

シリア・アラブ共和国 太陽光発電利用民生向上技術協力計画 事前調査報告書

シリア・アラブ共和国太陽光発電利用民生向上技術協力計画事前調査報告書

1995年9月

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国際協力事業団
鉱工業開発調査部

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シリア・アラブ共和国
太陽光発電利用民生向上技術協力計画
事前調査報告書

1995年9月

国際協力事業団
鉱工業開発調査部



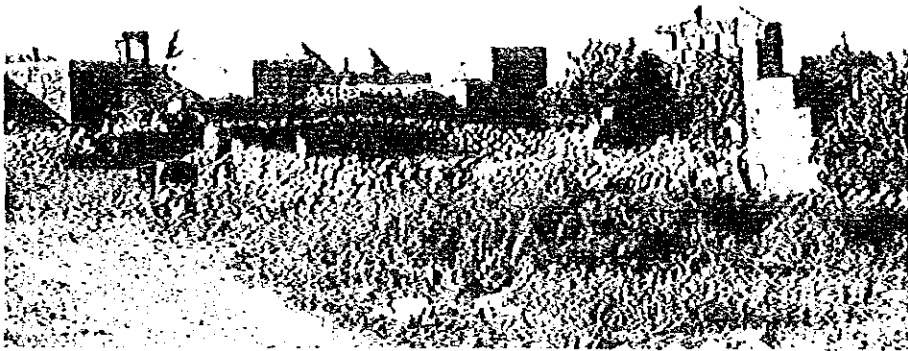
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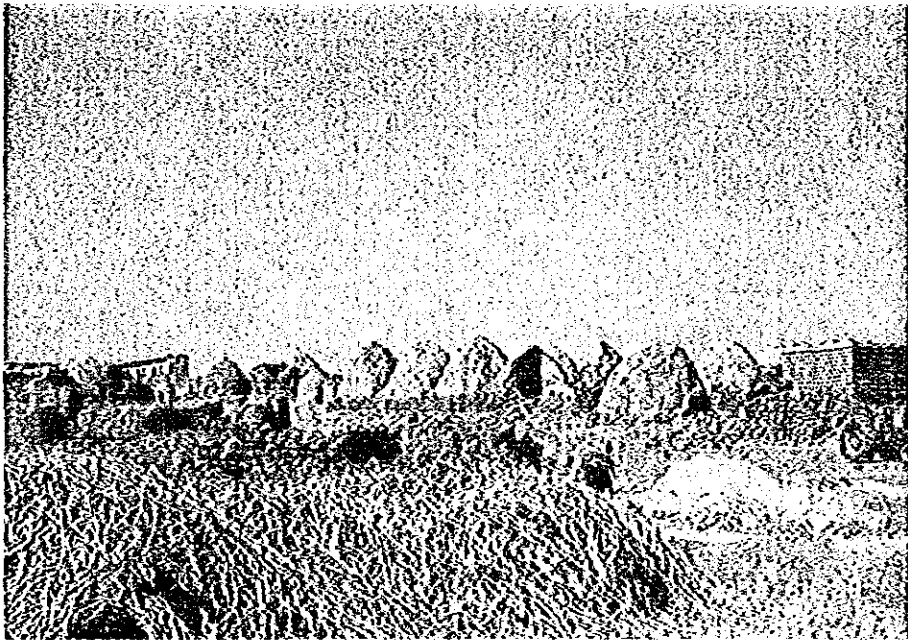
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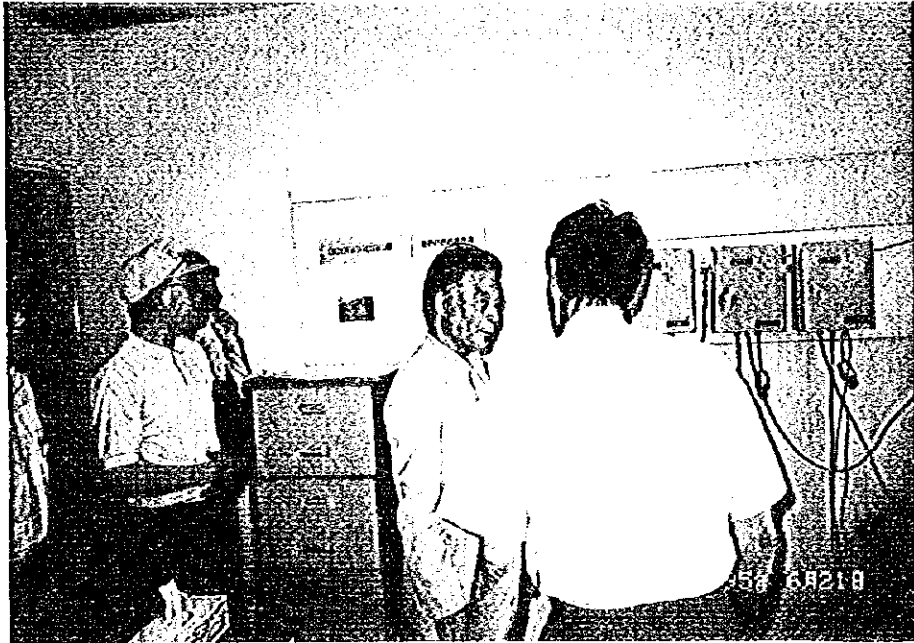
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ザルジータ村



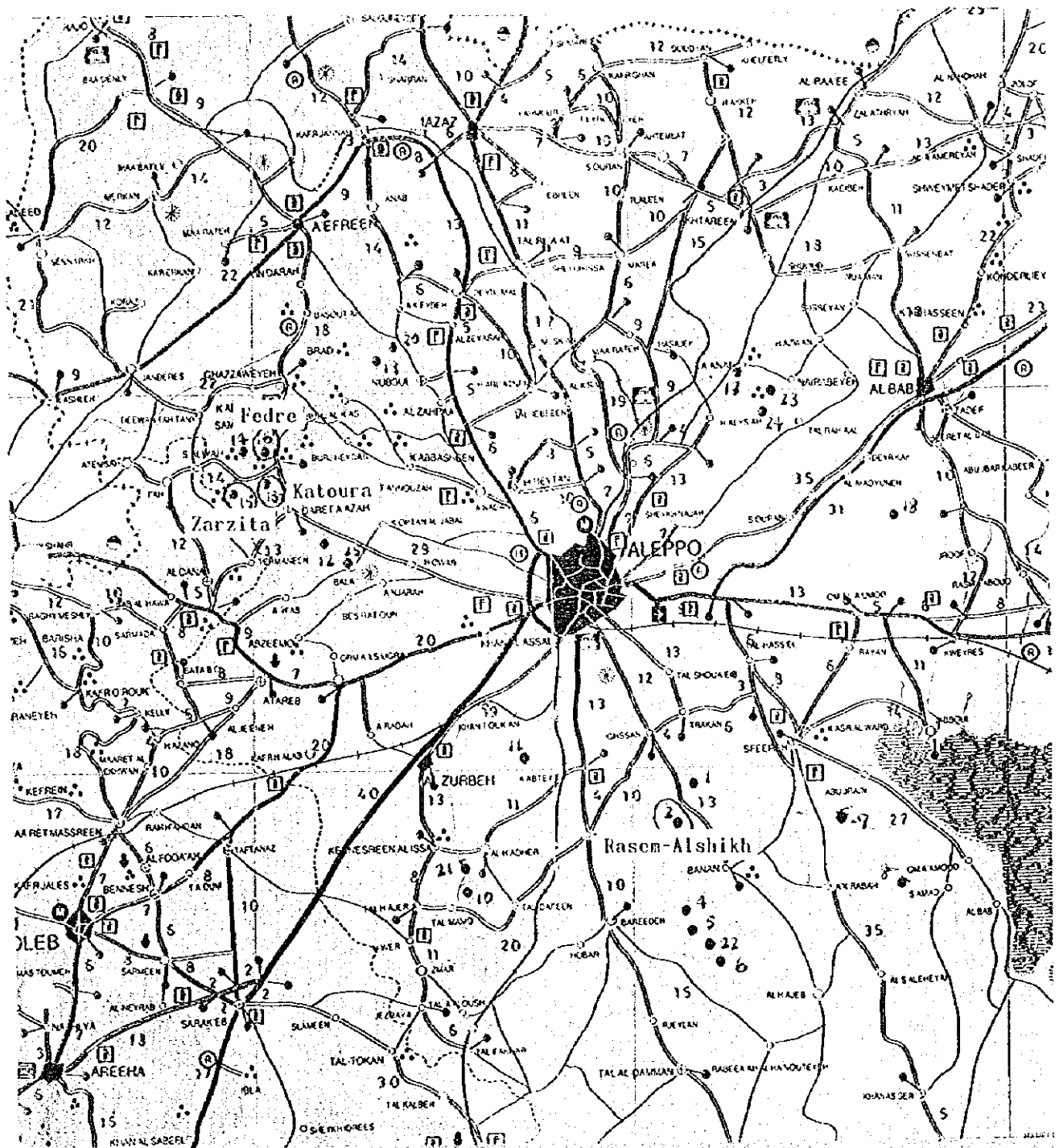
ラセム・アシェール村



HIAST研究室

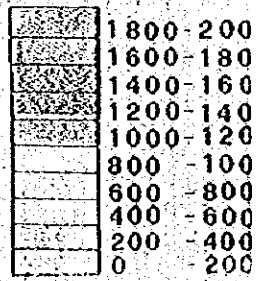


S/W及びM/Mの署名



**SYRIAN ARAB REPUBLIC
MINISTRY OF TOURISM
PLAN OF ALEPPO & IDLEB DISTRICTS**

- | | | | | | |
|-----------|-------------------------|---|-----------------------|---|---------------|
| ----- | INTERNATIONAL BOUNDARY | ⊙ | ARCHAEOLOGICAL SITE | ⊞ | AUTO SERVICE |
| - - - - - | TEMPORARY BOUNDARY | ⊙ | HOTEL | ⊞ | PANORAMA |
| ----- | ADMINISTRATIVE BOUNDARY | ⊙ | RESTAURANT | ⊞ | HANDICRAFTS |
| ===== | HIGHWAY | ⊙ | RAIL STATION | ⊞ | MUSEUM |
| ===== | MAIN ROAD | ⊙ | BUS (PULLMAN) STATION | ⊞ | AIRPORT |
| ===== | SECONDARY ROAD | ⊙ | GAS STATION | ⊞ | MINERAL WATER |
| ===== | OTHER ROAD | | | | |
| ----- | RAILWAY | | | | |
| ----- | DISTANCES IN KM | | | | |



SCALE: 1/500 000

第 1 章 総 論

1-1 事前調査団派遣の背景・経緯

シリア国は、シリア砂漠を始めとして広大な乾燥・半乾燥地域を有しているが、国内の多数の遠隔地が電気や水の恩恵を授かってはおらず（14,000に至る村落のうち、6,000が未電化）しかも送電線等の設置は経済性の観点から期待できない村落が多い。

第5次5か年計画（1981年～）以降、地域間格差の解消は国家開発計画の全体目標の1つに挙げられている。シリア国政府は農村の生活水準向上のために電化の促進を計画しており、地方電化の手段として豊富な太陽エネルギー利用等の研究に大きな関心・期待を寄せている。

