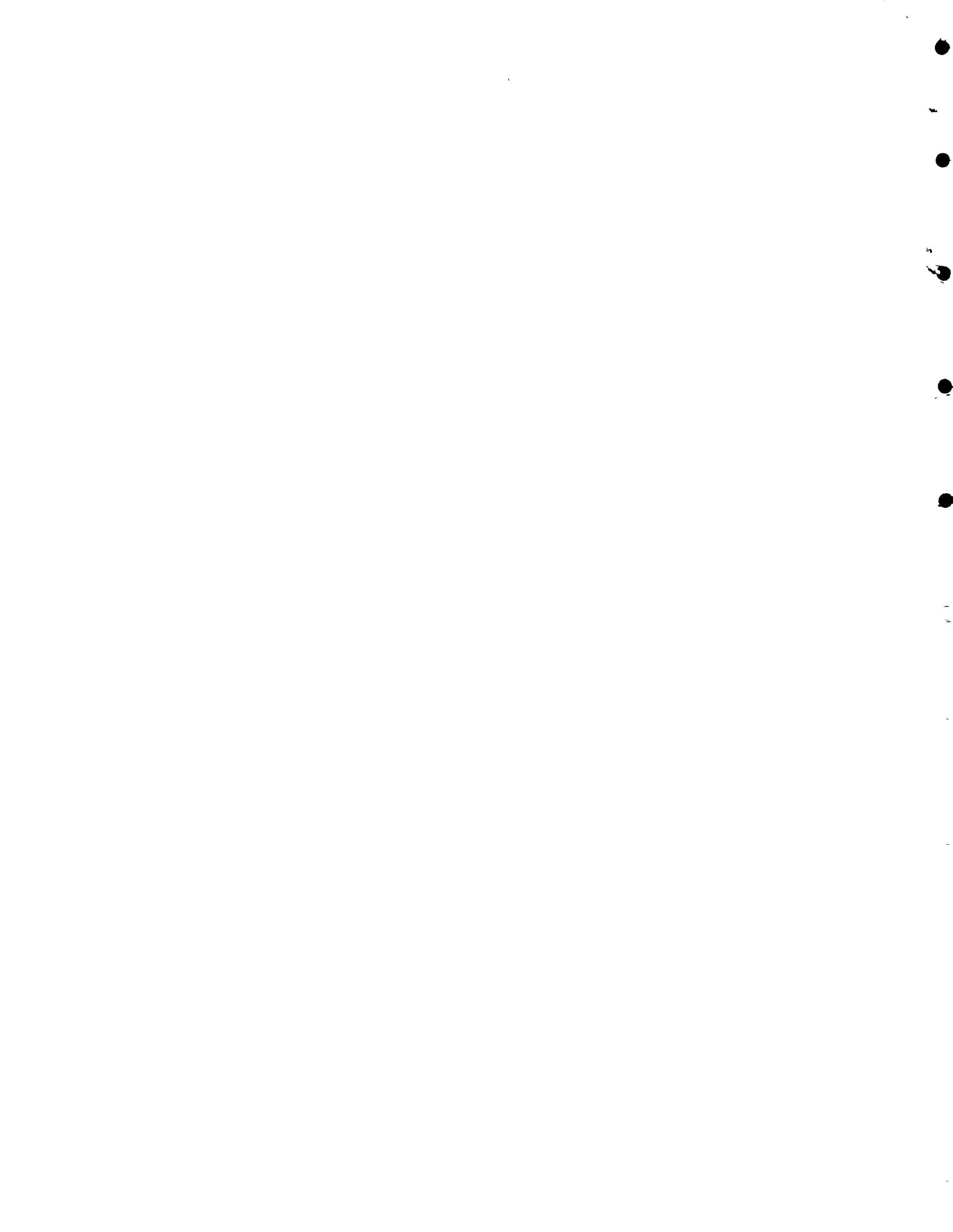
WASH FIELD REPORT NO. 84

MAY 1983

The WASH Project is managed by Camp Dresser & McKee Incorporated. Principal Cooperating Institutions and subcontractors are: International Science and Technology Institute; Research Triangle Institute; University of North Carolina at Chapel Hill; Georgia Institute of Technology—Engineering Experiment Station.

Prepared for:
USAID Mission to the Republic of Tunisia
Order of Technical Direction No. 120

824-3116



**WATER AND SANITATION
FOR HEALTH PROJECT**



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May 24, 1983

Mr. James Phippard
Mission Director
USAID Tunis
Tunisia

Attention: Mr. Frank Kerber

Dear Mr. Phippard:

On behalf of the WASH Project I am pleased to provide you with 10 (ten) copies of a report on Evaluation of Health and Social Benefits of Springs Capped for Irrigation, Further Adapted for Domestic Use in Central Tunisia.

This is the final report by Dr. Raymond B. Isely and is based on his trip to Tunisia from November 27 to December 7, 1982.

This assistance is the result of a request by the Mission on August 11, 1982. The work was undertaken by the WASH Project on September 25, 1982 by means of Order of Technical Direction No. 120, authorized by the USAID Office of Health in Washington.

If you have any questions or comments regarding the findings or recommendations contained in this report we will be happy to discuss them.

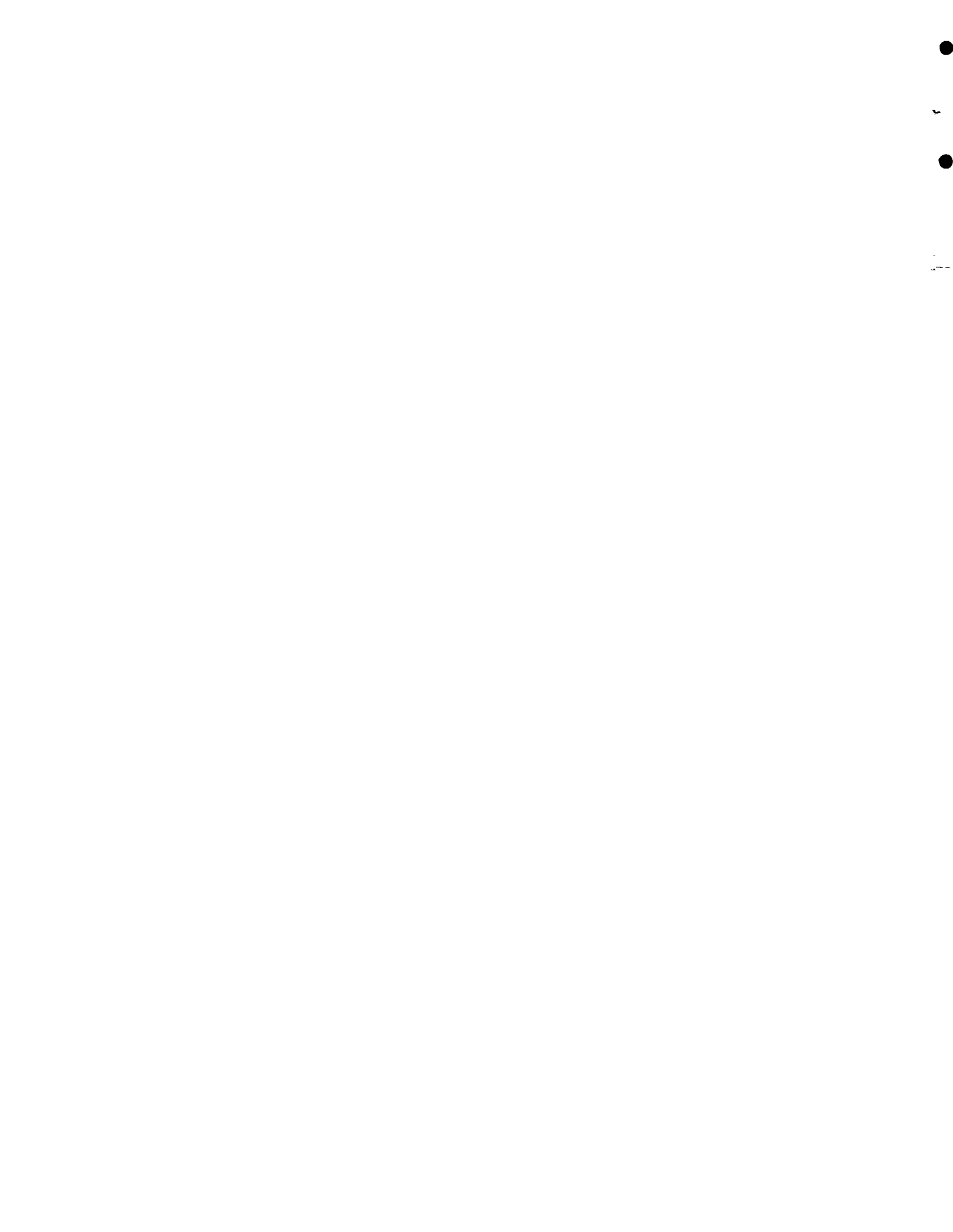
Sincerely,

Dennis B. Warner

Dennis B. Warner, Ph.D., P.E.
Director
WASH Project

cc. Mr. Victor W.R. Wehman, Jr., P.E., R.S.
AID WASH Project Manager
S&T/H/WS

DBW:cdej



WASH FIELD REPORT NO. 84

EVALUATION OF HEALTH AND SOCIAL BENEFITS
OF SPRINGS CAPPED FOR IRRIGATION, FURTHER ADAPTED
FOR DOMESTIC USE IN CENTRAL TUNISIA

Prepared for the USAID Mission to the Republic of Tunisia
under Order of Technical Direction No. 120

ISN ~~01185~~ 3116

Prepared by: 824 TNKA83

Raymond B. Isely, M.D., M.P.H., D.T.M. =KASSERINE

May 1983

U.S. Agency for International Development
Office of Health, Bureau for Science and Technology
Washington, DC 20523

