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ASSIGNMENT REPORT

PILOT PROJECT FOR THE DEVELOPMENT OF RURAL HEALTH SERVICES, LEBANON

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by

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ANNEXES AND TABLES

I INTRODUCTION

As Dr. Salah Attia, Senior WHO Adviser to the project Lebanon 4, will present in his assignment report information on the general aspects of project activities, this account will deal mostly with the environmental sanitation programme.

The Rural Health Unit project was initiated in Saida, head-town of the province of South Lebanon, when Dr. C. Amer assumed duties as Senior WHO Adviser in 1957. After operating for about two years, project activities were suspended. In October 1960 Dr. S. Attia arrived in Lebanon to re-open the project and two months later he was joined by the WHO sanitary engineer - writer of this report.

The area chosen for the renewal of project activities was the district of Akkar with centre in the town of Halba.

The assistance provided by WHO consisted of the services of a senior adviser in public health development and administration and an adviser in sanitary engineering. The assignment of a public health nurse, third member of the WHO team, was withheld until her presence was deemed necessary for the development of the nursing programme. Materials supplied by WHO for the operation of the project included clinic, laboratory and staff equipment, laboratory chemicals and stains, medicines and drugs, equipment and supplies for environmental sanitation and health education, vehicles, books and subscriptions to periodicals.

II THE PROJECT AREA

The "qada" of Akkar in the extreme North of Lebanon is the district most distant from Beirut. It extends over an area of about 700 sq.kms, from the Mediterranean coast to the summits of the Lebanon range. Some 120,000 people - grouped to form more than 200 villages - live in this area.

Before the start of the project, the health staff assigned by the Ministry of Health for the qada consisted of a team of doctor, nurse-midwife and sanitarian. The doctor worked on a twice-weekly basis and employed this time to attend patients at the dispensary of Halba and to pay routine visits to the villages of the district; the other two members of the team assisted the doctor in this work. During the rest of the week the main activities of the nurse were vaccination, distribution of drugs, home and school visiting; those of the sanitarian were inspection of water sources and surveillance of shops, cafés and restaurants. The inadequacy in number of this personnel is obvious when compared with the population. The relatively long distances and the limited means of transport - one fourth of the population of the area live between 30 and 70 kms from Halba - made it impossible to visit more than half of the villages during the year.

III SUMMARY OF OBJECTIVES

According to the plan of operation of the project the main objectives were:

1) to assist the Government in developing a pattern for rural health services in the qada, the smallest administrative unit in the country.

2) to utilize such development of rural health services for demonstration and training purposes, and to encourage and facilitate the extension and further improvement of health services in rural areas throughout the country.

Regarding environmental sanitation, the objective was the development of this basic activity as part of an integrated and comprehensive health service.

IV METHODS

As far as it was possible, the methods and procedures applied in the environmental sanitation programme were in accordance with the policies recommended by the World Health Organization.

Sanitation activities followed the three essential steps of:

1) Study of conditions

2) Planning

3) Execution

V ACCOMPLISHMENTS

1. Study of Conditions.

As a prerequisite to proper planning of programmes, surveys were carried out for the evaluation of the magnitude and local characteristics of the main sanitary problems.

A preliminary survey showed that public works and services of health significance such as water supply, sewerage, refuse collection and disposal, pest control, etc. were non-existent in the project area. This situation, detrimental to the health of the population, was recognized both by the inhabitants and the local authorities but it was found that encouragement and financial support were needed for ameliorating the existing conditions.

With the intention of producing facts and figures on the overwhelming problems resulting from this situation and with the ultimate aim of changing the attitude of people and authorities, a house-to-house survey was carried out in a selected area around the town of Halba. This survey was

originally planned to last six months; at the end of this period sufficient information was collected to stress the need for improving the sanitary situation. However, as the project was not in a position to go ahead in other activities, this survey was continued for almost two years. The results of this work are reported in Annex II entitled, "Study of living conditions in the houses of the district of Akkar, Lebanon".

Simultaneously with the house-to-house survey the project undertook a study on the quality of water available to the population. Routine bacteriological examination of water was carried out at the laboratory of the water company of Tripoli for 22 months. A report on the situation regarding water quality is attached to this account as Annex I entitled, "Study of the water quality situation in the district of Akkar, Lebanon".

2. Planning.

No proper planning of material improvements was possible during the first year of operation as it was doubtful whether a special fund for construction work allocated to the Sanitary Engineering Division of the Ministry of Health could be transferred to the project budget. However, as already the findings from surveys indicated the need for building or repairing protective structures for springs and public wells, and for constructing incinerators and latrines, prototypes were designed and construction programmes were studied.

The proposed budget for the second year of operation included an item for sanitation works to the amount of 100,000 Lebanese Pounds (approximately $ 35,000). This sum was to be employed in carrying out improvements in the villages covered by the house-to-house survey according to a programme and estimate prepared by Mr. M. Hallab, Chief of the Sanitary Engineering Division, Ministry of Health, and the WHO sanitary engineer; the construction programme included improvement work in wells and springs, repair of the water supply and sanitary installations in public schools, construction of refuse incinerators and latrines. After being discussed by the Rural Health Technical Committee, this programme received unamimous approval and full support. However, when the project budget was submitted to the Ministry of Finance the item for sanitation work was cancelled.

3. Execution.

The project was unable to promote the construction work as planned. The reasons for this failure are discussed in the following section. However certain improvements should be mentioned as project accomplishments.

A technique was developed for the systematic and comprehensive collection of information related to housing conditions. The two sanitarians working with the project acquired remarkable proficiency in this type of work. As a result of contact established with the population during surveys, the interest of the people was stimulated and the project gave them advice on their housing problems whenever requested.

A routine service of water bacteriological examination was established. Users were notified when the results showed contamination in their source, and in many instances action was taken to correct the situation following the measures recommended by the project. The use of Eau de Javel (5% solution of calcium hypochlorite) as disinfectant of wells and water reservoirs became more generally known and practised. Upon the request of some well owners the project undertook the disinfection of wells and cisterns.

Several villages requested the advice of the project for the improvement of their water supplies and work was carried out accordingly. The village of Kantara is an example of this collective interest; there the people contributed with money, materials and labour for the construction of a concrete box at the spring, the extension of pipelines and the repair of public fountains.

During the period of operation of the project the town of Halba was provided with a motor-pump storage tank and pipelines for supplying water to ten public taps. The source feeding this system is a well, which although drilled several years before was never brought into service.

Another project accomplishment was its successful experience in training 49 sanitarian and sanitary science students of the American University of Beirut who for two consecutive summers went through a field training period under the direction and responsibility of the project. Thus the plan of utilizing the project as a training centre was justified by the results.

VI COMPARATIVE SUMMARY AND ASSESSMENT OF RESULTS

The project had only a minor influence in developing health services for the qada of Akkar; actual results were not satisfactory when compared with the envisaged objectives. But the many discussions and conferences held during the two years of project activities will very likely prove to be of great influence in evolving a sound policy for future work.

During the operation of the project a rural hospital was opened under the charge of a doctor, and a qada health officer was appointed full-time, but it was found not possible to fully coordinate and integrate the activities of these two officials with the project programme. Regarding sanitation, no immediate material achievements of consequence were achieved; but the project successfully undertook studies needed for the better understanding and assessment of the main sanitary problems; the project completed preliminary work which may serve as a realistic basis for developing a programme of sanitary improvements in the future. Through the activities of the project public interest was stimulated; the people in the area are receptive and will readily participate within their means in any effort aimed at improving their health situation.

The main reasons for the mediocre results of the project were:

1) The project area was located far from Beirut. The extremely centralized administration of the country curtails the authority and means at the disposal of provincial and municipal health officers to such an extent that they are unable to carry out their full and proper responsibilities. This situation made it necessary to refer to Beirut all administrative and technical matters of the project for discussion and decision.