また、太陽光発電の導入による広範な半乾燥・無電化地域の民生向上を通じ、民生の安定化、ひいては中東地域の安定化への寄与が期待される。

94年1月 シリア国SSRC（科学研究調査センター）は援助窓口機関SPC（企画庁）に平成6年度開発調査要望案件として「太陽光発電計画に係るF/S調査」を提出。

94年1月 鉱工業プロジェクト選定確認調査団派遣。
～2月 シリア側に対し上記案件の要望背景及び内容等につき確認を行うとともに、我が国による協力の可能性等についても協議を実施した。その結果、シリア国の電力事情、豊富な太陽エネルギー、技術を吸収する人材等の豊富さ等に鑑みると、今後の太陽光発電普及の優良モデル国となり得る国であり、日本側実施体制の確立も含めて検討し、早急に実施に移すべきとの結論に至った。

94年7月 第1次鉱工業プロジェクト形成基礎調査団派遣。
シリア側と「太陽光発電利用遠隔地域民生向上技術協力計画」について、我が国の協力の可能性、その範囲につき協議を行ない、その中で要望のあった太陽光発電を利用した村落電化・揚水・淡水化システムに対する開発調査スキームによる協力についてシ側の見解を聴取した。その結果、具体的なサイト及びサイトに適合したPVシステムの設定等については引き続き検討していくこととなった。また本件の早期実現が求められたことから正式要請書の提出を促した。

94年8月 シリア国政府は無電化地域における民生向上を目的とした太陽エネルギーの利用方法を検討するとともに、地域の特性にあった経済性のあるエネルギー供給・利用システムを実証する総合的な開発調査の実施について、我が国政府に対し正式要請越した。

94年11月 JICA短期専門家派遣。

～95年1月 シリア側からサイト候補地選定、太陽光発電システムの概略設計及びSustainabilityの評価等について助言を得ることを目的として短期専門家の派遣要請があり、我が方は昨年11月30日から本年1月14日にかけて2名の短期専門家を派遣、シリア国における望ましい太陽光発電利用システムの具体化への協力を行った。

95年2月 第2次鉱工業プロジェクト形成基礎調査団派遣。

シリア側と「太陽光発電利用民生向上技術協力計画」に係る今後の協力計画立案のための協議を行い、その結果、概ね専門家の協力によって具体化された太陽光発電利用システムに沿った協力が可能であることが確認された。

1-2 事前調査の目的

本調査は、「シリア・アラブ共和国太陽光発電利用民生向上技術協力計画」調査に係る実施細目(S/W)についてシ側と協議し、合意に至った場合には署名・交換することを目的とし、以下の調査を行った。

- (1) シリア側要請内容の確認
- (2) サイト候補地の現地踏査・視察
- (3) S/Wに係る協議及び合意形成

1-3 事前調査団構成

- (1) 田守 栄一 (団長/総括) 国際協力事業団 理事
- (2) 林 貴 (技術協力行政) 通商産業省 通商政策局 技術協力課
- (3) 林 健三 (太陽光発電行政) 通商産業省 資源エネルギー庁 公益事業部 技術課長補佐
- (4) 荒川 嘉孝 (協力企画) 国際協力事業団 鉱工業開発調査部 資源開発調査課長代理
- (5) 井本 浩之 (調査企画) 国際協力事業団 鉱工業開発調査部 資源開発調査課

1-4 調査日程

本事前調査は95年6月17日(日)から95年6月27日(火)までの11日間にわたって以下の日程により実施された。

	月 日 曜	行 程	宿泊地	備 考
1	6/17 (土)	東京発 ⇒⇒ フランクフルト着	フランクフルト	移動
2	6/18 (日)	フランクフルト 発⇒ グラスカス 着	グラスカス	移動
3	6/19 (月)	グラスカス 市内	グラスカス	大使館・JICA事務所打合せ、 企画庁表敬 SSRC本部表敬/打合せ
4	6/20 (火)	グラスカス 市内	グラスカス	電力省・農業省・工業省表敬 SSRC本部にてS/W・M/M 協議
5	6/21 (水)	グラスカス 発 ⇒⇒ アレッポ着	アレッポ	移動
6	6/22 (木)	現地踏査	アレッポ	サイト候補地現地踏査
7	6/23 (金)	アレッポ発 ⇒⇒ グラスカス 着	グラスカス	移動、団内打合せ
8	6/24 (土)	グラスカス 市内	グラスカス	SSRC本部にてS/W・M/M 協議・ 署名・交換
9	6/25 (日)	グラスカス 発 ⇒ ウィーン着	ウィーン	大使館・JICA事務所帰国 報告、移動
10	6/26 (月)	ウィーン発⇒⇒フランクフルト 経由	機中泊	移動
11	6/27 (火)	⇒⇒ 東京着		移動

1-5 主要面会者リスト

氏 名	職 位
内田 富夫	在シリア日本国大使館特命全権大使
長谷川 恵一	在シリア日本国大使館参事官
山本 英昭	在シリア日本国大使館
小森 毅	JICAシリア事務所長
田中 泉	JICAシリア事務所員
Dr. A. R. Subei	Minister, State Planning Commission
Eng S. Daher	Minister, Ministry of Electricity
Mr. A. Mustafa	Minister, Ministry of Agriculture
Dr. A. Nizam Edin	Minister, Ministry of Industry
Dr. M. A. Malahafji	President, General Director, SSRC
Dr. A. H. Mansour	Vice President, SSRC
Dr. M. Mrayati	Director, HIAST
Dr. A. H. AlZein	Head Solar Energy Department, SSRC
Dr. R. Sabouni	Head of PV Group, HIAST
Mr. A. K. AlNayyal	Director of Scientific Cooperation,
Eng Shahid Yaser	Eng in PV systems, HIAST
Mr. B. Sibai	Director of Scientific & Technical Cooperation, SPC

第2章 S/Wの協議及び合意の内容

2-1 S/W・M/Mの協議

調査団は、予定の通り6月18日ダマスカス到着の後、6月19日、大使館内田大使、長谷川参事官、山本専門調査員、JICA事務所小森所長及び田中所員との打合せを行った後、関係各省及びC/P機関である大統領府科学技術研究調査センター(SSRC)及びその下部組織である応用科学技術高等研究所(HIAST)との協議に入った。6月24日、S/W及びM/MについてSSRCのマラヘフジ総裁との間で合意に達し、両者署名の上、これを交換した。なお調査団は協議の途中において6月21日から6月23日までの3日間、サイト候補地であるアレppo近郊ザルジータ村、フェドレ村、カトゥーラ村及びラセム・アシェール村の現地踏査・視察を行った。

今回のS/W協議はこれまで2度のプロジェクト形成調査団派遣及び2名の短期専門家派遣によってプロジェクトのフレームが大方定まっていたこともあってシ側より大きな変更を求められることもなく、微細な表現上の変更が数点あったのみでほぼ当初案のとおり合意することができた。協議・確認事項は以下のとおり。

- (1) プロジェクトはZarzita, Fedre, Katoura 及びRasem-alshikh で実施する。
- (2) 協力内容は以下のとおり(詳細は本格調査のなかで決定される)
 - A. Zarzita : 集中型電化システム
飲料水揚水
サマーインダストリー
 - B. Fedre, Katoura : 戸別型電化システム
 - C. Rasem-alshikh : 戸別型電化システム
地下水揚水
かん水淡水化
- (3) 日本側は太陽光発電プラント、配電設備、淡水化設備、揚水設備及び対象全家屋の照明器具について負担する。サマーインダストリーに係る機材を含む他の電気器具についてはシリア国政府または受益者が負担する。
- (4) 円滑な調査実施のため、アドヴァイザリーコミティーを設立する。
- (5) SSRCとHIASTは他の関係機関、特に電力省と太陽光発電による地方電化促進にむけ密接に協力する。
- (6) SSRCとHIASTはプロジェクト終了後も施設のメンテナンスについて責任を持つ
- (7) SSRCとHIASTはサステナビリティの確保のため、関係機関と電気料金の補助について調整を行う。

(8) アドヴァイザリー・コミティーはサマー・インダストリーに係る慎重な調査実施について責任を持つ。

(9) SSRCとHIASTはカウンターパート研修を要請した。

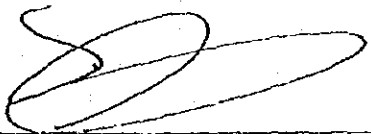
2-2 合意したS/W

今回シリア側と合意に至ったS/Wの全文を次に示す。

SCOPE OF WORK
FOR
THE STUDY
FOR
THE INTRODUCTION OF INTEGRATED
PHOTOVOLTAIC SYSTEMS
INTO
THE SYRIAN ARAB REPUBLIC

AGREED UPON BETWEEN
SCIENTIFIC STUDIES AND RESEARCH CENTER
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

24TH JUNE, 1996 DAMASCUS



Dr. M. A. Malahefji
President,
General Director,
SCIENTIFIC STUDIES
AND RESEARCH CENTER



Mr. Eiichi TAMORI
Vice President
JAPAN INTERNATIONAL
COOPERATION AGENCY



I. INTRODUCTION

In response to the request of the Government of the Syrian Arab Republic (hereinafter referred to as "the Government of Syria"), the Government of Japan decided to conduct the Study for the Introduction of Integrated Photovoltaic Systems into the Syrian Arab Republic (hereinafter referred to as "the Study"), in accordance with the Agreement on Technical Cooperation Between the Government of Japan and the Government of Syria signed on July 18th, 1985 (hereinafter referred to as "the Agreement").

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Syria.

The Government of Syria has appointed the Scientific Studies and Research Center (hereinafter referred to as "SSRC") as the responsible agency for the Study.

Higher Institute of Applied Science and Technology (hereinafter referred to as "HIAST") shall act as the implementing agency under the guidance of SSRC.

The present document sets forth the scope of work with regard to the Study.

II. OBJECTIVE OF THE STUDY

The objective of the study is to carry out a research project to promote rural electrification, water pumping, desalination of brackish water and development of rural industry by utilizing photovoltaic system so that it will contribute to rural area development.

III. STUDY AREA

Around Aleppo, the Syrian Arab Republic



IV. SCOPE OF THE STUDY

In order to achieve the above objective, the Study shall be conducted in accordance with following items:

1. Rural Electrification in Syria
 - 1-1. Present situation of the rural area development and rural electrification
 - 1-2. Review of existing the rural electrification policies and the development plan
 - 1-3. Prospect of demand for rural electrification
 - 1-4. Review of the introduction of photovoltaic systems policies
2. Village Survey
 - 2-1. Demand for electric power and water
 - 2-2. Social environment
 - 2-3. Natural environment
3. Meteorological Observation
 - 3-1. Radiation of sunlight
 - 3-2. Wind speed and direction
 - 3-3. Temperature and humidity
 - 3-4. Rainfall
4. Centralized Electrification and Individual Electrification
 - 4-1. Optimum capacity of each systems
 - 4-2. Plan for installation
5. Underground Water Pumping and Brackish Water Desalination
 - 5-1. Water Resource survey
 - 5-2. Water supply plan
6. Rural Industry Development by Utilizing Surplus Electricity in Summer
 - 6-1. Market study
 - 6-2. Selection of products
 - 6-3. Procurement of equipments
 - 6-4. Sales network arrangement

7. System Design and Construction

- 7-1. Battery inspection and assessment
- 7-2. Site reconnaissance
- 7-3. Detailed design of civil work and architectural structures
- 7-4. Procurement of equipments
- 7-5. Construction and installation

8. Plan of Operation

- 8-1. Formulation of the plan of operation and regulations
- 8-2. Promote of technicians and operators

9. Operation

- 9-1. Operation
- 9-2. Maintenance
- 9-3. Data collection

10. Evaluation

- 10-1. Technical analysis
- 10-2. Economic analysis
- 10-3. Financial analysis
- 10-4. Social analysis
- 10-5. Institutional and managerial analysis
- 10-6. Environmental Impact analysis

11. Conclusions and Recommendations

- 11-1. Recommendation to the sustainable photovoltaic systems
- 11-2. Formulation of the plan for the rural area development by utilizing photovoltaic systems
- 11-3. Plan for the role of the Government of Syria



IV. STUDY SCHEDULE

The Study will be conducted in accordance with the tentative time schedule to be shown in Appendix I.