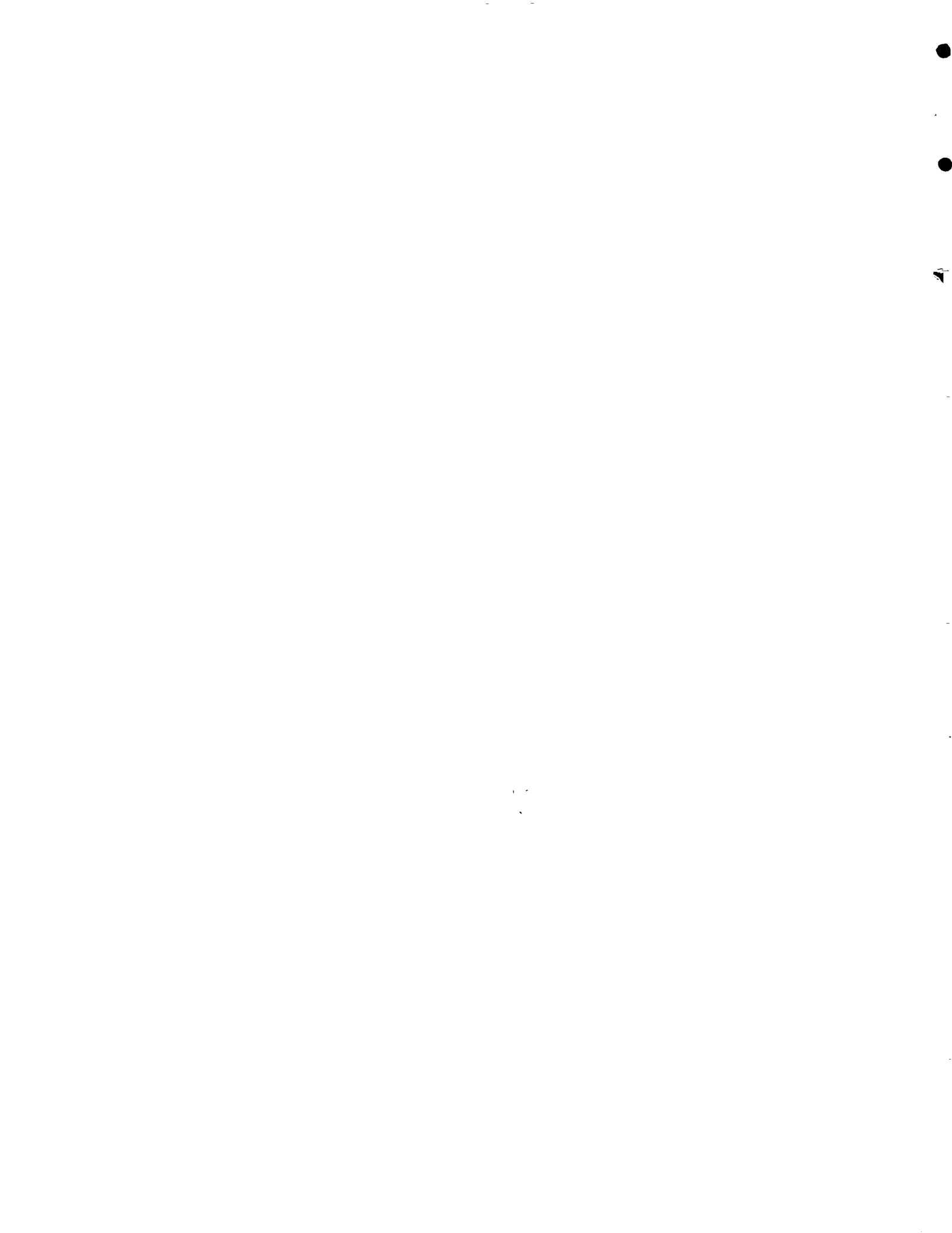
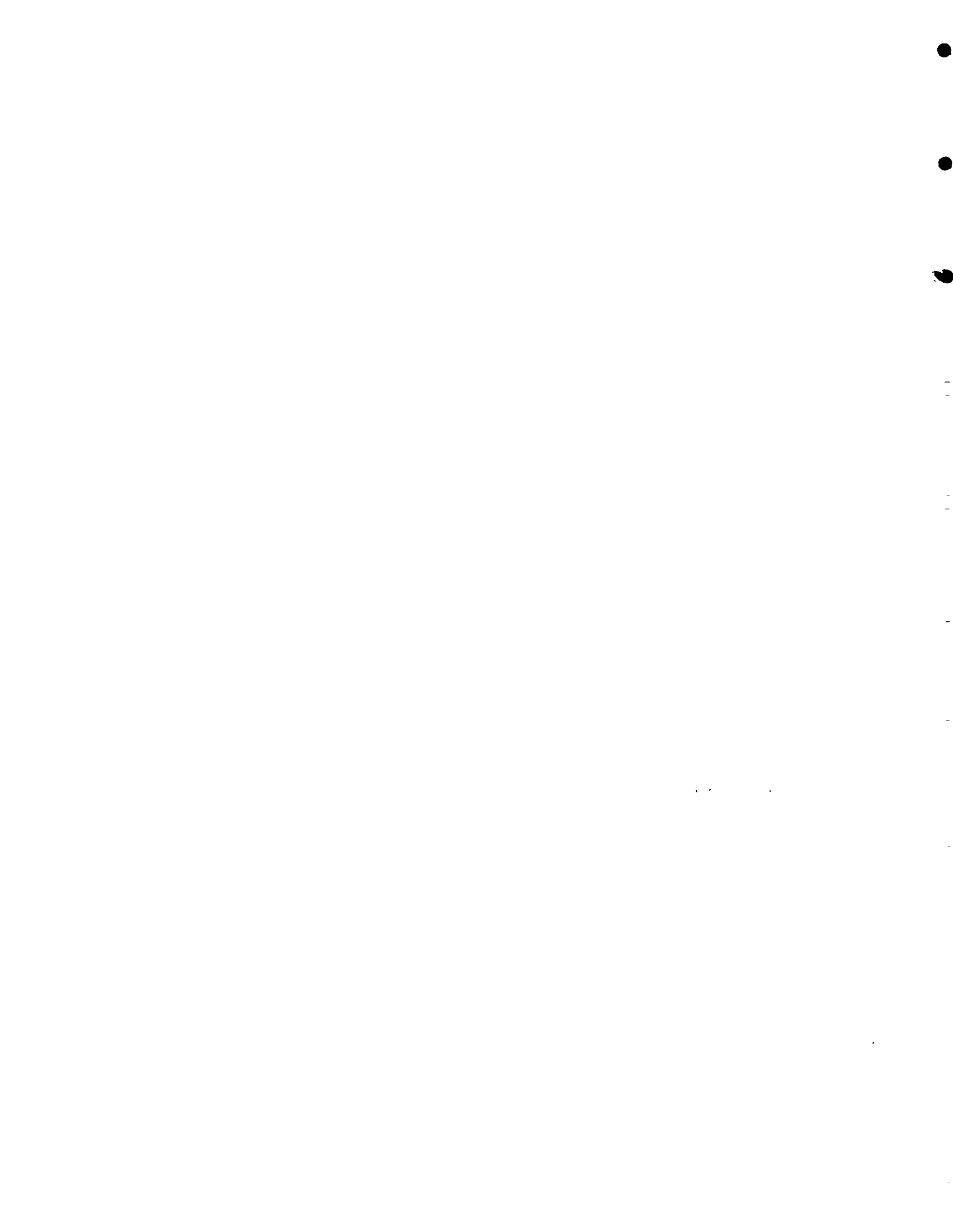
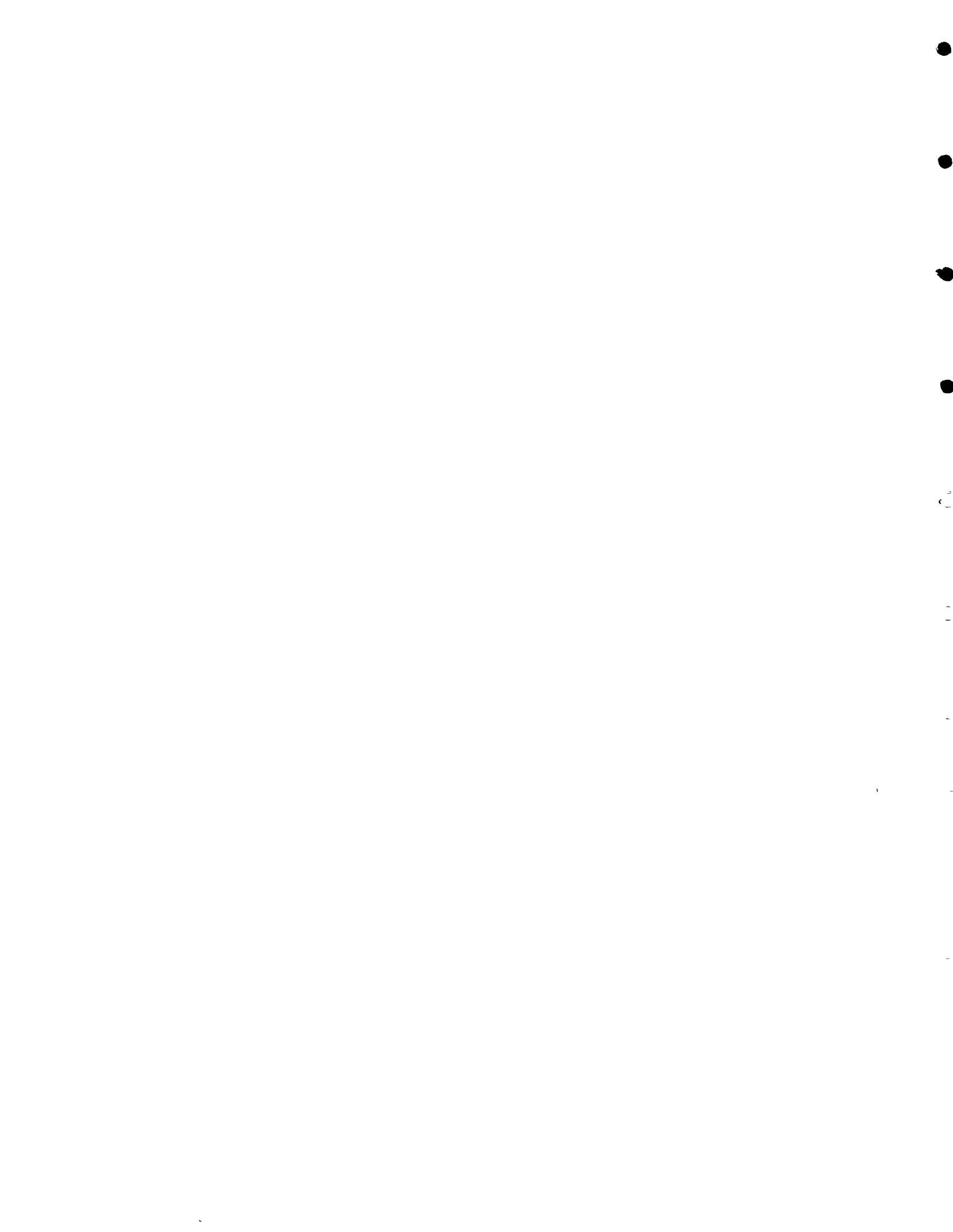


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ACKNOWLEDGEMENTS

This part of the evaluation required an intensive one-week field survey which would have been impossible without the cooperation of a great number of people. From the Central Tunisia Development Authority (CTDA) we had the full-scale and indispensable support of its Director, Rachid Bougatef as well as the assistance from Mousba Hadji, Mohamed Sakri and M'Della Bouazizi in the planning of the survey and the sorting of questionnaires. Mr. Hamsi helped us in choosing the survey sites. Saida Saydi, Zohra Boughenmi, Zina M'Nasri, Mohamed Tahar Missaoui and M'Della Bouazizi performed nobly as surveyors and patiently corrected the errors in their questionnaires. It was thanks to the support of Mongi Ghashem, Director of the Hospital, that Mohamed Missaoui was able to work with the team. We also had the much-appreciated help from the drivers of the CTDA. Last but not least the warm welcome extended to the team by the representatives of the CTDA at Foussana and Thala and especially that by local people surveyed, was greatly appreciated.



Chapter 1

INTRODUCTION

This report is based on a health and social survey carried out among user populations of eight springs in the governorat of Kasserine from November 27 through December 3, 1982. The eight springs included six that had been improved for domestic use by means of the construction of a small collection area just above the larger reservoir constructed for irrigation purposes. Two of the springs included in the survey had not been so improved.

Spring improvement for irrigation is a part of a larger project financed by USAID called "Water Resource Management for Small Farmers" (Project No. 664-0312-3). This subproject aims at capping about a hundred springs in the region served by the Central Tunisia Development Authority (CTDA) which contains all of the governorat of Kasserine and parts of the governorats of Gafsa, Sidi Bouzid, Siliana and Kef. During the course of this subproject it was decided to modify a certain number of springs so as to facilitate their use by the surrounding populations, given that these populations were already using the irrigation springs for domestic purposes. Before the survey some 20 springs had been modified in this way.

This survey was an integral part of a mid-term evaluation of the entire project, but had a special objective--to demonstrate any possible benefits, whether of a health or social nature, accruing to the user populations so as to encourage future planners of irrigation projects to include modifications for domestic use. The USAID Mission in Tunis cabled a request to AID Washington on August 11, 1982, in consequence of which Order of Technical Direction No. 120 was issued on September 25, 1982, by the AID Office of Health (see Appendix A).

The visit of Dr. Isely to carry out the survey lasted from November 27 to December 7, 1982.

The survey itself took place during three days, and 89 households composed of 474 persons were contacted. Interviews with women only were carried out by a team of interviewers supported by three administrative/coordinating persons and two chauffeurs using a questionnaire designed and developed by the Research Triangle Institute in the United States (see Appendix B).

The results are presented in Tables 1A through 3C (see Appendix C). The analysis is limited to simple tabulations, calculation of frequencies, and percentages.*

*Further analysis of interrelationships such as that between distance to the spring and health and social benefits or that between the perception of the householder of spring improvement and such benefits would be possible if requested since the means, standard deviations, standard errors, and variances are already registered in the computer. It would be a simple matter to set up the variables and the relationships, reaggregate the data, and perform appropriate statistical tests.

Because of the limits on the analysis of the data, the conclusions of this report are also limited.

In this report there are successively a brief description of the springs and their surroundings, a description of the methods employed during the survey, and the results, conclusions, and recommendations possible within the limits of the analysis.