The isolation of the area hindered the establishment of effective and permanent contact between the project and the central administration. This was so in spite of the efforts of the Director of Preventive Services and the Chief of the Sanitary Engineering Division, who volunteered to act as counterparts at ministry level to the two WHO advisers.

This isolation and the primitive living conditions in the area were a draw-back that dissuaded possible candidates for technical posts from joining the project and even more, from living in Halba.

2) The project did not receive full support from the Government. The commitments of the Government as specified in the plan of operation were not all fulfilled.

Regarding personnel, the national counterpart team of public health administrator, nurse and engineer was never appointed. The only technician assigned to the project was a sanitarian; a nurse joined the project for some months in 1961. Of the qada health staff, the nurse-midwife and sanitarian assisted the project on a part-time basis, their services were particularly useful in survey work; the qada health officer, appointed during the last quarter of 1961, and the hospital doctor carried out their activities independently. The administrative staff of the project consisted of an accountant-administrator (for six months), a clerk and a typist. Two drivers and two attendants were the auxiliary personnel; a third driver was with the project for the first nine months.

Regarding premises, the Government provided the project with a building of suitable size for offices and stores, but inconvenient if used as a health centre, and with a garage for the WHO vehicles in mid 1962. As to equipment, supplies and running expenses, the Government supplied adequate office furniture, stationery, etc.; it paid for fuel, maintenance and servicing of vehicles and the cost of official mail, telegrammes and telephone calls.

With respect to environmental sanitation work, although amongst the Government commitments it was specified that local materials and labour should be provided for this work, allocations were not authorized when the Ministry of Health submitted the project budget for approval.

3) The Ministry of Health was not invested with the required power for the proper fulfilment of the project objectives. All officials of the Ministry of Health demonstrated their constant interest and increasing dedication in promoting project activities to the scope and extent envisaged in the plan of operation. Their efforts towards the recruitment of personnel and the allocation of special funds for the project deserve particular mention. But ministerial decisions are delayed by having to pass through a multiple official sieve before they are put into action.

VII RECOMMENDATIONS AND PREDICTIONS FOR FUTURE

Living conditions in rural areas are undermining the health of the population; the gravity of this situation cannot be overemphasized. Rural communities demand an efficient health organization for their protection against disease, illness and injury. Environmental sanitation, being at a rudimentary stage of development in these areas, should occupy a pre-eminent place in the comprehensive programme of health services. The Ministry of Health cannot face alone the task of environmental improvement. Poor living conditions are generally associated with other socio-economic factors, such as poverty, over-work, insufficient food, deficient medical attention, traditions, ignorance, etc., which may affect the health situation. Therefore, all official bodies engaged in any aspect of rural development, such as agriculture, public works, cooperative organization, social and welfare promotion, housing, etc., should join forces with the Ministry of Health to provide the people with such an environment that ensures the prevention of the spread of disease, the encouragement of hygienic habits and the satisfaction of physiological needs.

It was mainly due to the lack of understanding of the need for this inter-ministerial collaboration for the comprehensive development of rural areas, that the project could not carry out successfully its environmental sanitation objectives.

The rural population is in need of governmental assistance for the betterment of socio-economic and health conditions. Provisions should be made to remedy this situation.

A suggested means for achieving this purpose is the constitution of a Board for Rural Development. This board, formed by representatives of all governmental agencies concerned with rural work, should be invested with full powers of decision and execution. The success of such a board would depend essentially on its endowment of proper authority and financial support.

The main functions of the suggested Board for Rural Development may be outlined as follows:

1) To bring together all governmental agencies engaged in the development of rural areas.

2) To formulate comprehensive programmes.

3) To coordinate activities of the ministries concerned.

4) To guide private enterprise and stimulate private initiative.

5) To prepare budgets and procure from the Ministry of Finance the necessary allocations for the execution of programmes. The Board would distribute these funds to each of the agencies involved according to specific budgets and would audit their utilization.

6) To supervise all activities carried out under the development programme.

7) To sponsor economically weak municipalities in the proper maintenance and operation of works and services executed within the programme.

Beside the proper functions of its representative, the Ministry of Health should participate in the programme of the Board for Rural Development by undertaking activities which may include:

1) Epidemiological studies in rural areas so as to recommend priority in assisting those where living conditions show to be most dangerous to the health of the people or where there exist a specific epidemiological hazards due to lack of general development.

2) Formulation and execution of its own plan of rural health development, always in coordination with those of other ministries.

3) Revision of plans, technical advice and supervision during execution of all types of construction work directly or indirectly affecting the health of the people, which are carried out under the programme of the board or by private enterprises or individuals.

Very likely technical assistance in the field of rural development provided by WHO as well as by other United Nations agencies will render better results if a board such as the one recommended could be constituted.

ACKNOWLEDGEMENT

The work was made possible by the close cooperation of the Ministry of Health, and the collaboration particularly of Mr. Wafa' Ghosn and Mr. Saadi Abdallah, sanitarians of the project Lebanon-4, and of Mr. Elias Maliha, laboratory technician of the water supply company of Tripoli. Their assistance is hereby acknowledged with grateful thanks.

ANNEX I

Study of the Water Quality Situation in the District of Akkar, Lebanon

INTRODUCTION

Although it was generally recognized that the quality of water used for domestic consumption in the district of Akkar was not reliable, no attempt had been made to evaluate the degree of contamination in sources and installations available to the population.

The Rural Health Unit-WHO Lebanon 4 project - operating in the district of Akkar undertook such study with the purpose of setting a sound and realistic base on which future plans of improvement could be worked out and recommendations could be put forward to authorities and public in general.

The material for this study comes from the results of 463 bacteriological examinations of water samples carried out by the laboratory of the water supply company of the city of Tripoli. Samples from public and private sources, at the source itself and at taps in houses and streets, were collected for a period of 22 months (February 1961 - November 1962).

The water quality survey in the two main towns of Halba and Miniara, with a population of about 2.000 inhabitants each, was carried out extensively so as to include most of the water sources available; in this analysis each town is considered separately. In smaller communities it was possible to collect an average of 3 to 4 water samples from 49 of such villages which presenting similar conditions water supply were con idered as a group representing average conditions for the analysis of the results of water bacteriological examinations. The UNRWA refugee settlement in El Abdeh, with a properly maintained water service presented a particular case, not representative of the prevailing conditions in the area, and therefore in this analysis it was considered apart.

Thus for comparison purposes the collected data were grouped under 4 main headings regarding locality: Halba, Miniara, 49 villages and UNRWA camp.

With regard to water sources, there are three main different types in the area covered by this study:

1) Spring water: Springs are usually protected by a masonry box-type structure where water is collected and delivered to the population either directly through a weir, pipe or tap in the structure or through a rudimentary pipe system that conveys water to public fountains, the school, church, mosque and a few private houses. Spring water is essentially a public source available to all people; there were however exceptions where a spring was utilized to serve a reduced number of nearby houses by means of privately owned pipes.

2) Well water: This is the most extensively used source of water in the area. The private well is a common feature of the house in Halba and Miniara. In smaller villages the private well is less frequent and becomes of a semi-public type as neighbours without this facility are allowed to draw water from the well. There are also villages with one or more public wells.

It was observed that wells were seldom properly protected against surface and underground pollution; the interior lining was faulty; the top cover was missing or not sufficiently water-tight to prevent leakage from the surface. In general, those private wells provided with a hand or motor-pump were in better state of maintenance, and among the latter those where water was pumped from the well to an overhead reservoir and distributed to the house by a pipe system presented the best sanitary conditions observed in the area.

3) Rainwater: This is a source of supply utilized during winter and spring, the rainy season and the following months. By mid-summer most of the reservoirs are exhausted and people have to find water from other sources, the well or spring.