V. REPORTS

JICA shall prepare and submit the following reports in English to the SSRC in accordance with the tentative time schedule in Appendix I.

1. INCEPTION REPORT	15 copies
2. PROGRESS REPORT NO. 1	15 copies
3. PROGRESS REPORT NO. 2	15 copies
4. INTERIM REPORT	15 copies
5. PROGRESS REPORT NO. 3	15 copies
6. DRAFT FINAL REPORT	15 copies
7. FINAL REPORT	30 copies

VI. UNDERTAKING OF THE GOVERNMENT OF SYRIA

1. The Government of Syria shall accord privileges, exemptions and other benefits to the Japanese study team (hereinafter referred to as "the Team") in accordance with the Agreement.
2. To facilitate smooth conduct of the Study, the Government of Syria shall take necessary measures:
 - 2-1. to secure the safety of the Team,
 - 2-2. to permit the members of the Team to enter, leave and sojourn in Syria for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,
 - 2-3. to exempt the members of the Team from taxes, duties and other charges equipment, machinery and other materials brought into Syria for the conduct of the Study,

- 2-4. to exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study,
 - 2-5. to provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Syria from Japan in connection with the implementation of the Study,
 - 2-6. to secure permission for entry into private properties or restricted areas for the implementation of the Study,
 - 2-7. to secure permission for the Team to take all data and documents including maps and photographs related to the Study out of Syria to Japan,
 - 2-8. to provide medical services as needed. These expenses will be chargeable on members of the Team.
3. The Government of Syria shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Team.
 4. SSRC, as responsible agency for the project, shall collaborate with HIAST and also coordinate the activities of other governmental and non-governmental organizations concerned, for the smooth implementation of the Study.
 5. SSRC will organize an advisory committee for purpose of coordinating among Ministries concerned of the Government of Syria. The committee shall include members of the following authorities and its secretariat shall be set up within SSRC.
 - (1) State Planning Commission
 - (2) Ministry of Electricity
 - (3) Ministry of Agriculture and Agrarian Reform
 - (4) Ministry of Industry

6. SSRC shall, at its expense, provide the Team with the following, in cooperation with other organizations concerned :

- 6-1. available data and information related to the Study,
- 6-2. counterpart personnel,
- 6-3. suitable office space with necessary equipment in Aleppo,
- 6-4. credentials or identification cards,
- 6-5. appropriate number of vehicles with drivers, fuel and spare parts for carrying out the field survey
- 6-6. communication facilities during the implementation of the Study, such as telephone, telex, fax, transceiver, etc.
- 6-7. necessary labour for the Study.

VII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. To dispatch, at its own expense, study Teams to Syria
2. To pursue technology transfer to the Syrian counterpart personnel in the course of the Study
3. To provide the relevant equipment.

VIII. DIVISION OF TECHNICAL UNDERTAKING

The division of technical undertaking by SSRC and JICA is detailed in the Appendix H as attached hereto.

IX. CONSULTATION

JICA and SSRC shall consult with each other in respect of any matter that may arise from or in connection with the Study.

APPENDIX I TENTATIVE SCHEDULE

FISCAL YEAR	1995				1996				1997				1998				1999					
	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2
MONTH																						
Procurement and installation of equipments for Meteorological observation																						
Village survey																						
System design of PV electrification plants.																						
Procurement and construction of PV electrification plants																						
System design of water pumping and desalination plant																						
Procurement and construction of water pumping and desalination plant																						
Operation and evaluation																						
REPORT PRESENTATION																						

NOTE IC/R : Inception Report DF/R : Draft Final Report
 PR/R : Progress Report F/R : Final Report

APPENDIX II DIVISION OF TECHNICAL UNDERTAKING

WORK ITEM

CONTRIBUTION BY SSRC/HIAT

CONTRIBUTION BY JICA

- | | | |
|---|---|--|
| 1. Rural Electrification in Syria | <ul style="list-style-type: none"> · Facilitate acquisition of necessary data, information and reports · Coordination with concerned authorities of the Govt of Syria, when necessary | <ul style="list-style-type: none"> · Acquisition, review and analysis of data, information and reports |
| 2. Village Survey | <ul style="list-style-type: none"> · Assignment of counterpart personnel and guide · Facilitate acquisition of permissions and other necessary arrangements · Coordination with local population | <ul style="list-style-type: none"> · Obtain permissions · Village survey · Social and Natural impact aspects in and around village |
| 3. Meteorological Observation | <ul style="list-style-type: none"> · Assignment of counterpart personnel · Custom clearance · Internal transportation of equipments · Installation of equipments · Observation and its data collection | <ul style="list-style-type: none"> · Provision of necessary equipments · Analysis |
| 4. Centralized electrification and Individual electrification | <ul style="list-style-type: none"> · Facilitate acquisition of necessary data, information and reports · Assignment of counterpart personnel | <ul style="list-style-type: none"> · Acquisition of necessary data, information and reports · Optimization study on capacity of each systems · Preparation of installation plan and schedule |
| 5. Underground Water Pumping and Brackish Water Desalination | <ul style="list-style-type: none"> · Assignment of counterpart personnel · Facilitate acquisition of necessary data, information and reports · Facilitate acquisition of permissions and other necessary arrangements · Coordination with concerned authorities of the Govt of Syria, when necessary · Custom clearance · Internal transportation of equipments · Installation of equipments | <ul style="list-style-type: none"> · Acquisition of necessary data, information and reports · Selection of survey area and location · Obtain permissions · Site reconnaissance · Carrying out of core drilling · Carrying out of water pumping · Inspection of water quality · Assessment of water resource survey · Provision of equipment for desalination · Supervision |

6. Rural Industry Development by Utilizing Surplus Electricity in Summer

- Assignment of counterpart personnel
- Facilitate acquisition of necessary data, information and reports
- Coordination with concerned authorities of the Govt of Syria, when necessary including:
 - Selection of products
 - Organize a group for rural industry
 - Training for manufacturing process
 - Procurement of equipments
 - Sales network arrangement

- Acquisition of necessary data, information and reports
- Market study and analysis

- Advise
- Advise
- Advise
- Advise

7. System Design and Construction

- Assignment of counterpart personnel
- Facilitate acquisition of necessary data, information and reports
- Battery inspection and assessment
- Observation and its data collection
- Facilitate acquisition of permissions and other necessary arrangements
- Custom clearance
- Internal transportation of equipments
- Construction and installation of equipments
- Compensation, when necessary

- Acquisition of necessary data, information and reports
- Provision of necessary equipments
- Assessment
- Obtain permissions
- Site reconnaissance
- Preparation of technical specifications
- Detailed design
- Provision of necessary equipments

8. Plan of Operation

- Facilitate acquisition of necessary data, information and reports
- Promote of technicians and operator

- Acquisition of necessary data, information and reports
- Design of operation and maintenance system
- Supervision

9. Operation

- Operation
- Maintenance
- Data collection

- Supervision of operation and maintenance
- Provision of maintenance services
- Analysis

10. Evaluation

- Facilitate acquisition of necessary data, information and reports

- Acquisition of necessary data, information and reports
- Analysis and evaluation

11. Conclusions and Recommendations

- Review recommendations and suggestions in collaboration with concerned authorities and JICA

- Preparation of conclusions and recommendations

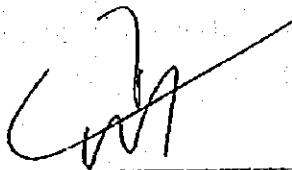
2-3 合意したM/M

今回のS/W協議に関連し、シリア側と合意に至ったM/Mの全文を次に示す。なお署名者はHIASTのムラヤティ局長である。

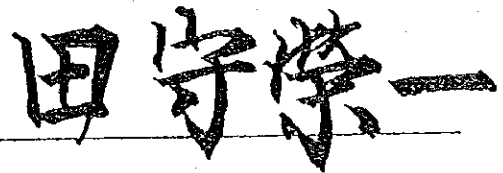
MINUTES OF MEETING
ON
THE SCOPE OF WORK FOR THE STUDY
FOR
THE INTRODUCTION OF INTEGRATED
PHOTOVOLTAIC SYSTEMS
INTO
THE SYRIAN ARAB REPUBLIC

AGREED UPON BETWEEN
HIGHER INSTITUTE OF APPLIED
SCIENCE AND TECHNOLOGY
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

24TH JUNE, 1995 DAMASCUS



Dr. M. Mrayati
Director
HIGHER INSTITUTE OF APPLIED
SCIENCE AND TECHNOLOGY



Mr. Eiichi TAMORI
Vice President
JAPAN INTERNATIONAL
COOPERATION AGENCY



The Preparatory Study Team, organized by the Japan International Cooperation Agency (hereinafter referred to as JICA), visited the Syrian Arab Republic from June 18th to 25th to discuss on " the Study for the Introduction of Integrated Photovoltaic Systems into the Syrian Arab Republic" (hereinafter referred to as the Study).

A series of discussions was held between the Syrian side headed by Dr. A. H. Mansour, Vice President, Deputy General Director, Scientific Studies and Research Center (hereinafter referred to as SSRC) and the Study Team headed by Mr. Eiichi TAMORI, Vice President, JICA.

This minutes of meetings records the result of discussions as follows;

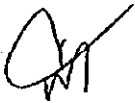
1. The project will be implemented in Zarzita, Fedre, Katoura and Rasem-alshikh.
2. The project will be classified as follows;
 - A. Zarzita : Centralized electrification system
Water pumping system
Summer industry
 - B. Fedre, Katoura : Individual electrification system
 - C. Rasem-alshikh : Individual electrification system
Water pumping system
Desalination system

The details on the project will determined during the study.

3. The Japanese side will bear the PV, distribution, desalination, pumping facilities and lighting equipments of every household. Electric appliances including possible summer industry will be bore by the Syrian Government or beneficiaries.
4. For smooth implementation of the project, an advisory committee composed of Syrian authorities concerned will be organized.
5. SSRC and HIAST will cooperate closely with other authorities especially Ministry of Electricity to promote rural electrification through PV technology.