Chapter 2

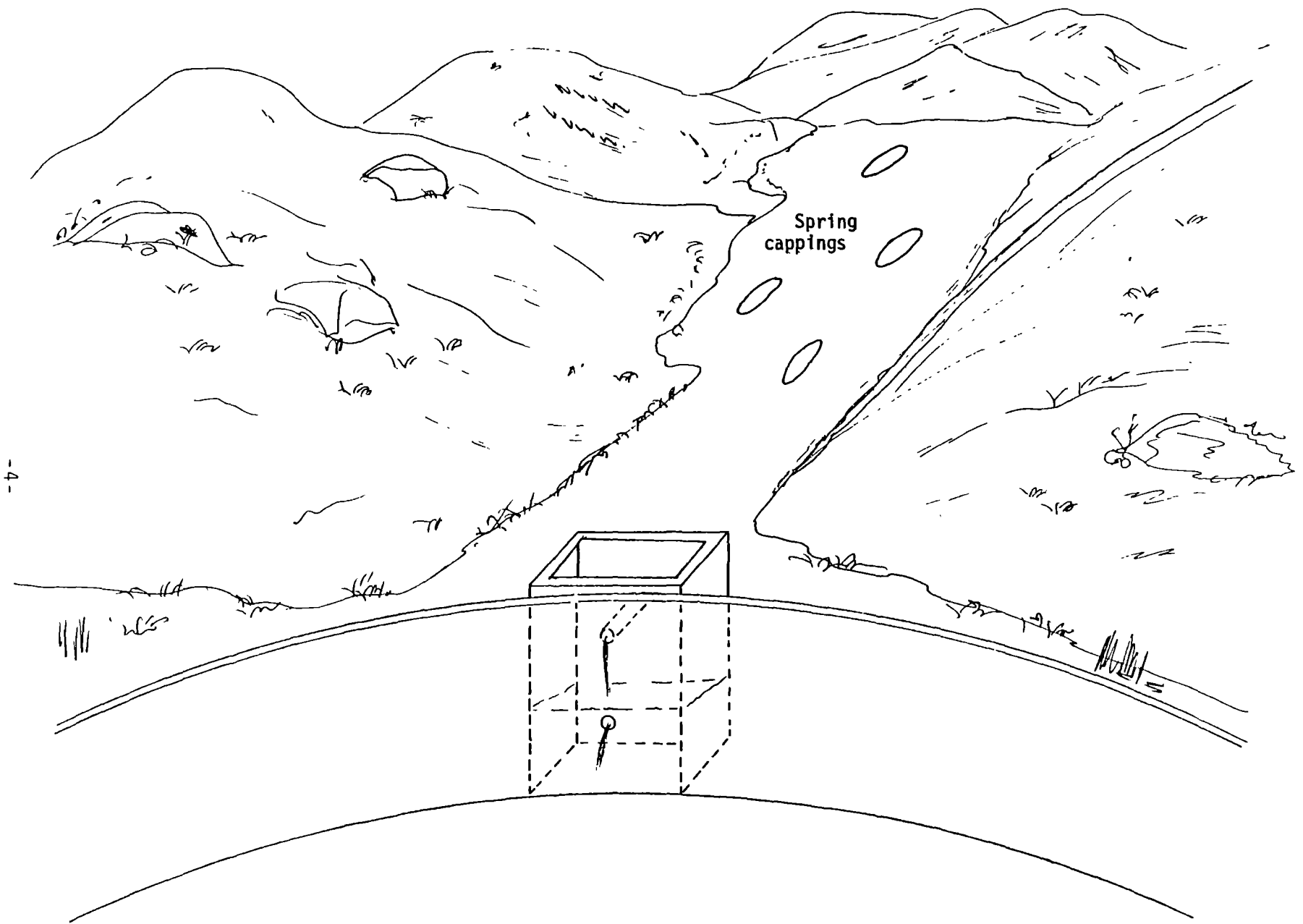
DESCRIPTION OF THE SPRINGS AND THEIR ENVIRONS

Each spring was improved in the same way (see Figure 1). The modification consists essentially of a basin built along side the larger tank that distributes water into the irrigation canals. By means of a pipe the water flows into this small basin for domestic use before going into the irrigation system. Eighteen springs were modified in this way by the Central Tunisia Development Authority within the context of a project financed by USAID (Project No. 664-0312-3, Irrigated Perimeters Improvement for Small Farmers). Most of the improvements were accomplished during the year preceding the survey here described.

Each installation of this type is, in fact, the result of spring cappings which bring water to the tank by means of underground pipes. The total cost of these installations varied from 1,070 to 3,824 dinars (US\$1,682 to \$6,013). The adaptations for domestic use constituted only a small portion of this amount.

The user and non-user populations live around the springs within distances varying from 100 meters to several kilometers (sometimes 10 to 15 kms). The primary users are the owners of the land on which the springs are located. An agreement between the owners and the CDTA is required by the USAID contract. One of the conditions of this agreement is that the owners allow the neighboring populations to use the spring.

The land surrounding the installations is generally rocky and uneven. The areas are often cut by rivers (oued) situated some 100 meters or so from the springs, thereby making access by the users difficult when it rains. The presence of the owners' dogs also makes access difficult in some cases.



-4-

Figure 1. Diagram of Spring Capping, Water Drawing Area and Irrigation Basin

Chapter 3

DEVELOPMENT OF THE SURVEY

3.1 Selection of the Springs

The Central Tunisia Development Authority chose eight springs for the survey of which six were improved and two were not. The latter two were already included in a future improvement program. At least one spring was chosen from each of three delegations in the governat of Kasserine. The authorities representing each delegation were informed of the arrival of the survey team.

3.2 Sampling

It was decided to use the household as the basic unit for sampling. Given the absence of lists of families using the springs and the lack of detailed maps of the springs and their environs, the only way to identify individual households for sampling was to wait until the survey visit and then draw up a rough map showing all the houses in sight and to choose households at random from the map. For this purpose a chart of random figures was used.

This method was generally satisfactory. In most cases, it was possible to count between 30 to 50 households, from which 16 to 20 were chosen, depending upon the number of interviewers. For springs with fewer than 16 user household, all the households were included in the sample.

3.3. The Interviewers

Six interviewers participated in the survey, but only four of them on a regular basis, which partly explains the variation in the number of households queried in a single day. Among the six interviewers, four were women. One of the men was a sanitary technician well known by the people. Three of the women were secretaries at CDTA, and the fourth was an economist with university training. Each of the investigators had had at least six years of secondary school.

To help the team, there was also a member of the CTDA staff who is in charge of the drinking water program, an CTDA technician who had worked in the spring improvement program (both of whom were familiar with the sites and the construction), and two drivers.

3.4 Logistical Considerations

The survey was carried out in three days between 10:30 am and 5:00 pm. The team supplied with food, left Kasserine every morning at 9:00 am. Two Land-Rovers were put at the disposal of the team every day except the last.

In general, it was possible to do a survey of one spring in the morning and another in the afternoon. There was a break for lunch sometime between 1:00 pm and 5:00 pm, depending on the progress of the work.

3.5 The Questionnaires

The WASH Project assigned the preparation of the survey questionnaires to the Research Triangle Institute in the U.S. Three questionnaires were prepared (see Appendix B).

The first questionnaire was used by the team to record the results of observations on the spring. The second was used to interview the wife of the head of the family on the health of the children, the use of water in the home, and various aspects related to the transportation of water from the spring. The third questionnaire was a supplement, used only when it was necessary to question water carriers in addition to the principal woman of the household.

3.6 Training of Investigators

Seven hours were allocated to training the survey team. This training comprised:

- survey methodology
- explanation of the questions and their meaning
- methods of interviewing
- translation of the questions into Arabic.

3.7 Problems Encountered

The first problem encountered was the lack of preparation for the survey despite the fact that CTDA had been informed in advance. The result was the delay of one day at the beginning of the survey and the need to recruit the CTDA secretaries as interviewers. Despite their generally good performance, one has to admit to their inexperience in surveying. The economist from the CTDA, who was to participate in the training of the investigators, had to be elsewhere the first day, thus causing another delay in beginning the survey.

Secondly, among the problems should be included the provision of a mid-day meal for the team. A stop at restaurants had been planned in the main towns of the delegations, but the end of the first survey each day never corresponded to the opening hours of the restaurants. This was most serious the first day.

As for the two as-yet-unimproved springs, only one was worth examining. It was estimated that no one used the other spring. The result was a weakening of the comparison of users of the two types of springs.

Finally, there was the problem of time. The last day of the survey it was necessary to examine three springs, the last of which was an unimproved one. If there had been one more day, this final stage would have been less hurried.

Chapter 4

RESULTS

The survey as indicated was carried out on eight springs and their user populations. Among the eight, however, only seven were submitted to detailed study. Spring number 7, Damousse, which had never been capped, seemed to be used by no one. Consequently the results presented in the tables and discussed in the following sections are derived from the survey of these seven springs.

4.1 Results of Observations Made at the Spring Site

Table 1A presents the results of observations made of six improved and two as-yet-unimproved springs. In general, the construction of improved springs is excellent which was true for two thirds of the sample (66.7 percent) and the number of faults in the construction is relatively small (33.3 percent with leaks, 16.7 percent with cracks, and 16.7 percent with other undesirable features). In 83.3 percent of the springs the flow was estimated as strong. Of the two unimproved springs only one had a strong flow. Despite good flows in most of the improved springs, access to the spring and the ease of drawing water were perceived by the survey team as easy in only 50 percent and 33.3 percent of the springs respectively. Access and ease of drawing water were perceived as very difficult in both the unimproved springs.

When observers estimated the probable changes in access and ease of drawing water since improvements, they recorded that access had probably been made easier in 33 percent, had stayed the same in 50 percent, and was more difficult in 16.7 percent; as for ease of drawing water the figures were 66.7 percent easier, 33.3 percent the same, and 0 percent more difficult.

4.2 Results of Interviews on Household Composition and Health Status

Table 2A presents the results of interviews on household composition and health status. As indicated in the table, the interviews were carried out in 89 households, representing a total of 474 persons, among whom 73 households or 408 persons were users of improved springs and 16 households or 66 persons were users of the single unimproved spring.

The age distribution of these two populations is not remarkable except that there seems to be an elevated proportion of young children (30 percent) in the population using the unimproved spring. The proportion of young children in households using improved springs was on average only 18 percent. In contrast the proportions of school-age children in these populations are reversed (24 percent in the population using the unimproved spring; 35 percent the population using the improved springs). The proportion of children 0-14 in both populations is however the same. One can say then that the two populations are comparable.

These two population groups were compared according to the two health questions posed, namely the rate of diarrhea among the young children (0-4) and the rate of skin infections among all children under 15 years of age. The

results are also in Table 2A. With respect to these two parameters the differences between populations having access to an improved spring and those with access to an unimproved spring are remarkable. According to the women interviewed, 80 percent of the young children in the unimproved group had had diarrhea during the week preceding the interview, whereas only 30.3 percent of the young children in the improved group had diarrhea in the same time period. As for skin infections 36.1 percent of the children with unimproved springs but only 16.8 percent in the improved category had a skin infection at the time of the interview.

The mean durations of the diarrhea in the two groups were roughly the same (5.0 days in the improved, and 4.8 days in the unimproved category).

Finally, in examining the perception of the women who use an improved spring one is impressed with the proportion of these women who perceive very little change in the rates of these two infections among young children they know (43 percent and 45 percent respectively). It is however notable that 15.5 percent thought there was less diarrhea and 23.9 percent less skin infection. Slightly less than 10 percent of the women had no idea whether there had been improvements in diarrhea rates or not, 28.2 percent could not say that skin infection rates had improved

4.3 Results of Interviews on Water-Related Activities

Table 2B contains the results of interviews on the use of water. The various water-related activities (handwashing, bathing, doing dishes, and clothes washing) tended to be from 20-100 percent more frequent among users of an improved spring than among users of an unimproved spring. Users of improved springs tend to carry on these activities more at home than users of the unimproved spring (except bathing).

In asking the women in the improved group their opinion concerning possible changes in the frequencies of these activities since spring improvement, it is found that from 30-45 percent (depending on the activity) think the activity is more frequent. More thought there had been no change, but very few declared the activities occurred less often.

When asked about the quantity of water obtained from their respective springs, 33.8 percent of those with improved springs thought they had more than enough, 50.7 percent enough, and only 14 percent too little water. The figures for the unimproved spring were none more than enough, 25 percent enough, and 75 percent too little.

Concerning the use of soap for handwashing, more than 90 percent of each group of households said there was soap available. All of the women in the improved group and 93 percent of those in the unimproved group said that at least one person in the household uses soap for handwashing on a regular basis.

The manner of bathing was the subject of the last question in this section. Comparing the two populations one finds that 22.5 percent of the first group take a sponge bath whereas none in the second group do so. The other notable difference is found in comparing the number who bathe in a pond or in some

other place where the percentages are 16.9 percent for the improved group, and 44 percent for the unimproved group. The chief other means of bathing appears to be the use of a single bucket of water in a special room of the house. One soaps up and then pours the water over oneself.