Rainwater is collected on the roofs and stored either in underground cisterns from where it is drawn by a pump or a vessel, or in an overhead tank directly under the roof from where it flows by gravity through pipes to one or more taps in the house.

Streams are also utilized as a source of water in the poorer communities where there is no other means of supply. As this water source is always exposed to pollution it was not included in this analysis.

During the survey six samples of filtered water were taken from the Berkefeld filters supplied by the project to verify their efficacy. In all instances bacteriological examination showed the absence of coliform organisms.

For comparison of results the collected data were grouped regarding type of source and site of sampling under the following headings:

Spring water at the outlet of the spring structure or collecting box.

Spring water at a tap of the public or private distribution system.

Well water at the source: where the well had no pump and was usually uncovered.

Well water at a tap of the distribution system where this installation existed.

Well water at the pump where the well had a pump and was usually covered.

Rainwater at the reservoir where there was an underground citern without a pump.

Rainwater at a tap of the distribution system where the overhead tank was connected to such installation in the house.

Rainwater at the pump where the underground cistern was provided with a pump.

Preliminary observation:

Table I presents a summary of the results of 463 bacteriological examinations of water samples. From the data in this table the following facts may be taken as preliminary observations:

In general the water quality situation in the district of Akkar is very unsatisfactory as foecal contamination is widespread.

Only 27% of the samples were free from coliform organisms
17% of the samples indicated contamination of the order of 2-12 coli per 100 coli.
38% of the samples indicated contamination of the order of 15-38 per 100 coli.
18% of the samples indicated contamination of the order of 96-240 per 100 coli.

Regarding locality, conditions in the UNRWA settlement, with 40% of negative samples, seem to be slightly better than in the average smaller community, with 39% of negative samples in the pooled data of 49 villages and definitely better than in Halba and Miniara, with 22% and 16% of negative samples respectively.

These facts lead to the conclusion that water contamination is more widely spread in larger towns where population is more concentrated and a defective means of excreta disposal is common, than in smaller villages with less concentrated population and where no means of excreta disposal exists.

Regarding the type of source, rainwater, with 43% of negative samples, seems to be safer than spring water and well water, with 38% and 18% of negative samples respectively.

These facts lead to the conclusion that structures for collecting rainwater are better protected against contamination than those built around springs or in wells.

Quantitative analysis:

The above observations are of a general character as they are based on the consideration of two distinctive conditions, negative and positive samples. In order to determine the degree of water contamination in the various localities and sources a quantitative analysis was carried out based on the assumption that the average content of coliforms per sample (means most probable number of coliforms per 100 cc per sample-abbreviated in this paper to mean MPN coli/sample) could represent the degree of contamination and therefore could be utilized as a parameter for comparison purposes.

Table II shows the mean values of the MPN coli/sample: their standard deviations and the maximum expected values of the mean for each type of locality and source. The figures between parenthesis in the columns of Mean and Maximum expected mean indicate the ranking order from the lower to the higher MPN coli/sample.

With regard to locality, the values of the mean MPN coli/sample confirms in general the ranking based on percentage of negative samples, i.e., conditions are better in the UNRWA camp than in the three other localities, but Miniara, although with a lower percentage of negative samples than Halba, has a better condition regarding degree of contamination. As for source, spring water with average ranking of 3.5 is better than rainwater and well water with average rankings of 4.3 and 5.3 respectively.

In order to take into consideration the differences in the number of samples for each type of locality and source and the standard deviations of the mean, the maximum expected value of the mean for an indefinetely large number of samples was determined with basis on the assumption that this maximum value will almost certainly lie not more than three times the standard error of the mean away from the calculated mean; these values appear in the last column of the table. The ranking order based on the maximum values of the means remains unaltered with regard to locality. Regarding source, spring water keeps its first place with an average ranking of 3.0; well water is in second place with an average rank of 4.0 and rainwater is the last with an average rank of 6.0.

To determine if the differences in the mean MPN coli/sample between each two of the localities and between each two of the sampling sites for the various types of sources were statistically significant, the actual differences in means and standard deviations were compared with their respective standard errors. If the ratio of the actual difference to its calculated standard error, both for the mean and the standard deviation, was close to 2 or above it was assumed that the actual difference was statistically significant. Table III presents the results obtained from this analysis of differences. It may be seen that regarding localities the ratio of actual difference to the difference of standard errors of means and standard deviation is clearly marked for all cases; therefore it can be represented by its respective mean MPN coli/sample. As for sampling sites for each of the various types of sources, the statistical analysis could only prove that there was a significant difference in the mean MPN coli/sample between well water supplied at a tap of a distribution system and well water collected directly at the well either by vessel or pump. The quality of well water in those wells provided with a pump and a distribution system is better than the well water in those wells not provided with a distribution system, either with or without a pump.

No statistically significant difference in the water quality was proved between spring water at the source and a tap in the distribution system; this indicates that contamination occurring in the pipelines is insignificant. Also it was not proved that there was a statistically significant difference in the quality of water at a well with or without cover, with or without pump; this indicates that either the existing protective structures in wells are ineffective or that contamination reaches the well mainly from the underground. As it was not proved that there was a statistically significant difference in the quality of rainwater when this was stored in underground cisterns, either provided with a pump or not and when stored in overhead tanks, it seems that rainwater becomes mainly contaminated when it gets in contact with the improperly kept roofs where it is collected before going storage.

Conclusions:

The general situation regarding the quality of water in public and private sources and installations of the district of Akkar is unsatisfactory as only 27% of the 463 water samples collected during almost two years proved to be free from foecal contamination.

Regarding localities, the UNRWA settlement in El Abdeh, with a proper well and pumping station that supplies the whole community with water at public water-points, is provided with relatively safer water than the average village and the towns of Halba and Miniara. These two main towns show a higher degree of water contamination than the average village of the district.

Regarding types of sources, properly maintained wells, provided with a pump and a pipe distribution system, proved to be the safest water source; there is not statistically significant difference in the quality of water from other wells, either, when covered or open, provided or not with a pump, or in the quality of spring water at the source or in a water distribution system, or in rainwater when stored in underground cisterns or overhead tanks.

The fact that the degree of water contamination is higher in towns where the concentration of houses is greater and consequently where the number of faulty excreta disposal installations is larger, and the fact that there is no statistically significant difference in the water quality of wells, whether they are covered or open, provided with a pump or not, indicates that water contamination is mainly due to underground seepage from improper latrines and cesspits.

A considerable reduction in the degree of water contamination in wells should be expected when the generally used type of leaking pit of large capacity is replaced by septic tanks and privies of proper design and construction.