6. SSRC and HIAST shall be responsible for maintenance of the facilities when the project is over.
 7. SSRC and HIAST shall coordinate relevant authorities for subsidy for electric charges so that sustainability shall be maintained.
 8. The advisory committee shall be responsible for careful investigation for summer industry.
 9. SSRC and HIAST requested that technical training be provided to counterpart personnel throughout the implementation of the Study.
-



2-4 シリア・アラブ共和国政府の要請書

الجمهورية العربية السورية

رئاسة مجلس الوزراء

هيئة تخطيط الدولة

الى السفارة اليابانية - دمشق

٢١٧١٦٩٧

٢٩٢٨

تحية طيبة وبعد

تهدي هيئة تخطيط الدولة اطيب تحياتها الى السفارة اليابانية
بدمشق وتود الاشارة الى المساعدات البختلفة التي تقدمها الحكومة
اليابانية الى مختلف الدول النامية ومنها الجمهورية العربية السورية

يسر هيئة تخطيط الدولة ان تتقدم بطلب مساعدة فنية من الحكومة
اليابانية بقصد دراسة امكانية تنفيذ مشروع الطاقة الشمسية الفوتوفولطائية
في المناطق النائية في سوريا لتزويدها بالطاقة الكهربائية ، وذلك لصالح
مركز الدراسات والبحوث العلمية

نرفق طيا الشروط المرجعية للمشروع والتي تم الاتفاق عليها مع
الوفد الياباني الذي زار القطر بتاريخ ١٩٦٩/٧/١٩

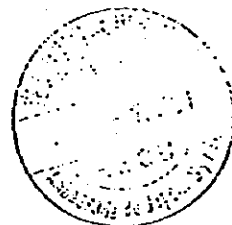
يرجى الاطلاع والسعي لدى السلطات اليابانية المعنية واعلامنا
نتيجة مساعيكم

شاكرين لكم حسن تعاونكم

دمشق في ١٧ / ٨ / ١٩٦٩ م

وزير الدولة لشؤون التخطيط
الدكتور عبد الوهيد السبيعي

١٨



TRANSLATION

State Planning Commission

No. 2928/1697/7/2

Date: August 7, 1994

The State Planning Commission presents its compliments to the Embassy of Japan in Damascus and with reference to the various aids presented by the Government of Japan to several developing countries, including the Syrian Arab Republic, the Commission wishes to submit an application for a technical cooperation by the Government of Japan to make a study on the feasibility of a project for introducing integrated photovoltaic system in the remote areas in Syria to provide them with electric power. The study will be for SSRC.

Enclosed is a paper on the project's "Terms of Reference" concluded together with the Japanese delegation which visited Syria on July 19, 1994.

It would be highly appreciated if the Embassy exercised its good offices with the relevant Japanese authorities and informed the Commission of the result.

Many thanks for cooperation,

Signed by
Dr. AL-SUBEI
Minister of State for
Planning Affairs.

**HIGHER INSTITUTE OF APPLIED
SCIENCE AND TECHNOLOGY**

Terms of Reference

of

**Feasibility Study for introducing
integrated photovoltaic System
in Syria**

December, 1993

CONTENTS

1- Outline Of The Study

2- Study Items

2-1- General information relating to system implementation

2-2- Site information

2-3- On-Site experience(Individual House System)

2-4- On-Site experience(Centralized System For Village Electrification)

2-5- On-Site experience(Water pumping)

2-5-1 Large Scale Water pumping and distribution system

2-5-2 Small Scale Water pumping system

2-6 On-Site experience (Small Scale Water Desalination System)

3- Set-up of further introduction plan

4- Study Schedule

5- Conclusions and Recommendations

1. Outline of the study

Photovoltaics is, as is well known, clean and can provide renewable energy. Because of this fact, it is expected to be the only means by which to save the earth from destruction of the global environment resulting from an increasing consumption of fossil fuels. Despite the advantage, some disadvantages have hindered its popularity: its relatively high cost, the lack of experts with the knowledge to implement the system, and organized maintenance system. One of the primary rural development factors throughout Syria is the need of electric power for villages electrification, water pumping, water desalination... etc. So the huge potential for PV systems is certain. Around 16% of the population do not have access to the national grid, and around 4500 villages are not connected to the grid. In addition to the above-mentioned basic needs, rural areas require different types of PV application to improve social life and to raise the standard of living through the installation of communication/education facilities. Conventional method is not always economically viable if the villages are located far away from the grid and the use of PV systems present an attractive alternative to some remote villages and for small groups of people in isolated farms since this country is blessed with good solar energy resources. The average solar radiation in Aleppo region for example is about 4.8 kWh/m², and the sunshine duration is about 3100 hour/year.

For the PV system to function properly, adequate operation and local maintenance of the system is the key issue. Every sub-system requires different expertise, therefore, to operate the whole system properly, the "integrated" operation and maintenance system, skill and organization should be studied.

The study proposed should overcome the disadvantages by installing the PV system for practical utilisation. The success of study will encourage and accelerate the introduction of photovoltaic technology in Syria, and will also form specialists and technicians capable of installing, monitoring and maintaining PV systems, for various applications.

2. Study Items

The proposed system consists of the following sub-systems:

- Electrification of individual houses
- Electricity supply for remote village consumption
- Water pumping
- Water desalination

2-1 General information relating to system implementation

- a- Social and economic condition
- b- Geographic and environmental conditions
- c- Power grid distribution
- d- Land and water utilization

2-2 Site information

- a- Social activities
- b- Social infra-structure
- c- Meteorological observation
- d- Land and water utilization

2-3 On-site experiences (Individual House System)

a- System configuration

Solar Cell Module: 6 module (300 W) / house

Batteries: 450 Ah / system

Fluorescent Lamp: 20 W x 3 / house

b- Specification

100 systems

Each system has the ability to supply an individual house, on a daily basis, with 190 W for 5-6 hours

c- Expected effects

The improvement in standards of living and the increase in communications with the outside world, including the government, via radio and TV.

d- Check list

Operating condition: Time in service, History, Application

Usefulness: Electricity generated, Battery maintenance

Frequency of battery replacement

Community maintenance organization

Performance of domestic parts: Battery, FL Lamp

2-4 On-site experience (Centralized System For Village Electrification)

a- System configuration

Solar cell module: 35 KW stand-alone

Batteries bank

DC / AC Inverter

Applications: Domestic appliances (refrigerator, TV, lighting, washing machines, ... etc.)

b- Specification

The system has the ability to supply the village with about 1KW AC electricity for 24 hours a day / house

c- Expected effects

Satisfaction of 50 houses village basic urban conditions

d- Check list

Operating condition: Time in service, History, Application

Usefulness: Electricity generated, Maintenance for batteries, Frequency for batteries exchange

Community maintenance organization

Performance of domestic parts: Battery, Electric Appliances

2-5 On-site experience (Water Pumping)

2-5-1 Large Scale Water pumping and Distribution System

a - System configuration

Solar Cell Module: 30 KW stand-alone

DC/AC inverter

Pumping system and buffer tank

Distribution system

Water utilizing system (system absorbing materials)

b- Specification

To pump up 500 t/d water and distribute it to residences, where it can be used for irrigation and consumption

2-5-2 on- site experience (Small Scale Water Pumping System)

a- System configuration

Solar Cell Module: 2 KW stand-alone

DC/AC inverter

Pumping system

b- Specification

Supplying drinking water to small village at rate of 10 t / day

c- Expected effects

Effective utilization of valuable water by the provision of an effective distribution system, which in turn, can increase harvest

d- Check list

Operating condition: Time in service, History
Usefulness: Electricity generated, Water pumped-up
Community maintenance organization
Water utilization: Application, consumption

2-6 on-site experience(Water Desalination System)

a- System configuration

Solar Cell Module: 5 KW stand-alone
Desalination unit: capacity about 20 t/day

b- Specification

The system should have the ability to supply drinking water to small community

c- Expected effects

Drinking water is quite scarce in many areas, so providing such water from brackish water will provide necessary element of living

d - Check list

Operating condition: PV system performance and efficiency desalination system
Usefulness: Drinking water supply

3- Set-up of further introduction plan

- a.- Basic Strategy
- b- Maintenance Organization
- c- Cost Estimation For Large Scale Plant
- d- Fund Allocation

4- Study Schedule

The feasibility study for the project should be started immediately for authorization. A proposed project schedule is shown in the Table.

5- Conclusions and Recommendations

- a- The Syrian side places great importance on the success of this study since it will accelerate the development of rural areas in Syria. This in turn will set up leading example in the region.
- b- The above mentioned system can not function properly without taking into account proper monitoring, local maintenance and adequate training for the personal involved as part of the overall project.
- c- The Syrian side is willing to contribute financially to this study in local currency to cover construction works and local staff salaries.
- d- The need for local module development to produce simple module structures consistent with the mild climatic conditions prevailing in Syria will necessate supporting the module test facilities available at HIAST with some basic equipment such as a laminator.
- e- Higher Institute Of Applied Science And Technology (HIAST) highly appreciates an early start of this study and shortest possible execution period.

Study Schedule (draft)

Quater Item	1Q	2Q	3Q	4Q	5Q	6Q	7Q	8Q	9Q	10Q	11Q	12Q	13Q	14Q	15Q	16Q
Study in Syrian Arab Republic																
Study in Japan																
Report	△ R/I			△ R/P				△ R/IN				△ R/P			△ R/DF	△ R/F

- R/I : Inception report
- R/P : Progress report
- R/IN : Interim Report
- R/DF : Draft Final Report
- R/F : Final Report.

第3章 現地調査の概要

3-1 ザルジータ村

(1) アレppoの西北西約40km、送電線から5km程度離れている。集落の入口まで舗装された道路があるが、各民家まではつながっていない。山の斜面に民家が点在している山村。山はほとんど岩に覆われており平地は極めて少ない。民家が40軒、人口250人が集落を構成。しばらくは配電による電化はされそうもない様子。

(2) 学校があり生徒が30人程度学んでいる。学校の作りは各集落とも標準設計らしく内部配線がされており、通電されればいつでも使える状態。教室は3~4室あり、コンクリート・タイル張り、室内はやや暗い。デゼルヒーティングによるストーブが設置されていた。

産業は農業（玉ねぎ、牧草、オリーブ等の栽培）だが、岩山の中の空き地を使つての耕作。牧畜は牛、鶏等。月収は1家族（6~8人）6000SP（140US\$）程度で、現金収入の多くは建設労働（不定期）の出稼ぎに頼っている。

(3) 集落の南側斜面にPVパネルを敷設するのに適した場所、及び当方斜面にも同様な場所がある。どちらも公共用地であるようだが、PVにとっては南方の斜面の方が適切と思われる。どちらも岩山の斜面であり、どのように基礎を作るか、また、まわりをさえぎるものがなく風が強いことを考慮する必要がある。

(4) 小さな家畜用の池があるが、飲料水は雨水をためて使用している。（冬期のみか。）

(5) 集落から150m先のところでWater Resources Agency（灌漑省と同一の組織化不明）が緯度を試掘したが水は余りなく、500m掘って1インチ程度とのこと。別の緯度を試掘する予定だが、余り期待はできないようである。

(6) ザルジータからフェドレまでは土漠となり、冬雨が降るとどろどろになるとのこと。

(7) ザルジータより4kmほど下ったところ（ザルジータ村内）に使用中の井戸がある。道路より約300m土（畑、あるいは牧草地？）の中を歩いたところに位置する。

(8) この井戸は個人所有の井戸で、蓋がされており鍵がかかっていたためながが見れなかったが、深さは100m位とのこと。知覚に直径5cmくらいのホースが道路まで置いてあり、また、周囲の農地の状況から見て相当の水はありそうな様子。ちなみに更に下った隣村では井戸から十分な水を得ているようである。

(9) この井戸の所有者は、水をむら全体に供出すると水不足になることを恐れて供出を拒んでいるようである。

(10) この井戸の近辺で試掘すれば水を確保できる可能性があろうが、私有地に井戸を掘るわけにも行かず、道路の周辺（上記個人井戸から若干上る）であれば公有地があるとのこ