4.4 Results of Interviews on Factors Associated with Obtaining Water

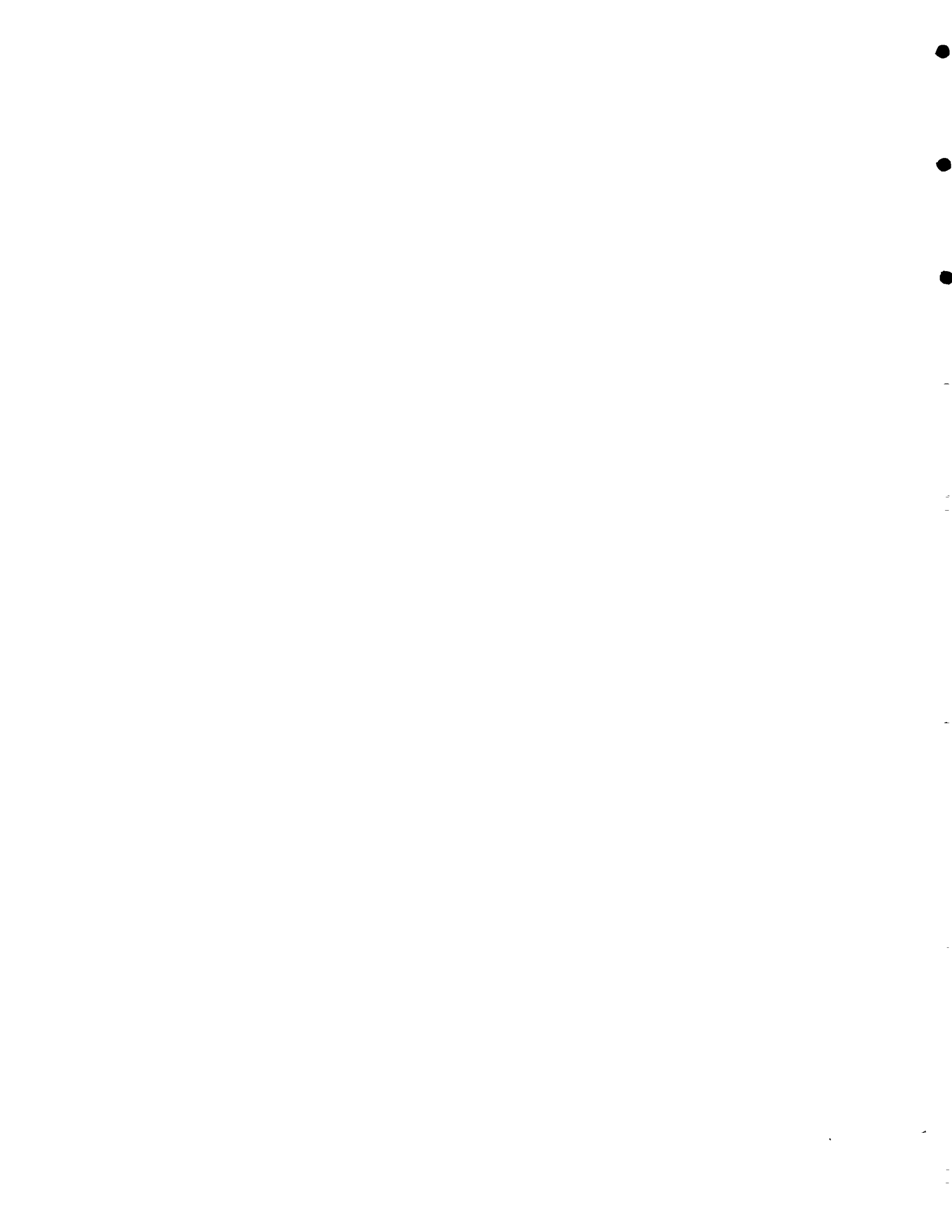
Water-carrying and associated factors are the subject of the results presented in Table 2C. When the two populations are compared no important differences show up in the quantities of water carried from the spring per day, in the distance traveled, nor in the time spent drawing water. Women in both groups bring home 75-80 litres of water a day,* leading to average household consumptions of 92.2 and 81.6 litres per day and individual consumptions of 16.0 and 19.8 liters per day in the two groups respectively. Women in the improved group travel slightly farther (922 vs 750 metres) but spend roughly the same amount of time per day (75 and 80 minutes respectively for each trip).

When the perceptions of ease of access to the spring and drawing water from the spring are compared, however, remarkable differences emerge. Fifty percent with an improved spring think that access to their spring is easy or very easy, whereas this percentage is only 29.4 percent among users of the unimproved spring. As for drawing water 56 percent in the improved group think it is easy, but only 6 percent of the users of unimproved springs think so.

Finally in seeking the perceptions of those women with an improved spring of change in access and drawing water, one finds that 41 percent of the group declare that the spring was more difficult to approach before the improvement, 38.3 percent that drawing water was more difficult, and 39.5 percent that they are now carrying more water than before; 35.8 percent, 14.8 percent, and 42 percent respectively think there has been no change and 18.5 percent, 42 percent and 14.8 percent think that access to the spring and drawing water were less difficult or they carried more water before the improvements.

In Tables 3A-C comparisons of the findings between the two populations are summarized.

*Keeping in mind that in several households there were multiple water carriers.



Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Results of the Data Analysis

These results can be grouped into four categories:

- o Those concerning the quality of construction of the improved springs.
- o Those concerning the perceptions of women interviewed regarding the health of their children.
- o Those concerning their perceptions of water-related activities of the family.
- o Those related to their perceptions of obtaining water.

5.1.1 Quality of Spring Construction

According to observations made during the survey (Appendix D) five of the six improved springs had the same major deficiencies, notably:

- o The collection site was too narrow to be used by more than one person at a time leading therefore to long waiting lines. It would be very desirable to widen the area so as to permit two persons to have access at the same time.
- o The drain is generally placed too high, resulting in the accumulation of water in the bottom of the collection area, where women are thus obliged to stand barefoot in cold water.
- o The absence of steps down into the collection area makes the access of women to the collection area difficult, since the collecting area is quite deep in most cases. The addition of steps to the basic design is recommended.
- o The total neglect of the path leading to the spring. In some cases a rapid and rocky descent make access to the spring quite difficult. Some smoothing out of the path just beside the spring or the creation of steps where the descent is rapid would be helpful.

It is estimated that making these modifications in spring improvement would require very little financial outlay and would be technically simple to realize. It is recommended that some changes be made in the basic design of spring improvement.

In parallel with these general problems one should also mention a problem associated with the fact that these springs are for the most part on private land. At Ain Bechir we found three improved springs in proximity to each other on a single private landholding. One wonders how such an irrational distribution of project resources occurred.

Finally, at Ain Damousse there was a spring that no one uses. Why was this spring on the list of those to be improved? Why had no one eliminated it since the fundamental criterion one uses for improving a spring is that it should be used by the surrounding population.

5.1.2 Results from Questions Concerning the Health of Children

There are clear differences between the two populations in the proportion of children under five years of age who had diarrhea in the week before the interview and in the proportion of children age 0-14 with skin infections. These differences appear to be great, but what do they mean? Without the application of statistical tests it is difficult to draw any firm conclusions, but even if there were any statistically significant figures it would be difficult to conclude there is a true difference. Since there is no difference between the two populations in the quantity of water brought to the home each day and since the majority of women questioned felt there had be no change in the rates of these two conditions, one would have to remain doubtful of the significance of these results. The small sample sizes and the great variance in the data make statistical significance unlikely in any case.

5.1.3 Results from Questions on Water-Related Activities in the Home

According to the perception of the women questioned all water related activities are more frequent among the population using an improved spring than among the population using an unimproved spring. Without being able to draw definitive conclusions, one is nevertheless forced to ask if these are not among the most significant results of this survey. Theoretically an increased frequency in these activities should be the first result of more accessible and easier to obtain water. Is this result related to the strong minority of women with an improved spring who think that their families now engage in all these activities (handwashing, bathing, dishwashing, and clothes washing) more often than before the spring improvement? Do these findings describe a threshold response to the spring improvements wherein women first perceive of a change in the spring and (see next section) then of a change in frequency of water related activities whether or not it is true, and then one finds objectively that these activities are more frequent in the improved group?

Another finding is the tendency of members of households benefiting from an improved spring to carry on all these activities (except bathing) in the home, rather than at the spring. Can this finding be so if the quantity of water carried to the home has not increased greatly (39.5 percent thought it had increased, 42 percent no change)?

The presence of soap seems universal and the use of soap is identical between the two populations.

Finally there is a curious difference between the two groups concerning the manner of bathing. What does it mean that people with an improved spring take more sponge baths and that those with an unimproved spring take more baths at

the spring? Does this difference indicate a perception already implanted among the first population that water is cleaner and more abundant so that family members can bathe at home?

5.1.4 Results from Questions Concerning the Search for Water

Only the results concerning the perceptions of access and water drawing are different between the two populations. Those with an improved spring tend more to think that access and water drawing are easy than those using an unimproved spring.

There is also a weak tendency for women with an improved spring to view access and water drawing as easier than before the improvements, a result that corresponds to the observations of the survey team. It remains to be analyzed whether these women are the same as those who report the increased frequencies of water-related activities among family members.

5.2 Evaluation of these Results

The analysis of results reported here is based exclusively on a comparison of frequencies and percentages of responses among populations using improved and unimproved springs as well as on a comparison of the springs themselves. This analysis can produce only limited results, first, because the population served by the unimproved spring is probably too small to serve as a valid control. The 16 households with their 66 inhabitants who use the single unimproved spring in the sample represent only 18.8 percent of the individuals and 12.7 percent of the households. It is indeed regrettable that it was not possible to carry out the survey among the population of at least one more unimproved spring. This handicap requires that a different mode of analysis be used.

5.3 Recommendations of Further Analyses to Pursue

After studying the raw data and the limited results derived from a comparison of percentages and frequencies of responses between the two populations, it is strongly recommended that two further lines of analysis be pursued.

5.3.1 Comparison of groups of the population according to their perception of changes in access and in the ease of drawing water (improved springs only)

The groups should be broken down as follows:

- o Those that think the access is easier since improvement.
- o Those that think drawing water is easier.
- o Those that think both are easier.
- o Those who think there has been no change.

These four groups could then be compared with regard to all the independent variables in the survey (health, water use, water quantity, and other perceptions).

This approach to analysis is based on the observation that women who perceive changes in access and water drawing use the same springs where the survey team made identical observations.

5.3.2 Comparison of groups of the populations according to the distance to the spring (improved and unimproved springs)

Because of the important influence of the distance traversed to reach the spring on the volume of water brought to the home and the absence in this survey of any variation in this volume among springs, it is imperative to carry on this analysis in order to elucidate the role of distance (in actual fact, a proxy for convenience). It is possible for example that the high levels of diarrhea and skin infections among the children of populations using the unimproved spring may be due to the long distances that certain women must walk to reach the spring and consequently to the little water they can bring home rather than to the fact that the spring is not improved.

One can rearrange the household level data according to the distance from the spring, divided into several categories:

- households at less than 100 meters
- households at between 100 and 300 meters
- households at more than 300 meters.

These groups would then be compared according to the same independent variables mentioned above.

5.4 Recommendations for Action

What can be recommended as actions to pursue? Two other program recommendations can be made.

5.4.1 Modification of the design for spring improvement

No further analysis of data seems necessary to justify a modification of the construction design so as to remedy the four problems observed during the survey, notably:

- the narrowness of the collection area
- the drain too high
- the absence of steps
- the failure to improve the path.

5.4.2 Inclusion of domestic adaptations of spring improvement and other domestic water installations in future irrigated perimeter projects

The justification for this recommendation is based on results of the survey that seem already established.

1. The perception on the part of a majority of those using an improved spring that access to the spring and the drawing of water are easy.
2. The further perception of a strong minority of the users of improved springs that access and water drawing are easier than before the improvement.
3. The fact that water related activities are more frequent among users of improved springs than among those that use unimproved springs and the tendency of the first group to carry on most of these activities at home.
4. The coincidence of the perception by householders of improvement in access and water drawing among the users and the observers of the same springs.

In conclusion certain evidence of social benefits of the spring adaptations emerge in support of continuing these adaptations in the future. Despite the tentativeness of this evidence it is nonetheless quite suggestive. It appears there is already the idea in the perceptions of the women questioned that water in the improved springs is accessible and easy to draw and without doubt among some more accessible and easier to draw than it was before. Finally, there are definite low-cost steps that program planners can take to positively and concretely improve the design of the spring improvements so that accessibility and water drawing are further improved.



APPENDIX A

Water and Sanitation for Health (WASH) Project
Order of Technical Direction (OTD) Number 120
September 25, 1982

TO: Dr. Dennis Warner, Ph.D., P.E.
WASH Contract Project Director

FROM: Mr. Victor W. R. Wehman Jr., P.E., R.S. *VWR*
AID WASH Project Manager
AID/S&T/H/WS

SUBJECT: Provision of Technical Assistance Under the WASH Project Scope of Work
for USAID/Tunisia

REFERENCES: A) Tunis 5993, dated 11 Aug 82
B) State 255582, dated 11 Sept 82
C) Tunis 6893, dated 16 Sept 82
D) Tunis 7059, dated 21 Sept 82

1. WASH contractor requested to provide technical assistance to USAID/Tunisia as per Ref A, para 1-4 and Ref. B, para 1-3.
2. WASH contractor/subcontractor/consultants authorized to expend up to 16 person days of effort over a four (4) month period to accomplish this technical assistance effort.
3. Contractor authorized up to 10 person days of international per diem to accomplish this effort.
4. Contractor to coordinate with NE/TECH/AGR (Mr. George Armstrong), NE/TECH/HPN (Mr. Joe Haratani), NE/PD/ENGR (Mr. James Habron), USAID/Tunisia (Mr. Frank Kelber—Program Officer and Ms. Dorothy Young—Rural Development Officer) and should provide copies of this OTD along with periodic progress reports as requested by S&T/H or the NE EUR staff.
5. Contractor authorized no repeat no international round trips. Contractors consultant will be in Tunisia in conjunction with separate OTD which will provide authorization for international round trip.
6. Contractor authorized to initiate local travel within Tunisia to view, review and evaluate projects described under Ref. A. Local travel NTE \$400 without the written approval of the AID WASH Project Manager.
7. Contractor authorized to obtain local secretarial, graphics, reproduction or interpreter services in Tunisia as necessary and appropriate to accomplish tasks. These services are in addition to and above the level of effort specified in para 2 and 3 above NTE \$900 without the prior written approval of the AID WASH Project Manager.
8. Contractor authorized to provide for car/vehicle rental if necessary and appropriate to facilitate effort. USAID encouraged to support vehicle needs of WASH consultant and provide vehicles support if available and appropriate.