TABLE I

Results of Water Bacteriological Examination

LOCALITY	Most Probable Number of coliforms per 100 c.c.	NUMBER OF WATER SAMPLES: Spring Water: at outlet of spring structure	Spring Water: at water tap in the distribution system	Spring Water: Sum	Well Water: Open well without pump: at well	Well Water: Covered well with pump: at outlet of pump	Well Water: Covered well with pump: at water tap in the distribution system	Well Water: Sum	Rainwater: Underground cistern: at cistern	Rainwater: Underground cistern: at outlet of pump	Rainwater: Overhead tank: at water tap in the distribution system	Rainwater: Sum	[illegible]	[illegible]
HALBA	Zero	4	4	8	1	12	11	24			3	3	35	[illegible]
	2 to 5		1	1		2	3	5					[illegible]	4
	7.5 to 12		2	2	1	10	3	14					16	10
	15 to 21	1	6	7	8	20	3	31					[illegible]	14
	27		2	2	1	5	1	7					9	5
	38	1	1	2	6	5	2	13					15	10
	96	1	2	3	5	12		17					20	13
	240	3	1	4	2	10	1	13					17	11
	Sum	10	19	29	24	76	24	124			3	3	156	
MINIARA	Zero		1	1	1	2	2	5	1	5	10	16	21	16
	2 to 5					6		6					6	5
	7.5 to 12		2	2	2	12	3	17		2	2	4	21	16
	15 to 21					25	7	32	1	2	3	6	[illegible]	[illegible]
	27		1	1	1	4		5			1	1	[illegible]	5
	38		3	3	3	5	6	14			1	1	[illegible]	[illegible]
	96		6	6	6	4	4	14	1	1	2	4	[illegible]	[illegible]
	240					3	2	5			1	1	6	5
	Sum		13	13	13	61	24	98	4	10	20	34	[illegible]	
49 VILLAGES	Zero	26	18	44	1	13		14	1		3	4	[illegible]	[illegible]
	2 to 5	3	6	9	1	1		2	1		1	2	[illegible]	8
	7.5 to 12	4	1	5	2	2		4			1	1	[illegible]	6
	15 to 21	8	10	18	1	5		6		2	2	4	[illegible]	[illegible]
	27	1	3	4	2	2		4		1		1	[illegible]	6
	38	5	2	7	4	1		5			1	1	[illegible]	[illegible]
	96	6	1	7	5	4	1	10	1	1		2	[illegible]	[illegible]
	240		2	2						1	1	2	4	[illegible]
	Sum	53	43	96	16	28	1	45	3	5	9	17	[illegible]	
UMRAWA CAMP	Zero					3	4	7					7	[illegible]
	2 to 5						3	3					3	[illegible]
	7.5 to 12						3	3					3	[illegible]
	15 to 21						2	2					2	12
	27						1	1					1	[illegible]
	38						1	1					1	
	96													
	240													
	Sum					3	14	17					17	
TOTAL	Zero	30	23	53	4	30	15	48	2	5	16	23	125	[illegible]
	2 to 5	3	7	10	7	3	6	16	1		1	2	28	[illegible]
	7.5 to 12	4	5	9	15	15	6	36		2	3	5	50	11
	15 to 21	9	16	25	34	32	5	71	1	4	5	10	106	[illegible]
	27	1	6	7	7	7	2	16		1	1	2	25	
	38	6	6	12	15	12	3	30	1		2	3	45	[illegible]
	96	7	9	16	14	20	1	35	2	2	2	6	[illegible]	[illegible]
	240	3	3	6	5	12	1	18		1	2	3	27	
	Sum	63	75	138	101	131	39	271	7	15	32	54	463	
PERCENTAGE OF TOTAL	Zero	47	31	38	4	23	38	18	29	33	50	43		
	2 to 5	5	9	7	7	2	15	6	14		3	4		
	7.5 to 12	6	7	7	15	12	15	13		13	9	9		
	15 to 21	14	21	18	33	25	13	26	14	27	17	19		
	27	2	8	5	7	5	5	6		7	3	4		
	38	10	8	9	15	9	8	11	14		6	5		
	96	11	12	12	14	15	3	13	29	13	6	11		
	240	5	4	4	5	9	3	7		7	6	5		

TABLE II

DEGREE OF CONTAMINATION

REGARDING LOCALITY	Number of Samples	Mean	Standard deviation	Maximum expected mean
HALBA	156	49.2(4)	72.3	60.6(4)
MINIARA	132	36.7(3)	53.3	50.8(5)
49 VILLAGES	158	26.4(2)	45.3	37.2(2)
UNRWA CAMP	17	8.3(1)	10.3	15.1(1)
REGARDING SOURCE AND SAMPLING SITE				
SPRING WATER - at outlet of spring structure	63	29.5(3)	55.6	50.2(4)
SPRING WATER - at water tap in the distribution system	75	31.1(4)	51.9	49.1(2)
WELL WATER - Open well without pump - at well	101	40.4(7)	53.7	56.3(5)
WELL WATER - covered well with pump at outlet of pump	131	47.1(8)	63.6	65.1(6)
WELL WATER - at water tap of the distribution system	39	17.3(1)	33.2	35.6(1)
RAINWATER - Underground cistern - at cistern	7	35.9(5)	39.9	80.9(7)
RAINWATER - Underground cistern - at outlet of pump	15	36.7(6)	62.2	84.7(8)
RAINWATER - Overhead tank - at water tap in the distribution system	32	28.1(2)	40.1	49.3(3)

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Annex I

TABLE III

STATISTICAL SIGNIFICANCE OF THE DIFFERENCES IN MPN coli/sample

	Difference in Standard Deviation			Difference in Mean			
REGARDING LOCALITY	Actual	Standard error	Actual St. error	Actual	Standard error	Actual St.error	
Between HALBA and							
Miniara	19.5	5.4	3.6	12.5	7.5	1.7	Statistically significant differences
49 Villages	27.0	4.8	5.6	22.8	6.9	3.3	
UNRWA Camp	62.0	12.5	5.0	40.9	6.4	6.4	
Between MINIARA and							
49 Villages	7.5	4.1	1.8	10.3	5.9	1.7	
UNRWA Camp	42.5	9.2	4.6	28.4	5.3	5.4	
Between 49 VILLAGES and							
UNRWA Camp	35.0	7.9	4.4	18.1	4.5	4.0	
REGARDING SOURCE AND SAMPLING SITE							
Between SPRING WATER - at spring structure and at distribution system	3.7	6.6	0.6	1.6	9.3	0.2	
Between WELL WATER - at well and at pump	14.9	5.9	2.5	6.7	8.1	0.8	Statistically significant differences
at well and at distribution system	15.5	6.8	2.3	23.1	8.1	2.9	
Between WELL WATER - at pump and at distribution system	30.4	8.2	3.7	29.8	8.6	3.5	
Between RAINWATER - at cistern and at pump	22.3	20.3	1.1	0.8	23.3	≐ 0	
at cistern and at distribution system	0.2	13.9	≐ 0	8.6	17.9	0.5	
Between RAINWATER at pump and at distribution system	22.1	11.2	2.0	8.6	18.1	0.5	

ANNEX II

Study of Living Conditions in the Houses of the District of Akkar, Lebanon

The information presented in this paper is the result of a house-to-house survey carried out by the Rural Health Unit - project WHO Lebanon-4 - in the project area. During this survey data were collected on demography (name, age, sex, marital status, education level, occupation, etc. of the inhabitants), health (physical and mental ailments, births, deaths, infant mortality, etc.), and sanitation (living and sanitary conditions of houses). A questionnaire form was devised for obtaining this information in a standard and systematic manner.

This report deals with the sanitation part of the survey; it includes information on the size of houses, measured by the number of rooms, type of construction from the sanitary point of view, light and ventilation as indicated by the number and type of windows and as observed at the time of survey, type of water supply and excreta disposal installations, etc. To evaluate the rate of occupancy and overcrowding conditions a study of the number of dwellers in relation to number of rooms in the house is included in this work.

To avoid ambiguity and confusion, a list of terms and their explanation as applied in this paper is given.

EXPLANATION OF TERMS

Rooms are classified according to their function as:

Living room. This term includes all rooms used for living purposes, such as sleeping, eating, receiving visitors, recreation, study,etc. It is not possible to differentiate these activities as in the largest number of houses rooms are used for more than one purpose; thus the sitting-room is also a dining-room at meal time and a bedroom at night.

Kitchen. A room used for preparing and cooking food. If food is cooked in the dining-room, this room is considered as kitchen and not as living room; if food is cooked in the yard under a temporary shelter, the house is considered as without a kitchen. Kitchens are commonly used also for storing grain, fruits, food, clothes, etc.

Bathroom. A room used for washing and bathing. It is also used for laundry and as storeroom.

Toilet. A room or shelter provided with any type of excreta disposal installation.

Storeroom. A room exclusively used for storing goods such as grain, fodder, tools, furniture, etc.; for the purpose of this study garages were included under this term.