と。道路に沿って更に低地に下がっていくと隣村になってしまうので、試掘可能地点は限定される可能性がある。

3-2 フェドレ村

- (1) ザルジータから2~3km離れたところに位置している。山がちのところに集落が点在。
- (2) 産業は牧畜が中心か。鶏、羊、牛、七面鳥等が少数いた。
- (3) 飲料水は約2km先の他村から購入。冬期には雨水をためて使用。約4km離れたところに井戸があるが、井戸の場所が道から離れているため、車ではいけない。

3-3 カトゥーラ村

- (1) アレッポの西北西約40km、ザルジータの手前4kmほどのところに位置する。送電線からそんなに離れていないが(1km程度か)、17軒と住宅数が少ないためコストベネフィットの面からも将来配電される可能性は薄いと考えられる。仮に配電される場合には、近隣のザルジータ、フェドレと同時に行うことが前提となるものと推察される。しかし、ザルジータ、フェドレ、カトゥーラそれぞれ数kmほど離れており、また各村とも住宅数がそんなに多くないためPV電化が適切な場所であると考えられる。
- (2) 生活水準は高くない。1家族(6~8人)月収6000SP(140US\$)程度(Final Report)。オリーブの育成、羊、鶏、牛等を買っている。
- (3) 岩の多い斜面に石造りの家が点在している。集落にはモスク、学校がある。
- (4) 井戸は2つほどあるが、雨水を貯めたもの。集落の下の方(1km程先か)に地下水くみ上げの井戸があるが、別の村が所有。
- (5) 現在使われている電源として、Chargeable BatteryとPrimary Batteryがひとつずつあるとのこと。

3-4 ラセム・アシェール村

- (1) アレッポの南東約40kmほど離れたところに位置する。平坦な農地に集落が点在。約3~4km程先に送電線が見られる。しかし、送電線があっても小さな修羅区に配電されるかどうかは経済的な側面を検討しなければ不明であろう。
- (2) 集落の入口約200m手前に公共の井戸がある。深さ約20m程で井戸水は塩水。(なめてみたが、あまり塩分は感じなかった。)
- (3) 村人の収入は農業が中心で、ザルジータ等他の集落と比較すると、明らかに豊かなようである。(Final Reportによると、月収11500SP/Family(約270US\$)。テレビ(トラクターバッテリー使用)を2台、ラジオ(プライマリーバッテリー使用)を

10台保有しているとのこと。

(4) 集落のなかにFresh Waterの井戸が2つ、Salty Waterの井戸が4つあるようだ。飲料水を外部から買うと50SP/M3の値段。

(5) 集落内に井戸掘り用の掘削器が放置されており、井戸掘りを自ら行っている。

第4章 本格調査実施にあたっての留意事項

4-1 アドヴァイザリーコミッティ

本件調査のC/P機関であるSSRC/HIASTは優秀な研究者を抱え太陽光発電に対する研究意欲も高く、JICAがこれまで行ってきたプロジェクト方式による技術協力での経験からもC/P機関として相応しいと考えられるが、電力供給については電力省、地場産業育成については工業省、地下水揚水については農業・農地改革省、飲料水の供給については住宅省の所管になるなど、本件調査は各省庁を横断するプロジェクトであるため関係省庁の理解及び円滑な連係が不可欠である。このためS/Wにおいても関係省庁からなる「アドヴァイザリーコミッティ」の設置を確認している。

本格調査時にはこれら関係機関の担当部局からそれぞれ本件調査に責任を持つエキスパートのアサインメントを求め、彼らと幅広く討議・協議を行うとともに、システムの設計、運営計画・規則の策定、使用料金の設定、調査の分析結果・決定等については適宜アドヴァイザリーコミッティを開催して、関係機関に周知徹底することが不可欠である。

4-2 地場産業/家内工業の育成

地場産業/家内工業の育成は集中型村落電化システムにおける夏期余剰電力の有効利用を目的として計画されている。シリア側との打合せではアイスクリーム製造、バター・チーズ製造、石切り、縫製等の案が考えているとのことであったが、アイスクリーム製造を例に取ってみても、需要調査、衛生管理への配慮、販売網整備等多くの事項について詳細な調査及び周到な準備が必須である。地場産業/家内工業は今回の太陽光発電利用による民生向上の目玉となる項目であり、その成否は本件調査全体の評価に影響をもたらすことになる。については本格調査団の編成に際してはこの方面に十分な知見を有する専門家を加えるとともに、工業省、地方自治体とも良く連絡を取りつつ万全の態勢で臨むことが肝要である。

4-3 システムの運営・管理の持続性の確保（サステナビリティ）

本格調査では日本側からの協力期間中のみならず、調査協力終了後においてもシステムの運営・管理の持続性を確保（サステナビリティ）することは極めて重要である。設置されるシステムは、調査終了後もSSRC/HIASTが研究施設として管理していくことがミニッツにて同意されているが、そのためにはシステムを適正に維持するとともに、一般の電気料金に比べて妥当かつ需要家が負担可能な料金の設定は如何にあるべきか、また水の料金設定はどうするのか、これらの料金を誰が徴収し、どのように管理するのか等について検討を行い、具体的運営・管理計画を策定することが不可欠である。

第5章 調査用機材

5-1 供与機材

調査用機材として、事業団は次の機器を供与する。

(1) 気象観測装置

A. HIAST (アレッポ市内) 設置分

・ 全天日射計測、散乱日射計測、雨量計測、データ記録

B. サイト設置分

・ 全天日射計測、風向・風速計測、気温・湿度計測、データ記録

C. データ解析システム

・ パーソナルコンピューター、ソフトウェア、プリンター

(2) 蓄電池性能試験評価システム

A. 蓄電池性能試験評価装置

B. 蓄電池設置トレー

C. 蓄電池評価用恒温槽

(3) 村落電化システム

A. 集中型村落電化システム

・ 太陽光発電装置一式、蓄電池一式、インバーター一式、
配電設備一式、蛍光灯、制御監視装置一式、飲料水揚水装置一式

B. 戸別型小規模電化システム

・ 太陽光発電装置一式、蓄電池一式、充放電制御装置一式
配電設備一式、蛍光灯

C. 戸別型中規模電化システム及び揚水/淡水化システム

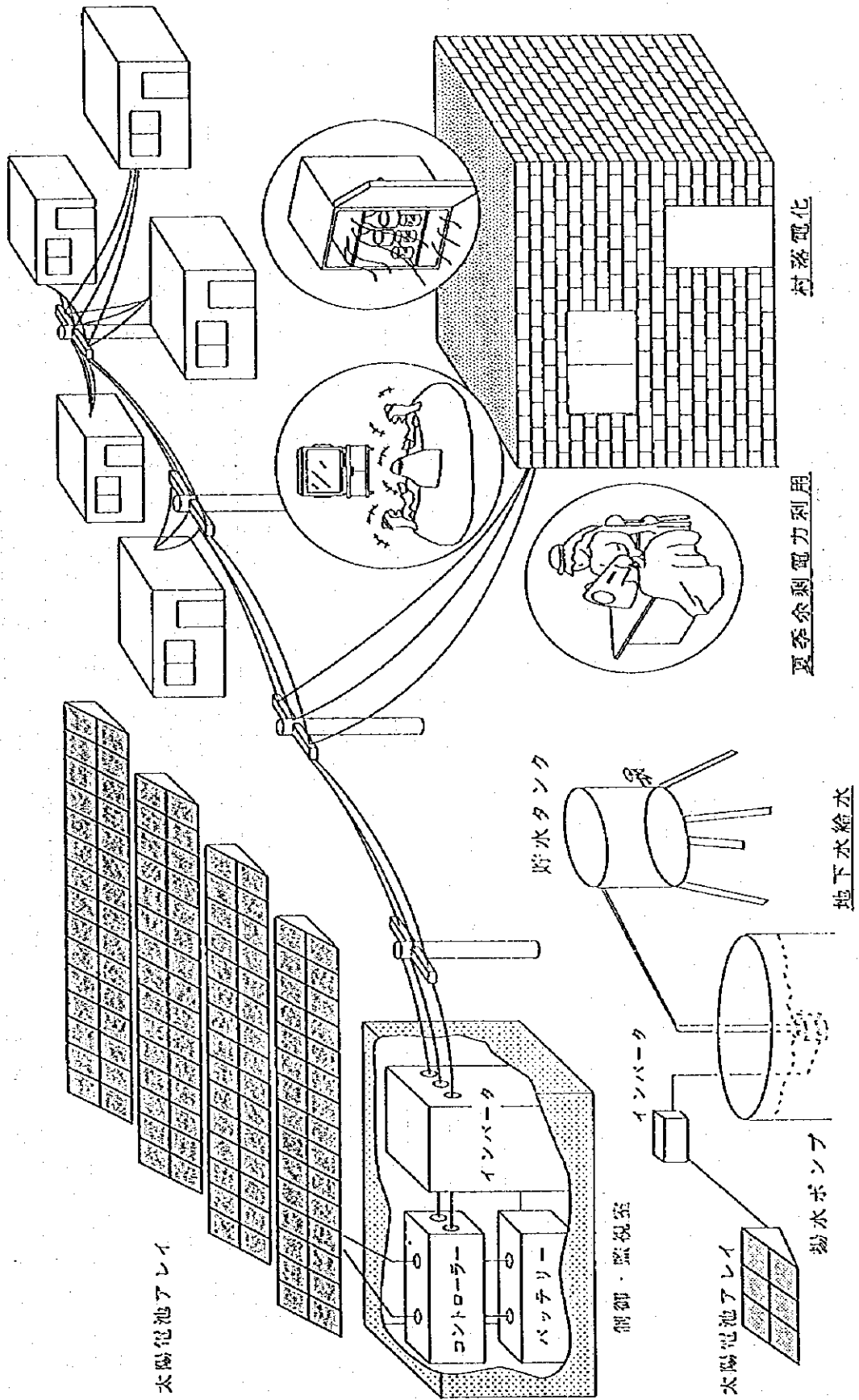
・ 太陽光発電装置一式、蓄電池一式、インバーター一式、
配電設備一式、蛍光灯、充放電制御監視装置一式、
地下水揚水/かん水淡水化装置一式、小規模灌漑設備一式