9. WASH contractor will adhere to normal established administrative and financial controls as established for WASH mechanism in WASH contract.
10. WASH contractor should definitely be prepared to administratively or technically backstop field consultants and subcontractors.
11. Contractor to provide overall final draft coordinated report to USAID/Tunisia before consultant leaves Tunisia. Contractor to provide USAID with final report within 30 days of return of consultants to the U.S.
12. New procedures regarding subcontractor cost estimates and justification of subcontractor and consultants remain in effect.
13. USAID/Tunisia, NE/TECH/AGR and NE/TECH/HPN should be contacted immediately and technical assistance initiated as soon as convenient to USAID.
14. Appreciate your prompt attention to this matter. Good luck.

WASH
Prj
Dir.

ACTION
COPY

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Department of State

INCOMING
TELEGRAM

PAGE 01 TUNIS 05993 111349Z 8328 013975 AID4975
ACTION AID-00

ACTION OFFICE STHE-01
INFO NEPO-04 NECP-03 NETC-04 NENA-03 PPCE-01 POPR-01 PPPB-03
SAST-01 MHS-09 RELO-01 MAST-01 /032 AS 811

INFO OCT-00 NEA-07 AMAD-01 /043 W
-----262275 111551Z /38

R 111039Z AUG 82
FM AMEMBASSY TUNIS
TO SECSTATE WASHDC 8458

UNCLAS TUNIS 5993

AIDAC FOR VICTOR WEHMAN

E. O. 12356 N/A
SUBJECT: INTERIM EVACUATION OF SUB-PROJECTS
684-0312.3 SMALL HOLDER IRRIGATION; 684-0312.2
DRYLAND RESEARCH

McTulbin
Arthur
Webman

1. USAID IS PLANNING TO UNDERTAKE JOINTLY WITH THE CTDA (CENTRAL TUNISIA DEVELOPMENT AUTHORITY) IN KASSERINE A MID-PROJECT EVALUATION OF TWO SUBJECT PROJECTS. EVALUATION IS CURRENTLY SCHEDULED TO START AROUND MID NOVEMBER AND LAST FOR ABOUT THREE WEEKS. THE PROPOSED THREE PERSON TEAM IS COMPOSED OF ONE DRYLAND AGRONOMIST, ONE IRRIGATION SPECIALIST AND ONE SOCIOLOGIST/ECONOMIST. SCOPES OF WORKS, FUNDING SOURCES AND MODE OF CONTRACTING WILL BE SENT IN A FOLLOW UP CABLE.
2. REGARDING THE EVALUATION OF THE IRRIGATION SUB-PROJECT, USAID/TUNIS REQUESTS SERVICES OF WASH SPECIALIST IN SOCIAL AND HEALTH BENEFITS WITH EPIDEMIOLOGY BACKGROUND. FRENCH 3 PLUS HELPFUL. HE WILL SERVE IN A FOUR MAN TEAM TO EVALUATE THIS PROJECT
3. THE REQUESTED SERVICES ARE FOR ONE WEEK CONSULTATION TO EVALUATE AND PROVIDE RECOMMENDATIONS REGARDING WATER SUPPLY, SANITATION AND HEALTH INCIDENCE FROM 18 IMPROVED NATURAL SPRINGS. THE TIMING OF THE CONSULTATIONS CAN BEARRANGED SO AS TO COINCIDE WITH COMPLETION OF RURAL WATER AND SANITATION CONFERENCE TO BE HELD IN KASSERINE NOVEMBER 23-26, 1982 AND THEREFORE TO USE SERVICES OF EITHER PIERRE LEGER, FRED ROSENSWEIG, RAY ISELY, OR OTHER WASH SANITATION EXPERT WHO WILL BE PARTICIPATING IN CONFERENCE
- 4 THIS EVALUATION PLAN WAS DISCUSSED WITH ISELY ON MAY 24 IN TUNIS
- 5 PLEASE ADVISE WHEN POSSIBLE CANDIDATE IDENTIFIED CUTLER

Received ST/H (Webman) 8-13-82
Passed to WASH 8-13-82

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OUTGOING
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PAGE 01 STATE 255582 4890 038560 AIC0391
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ORIGIN OFFICE STHE-01
INFO NETC-04 NENA-03 S-ST-01 ENGR-02 RELO-01 MAST-01 7M-20
/013 A0

INFO OCT-00 NEA-07 /042 R

DRAFTED BY AID/ST/H/WS, V WEHMAN
APPROVED BY AID/ST/H, C A PEASE
AID/NE/TECH, B TURNER (INFO)
AID/NE/TECH/AD, G ARMSTRONG (PHONE)
AID/NE, K EIL (PHONE)

McJunkin
Austin
Wehman
VWV

P 110421Z SEP 82 -----311410 110715Z /38

FM SECSTATE WASHDC
TO AMEMBASSY TUNIS PRIORITY

UNCLAS STATE 255582

AIDAC

E O 12356 N/A
TAGS

SUBJECT INTERIM EVALUATION OF SUB-PROJECTS
664-0312 3, SMALL HOLDER IRRIGATION, 664-0312 2, DRYLAND
RESEARCH

REF. A) TUNIS 5993

1. REFERRING REF A, PARA 2, ST/H AND WASH PROJECT
PLEASED TO PROVIDE WORKSHOP MEMBER SPECIALIST IN SOCIAL
AND HEALTH BENEFITS WITH STRONG EPIDEMIOLOGY BACKGROUND
FOR A PERIOD OF UP TO 10 DAYS AFTER COMPLETION OF RURAL
WATER SUPPLY AND SANITATION CONFERENCE OR RAY ISLEY
WILL BE EXPERT PROVIDED

2. PLEASE SEND COPY OF DETAILED PLAN TO WASH OR ST/H/WS
(V. WEHMAN) OR PROVIDE COPY TO ISLEY WHEN HE IS IN
TUNISIA FOR COORDINATION OF WORKSHOP EVALUATION PLAN
DESCRIBED IN REF A, PARA. 4 UNCLEAR TO ISELY AND ST/H
(WEHMAN)

3. PLEASE PROVIDE DOCUMENT WITH INPUTS/OUTPUTS OF
IRRIGATION/SPRING PROJECT DESCRIBED FOR ISELY WHEN HE IS
IN TUNISIA SHULTZ

Received ST/H (Wehman) 9-13-82
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INCOMING
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PAGE 01
ACTION AID-00

TUNIS 07059 212210Z

2854 047244 AID8670

*WASH
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D.H.*

ACTION OFFICE STHE-01
INFO NETC-04 NENA-03 PPCE-01 PDPR-01 PPPB-03 STAG-02 SAST-01
ENGR-02 RELO-01 MAST-01 /020 A2 022

INFO OCT-00 AMAD-01 /036 W

-----326201 220024Z /38

R 211723Z SEP 82
FM AMEMBASSY TUNIS
TO SECSTATE WASHDC 8900

*McJunkin
Austin
Wichman*

UNCLAS TUNIS 7059

AIDAC

EO 12356- NA
SUBJ: INTERIM EVALUATION OF SUBPROJECTS

664-0312.3 SMALL HOLDER IRRIGATION

664-0312.2 DRYLAND FARMING RESEARCH

REFS: (A) STATE 255582, (B) TUNIS 6893

PER REFTEL (A) PARA 2 SCOPE OF WORK WILL BE-DISCUSSED WITH
ISELY DURING HIS TDY IN TUNIS SEPT 24 TO OCT 2.
CUTLER

*Received ST/H (Wichman) 9-23-82
Passed to WASH 9-23-82*

UNCL FIED



APPENDIX B

CHECKLIST OF THE SPRING LOCATION

The purpose of this checklist is to record important characteristics of the springs needed for the assessment of this project. It is you, the observer, who must answer these questions, based on what you see, rather than asking the spring users questions during your visit.

A. IDENTIFICATION

1. Delegation _____
2. Location code _____
3. Name of the spring _____
4. Date of spring improvement _____
5. Name of observer _____
6. Date of observation _____
7. Beginning time of observation _____
8. Time at end of observation _____
9. Duration of observation _____ minutes

B. CHARACTERISTICS OF THE SPRING LOCATION

1. Is this an improved or an unimproved spring? (Circle your answer)

IMPROVED.....1 proceed to Q. 2
UNIMPROVED.....2

- 1a. Has this spring been rebuilt or improved in some way or is it flowing directly out of the ground?

(Circle your answer)

IMPROVED OR REBUILT.....1
NATURAL FLOW.....2 proceed to Q. 7

- 1b. How has the spring been improved? _____

proceed to Q. 7

2. Carefully examine the capping of the spring at this location and indicate the quality of its construction by answering the following questions. First of all, are there any leaks in the construction resulting in a waste of water?

(Circle your answer)

YES.....1
NON.....2
I DON'T KNOW.....8

3. Are there any cracks in the cement part of the construction?

(Circle your answer)

YES.....1
NO.....2
I DON'T KNOW.....8

4. Are the furnished gutters deep enough for the runoff from the slope, or do they overflow often?

(Circle your answer)

GUTTERS DEEP ENOUGH.....1
OVERFLOW OFTEN.....2
I DON'T KNOW.....8

5. Are there other elements of construction which appear to be the cause of leaks, loss of water or contamination other than those already mentioned?

(Circle your answer)

YES.....1
NO.....2 proceed to Q. 6
I DON'T KNOW.....8

- 5a. What are the elements which cause these problems?

Leak

Loss of water

Contamination

6. Generally speaking, how would you evaluate the quality of construction at this location with regard to the protection of the spring water from contamination: Would you judge it excellent, good, average or bad?

(Circle your answer)

EXCELLENT.....1
GOOD.....2
AVERAGE.....3
BAD.....4
I DON'T KNOW.....8

7. A few questions to find out if it is easy or difficult for people to obtain water from this spring. First of all, is it difficult to get to the spring? Do you feel that it is very difficult, somewhat difficult or not difficult at all?

(Circle your answer)

- VERY DIFFICULT.....1
SOMEWHAT DIFFICULT.....2
NOT AT ALL DIFFICULT.....3 proceed to Q.8

7a. What makes the location difficult to get to? _____

8. Is it difficult to collect the water from the spring? very easy, somewhat easy, somewhat difficult or very difficult?

(Circle your answer)

- VERY EASY.....1 proceed to Q. 9
SOMEWHAT EASY.....2
SOMEWHAT DIFFICULT.....3
VERY DIFFICULT.....4

8a. Why is it difficult to collect the water? _____

9. If the water flow is compared with the stream poured from a tea pot, is it stronger, the same, or weaker?

(Circle your answer)

- STRONGER.....1
THE SAME.....2
WEAKER.....3

CONTROL A

CAPPED Spring proceed to Q. 10

UNCAPPED Spring proceed to Q. 12

10. In your opinion, has the improvement of the spring made access to the spring water easier, more difficult or inconsequential?

(Circle your answer)

EASIER.....1

MORE DIFFICULT.....2

INCONSEQUENTIAL.....3 proceed to Q. 11

- 10a. In what way is it easier/more difficult? _____
- _____
- _____

11. Has the spring capping made water collecting easier, more difficult or does it make little difference?

(Circle your answer)

EASIER.....1

MORE DIFFICULT.....2

LITTLE DIFFERENCE.....3 proceed to Q. 12

- 11a. In what way is it easier/more difficult? _____
- _____
- _____

12. During the time when you were at the spring, which activities, other than the distribution of water, were taking place?

(Circle the appropriate answers)

DRINKING.....1

WASHING.....2

BATHING.....3

WATERING OF ANIMALS.....4

OTHER (specify).....5

13. When you were at the spring, which of the following types of containers were being used to collect water?

(Circle the appropriate answers)

- RECTANGULAR PLASTIC JERRY CAN (BIDOUNE)
20 LITERS.....1
- PLASTIC BARREL (BIDOUNE)
ca. 50 LITERS.....2
- RECTANGULAR PLASTIC JERRY CAN
OTHER THAN 20 LITERS.....3
- WOODEN BARREL (BITURA)
ca. 25 LITERS.....4
- PEAR-SHAPED CERAMIC VESSEL (GOULA)
ALL SIZES.....5
- GOAT SKIN CONTAINER (GUIRBA)
ca. 30 LITERS.....6
- PLASTIC OR METAL BUCKET
ca. 10 LITERS.....7
- OTHER (specify).....8

14. Remarks: _____

3. (TO BE ASKED OF FAMILIES HAVING ONE OR MORE CHILDREN LESS THAN 5 YEARS OLD): Please give me the name(s) of the young infants or children in your household. LIST THE NAME OF EACH CHILD IN THE UPPER PART OF COLUMN 1 BELOW.
4. (TO BE ASKED ONLY OF FAMILIES HAVING ONE OR MORE CHILDREN OF SCHOOL AGE): Now, could you please give me the name(s) of school age children in your household. LIST THE NAME OF EACH CHILD IN THE LOWER PART OF COLUMN 1 BELOW.