Kitchen-bathroom. The same room is used for cooking and bathing.

Bathroom-toilet. The excreta disposal facility is installed in the bathroom.

Kitchen-bathroom-toilet. The excreta disposal facility is installed in the room used for cooking and bathing.

Windows are classified according to the material of their casements as:

Glass windows. Hinged windows provided with glass panels.

Wood windows. Hinged windows of opaque material that bars all light when closed.

Air vent. Permanent opening in the wall usually of small size near the ceiling.

Regarding construction the following terms are used:

Hard floor. When flooring presents a continuous and even surface, hard and waterproof, easy to wash; usually made of concrete or cement tiles.

Smooth walls. When walls have a hard plaster or cement finish, painted or unpainted, which presents an even and uncracked surface easy to clean. Walls with a clayish lining are not considered as smooth walls.

Solid roof. When roofing is permanent, durable and strong, waterproof and easy to clean; usually made of concrete. Roofs of galvanized sheets, reeds and mud, and other perishable materials are not considered as solid roofs.

Regarding conditions observed at the time of survey the following terms are used:

Proper light. When standing at the centre of the room there was sufficient natural lighting to read news-print.

Adequate ventilation. When no offensive or musty odours or fumes were noticeable.

Sky view. When standing at the centre of the room the sky could be seen through a window or door. Sky view gives an indication of ample open space outside the room.

Regarding the type of toilet facility the following terms are used:

Water supply. When the installation is of the flush type or when there is a water tap in the same room.

Hydraulic seal. When there is an S-shaped outlet in the toilet that prevents the escape of gases from the pipeline or pit into the room.

Cesspit. The common means of excreta disposal in the area; a pit of large capacity (about 30 cu.m.), covered with a concrete slab, where used water from the kitchen, bathroom and toilet is collected and allowed to percolate through the floor and walls of the pit. This pit is usually dug in the yard or garden and connected with the toilet by a pipeline.

Latrine. The ordinary type of pit latrine with the squatting place directly over the pit.

Sewer. A privately owned pipeline that conveys waste water from a house or houses to a ditch.

Surface drain. A toilet without pit that discharges directly to an open drain outside the room.

Regarding the location of the stable the following terms are used:

In the house. The stable is used as a living room or is directly communicated with a living-room.

Attached. The stable has one or more walls in common with the living quarters but without a direct communication.

Detached. The stable is surrounded by a yard or open space.

Other terms used in this report are self-explanatory.

EXTENT OF THE SURVEY

This report is based on information obtained from the survey of 1350 houses in two main towns, Halba and Miniara, and six villages, Tel Abbas Gharbi, Sheikh Mohammed, Zouk el Housniya, Zouk el Habalsa, Karem Asfour and Nufeysa; the survey covered a population of 6923. For comparison purposes the data of the six villages, as they presented similar housing conditions, were pooled to form one representative group of average conditions in villages with a population varying from 200 to 650 inhabitants.

LIVING CONDITIONS REGARDING ROOM OCCUPANCY

The size of the family. The number of family members occupying one house varies from 1 to 15, but only 11% of the families have 9 or more members and 7% are formed of one individual, about 28% of the families are composed of 5 to 6 members. The general average is 5.13 members per family, which is not considerably different from the particular averages of the two main towns and six villages.

The size of the house. The number of living rooms in the house varies from 1 to 12, but only 10% of the houses have 8 or more rooms and 39% are of one room only; about 83% of the houses have 1 to 3 living rooms. The general average is 2.24 living rooms per house and there is a marked difference between the average size of the house in the two main towns (2.52) and in the six villages (1.80).

Overcrowding conditions. The general rate of occupancy in the area is 2.29 dwellers per living room. In Halba and Miniara this rate is very close to the acceptable minimum (arbitrarily chosen as a desirable figure in rural areas) of 2 dwellers per living room, regardless of sex and age. For the average village the occupancy rate is higher (2.86). Although the general occupancy rate of 2.29 dwellers per living room seems close to the desirable minimum, when a detailed analysis of room occupancy was carried out the results showed that 60% of the total population are living in overcrowding conditions and that 1102 additional living rooms, representing

36% of those existing, are required for having the whole population living at the desirable minimum of 2 dwellers per living room.

Table 1 presents a summary of the data related to family size, house size and rate of occupancy.

THE HOUSE

Many of the houses in the area covered by this study are of relatively recent construction and of a general standard higher than in similar areas of Egypt and Iraq - countries where the writer undertook studies of the same kind. In the towns particularly a large number of houses are built in two stories. Lebanese cement is widely used; as reinforced concrete in the construction of roofs, floors, beams and columns, as plain concrete for ground floors and pavement of yards, as sand-cement compressed blocks and tiles for walls and flooring, as mortar for plastering walls. Older houses are built of stone walls, masonry arches and slanting roofs of wooden rafters and baked clay tiles. A coveered veranda, used as bedroom in summer, is a common feature in old and new houses. Villages present a striking difference in the type of house construction, where stone and mud are still the most used building materials.

THE LIVING ROOM

The items taken into consideration for evaluating housing conditions are those directly affecting the health of the occupiers and the maintenance of a hygienic environment. These items include the number and kind of windows, type of construction, light and ventilation, access of direct sunlight to the room. Room space was not included in this study as it was considered impractical to measure dimensions of all the rooms covered by the survey.

The following information is based on data collected from 3026 living rooms.

Windows. Although the actual number and kind of windows in each living room of the area appear in the questionnaire form for each house, for expedient reasons this information is classified into four main groups.

The first group includes living rooms having one or more glass windows. More than half of the rooms in Halba and Miniara, but only 28% in the average village, satisfy the desirable minimum of one glass window per living room.

The second group includes living rooms having one or more windows which obstruct the passage of light when closed. 35% of the living rooms in Halba, 43% of those in Miniara and 60% of those in the average village belong to this group. If an attempt was made to improve the window situation of these rooms so that all fulfil the desirable minimum of one glass window per living room, a wood window should be replaced by a glass window in 1379 living rooms, representing 46% of the total.

The third group includes living rooms having one or more air vents which provide a limited but constant ventilation; the only light that enters the room is through the open door. Living rooms in this group represent 4% of the total in Halba, 3% in Miniara and 6% in the average village.

The fourth group includes living rooms without any sort of opening for light and ventilation, the door when open is the only means available. 5% of the living rooms in Halba, 1% in Miniara and 6% in the average village, are of this type. To improve the window situation so that all living rooms in the third and fourth groups fulfil the desirable minimum of one glass window per living room it would be necessary to make an opening in the wall and install a glass window in 244 living rooms, or 8% of the total.

Construction. The items used for the classification of living rooms according to the sanitary aspect of their construction are the nature and condition of floor, walls and roof. It is desirable that materials and exposed surfaces of the constitutent parts of the room are those which are easy to maintain in a proper state of cleanliness.

Living rooms fulfilling the requirement of having floor, walls and roof of such nature that facilitate a hygienic condition represent 62% of the total; living rooms are better built in Halba (65%) than in the average village (59%). 23% of the existing living rooms fulfil only partially the above requirement and 15% do not comply at all with the desirable type of construction.

To improve conditions in the living room from the viewpoint of a hygienic construction it would be necessary to lay hard flooring in 501 living rooms, improve and plaster walls in 907 and re-build a solid roof in 1000; these figures represent respectively, 17%, 30% and 33% of the total number of living rooms.

Light and ventilation. Based on the appreciation of conditions at the time of surveying the house, it was estimated that 582 living rooms - 19% of the total - had insufficient light and ventilation, 146 living rooms - 5% of the total - are deficient either in light or ventilation, Light and ventilation conditions were better in Halba, where 83% of the living rooms had proper light and adequate ventilation, than in the average village where the proportion was 67%.

614 living rooms need improvement in the lighting situation and 696 living rooms need better ventilation.