第 6 章 システムイメージ及び構成概念図

現在考えられている各システムイメージと概念図を次に示す。

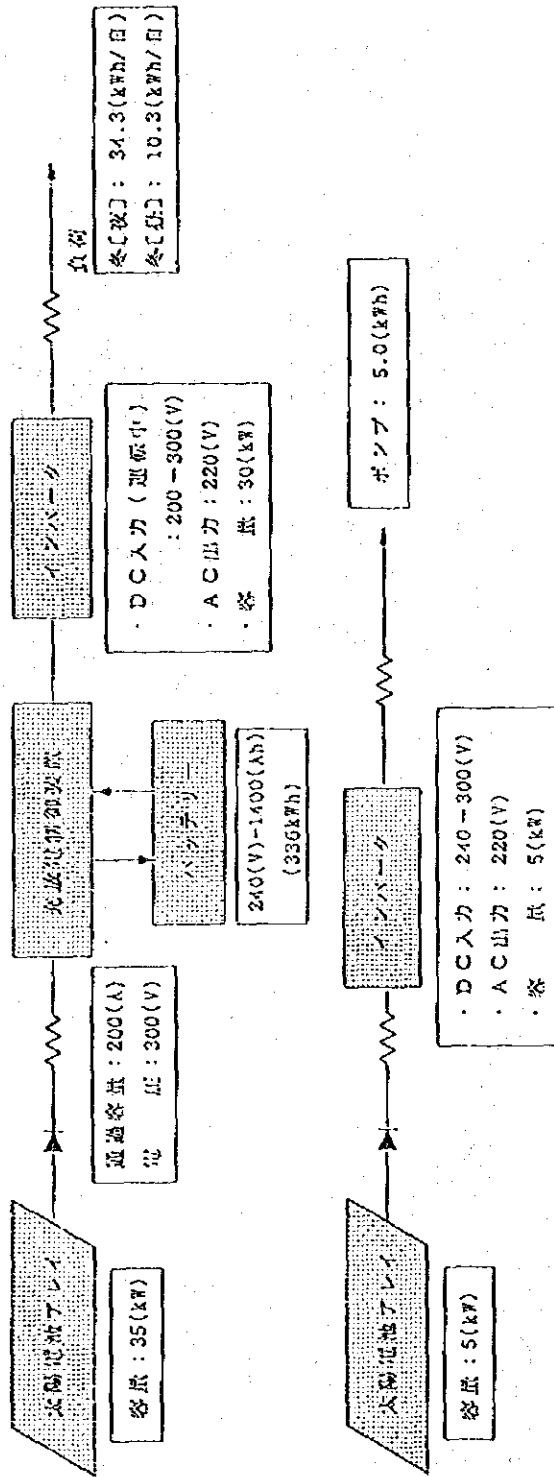
なお詳細は本格調査の中で決定される。

6.1 集中村落電化システムイメージ



集中型村落電化システム構成概略図

6. 2

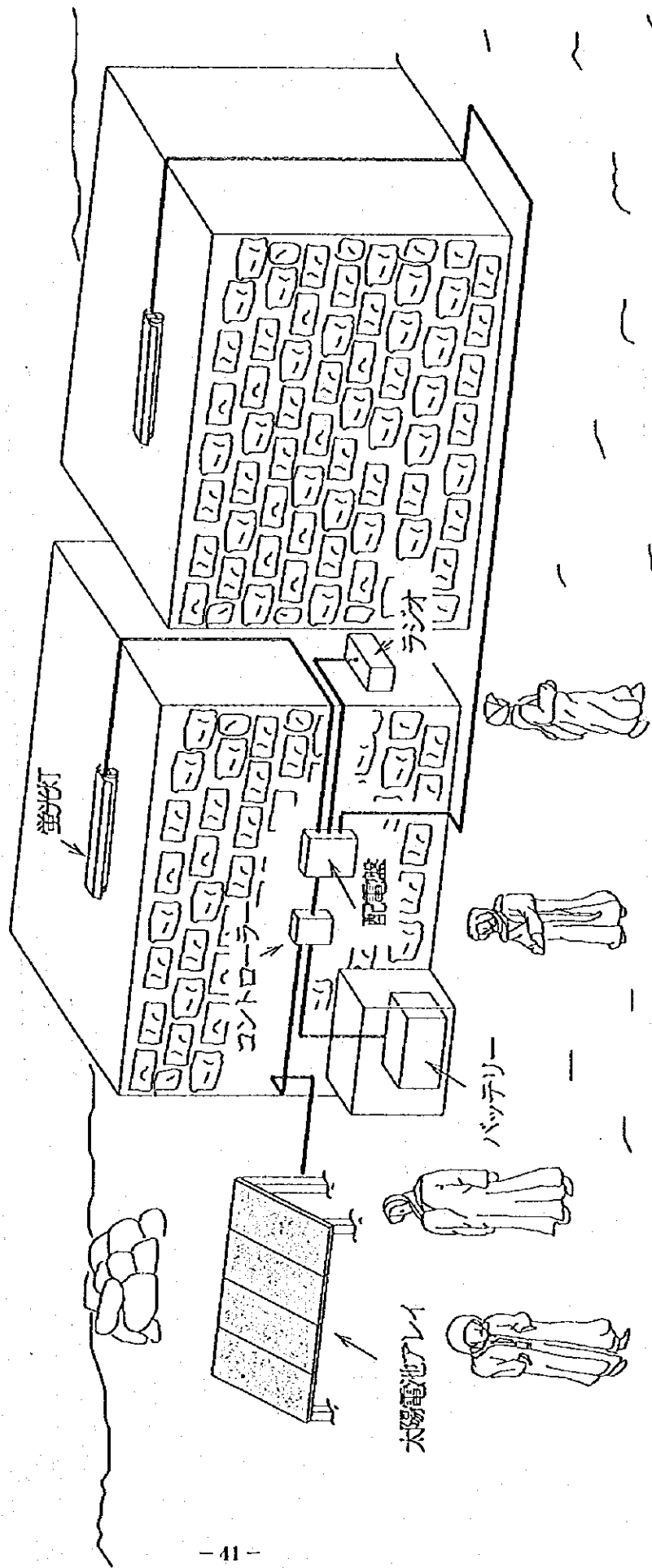


負荷設定

負荷	数量	容量	負荷(W)	効率	時間	電力量(kWh)	エネルギー
夜	住居	140	40	0.8	3	21000	5600
	教会	7	40	0.8	1	350	280
	街灯	20	10	0.8	3	2000	200
	ラジオ	40	4	0.8	3	600	160
	カセット	40	15	0.8	2	1500	600
	TV	25	70	0.8	3	6563	1750
計	15	40	0.8	3	2250	600	
昼	住居	10	40	0.8	1	500	400
	教会	40	40	0.8	3	600	160
	街灯	6	160	0.8	2	1680	960
	冷蔵庫(小)	4	1000	0.8	1.5	7500	4000
	計	-	-	-	-	10280	5520
ポンプ	1	-	-	-	-	-	

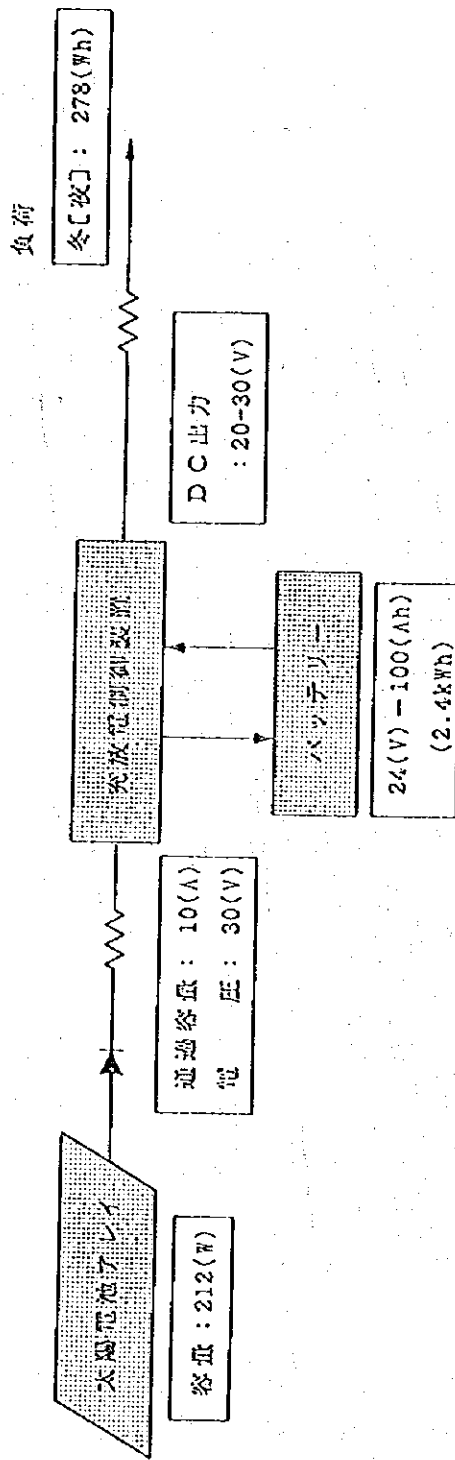
戸別型村落小規模電化システムイメージ

6. 3



戸別型村落小規模電化システム構成概略図

6. 4

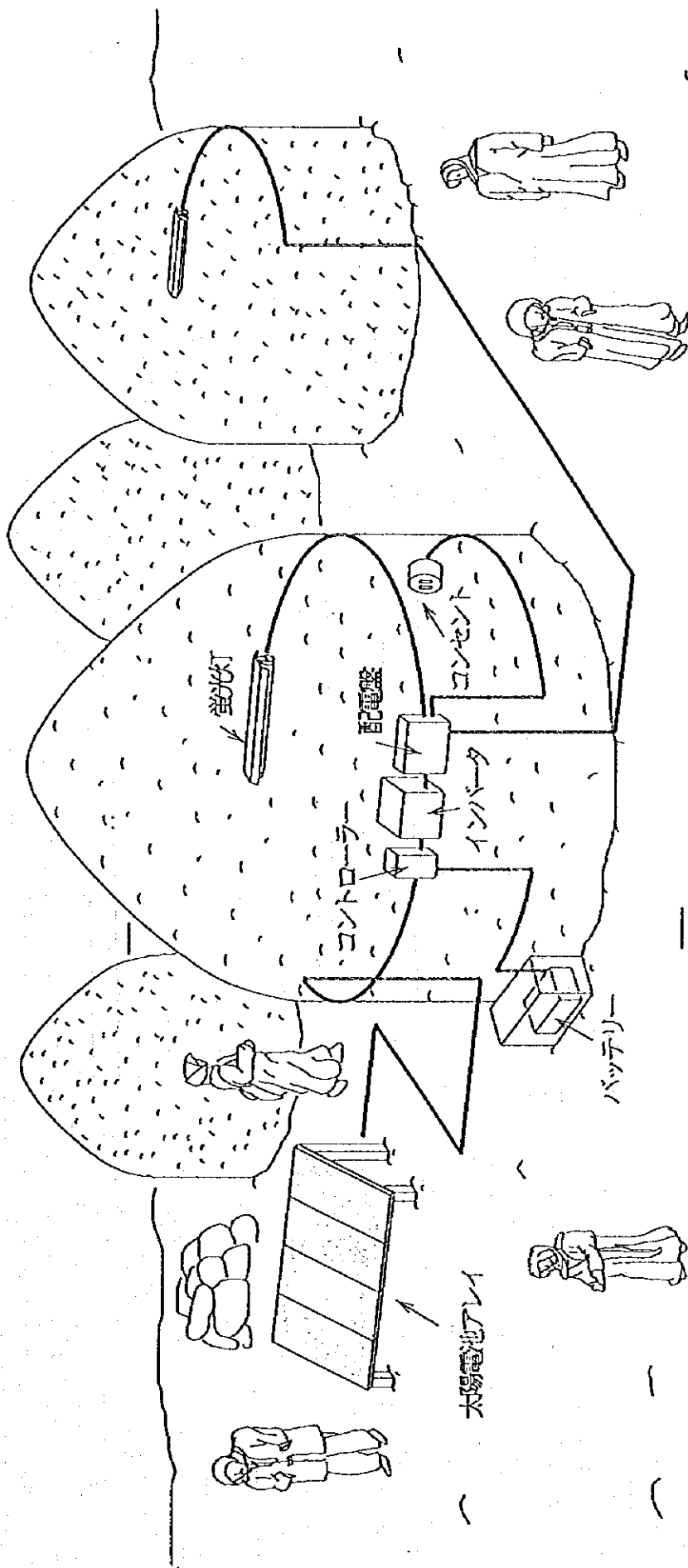


負荷設定

負荷	数量	負荷[W]	効率	時間	電力量[Wh]	ピーク値[W]
夜 電 灯	3	20	0.8	3	225	60
ラジオ	1	4	0.8	3	15	4
カセット	1	15	0.8	2	38	15
計	-	-	-	-	278	79