IF THERE ARE NO NAMES LISTED IN THE TABLE, GO ON TO SECTION C. ASK QUESTION 5 ONLY FOR EACH YOUNG CHILD AND QUESTIONS 6-8 FOR ALL ENROLLED CHILDREN.

5. (TO BE ASKED ONLY FOR CHILDREN LESS THAN 5 YEARS OLD): Has (NAME OF THE CHILD) had diarrhea in the course of last week? CIRCLE "YES" OR "NO" IN COLUMN 2 ALONG SIDE OF THE NAME. IF THE ANSWER IS "NO", MARK A ZERO (0) IN COLUMN 3 AND PROCEED TO Q. 6.

5a. How many days did _____'s (NAME OF THE CHILD) last?
MARK THE NUMBER OF DAYS IN COLUMN 3 NEXT TO THE NAME.

6. (TO BE ASKED FOR ALL CHILDREN): Has _____ (NAME OF THE CHILD) had any skin infections such as boils, reddening or swelling? VERIFY ALL INFECTIONS MENTIONED BY THE PERSON INTERVIEWED BY EXAMINING THE CHILD AND THE OTHER CHILDREN AS WELL IN ORDER TO DETECT ANY SYMPTOMS OF SKIN INFECTION, THEN CIRCLE "YES" OR "NO" NEXT TO THE NAME IN COLUMN 4 OF THE TABLE.

1	2		3	4	
CHILD'S NAME	HAS HAD DIARRHEA LAST WEEK?		NO. OF DAYS DIARRHEA	DOES CHILD HAVE SKIN INFECTION?	
	YES	NO		YES	NO
	YES	NO		YES	NO
	YES	NO		YES	NO
	YES	NO		YES	NO
	YES	NO		YES	NO
	YES	NO		YES	NO
				YES	NO
				YES	NO
				YES	NO
				YES	NO
				YES	NO
				YES	NO

CONTROL A

FAMILY USER OF AN IMPROVED SPRING proceed to Q. 7

FAMILY USER OF AN UNIMPROVED SPRING proceed to SECTION C.

7. Now think about the period preceding the improvement of the spring (NAME OF THE SPRING). Since the improvement has there been among young children more cases of diarrhea than before, fewer cases or little change?

(Circle an answer)

MORE.....1
LITTLE CHANGE.....2
FEWER.....3
I DON'T KNOW.....8

8. Regarding skin infections among young children in general. Do you think that there are more skin infections among children since the improvement of the spring, fewer than before or little difference?

(Circle an answer)

MORE.....1
LITTLE CHANGE.....2
FEWER.....3
I DON'T KNOW.....8

C. WATER USE

1. I now have some questions on the way water is used in your family. First of all, how frequently do members of your family:

- a. wash their hands Number of times per day
- b. take a bath Number of times per month IF LESS THAN ONCE WRITE 00
- c. wash the dishes Number of times per day
- d. wash clothes Number of times per week

3. And where do they do that? At the spring, at home or both?

(Circle an answer on each line)

	AT THE SPRING	AT HOME	BOTH
a. wash their hands	1	2	3
b. take a bath	1	2	3
c. wash the dishes	1	2	3
d. wash clothes	1	2	3

3. Generally speaking, does your family have enough water to carry out all these tasks (bathing, washing clothes, dishes etc.) as often as you would like: more than enough, too little, much too little?

(Circle an answer)

- MORE THAN ENOUGH.....1
- ENOUGH.....2
- TOO LITTLE.....3
- MUCH TOO LITTLE.....4

4. Do members of your family have soap to wash their hands?

(Circle an answer)

YES.....1

NO.....2 proceed to Q. 5

4a. Do they generally use soap to wash their hands?

(Circle an answer)

YES.....1

NO.....2

SOME YES, OTHERS NO.....3

5. When members of your family take a bath, how do they do it? Do they wash with a sponge, use a bath tub, a shower or something else?

(Circle an answer)

SPONGE BATH.....1

BATH TUB.....2

SHOWER.....3

STREAM, POND OR OTHER WATER SOURCE.....4

OTHER (SPECIFY).....5

6. (TO BE ASKED OF ALL FAMILIES USING IMPROVED SPRINGS): Think now of the period prior to the improvement of the spring (NAME OF THE SPRING). For each of the following activities, please tell me if the members of your family used the spring since its improvement, more often, as often or less often.

(Circle one figure per line)

	MORE OFTEN	AS OFTEN	LESS OFTEN
a. To wash hands	1	2	3
b. Take a bath	1	2	3
c. Wash dishes	1	2	3
d. Wash clothes	1	2	3

D. FETCHING WATER

1. Do you yourself bring the water to the house or do other members of the family do it?

(Circle an answer)

THE QUESTIONED PERSON BRINGS THE WATER.....1

OTHERS BRING THE WATER.....2 proceed to Q. 14

- 1a. Do you get your water from (NAME OF SPRING)?

(Circle an answer)

YES.....1

NO.....2 proceed to Q. 13

2. When you fetch the water from (NAME OF THE SPRING), what type(s) of container(s) do you use to collect the water and to carry it? IN COLUMN 1 OF THE TABLE MODEL LIST THE NAME OF EACH CONTAINER USED. IF MORE THAN ONE TYPE OF CONTAINER IS USED, LIST EACH ONE ON A DIFFERENT LINE. THEN ASK QUESTIONS 2a and 2b FOR EACH OF THE CONTAINERS LISTED.

TABLE MODEL

TYPE OF CONTAINER	APPROXIMATE VOLUME(S)
<u>Bitira</u> : Wooden barrel	About 25 liters
<u>Jerry can</u> : Rectangular plastic container	5, 10, 20 ⁽¹⁾ , or 40 liters
<u>Goula</u> : Pear-shaped ceramic pot	About 50 liters
<u>Guirba</u> : Goat skin water bag	Sizes of about 30 liters
<u>Bucket</u> : plastic or metal pail	Generally about 10 liters
Other (specify)	Variable

(1) The most common size.

- 2a. What is the size of this container? ESTIMATE THE VOLUME OR THE CAPACITY OF THE CONTAINER AND MARK THE APPROXIMATE NUMBER OF LITERS IN COLUMN 2 ALONG SIDE THE NAME OF THE CONTAINER.
- 2b. Approximately how many times per day do you go to (NAME OF THE SPRING) to fill this container? MARK THE NUMBER OF TIMES EACH DAY (ZERO, IF FEWER THAN ONCE A DAY) IN COLUMN 3 OF THE TABLE NEXT TO THE NAME OF THE CONTAINER.

1	2	3
TYPE OF CONTAINER	NO. OF LITERS	NUMBER OF TIMES PER DAY

3. Approximately how far is the spring from your home?
- NUMBER OF METERS OR NUMBER OF KILOMETERS
4. Approximately how long does it take you to go and come back from the spring (including the time you wait at the spring, and the time you need to draw water)?
- NUMBER OF MINUTES OR NUMBER OF HOURS
- 4a. How long do you wait at the spring?
- NUMBER OF MINUTES OR NUMBER OF HOURS
5. How many days per week do you carry water home?
- NUMBER OF DAYS PER WEEK

6. When you go to (NAME OF THE SPRING), is it easy to approach the spring to fetch water? Would you say that it is very easy, somewhat easy, somewhat difficult or very difficult?

(Circle an answer)

- VERY EASY.....1
- SOMEWHAT EASY.....2
- SOMEWHAT DIFFICULT.....3
- VERY DIFFICULT.....4

proceed to Q. 7

6a. In what way is the location difficult to approach?

7. Is it easy or difficult for you to obtain water? Would you say that it is very easy, somewhat easy, somewhat difficult, or very difficult?

(Circle an answer)

- VERY EASY.....1
- SOMEWHAT EASY.....2
- SOMEWHAT DIFFICULT.....3
- VERY DIFFICULT.....4

proceed to Q. 8

7a. In what way is it difficult to obtain water?

CONTROL B

FAMILY USER OF IMPROVED SPRING proceed to Q. 8

FAMILY USER OF AN UNIMPROVED SPRING proceed to Q. 12

8. Think now of the period preceding the improvement of (NAME OF THE SPRING). Did you then take water from the spring?

(Circle an answer)

YES.....1

NO.....2

9. At that time was access to the spring more difficult than now, less difficult, or about the same?

(Circle an answer)

MORE DIFFICULT.....1

ABOUT THE SAME.....2

LESS DIFFICULT.....3

I DON'T REMEMBER.....8

10. Before the spring was improved was it more difficult to obtain water, less difficult or about the same?

(Circle an answer)

MORE DIFFICULT.....1

ABOUT THE SAME.....2

LESS DIFFICULT.....3

I DON'T REMEMBER.....8

11. Since the spring was improved do you transport more water than before, less water or about the same?

(Circle an answer)

MORE WATER.....1

ABOUT THE SAME.....2

LESS WATER.....3

I DON'T REMEMBER.....8

12. Do you take water only from the spring (NAME OF THE SPRING), or do you have other sources also?

(Circle an answer)

ONLY THIS SPRING.....1 proceed to Q. 14

OTHER WATER SOURCES.....2

13. When you fetch water from (an) other source(s), what type of container do you use to transport the water? MARK THE NAME OF EACH CONTAINER USED IN COLUMN 1 OF THE TABLE, USING IF NECESSARY THE MODEL IN Q.2. IF MORE THAN ONE TYPE OF CONTAINER IS USED LIST EACH OF THEM ON A DIFFERENT LINE. THEN ASK QUESTIONS 13a AND 13b FOR EACH CONTAINER LISTED.

13a. What is the size of this container? ESTIMATE THE VOLUME OR THE CAPACITY OF EACH CONTAINER AND MARK THE (APPROXIMATE) NUMBER OF LITERS IN COLUMN 2, NEXT TO THE NAME OF THE CONTAINER

13b. Approximately how many times per day do you fill these containers (at the other springs)? MARK THE NUMBER OF TIMES PER DAY (ZERO IF FEWER THAN ONCE A DAY) IN COLUMN 3 OF THE TABLE AND NEXT TO THE NAME OF THE CONTAINER.

1	2	3
TYPE OF CONTAINER	NO. OF LITERS	NUMBER OF TIMES PER DAY

14. Who are the other members of your family who carry water to the house? WRITE BELOW THE NAME OF EACH WATER CARRIER (OTHER THAN THE QUESTIONED PERSON). THANK THIS PERSON FOR HAVING ANSWERED THE QUESTIONS, THEN TRY TO SUBMIT THE QUESTIONNAIRE FOR WATER CARRIERS TO EACH OF THE PERSONS LISTED.

NAME OF THE WATER CARRIER	SUBMITTED QUESTIONNAIRE TO WATER CARRIER	
	YES	NO
1.	YES	NO
2.	YES	NO
3.	YES	NO
4.	YES	NO
5.	YES	NO
6.	YES	NO
7.	YES	NO
8.	YES	NO

QUESTIONNAIRE INTENDED FOR OTHER WATER CARRIERS

This form is meant to be used to question each water carrier in the family, the same family identified in the Questionnaire on the utilization of water by households and their health. Once the Questionnaire is finished it should be so indicated on the last page of the family Questionnaire next to the name of the water carrier questioned. A Questionnaire intended for the water carrier should be filled out for every water-carrying member of the family.

A. IDENTITY

1. Household Code
2. Family Name _____
3. Name of the water carrier _____
4. Code of the water carrier (See Questionnaire UEMS)
5. Name of the Spring _____
6. Name of the Interviewer _____
7. Date of the Interview _____/_____/_____
8. Location Code
9. Delegation _____

B. FETCHING WATER

1. We are questioning all the water-carrying members of your family on the amount of water they transport from different springs, in particular (NAME OF THE SPRING). Do you fetch water from (NAME OF THE SPRING)?

YES.....1 (Circle an answer)
 NO.....2 proceed to Q. 13

2. When you fetch the water from (NAME OF THE SPRING), what type(s) of container(s) do you use to collect the water and to carry it? IN COLUMN 1 OF THE TABLE MODEL LIST THE NAME OF EACH CONTAINER USED. IF MORE THAN ONE TYPE OF CONTAINER IS USED, LIST EACH ONE ON A DIFFERENT LINE. THEN ASK QUESTIONS 2a and 2b FOR EACH OF THE CONTAINERS LISTED.

TABLE MODEL	
TYPE OF CONTAINER	APPROXIMATE VOLUME(S)
<u>Bitira</u> : Wooden barrel	About 25 liters
<u>Jerry Can</u> : Rectangular plastic container	5, 10, 20 ⁽¹⁾ , or 40 liters
<u>Goula</u> : Pear-shaped ceramic pot	About 50 liters
<u>Guirba</u> : Goat skin water bag	Sizes of about 30 liters
<u>Bucket</u> : Plastic or metal pail	Generally about 10 liters
Other (Specify)	Variable

(1) The most common size.

2a. What is the size of this container? ESTIMATE THE VOLUME OR THE CAPACITY OF THE CONTAINER AND MARK THE APPROXIMATE NUMBER OF LITERS IN COLUMN 2 ALONG SIDE THE NAME OF THE CONTAINER.