Open space. Based on the fact that only 302 living rooms - 10% of the total - have an adjacent construction that obstructs the view of the sky, open space around rooms and houses can be considered as sufficiently ample. In this respect the average village with 15% of the living rooms without a sky view shows a relatively higher congestion of buildings.

Table II presents a summary of the data pertaining to housing conditions in the living room.

THE KITCHEN, BATHROOM AND TOILET

In the majority of cases no facilities are provided in the rooms for cooking and washing; a simple charcoal brazier and an earthen water pot in the room are the whole kitchen furnishing, and a cemented floor and a water barrel may constitute the bathroom. But many houses in Halba and Miniara use bottled gas for cooking fuel, and a washbasin, either supplied from a piping system or from the tap of a small tin receptacle constantly replenished by hand from outside sources, is sometimes found in the kitchen and bathroom. It was the exception to find a bathroom with piped water supplying both a shower and a flush WC.

There is a room for cooking in 805 houses - 60% of the total; this proportion is higher in Halba (76%) than in the average village (49%). However, in 506 of these houses the room is also used as a bathroom. Only 299 houses - 22% of the total - have a room exclusively used as kitchen; kitchens are more frequent in Halba (33% of the houses) than in the average village (16%).

A room exclusively used for bathing was found in 221 houses - 16% of the total; bathrooms are more frequent in Halba (25% of the houses) than in the average village (8%).

There are 434 houses - 32% of the total - with a toilet ; this proportion is higher in Halba (51%) than in the average village (12%). In about 80% of the houses with a toilet this facility is located in a separate room or shelter; in 8 houses it is in the kitchen.

Exceptionally, houses have two kitchens - 11 houses; two bathrooms - 10 houses; two kitchen-bathrooms - 6 houses; two or three toilets - 14 houses.

To provide each house in the area covered by the survey with a kitchen, bathroom and toilet it would be necessary to build 1051 kitchens - 3.4 times the number existing at present, 1129 bathrooms - 4.9 times the existing, 916 toilets - twice the number of those now existing. Besides, it should be necessary to move 504 bathrooms and 8 toilets out of the kitchen to new rooms.

Table III presents a summary of the data pertaining to the kitchen, bathrooms and toilet situation in the houses of the area covered by this study.

Housing conditions. A study of housing conditions in kitchens and bathrooms was carried out in a way similar to that used for the living room.

In general,kitchens and bathrooms are of inferior standard. 797 kitchens and bathrooms - 76% of the total - do not fulfil the desirable minimum of one glass window. 328 kitchens and bathrooms - 31% of the total - do not fulfil the requirement of having floor, walls and roof of such nature that facilitates a hygienic condition. 567 kitchens and bathrooms - 54% of the total have a deficient lighting and ventilation. Kitchens were in all aspects better in Miniara than in Halba and the average village.

To raise the existing kitchens and bathrooms to the same desirable level of the living room it would be necessary to replace 221 wood windows by glass windows and to open walls and install 576 glass windows. 396 new floors and 447 roofs should be built and the walls of 507 kitchens and bathrooms should be plastered. Better lighting should be provided in 582 kitchens and bathrooms and better ventilation in 617.

Table IV presents a summary of the data pertaining to housing conditions in the kitchen and bathroom.

Type of toilet facility. Out of the 434 houses with an installation for excreta disposal, 266 houses - 20% of the total - are provided with a cesspit and 114 houses - 8% of the total - have a pit latrine; 54 houses - 4% of the total - discharge the toilet contents on the ground surface. In 97 houses (7%) the toilet is supplied with piped water and 329 houses (23%) there is a toilet bowl with hydraulic seal to prevent the return of foul gases into the room. In 916 houses - 68% of the total - there is no means at all for excreta disposal.

A comparative analysis shows that the types of toilet found in Halba were better than in Miniara and the average village.

To improve the toilet situation in houses provided with a cesspit it would be necessary to supply water in the toilet of 191 houses - 2.5 times the number of toilets at present supplied with water; and install 64 toilet bowls with hydraulic seal - one third of those now existing. The 22 houses in Halba and Miniara that are connected to insanitary sewers should be provided with a safe cesspit. 32 houses that discharge the toilet contents on the ground surface and 916 houses without any sort of toilet facility should be provided with a latrine.

Table V presents a summary of the data relative to types of toilet facilities existing in the area covered by this study.

Type of water supply. There are 421 houses in the area - 31% of the total - with water available inside the premises; this proportion is 75% for Halba, 36% for Miniara and 1% for the average village. The remaining population has to recur to the public spring, well or fountain, the nearest stream or the neighbour's well, for the water they need. Even the people with water inside their premises, which is seldom of reliable quality, frequently use water from a public spring for cooking and drinking. The most common domestic source of water in Halba and Miniara is the well - 96% and 76% of the private sources respectively; in the average village rainwater is more generally utilized - 72% of the houses provided with water have an installation for collecting and storing rainwater. Exceptionally - 8 cases in the area - a privately owned pipeline connects the house with the nearby spring.

Of the 334 wells found in the area, 193 (58%) are provided with adequate means of protection against contamination and 141 (42%) show conditions which were clearly deficient. Water is drawn by pump from 98 wells (30%) and lifted to an overhead reservoir in 54 cases (16%).

Of the 79 houses with a rainwater system, 42 (53%) have an underground cistern; 31 cisterns (39%) are provided with pumps; in 11 cases (14%) pumped water is lifted to an overhead tank. The remaining 37 houses (47%) with a rainwater system, have an overhead tank located directly under the roof; stored water flows by gravity to one or more taps in the house. Cases in which the rainwater collected from the roofs is stored in oil drums and other vessels are frequent, but this type of system is not included in the study as it is not a permanent feature of the house.

97 kitchens and 91 bathrooms in the area are supplied with piped water. Only 82 houses - 6% of the total have a pipe system to supply the kitchen and bathroom.

To improve the water supply situation in those houses already provided with some sort of water supply it would be necessary to repair 141 wells so as to make them safe from pollution, to install 247 pumps for drawing water from wells and cisterns, 311 overhead tanks and 331 pipe systems so that the 421 houses at present with some means of water supply could have at least a water tap in the kitchen, the bathroom and toilet. Besides, there are 929 families - 69% of the total - who need a complete water system in their homes.

Table VI presents a summary of the data related to the water supply situation.

The danger of water contamination. From the study of water quality in sources available to the population carried out by the Rural Health Unit in this district it was found that 82% of the 271 samples of well water showed the presence of coliform organisms. This widespread contamination may originate from the percolation of the contents in cesspits and latrines to the shallow water-bearing strata that feed the wells. The calcareous nature of the soil facilitates this percolation and the contamination of subsoil water may spread extensively.

The study of the location of the cesspit or latrine with respect to the well in the 197 houses where a well and a pit was found shows that in 155 cases (79%) the distance pit-well was less than 20m. and in 39 cases (20%) the well was located at the same level or below the cesspit or latrine.

This dangerous situation could be remedied by replacing cesspits for septic tanks and building watertight pit privies in 155 houses where the well and pit are located at a distance that does not safeguard the water source from contamination. It is obvious that real improvement of this situation can only be achieved when, besides making the recommended changes mentioned above, wells are properly protected and the 916 families who at present defecate indiscriminately on the ground are provided with a safe means of excreta disposal.

Table VII presents a summary of the data relative to the location of well in relation to the cesspit or latrine.

THE STABLE

As in all rural areas, the stable is a frequent feature of the house in the area covered by this study. In general, stables are of poor construction, of insufficient space for the animals they shelter and of neglected appearance, manure is spread all over the grounds. These conditions and the vicinity of stables to living quarters produce a source of nuisance and a health hazard as a place for breeding flies and harbouring rats. Piles of manure may remain in the yard or street for long periods before this material is used as fertilizer in the cultivation fields.