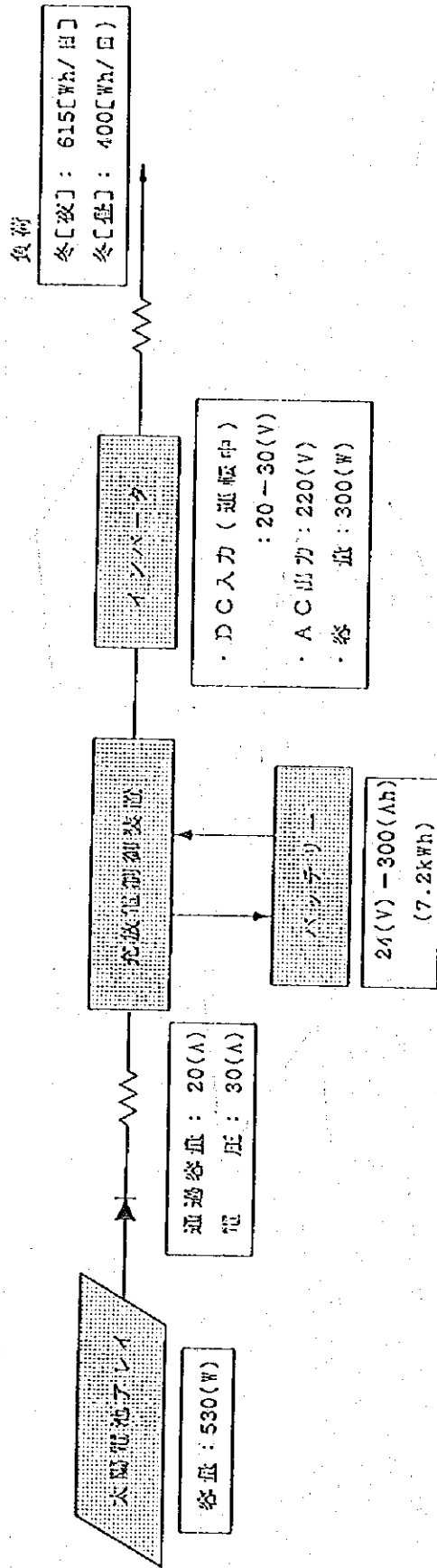
戸別型村落中規模電化システムイメージ

6.5



戸別型村落中規模電化システム構成概略図

6. 6



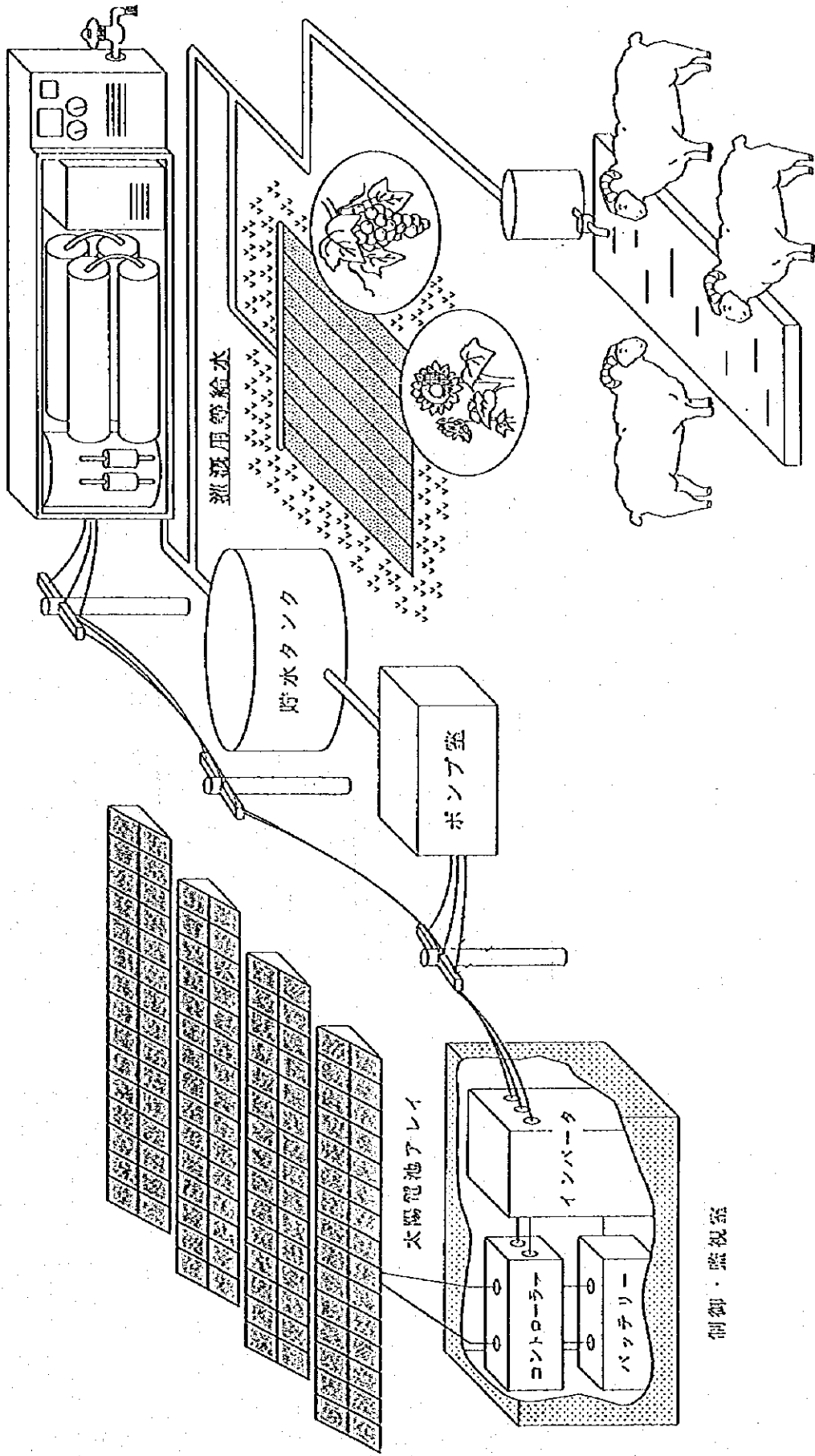
負荷設定

負荷	数量	負荷[W]	効率	時間	電力消費[Wh]	ピーク値[W]
夜	4	20	0.8	3	300	80
ラジオ	1	1	0.8	3	15	4
カセット	1	15	0.8	2	37	15
炊飯V	1	70	0.8	3	263	70
合計	-	-	-	-	615	169
洗濯機	1	160	0.8	2	400	160
合計	-	-	-	-	400	160