2b. Approximately how many times a day do you go to (NAME OF THE SPRING) to fill this container? MARK THE NUMBER OF TIMES EACH DAY (ZERO, IF FEWER THAN ONCE A DAY) IN COLUMN 3 OF THE TABLE NEXT TO THE NAME OF THE CONTAINER.

1	2	3
TYPE OF CONTAINER	NO. OF LITERS	NUMBER OF TIMES PER DAY

3. Approximately how far is the spring from your home?

NUMBER OF METERS OR NUMBER OF KILOMETERS

4. Approximately how long does it take you to go and come back from the spring (including the time you wait at the spring, and the time you need to draw water)?

NUMBER OF MINUTES OR NUMBER OF HOURS

4a. How long do you wait at the spring?

NUMBER OF MINUTES OR NUMBER OF HOURS

5. How many days per week do you carry water home?

NUMBER OF DAYS PER WEEK

6. When you go to (NAME OF THE SPRING), is it easy to access the spring to fetch water? Would you say that it is very easy, somewhat easy, somewhat difficult or very difficult?

(Circle an answer)

- VERY EASY.....1
- SOMEWHAT EASY.....2
- SOMEWHAT DIFFICULT.....3
- VERY DIFFICULT.....4

proceed to Q. 7

6a. In what way is the location difficult to approach?

7. Is it easy or difficult for you to obtain water? Would you say that it is very easy, somewhat easy, somewhat difficult, or very difficult?

(Circle an answer)

- VERY EASY.....1
- SOMEWHAT EASY.....2
- SOMEWHAT DIFFICULT.....3
- VERY DIFFICULT.....4

proceed to Q. 8

7a. In what way is it difficult to obtain water?

CONTROL B

FAMILY USER OF IMPROVED SPRING proceed to Q. 8

FAMILY USER OF AN UNIMPROVED SPRING proceed to Q. 12

8. Think now of the period preceding the improvement of (NAME OF THE SPRING). Did you then take water from the spring?

(Circle an answer)

YES.....1

NO.....2 Proceed to Q. 12

9. At that time was access to the spring more difficult than now, less difficult, or about the same?

(Circle an answer)

MORE DIFFICULT.....1

ABOUT THE SAME.....2

LESS DIFFICULT.....3

I DON'T REMEMBER.....8

10. Before the spring was improved was it more difficult to obtain water, less difficult or about the same?

(Circle an answer)

MORE DIFFICULT.....1

ABOUT THE SAME.....2

LESS DIFFICULT.....3

I DON'T REMEMBER.....8

11. Since the spring was improved do you transport more water than before, less water or about the same?

(Circle an answer)

MORE WATER.....1

ABOUT THE SAME.....2

LESS WATER.....3

I DON'T REMEMBER.....8

12. Do you take water only from the spring (NAME OF THE SPRING), or do you have other sources also?

(Circle an answer)

ONLY THIS SPRING.....1 proceed to Q. 14

OTHER WATER SOURCES.....2

13. When you fetch water from (an) other source(s), what type of container do you use to transport the water? MARK THE NAME OF EACH CONTAINER USED IN COLUMN 1 OF THE TABLE, USING IF NECESSARY THE MODEL IN Q. 2. IF MORE THAN ONE TYPE OF CONTAINER IS USED LIST EACH OF THEM ON A DIFFERENT LINE. THEN ASK QUESTIONS 13a AND 13b FOR EACH CONTAINER LISTED.

13a. What is the size of this container? ESTIMATE THE VOLUME OR THE CAPACITY OF EACH CONTAINER AND MARK THE (APPROXIMATE) NUMBER OF LITERS IN COLUMN 2, NEXT TO THE NAME OF THE CONTAINER

13b. Approximately how many times per day do you fill these containers (at the other springs)? MARK THE NUMBER OF TIMES PER DAY (ZERO IF FEWER THAN ONCE A DAY) IN COLUMN 3 OF THE TABLE AND NEXT TO THE NAME OF THE CONTAINER.

1	2	3
TYPE OF CONTAINER	NO. OF LITERS	NUMBER OF TIMES PER DAY

14. Who are the other members of your family who carry water to the house? WRITE BELOW THE NAME OF EACH WATER CARRIER (OTHER THAN THE QUESTIONED PERSON). THANK THIS PERSON FOR HAVING ANSWERED THE QUESTIONS, THEN TRY TO SUBMIT THE QUESTIONNAIRE FOR WATER CARRIERS TO EACH OF THE PERSONS LISTED.

NAME OF THE WATER CARRIER	SUBMITTED QUESTIONNAIRE TO WATER CARRIER	
	YES	NO
1.	YES	NO
2.	YES	NO
3.	YES	NO
4.	YES	NO
5.	YES	NO
6.	YES	NO
7.	YES	NO
8.	YES	NO



Table 1a
 SPRING SITE OBSERVATIONS

Spring Number	Leaks	Cracks	Other Undesirable Features	Overall Quality	Access	Drawing Water	Flow	Change in Access	Change in Drawing Water	Activities During Observation
1 Medoun (Improved)	Yes	No	Yes	Good	Somewhat difficult	Somewhat difficult	Heavy	Easier	Easier	Nothing
2 Bechir (Improved)	No	No	No	Excellent	Not at all difficult	Somewhat difficult	Heavy	Easier	Easier	Nothing
3 Jneyen (Improved)	Yes	Yes	No	Fair	Somewhat difficult	Somewhat difficult	Moderate	Same	Same	Nothing
4 Khoukha (Improved)	No	No	No	Excellent	Somewhat difficult	Somewhat difficult	Heavy	More	Easier Difficult	Nothing
5 Arara (Improved)	No	No	No	Excellent	Not at all difficult	Very easy	Heavy	Same	Easier	Nothing
6 Gammem (Improved)	No	No	No	Excellent	Not at all difficult	Very easy	Heavy	Same	Easier	Nothing
7 Damousse (Unimproved)	-	-	--	Very difficult		Very difficult	Light	--	--	Nothing
8 Jaffel (Unimproved)	-	-	--	Very difficult		Very difficult	Heavy	--	--	Bathing

APPENDIX C

Table 1b: Summary

	Leaks	Cracks	Other Undesirable Features	Overall quality			Access			Drawing Water			Flow			Change in Access			Change in Drawing Water		
				Excellent	Good	Fair	Very Difficult	Somewhat Difficult	Not at all Difficult	Very Difficult	Somewhat Difficult	Very Easy	Stronger	Same	Weaker	Easier	Same	More Difficult	Easier	Same	More Difficult
Improved N=6	33.3%	16.7%	16.7%	66.7%	16.7%	16.6%	0	50%	50%	0	66.7%	33.3%	83.3%	16.7%	0	33.3%	50%	16.7%	66.7%	33.3%	0
Non-Improved N = 2	--	--	--	--	--	--	100%	0	0	100%			50%	0	50%	--	--	--	--	--	--

Table 2a Summary of Results of Interview Household Composition and Health Status

Spring Number	A Total Number of Households	B Number of User Households	C Total Number of People	D Number of Children	E Number under 5	F Number 5-14	G Number of Adults	H Number 5< with Diarrhea	I Percentage % H/E	J Number of Diarrhea Days per Week	K Number of Children with Skin Infections	L Percentage	M Amount of Diarrhea Since Improvements				N Amount of Skin Infections Since Improvements			
													More	Same	Less	Missing/Don't know	More	Same	Less	Missing/Don't know
1 Medoun	20	20	116	65	26	39	51	7	26.9	4.4	18	27.7	2	8	3	7	0	9	5	6
2 Bechir	6	6	25	15	5	10	10	5	100.0	6.3	3	13.3	0	2	1	3	0	2	3	1
3 Jneyen	7	7	49	34	9	25	15	0	0	0	2	5.9	0	0	0	7	0	0	1	6
4 f.houkha	10	8	49	31	11	20	18	3	27.3	3.0	6	19.4	0	7	1	0	0	4	0	4
5 Arara	10	10	55	30	6	24	25	0	0	0	2	6.7	2	5	0	3	2	5	0	3
6 Gannem	20	20	114	45	19	26	69	8	42.1	5.6	6	13.6	3	9	6	2	0	12	8	0
TOTAL IMPROVED	73	71	408	220	76	144	188	23	30.3	5.0	37	16.8	7	31	11	22	2	32	17	20
7 Daimousse	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8 Jaffel	16	16	66	36	20	16	30	16	80.0	4.8	13	36.1	--	--	--	--	--	--	--	--
TOTAL NON-IMPROVED	16	16	66	36	20	16	30	16	80.0	4.8	13	36.1	--	--	--	--	--	--	--	--

Table 2b Summary of Results of Interviews: Use of Water

Spring Number	Hand Washing				Bathing				Dishes				Clothes Washing				Sinc- Improvements Family Washes/Takes												Enough Water			S o a p		Use Soap			Type of Bath					
	Average per Day	Location			Average per Month	Location			Average Per Day	Location			Average per Week	Location			Hands			Baths			Dishes			Clothes			More than Enough	Enough	Too Little	Much Too Little	Yes	No	Yes	No	Some	Sponge	Tub	Shower	Pond	Other
		Spring	Home	Both		Spring	Home	Both		Spring	Home	Both		Spring	Home	Both	More Often	Same	Less Often	More Often	Same	Less Often	More Often	Same	Less Often	More Often	Same	Less Often														
1	3.5	0	13	7	2.8	0	16	4	2.6	0	15	5	1.6	0	13	7	10	9	1	11	7	2	10	9	1	9	10	1	4	11	4	1	17	3	6	0	10*	1	6	4	0	6*
2	1.2	0	1	4*	2.2	0	5	0*	2.2	0	5	0*	1.2	0	5	0*	1	4	0*	1	4	0*	1	4	0*	1	4	0*	1	3	1	0*	5	0*	1	0	4*	0	0	3	1	1*
3	2.1	0	3	4	3.7	0	3	4	1.7	1	6	0	1.0	0	3	4	4	3	0	4	3	0	4	3	0	4	3	0	1	6	0	0	7	0	1	0	6	2	4	1	0	0
4	2.3	0	8	0	1.6	0	8	0	2.0	0	8	0	2.1	0	8	0	1	4	2*	0	5	2*	0	5	2*	0	5	2*	0	6	1	1	8	0	3	0	5	4	0	4	0	0
5	2.0	0	9	1	2.2	0	9	1	2.1	0	10	0	1.5	0	10	0	6	4	0	2	8	0	2	8	0	2	8	0	1	7	2	0	9	0*	1	0	8*	3	1	4	1	0*
6	2.9	0	15	4*	2.0	0	19	0*	2.1	0	19	0*	2.3	1	17	1*	10	9	1	7	12	1	7	12	1	6	13	1	17	3	0	0	20	0	9	0	11	6	1	8	0	5
TOTAL IMPROVED	2.7	0	49	20*	2.4	0	60	9*	2.2	1	63	5	1.7	1	56	12	32	33	4	25	39	5	24	41	4	22	43	4	24	36	8	2	66	3	21	0	44	16	12	24	2	12
8	1.5	1	8	7	1.0	0	16	0	1.6	4	12	0	1.4	4	7	5	-	-	-	--	--	--	--	--	--	--	--	--	0	4	10	2	15	1	8	1	6	0	2	5	2	7
TOTAL UNIMPROVED	1.5	1	8	7	1.0	0	16	0	1.6	4	12	0	1.4	4	7	5	-	-	-	--	--	--	--	--	--	--	--	--	0	4	10	2	15	1	8	1	6	0	2	5	2	7

* Counts exclude missing data

Table 2c: Summary of Interview Results. Water Collection

Spring Number	Number of Water Carriers	Average Amount from Spring (Liters) per			Average from Other Sources (Liters) per			Average Amount (Liters) per			Average Trip to Spring				Approach				Drawing Water				Used Before Improvement		Approach Used to Be				Drawing Water Used to Be				Currently Carrying				Use Other Sources	
		Carrier	House	Person	Carrier	House	Person	Carrier	House	Person	Distance (Meters)	Travel Time (Min)	Time at Spring (Min)	Days per Week	Very Easy	Easy	Difficult	Very Difficult	Very Easy	Easy	Difficult	Very Difficult	Yes	No	More Difficult	Same	Less Difficult	Do not Recall	More Difficult	Same	Less Difficult	Do not Recall	More Difficult	Same	Less Difficult	Do not Recall	Yes	No
1	26	71.9	93.5	16.1	91.0	113.8	3.9	89.4	116.3	20.0	665	74	31	6.8	2	3	11	10	3	2	12	9	25	1	7	10	9	0	8	2	16	0	7	18	0	1	21	5
2	6	55.0	55.0	13.2	80.0	80.0	3.2	68.3	68.3	16.4	733	58	23	7.0	5	0	1	0	4	1	1	0	6	0	1	0	5	0	1	0	5	0	1	0	5	0	5	1
3	7	67.9	67.9	9.7	40.0	40.0	1.6	79.7	79.3	11.3	1171	116	60	7.0	0	1	6	0	1	0	5	0*	5	2	2	4	0	0	0	0	5	1	1	5	0	0	5	2
4	8	44.8	44.8	7.3	86.7	86.7	10.6	109.8	109.8	17.9	419	41	17	6.1	0	3	5	0	1	2	5	0	4	4	2	2	1	0*	2	1	2	3	2	3	1	0*	2	6
5	12	54.2	65.0	11.8	60.0	70.0	7.6	89.2	107.0	19.5	1224	83	33	6.8	6	5	1	0	5	5	1	1	12	0	2	10	0	0	1	5	6	0	3	4	5	0	5	7
6	23	56.7	65.3	11.4	0	0	0	56.7	65.3	11.4	1204	77	18	7.0	14	2	7	0	19	3	0	0*	23	0	20	3	0	0	19	4	0	0	18	4	1	0	23	0
TOTAL IMPROVED	82	60.8	70.3	12.2	74.0	81.8	3.8	79.8	92.2	16.0	922	75	28	6.8	27	14	31	10	33	13	24	10	75	7	34	29	15	0	31	12	34	4	32	34	12	1	61	21
8	17	76.8	81.6	19.8	0	0	0	76.8	81.6	19.8	750	80	31	6.8	4	1	6	6	1	0	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	0
TOTAL UNIMPROVED	17	76.8	81.6	19.8	0	0	0	76.8	81.6	19.8	750	80	31	6.8	4	1	6	6	1	0	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	0

* One or more missing answers

Table 3a.