499 houses - 37% of the total - have a stable that shelters from 1 to 15 animals, with an average capacity of 3.3 animals per stable. Stables are more frequent in the average village (52% of the houses and 3.4 animals per stable) than in Miniara (21% and 2.2 animals per stable.) The corresponding figures to Halba are, 33% of the houses with an average capacity of 3.6 animals.

With respect to their location, 113 stables (23%) are conveniently located in detached shelters in the yard or grazing field, 227 stables (45%) are attached to the house with one or more walls in common with the living quarters, and 159 stables (32%) form part of the house, where in many instances they also serve as kitchens and even as bedrooms. The inhabitants of houses without toilet use the stable for defecating.

The insanitary situation produced by having the stable inside the house is more acute in the average village, where 40% of the stables are thus located, than in Halba and Miniara, where this type represents 22% and 27% of the stables respectively.

To improve the stable situation in the area it would be necessary to remove 386 stables from the house and build new ones at a convenient location.

Better construction and maintenance of stables is required.

An animal census was included in the survey so as to have an idea of the manure disposal problem in the area. Animals for milking (cows and goats) and animals destined to slaughter (goats, sheep, bullocks) were grouped apart for estimating milk production and deciding if an abbatoir was needed in the area. There is a stabled animal for every 4 inhabitants. The number of milking animals is 576 and animals for slaughtering are 544, this is about one of each kind for every 12 persons; animals are relatively more numerous in the average village (one of each for every 8 persons) than in Miniara (one of each for every 35 persons).

Table VIII presents a summary of the data pertaining to the stable and stabled animals.

OTHER ASPECTS OF THE HOUSE

The storeroom. A room used for storing grain and other perishable materials, with poor lighting and ventilation, seldom opened and aired, where decay and dust accumulates, attracts rodents and arthropods and may become a health and fire hazard in the house. There are 121 storerooms of this type in 116 houses - 9% of the total number in the area. According to information obtained during the survey, mice and rats are a nuisance in 81% of the houses.

Insects. The most common pests recognized as such by the population are flies (99% of the people agreed that flies were a continuous nuisance), mosquitoes (73%), fleas (47%) and bedbugs (23%).

The space surrounding the house. The sanitary importance of the nature of the ground round the house lies in the production of dust during the dry season, which may be blown by the wind into the rooms, and of mud during the rainy season, which may be brought in by the feet of the dwellers. Infection due to the presence of pathogenic organisms in dust and mud may be spread in this way. This hazard is greater in houses surrounded by loose earth than in those with a cultivated garden or orchard, or in those with a paved yard. Two-thirds of the houses of the area are surrounded by grounds formed of loose earth.

Public services. The absence of all public services of health importance in the area covered by this study makes sanitary conditions in the house extremely difficult to achieve and maintain. Without a water supply system, sewerage, refuse collection, electricity, etc. it is almost impossible to improve the living conditions of the inhabitants. The towns such as Halba and Miniara, are gradually becoming less rural in character, many and better houses are now being built, but regarding sanitary facilities these remain of the most primitive kind.

CONCLUSIONS

The general sanitary condition of houses in the district of Akkar is very much the same as in other rural areas of the Eastern Mediterranean Region. The outside aspect of many houses shows the interest of dwellers in improving the construction and appearance of buildings; thus in rural towns dwellings lose their home-made character typical of the rural habitation. However, with regard to house sanitation no similar progress has been accomplished. The findings of a house-to-house survey show that out of every 10 living rooms, still 6 are overcrowded beyond the desirable minimum of 2 dwellers per room, 6 are not provided with a glass-panelled window, 4 are so constructed as to make difficult and discourage cleanliness. 5 out of every 6 houses have no separate room for cooking and bathing; two-thirds of the houses have no facilities for excreta disposal, and only 1 out of every 14 houses has a toilet with running water; two-thirds of the houses have no water supply and only in 1 out of every 13 houses has a water pipe system.

General recommendations for the improvement of the present housing situation are included at the appropriate place in the text of this report.

TABLE I

SUMMARY OF THE DATA RELATED TO FAMILY SIZE, HOUSE SIZE AND RATE OF OCCUPANCY

FAMILY SIZE

Distribution of families according no. of members

Number of members	Number of families with the specified number of members in column I			
	HALBA	MINIARA	6 VILLAGES	T O T A L
15	2		3	5
14	2		1	3
13	1	2		3
12	4	1	2	7
11	5	6	6	17
10	12	14	11	37
9	23	23	30	76
8	31	34	42	107
7	39	40	54	133
6	66	52	73	191
5	63	43	82	188
4	47	55	61	163
3	53	38	67	158
2	64	51	66	181
1	25	32	24	91
no.of fa-	437	391	522	1350
s popula-	2233	1998	2692	6923
ion				
GE members family	5.11	5.11	5.16	5.13

HOUSE SIZE

Distribution of houses according to no. of living-rooms

Number of living rooms	Number of houses with the specified number of living-rooms in column I			
	HALBA	MINIARA	6 VILLAGES	T O T A L
12	1			1
11				
10		1		1
9	1	2	1	4
8	1	4	3	8
7	4	8	2	14
6	15	10	3	28
5	31	28	11	70
4	45	31	17	93
3	84	60	48	192
2	118	111	184	413
1	137	136	253	526
Total [illegible] no.of living rooms	437 1107	391 977	522 942	1350 3026
AVERAGE living-rooms per house	2.53	2.50	1.80	2.24

RATE OF OCCUPANCY - Dwellers per living-room

HALBA	MINIARA	6 VILLAGES	TOTAL	
2.02	2.05	2.86	2.29	
1343	1241	1561	4145	
60%	62%	58%	60%	of total population
360	347	395	1102	
33%	35%	42%	36%	of existing living rooms

Population living in overcrowded conditions (more than 2 dwellers per living-room)

Number of living rooms required for raising the occupancy rate to 2 dwellers per living room - for the whole population

TABLE II

HOUSING CONDITIONS IN THE LIVING ROOM

NUMBER OF LIVING ROOMS	HALBA	MINIARA	6 VILLAGES	TOTAL	
a) with the specified type and number of WINDOWS	1107	977	942	2026	
2 or more glass windows	387	309	144	840	If minimum requirement is one glass window
1 glass window and 1 or more wood windows	37	90	43	170	
1 glass window and 1 or more air vents	46	71	22	139	
1 glass window only	153	52	55	260	
2 or more wood windows	188	225	304	717	1379 living rooms (46%) require the change of a wood window for a glass window
1 wood window and 1 or more air vents	76	166	102	344	
1 wood window only	119	38	161	318	
2 or more air vents	16	14	31	61	244 living rooms (8%) require the installation of a glass window
1 air vent only	34	4	27	75	
No windows or air vents	51	8	59	118	1623 living rooms (54%)do not fulfil the minimum requirement
b) with the specified type of CONSTRUCTION					
Hard floor only	138	120	79	337	501 living rooms (17%) need a proper floor
Smooth walls only		1	2	3	
Solid roof only	8	8	20	36	907 living rooms 30% need proper walls
Hard floor and smooth walls	80	64	71	215	
Hard floor and solid roof	29	28	32	89	
Smooth walls and solid roof	7	9	1	17	1000 living rooms 33% need a proper roof
Hard floor, smooth walls and solid roof	728	558	558	1884	
No hard floor, smooth walls or solid roof	117	149	179	445	
c) with the specified LIVING CONDITIONS					
Proper light only	25	40	49	114	614 living rooms (20%) need better sunlight
Adequate ventilation only	6	14	12	32	
Proper light and adequate ventilation	924	743	631	2298	696 living rooms (23%) need better ventilation
No proper light nor adequate ventilation	152	180	250	582	
Sky view	1017	911	796	2724	
No sky view	90	66	146	302	