Household Composition and Health

	Total Number of Households	Total Number Using Spring	Total Number of People	Total Number of Children	Number of Children <5	Number of Children 5-14	Number of Adults	Number of Children <5 with Diarrhea
Improved	73	71	408	220	76	144	188	23
Non-Improved	16	16	66	36	20	16	30	16

	Percentage of Children with Diarrhea	Average Number of Days per Week	Percentage of Children with Skin Infections	Amount of Diarrhea Since Improvement				Amount of Skin Infections Since Improvement			
				More	Same	Less	Do not know*	More	Same	Less	Do not know
Improved	30.3	5.0	16.8	9.9%	43.7%	15.5%	9.9%	2.8%	45.1%	23.9%	28.2%
Non-Improved	80.0	4.8	36.1	-	-	-	-	-	-	-	-

Table 3b:
Use of Water

	Washing Hands					Times per month	Bathing				Times per day	Washing Dishes			
	Times per day	Spring	Home	Both	No answer		Spring	Home	Both	No answer		Spring	Home	Both	No answer
Improved	2.7	0	69%	28.2%	2.8%	2.4	0	84.5%	12.7%	2.3%	2.2	1.4%	88.7%	7.0	2.8%
Non-Improved	1.5	6.3%	50%	43.8%	0	1.0	0	100%	0	0	1.6	25%	75%	0	0

	Washing Clothes					Enough Water*				Have Soap*		Use Soap*		
	Times per Week	Spring	Home	Both	No answer	More than Enough	Enough	Too Little	Much too Little	Yes	No	Yes	No	Some
Improved	1.7	1.4%	78.9%	16.9%	2.8%	33.8	50.7%	11.3%	2.8	93%	4.2%	30.9	0	64.7
Non-Improved	1.4	25%	43.8%	31.2%	0	0	25%	62.5%	12.5%	93.8%	6.2%	53.3%	6.7	40.0%

* % excludes missing data

Since Improvements Family Washes/Takes

	Hands				Baths				Dishes			
	More	Same	Less	No answer	More	Same	Less	No answer	More	Same	Less	No answer
Improved	45.1%	46.5%	5.6%	2.8%	35.2%	54.9%	7.0%	2.8%	33.8%	57.8%	5.6%	2.8%
Non-Improved												

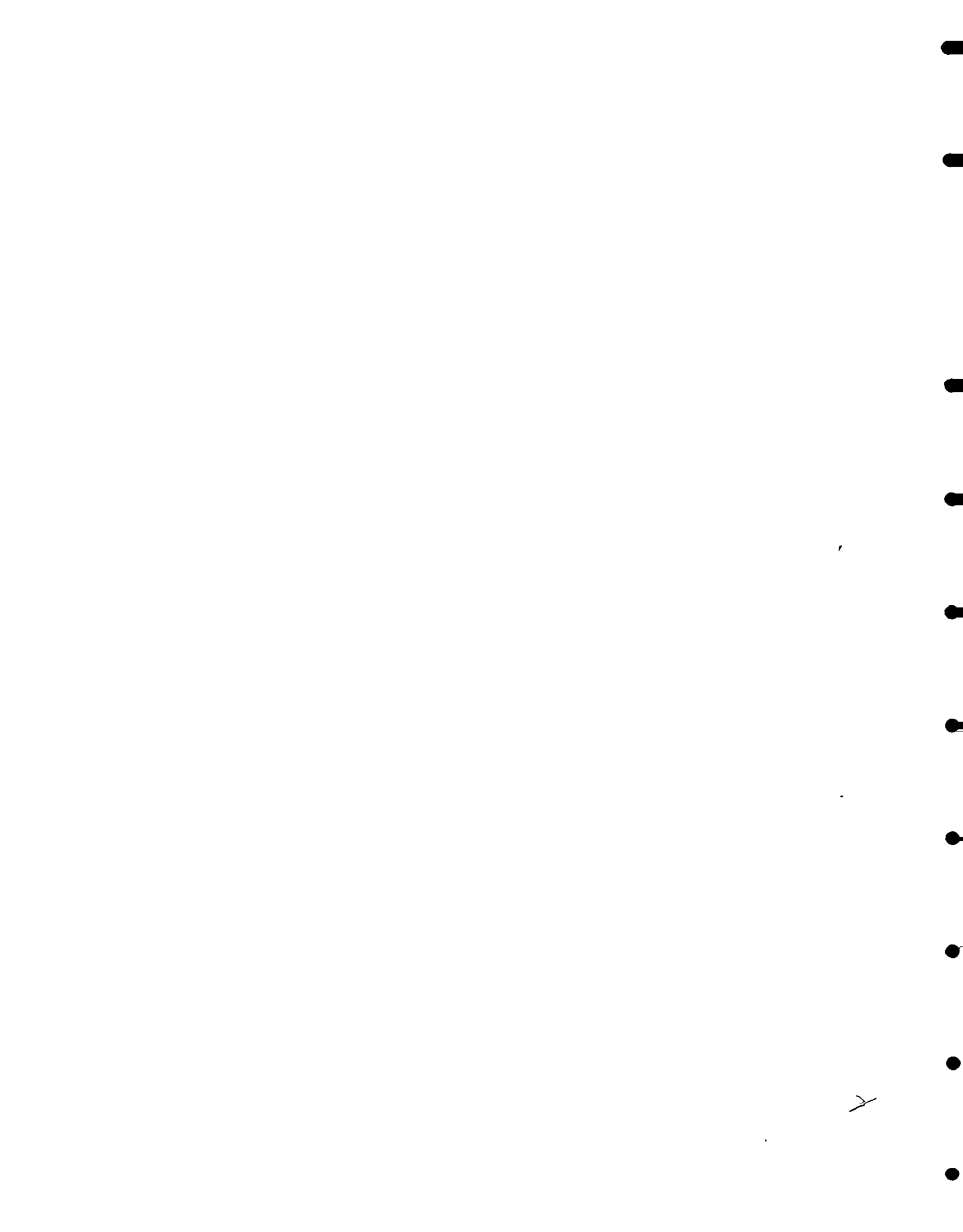
	Clothes				Type of Bath					
	More	Same	Less	No answer	Sponge	Tub	Shower	Pond	Other	Not answered
Improved	31%	60.6%	5.6%	2.8%	22.5%	16.9%	33.8%	2.8%	16.9%	7%
Non-Improved					0	12.5%	31.3%	12.5%	43.7%	0

Table 3c:
Summary of Data on Water Collection

	Average Amount of Water (Liters)			From Other Per			Total Per			Distance (meters)	Average Trip Travel Time (min.)	Time at Spring	Day per Week
	From Spring Carrier	Per House	Person	Carrier	House	Person	Carrier	House	Person				
Improved	60.8	70.3	12.2	74.0	81.8	3.8	79.8	92.2	16.0	922	75	28	6.8
Non-Improved	76.8	81.6	19.8	0	0	0	76.8	81.6	19.8	750	80	31	6.8

	Approach is				Drawing Water					Approach was				
	Very Easy	Easy	Difficult	Very Difficult	Very Easy	Easy	Difficult	Very Difficult	No Answer	More Difficult	Same	Less Difficult	Don't Recall	No Answer
Improved	32.9%	17.1%	37.8%	12.2%	40.2%	15.9%	29.3%	12.2%	2.4%	41.9%	35.8%	18.5%	0	3.7%
Non-Improved	23.5%	5.9%	35.3%	5.9%	0	35.3%	58.8%	0	--	--	--	--	-	--

	Drawing Water Used To Be				Currently Carrying					Use Other Sources		
	Harder	Same	Easier	No answer	More	Same	Less	Don't Recall	No Answer	Yes	No	
Improved		38.3%	14.8%	42.0%	4.9	39.5%	42.0%	14.8%	1.2%	2.5%	25.6%	74.4%
Non-Improved		--	--	--	--	--	--	--	--	--	0	100%



APPENDIX D

Ain Medoum (01)

Observations

1. Spring - improved
2. Leaks - 0
3. Cracks - 2
4. Gutters - not applicable
5. Others - Underground leaks between cappings and man-hole
6. Construction - good
7. Access - somewhat difficult
 - 7a. Hard ground
8. Drawing of water: somewhat difficult
 - 8a. Deep pipe, narrow space
9. Flow - stronger
10. Change of access - easier
 - 10a. One spot
11. Drawing of the water - easier.
At the extremity of a pipe instead of peddles.
12. Activities - 0
13. Containers - 20 liters jerry can

Ain Bechir (02)

Observations

1. Spring - improved
2. Leaks - 0
3. Cracks - 0
4. Gutters - not applicable
5. Others elements - 0
6. Construction - excellent
7. Access - not difficult at all
8. Drawing of water - somewhat difficult
 - 8a. Tank too narrow, no stairs
9. Flow - stronger
10. Change of access - easier
 - 10a. 0
11. Change in drawing water - easier, water is concentrated in only one spot
12. Activities - 0
13. Containers - 20 liters jerry can

Ain Jneyen (03)

Observations

1. Spring - improved
2. Leaks - 0
3. Cracks - 0
4. Gutters - not applicable
5. Other elements - 0
6. Construction - average
7. Access - somewhat difficult
 - 7a. Difficult footpath, mud, oued nearby
8. Drawing of water - somewhat difficult, deep, narrow tank, no stairs
9. Flow - same
10. Change of access - not a lot of difference
11. Change of drawing - not a lot of difference
12. Activities - 0
13. Containers - 20 liters jerry can and other jerry can

Ain Khoukha (04)

Observations

1. Spring - improved
2. Leaks - 0
3. Cracks - 0
4. Gutters - not applicable
5. Contamination - 0
6. Construction - excellent
7. Access - somewhat difficult
8. Drawing of water - somewhat difficult
 - 8a. Small, narrow, deep tank, no stairs
9. Flow - stronger 0.65 liters/second
10. Change of access - not a lot of difference
11. Change of drawing - not a lot of difference
12. Activities - 0
13. Containers - 50 liters barel

Ain Arara (05)

Observations

1. Spring - improved
2. Leaks - 0
3. Cracks - 0
4. Gutters - not applicable
5. Other elements - 0
6. Construction - excellent
7. Access - not at all difficult
8. Drawing of water - very difficult
9. Flow - stronger: 0.25 liters/second
10. Change of access - not a lot of difference
11. Drawing of water - easier
 - 11a. Stones places at the bottom of man-hole
12. Activities - 0
13. Containers - 0

Ain Guammam (06)

Observations

1. Spring - improved
2. Leaks - 0
3. Cracks - 0
4. Gutters - not applicable
5. Contamination - 0
6. Construction - excellent
7. Access - not at all difficult
8. Drawing of water - very easy
9. Flow - 0.8 liters/second
10. Change of access - not a lot of difference
11. Change of drawing - easier
 - 11a. Increased flow
12. Activities - 0
13. Containers - 0
14. Remarks - lack of animal water-hole

Ain Damousse (07)

Observations

1. Source - unimproved
 - 1a. Natural flow
7. Access - very difficult
 - 7a. Footpath difficult, spring far from habitations, no users
8. Drawing of water - very difficult
 - 8a. Surrounded by vegetation, slow water flow
9. Flow - weaker
12. Activities - 0
13. Containers - 0
14. Remarks - unused spring

Ain Jaffel (08)

Observations

1. Spring - unimproved
 - 1a. Rebuilt in the past
 - 1b. Surrounding wall, capping, multiple leaks
7. Access - very difficult
 - 7a. Steep slope, very close from an oued, a lot of mud
8. Drawing of water - very difficult.
One must be in the water and in the mud
9. Flow - stronger
12. Activities - washing of a child
13. Containers - 10 liters jerry can, goula