TABLE II.1

THE KITCHEN, BATHROOM AND TOILET

	HALBA	MINIARA	6 VILLAGES	TOTAL
MBER OF HOUSES th the specified type of kitchen, throom and toilet	437	391	522	1350
tchen only	20	10	46	76
throom only	1	2	4	7
tchen bathroom only	104	89	153	346
ilet only	15	26	11	52
tchen and bathroom	4	1	9	14
tchen and toilet	12	7	3	22
tchen bathroom and toilet	86	47	19	152
throom and toilet	1	8	4	13
tchen, bathroom and toilet	105	58	24	187
tchen-bathroom-toilet	3	5		8
kitchen, bathroom or toilet	65	143	249	477

1051 houses (78%) need a kitchen

1129 houses (84%) need a bathroom

506 houses (37%) need the bathroom moved out of the kitchen

916 houses (68%) need a toilet

8 houses (0.6%) need the toilet moved out of the kitchen

MBER OF HOUSES AND ROOMS th the specified number and type of tchen, bathroom and toilet		House	Room	House	Room	House	Room	House	Room
uses with	1 kitchen	135	135	71	71	82	82	299	310
	2 kitchens	6	12	5	10				
	1 bathroom	78	78	19	19	37	37	137	140
	2 bathrooms	2	4	1	2				
	1 toilet	184	184	94	94	57	57	342	350
	2 toilets	3	6	3	6				
	3 toilets	1	3						
	1 kitchen-bathroom	187	187	133	133	172	172	498	504
	2 kitchen-bathrooms	3	6	3	6				
	1 bathroom-toilet	30	30	43	43	4	4	84	91
	2 bathroom-toilets	1	2	6	12				
	1 kitchen-bathroom-toilet	3	3	5	5			8	8
AL -	kitchen and kitchen-bathroom	334	343	217	225	254	254	805	822
	bathroom and bathroom-toilet	111	114	69	76	41	41	221	231
	toilet	222	228	151	160	61	61	434	449

TABLE IV

HOUSING CONDITIONS IN THE KITCHEN AND BATHROOM

NUMBER OF KITCHEN AND BATHROOMS	HALBA	MINIARA	6 VILLAGES	TOTAL	
a) with the specified type and number of WINDOWS	457	301	295	1053	
2 or more glass windows	29	24	11	64	If minimum requirement is one glass window
1 glass window and 1 or more wood windows	5	7	2	14	
1 glass window and 1 or more air vents	23	21	9	53	
1 glass window only	52	49	25	126	
2 or more wood windows	13	21	28	62	221 kitchens and bathrooms (21%) require the change of a wood window for a glass window
1 wood window and 1 or more air vents	15	28	23	66	
1 wood window only	38	22	33	93	
2 or more air vents	50	38	25	113	576 kitchens and bathrooms (55%) require installation of a glass window
1 air vent only	113	46	58	217	
No windows or air vents	120	45	81	246	797 kitchens and bathrooms (76%) do not fulfil the minimum requirement
b) with the specified type of CONSTRUCTION					
Hard floor only	44	23	12	79	396 kitchens and bathrooms (38%) need a proper floor
Smooth walls only		1		1	
Solid roof only	14	4	41	59	507 kitchens and bathrooms (48%) need proper walls
Hard floor and smooth walls	21	9	9	39	
Hard floor and solid roof	14	18	9	41	
Smooth walls and solid roof		4	4	8	447 kitchens and bathrooms (43%) need a proper roof
Hard floor, smooth walls and solid roof	230	173	95	498	
No hard floor, smooth walls or solid roof	134	69	125	328	
c) with the specified LIVING CONDITIONS					
Proper light only	14	14	22	50	582 kitchens and bathrooms (56%) need better sunlight
Adequate ventilation only	4	2	9	15	
Proper light and adequate ventilation	176	155	90	421	
No proper light or adequate ventilation	263	130	174	567	617 kitchens and bathrooms (59%) need better ventilation
Sky view	226	185	167	578	
No sky view	231	116	128	475	

TABLE V

TYPE OF TOILET

	HALBA	MINIARA	6 VILLAGES	TOTAL
NUMBER OF HOUSES with the specified type of TOILET	222	151	61	434
Cesspit - with water supply in the room	16	12	2	30
with hydraulic seal in the toilet	102	33	23	158
with water supply and hydraulic seal	21	15	9	45
without water supply and hydraulic seal	28	4	1	33
Latrine - with hydraulic seal	14	23	8	45
without hydraulic seal	28	29	12	69
Sewer - with water supply	6	4		10
with water supply and hydraulic seal	7	5		12
Surface drain - with hydraulic seal		12		12
without hydraulic seal		14	6	20

97 houses (7%) have a toilet with water

337 houses (25%) have a toilet without water

916 houses (68%) have no toilet

TABLE VI
TYPE OF WATER SUPPLY

NUMBER OF HOUSES with the specified type of WATER SUPPLY	HALBA	MINIARA	6 VILLAGES	TOTAL
	226	141	54	421
Well protected - with motor pump and overhead tank	6			6
with hand pump and overhead tank	36	9	2	47
with hand pump	29	13		42
without hand pump	75	23		98
Well unprotected -				
with motor pump and overhead tank	1			1
with hand pump	1		1	2
without hand pump	64	62	12	138
Rainwater -				
underground cistern -				
with hand pump and overhead tank		8	6	14
with hand pump	1	4	12	17
without hand pump		3	8	11
overhead tank connected to the roof	5	19	13	37
Private water service from spring	8			8
with a water distribution system				
to the bathroom only	6	3	6	15
to the kitchen only	3	5	1	9
to the kitchen and bathroom	41	31	10	82

WELL
334 houses (25%) have a well

193 houses (14%) have a protected well
141 houses (11%) have an unprotected well
98 houses (7%) have a well with a tank

RAIN
79 houses (6%) have a rainwater system
42 houses (3%) have an underground cistern
51 houses (4%) have an overhead tank
31 houses (2%) have a hand pump

SPRING
8 houses (0.6%) have a supply of spring water

DISTRIBUTION SYSTEM
106 houses (8%) have a water distribution system

929 houses (69%) have no water supply

TABLE VII

LOCATION OF WELL IN RELATION TO CESSPIT OR LATRINE

	HALBA	MINIARA	6 VILLAGES	TOTAL
NUMBER OF HOUSES with a well and a cesspit or latrine	129	59	9	197
a) at the specified distance				
9m or less	39	19	1	59
10 to 19m	64	27	5	96
20 to 29m	18	8	3	29
30m or more	8	5		13
b) at the indicated relative elevation				
Well above cesspit or latrine	104	47	7	158
Well level with cesspit or latrine	9	4	1	14
Well below cesspit or latrine	16	8	1	25

155 wells (79%) are dangerously located to the cesspit or latrine

39 wells (20%) are dangerously located with regard to difference of level between well and cesspit or latrine

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TABLE VIII

STABLE AND ANIMALS

	HALBA	MINIARA	6 VILLAGES	TOTAL
NUMBER OF HOUSES with the specified LOCATION of the stable	143	82	274	499
in the house	31	22	106	159
Attached	80	38	109	227
Detached	32	22	59	113
with the specified SIZE of the stable				
for 1 to 3 animals	101	59	187	347
for 4 to 7 animals	35	19	69	123
for 8 to 12 animals	2	4	13	19
for 13 or more animals	5		5	10
NUMBER OF ANIMALS in the stable of the specified class	511	184	933	1628
for milking	165	54	357	576
for slaughter	180	60	304	544
other	166	70	272	508
Ratio - Population to animals in stable	4.4	10.8	2.9	4.3
Ratio - Houses to stables	2.4	4.7	1.9	2.7

499 houses (37%) have a stable, of which 159 stables (32%) are improperly located and 227 stables (45%) are inadequately located

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