(注) 洗濯機は3日に1回使用

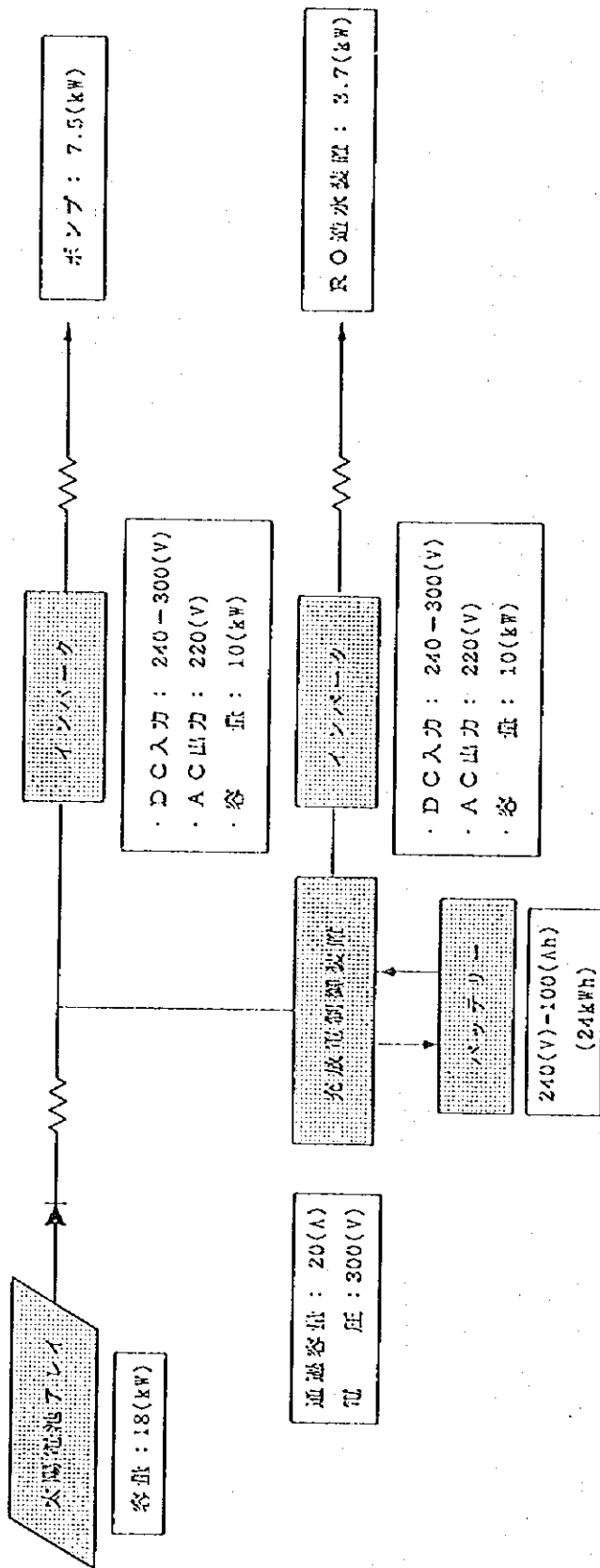
揚水・淡水化システムイメージ

淡水化



揚水・淡水化システム構成概略図

6. 8



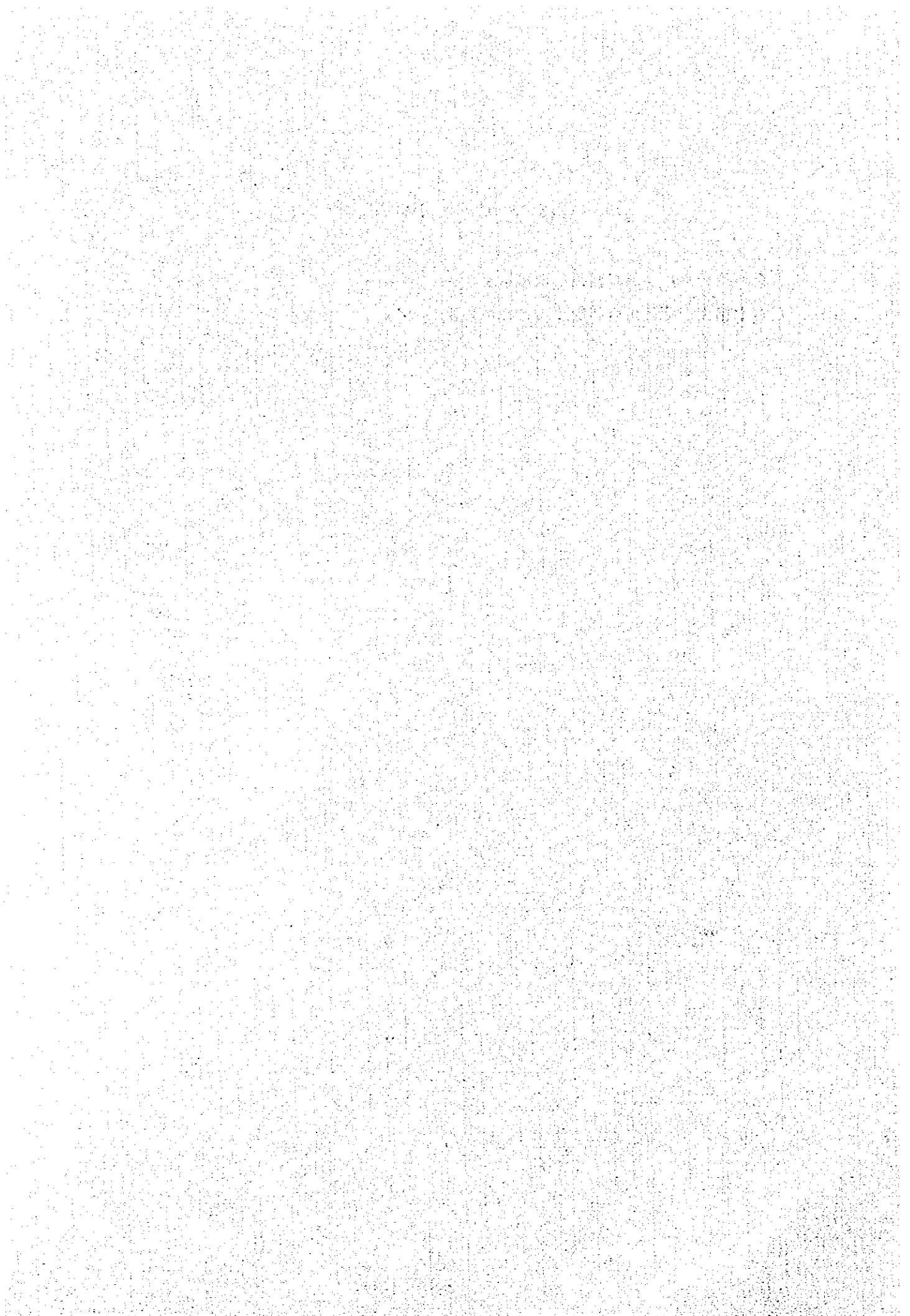
負荷設定

負荷	数量	負荷(kW)
淡水化装置	1	3.7
揚水ポンプ	1	7.5

第 7 章 関係資料

調査対象村落戸別調査結果を次に示す。

なお本格調査では再度確認することが必要である。



7.1

Private House Survey Results

-- Zarzita --

Private House Survey Results (Zarzita)

Location Number	1
Name of Household Head	Yosef Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 2 (Men: 2 , Women: 0)
Occupation	Agriculture
Income (SP / month)	2,000
Expense (SP / month)	+ Fuel : 150 + Lighting : 150 + Foods : 1,500 + Others : 200
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water	How? Well + Buying water
	What for? Drinking
	Quantity? 6 month rainfall water + 5 m ³ / week
	Price? 300 SP/ 5 m ³
Others	

Private House Survey Results (Zarzita)

Location Number	2
Name of Household Head	Mohammed Yousef Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 9 (Men: 3 , Women: 6)
Occupation	Teacher
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water	How? Well + Buying water + Rainfall
	What for?
	Quantity? 6 month rainfall water + 5 m ³ / week
	Price? 300 SP/ 5 m ³
Others	1 motorcycle

Private House Survey Results (Zarzita)

Location Number	3
Name of Household Head	Jmal Yousef Karta
Number of Rooms	3 (cement)
Number of people in family	Total: 7 (Men: 4 , Women: 3)
Occupation	Teacher
Income (SP / month)	3,500
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How?	Well + Buying water + Rainfall collection
What for?	Drinking
Quantity?	6 month rainfall collection + 5 m ³ / week
Price?	300 SP/ 5 m ³
Others	

Private House Survey Results (Zarzita)

Location Number	4
Name of Household Head	Jalal Kartal
Number of Rooms	2 (cement)
Number of people in family	Total: 5 (Men: 3 , Women: 2)
Occupation	Teacher
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How?	Well + Buying water + Rainfall collection
What for?	Drinking
Quantity?	6 month rainfall collection + Buying 5 m ³ / week
Price?	300 SP/ 5 m ³
Others	

Private House Survey Results (Zarzita)

Location Number	5
Name of Household Head	Hekmat Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 10 (Men: 6 , Women: 4)
Occupation	Policeman
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How?	Rainfall collection + Buying water
What for?	Drinking
Quantity?	6 month rainfall water + Buying 5 m ³ / week
Price?	300 SP/ 5 m ³
Others	

Private House Survey Results (Zarzita)

Location Number	6
Name of Household Head	Bakro Bakro
Number of Rooms	4 (cement)
Number of people in family	Total: 12 (Men: 5 , Women: 7)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,400 + Others : 200
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How?	Buying water + Rainfall collection
What for?	
Quantity?	
Price?	
Others	

Private House Survey Results (Zarzita)

Location Number	7
Name of Household Head	Mohammed Bakro
Number of Rooms	4 (cement)
Number of people in family	Total: 9 (Men: 4 , Women: 5)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,200 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	8
Name of Household Head	Ibrahim Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 5 (Men: 2 , Women: 3)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well + Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	9
Name of Household Head	Dieb Kartal
Number of Rooms	5 (cement)
Number of people in family	Total: 7 (Men: 4 , Women: 3)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 250 + Lighting : 200 + Foods : 2,000 + Others : 650
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well + Rainfall collection
Others	1 motorcycle

Private House Survey Results (Zarzita)

Location Number	10
Name of Household Head	Abdell Kader Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 8 (Men: 3 , Women: 5)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	11
Name of Household Head	Mohamed Kamel
Number of Rooms	5 (cement)
Number of people in family	Total: 14 (Men: 7 , Women: 7)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well + Buying water + Rainfall collection Drinking + Irrigation 6 month rainfall collection + Buying 5 m ³ / week 300 SP/ 5 m ³
Others	

Private House Survey Results (Zarzita)

Location Number	12
Name of Household Head	Ahmad Omar Kartal
Number of Rooms	4 (cement)
Number of people in family	Total: 12 (Men: 7 , Women: 5)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	13
Name of Household Head	Abudal Rahman Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 10 (Men: 4 , Women: 6)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well + Rainfall collection + Buying water Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	14
Name of Household Head	Ahmad Abudulla Kartal
Number of Rooms	4 (cement)
Number of people in family	Total: 12 (Men: 6 , Women: 6)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well + Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	15
Name of Household Head	Abdo Mohammed Kartal
Number of Rooms	4 (cement)
Number of people in family	Total: 8 (Men: 5 , Women: 3)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	16
Name of Household Head	Mohamad Abdo Kartal
Number of Rooms	2 (clay)
Number of people in family	Total: 8 (Men: 3 , Women: 5)
Occupation	Agriculture
Income (SP / month)	3,500
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,300 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	17
Name of Household Head	Abdalla Mohamad Kartal
Number of Rooms	2 (cement)
Number of people in family	Total: 7 (Men: 4 , Women: 3)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	18
Name of Household Head	Abdel Wahed Kartal
Number of Rooms	4 (cement)
Number of people in family	Total: 9 (Men: 5 , Women: 4)
Occupation	Teacher
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Rainfall collection + Buying water Drinking
Others	

Private House Survey Results (Zarzita)

Location Number	19
Name of Household Head	Abdalla Abdel Kader Kartal
Number of Rooms	4 (cement)
Number of people in family	Total: 8 (Men: 3 , Women: 5)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well + Buying water Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	20
Name of Household Head	Hasan Kartal
Number of Rooms	5 (cement)
Number of people in family	Total: 12 (Men: 7 , Women: 5)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Zarzita)

Location Number	21
Name of Household Head	Abudal Kahman Kartal
Number of Rooms	4 (cement)
Number of people in family	Total: 9 (Men: 4 , Women: 5)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well + Rainfall collection
Others	

Private House Survey Results (Zarzita)

Location Number	22
Name of Household Head	Abdel Kader Kartal
Number of Rooms	2 (cement)
Number of people in family	Total: 5 (Men: 2 , Women: 3)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	23
Name of Household Head	Brkat Hasan
Number of Rooms	2 (cement)
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	24
Name of Household Head	Abdel Mageed Alhasan
Number of Rooms	3 (clay)
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	2,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 1,000 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	25
Name of Household Head	Abdul Kader Kartal
Number of Rooms	3 (clay)
Number of people in family	Total: 1 (Men: 1 , Women: 0)
Occupation	Agriculture
Income (SP / month)	1,500
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 600 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Rainfall collection Drinking
Others	

Private House Survey Results (Zarzita)

Location Number	26
Name of Household Head	Mohamed Ahmed Kartal
Number of Rooms	5 (cement)
Number of people in family	Total: 8 (Men: 4 , Women: 4)
Occupation	Agriculture
Income (SP / month)	5,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,500 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Rainfall collection + Buying water Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	27
Name of Household Head	Jumaa Juma Kartal
Number of Rooms	4 (cement) + 1 (clay)
Number of people in family	Total: 10 (Men: 6 , Women: 4)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well + Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	28
Name of Household Head	Mohamed Abdall Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 12 (Men: 8 , Women: 4)
Occupation	Agriculture
Income (SP / month)	5,000
Expense (SP / month)	+ Fuel : 400 + Lighting : 200 + Foods : 3,600 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Rainfall collection + Buying water Drinking + Irrigation
Others	1 motorcycle

Private House Survey Results (Zarzita)

Location Number	29
Name of Household Head	Abdalla Mohamed Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 10 (Men: 5 , Women: 5)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Rainfall collection + Buying water Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	30
Name of Household Head	Ahmad Juma Kartal
Number of Rooms	2 (cement)
Number of people in family	Total: 6 (Men: 2 , Women: 4)
Occupation	Policeman
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 3,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting
Water How? What for? Quantity? Price?	Buying water + Rainfall collection Drinking
Others	

Private House Survey Results (Zarzita)

Location Number	31
Name of Household Head	Mariam Omar Kartal
Number of Rooms	2 (clay)
Number of people in family	Total: 1 (Men: 0 , Women: 1)
Occupation	
Income (SP / month)	1,500
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 600 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Zarzita)

Location Number	32
Name of Household Head	Kamal Al Hasan
Number of Rooms	4 (cement)
Number of people in family	Total: 10 (Men: 3 , Women: 7)
Occupation	Agriculture
Income (SP / month)	2,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 1,400 + Others : 200
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	33
Name of Household Head	Abdel Rahman Kartal
Number of Rooms	3 (cement)
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Teacher
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water	How? What for? Quantity? Price?
	Buying water + Rainfall collection Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

Location Number	34
Name of Household Head	Juma Abdel Hameed Kartal
Number of Rooms	4 (cement)
Number of people in family	Total: 7 (Men: 3 , Women: 4)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 200 + Foods : 2,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water	How? What for? Quantity? Price?
	Rainfall collection + Buying water Drinking + Irrigation
Others	

Private House Survey Results (Zarzita)

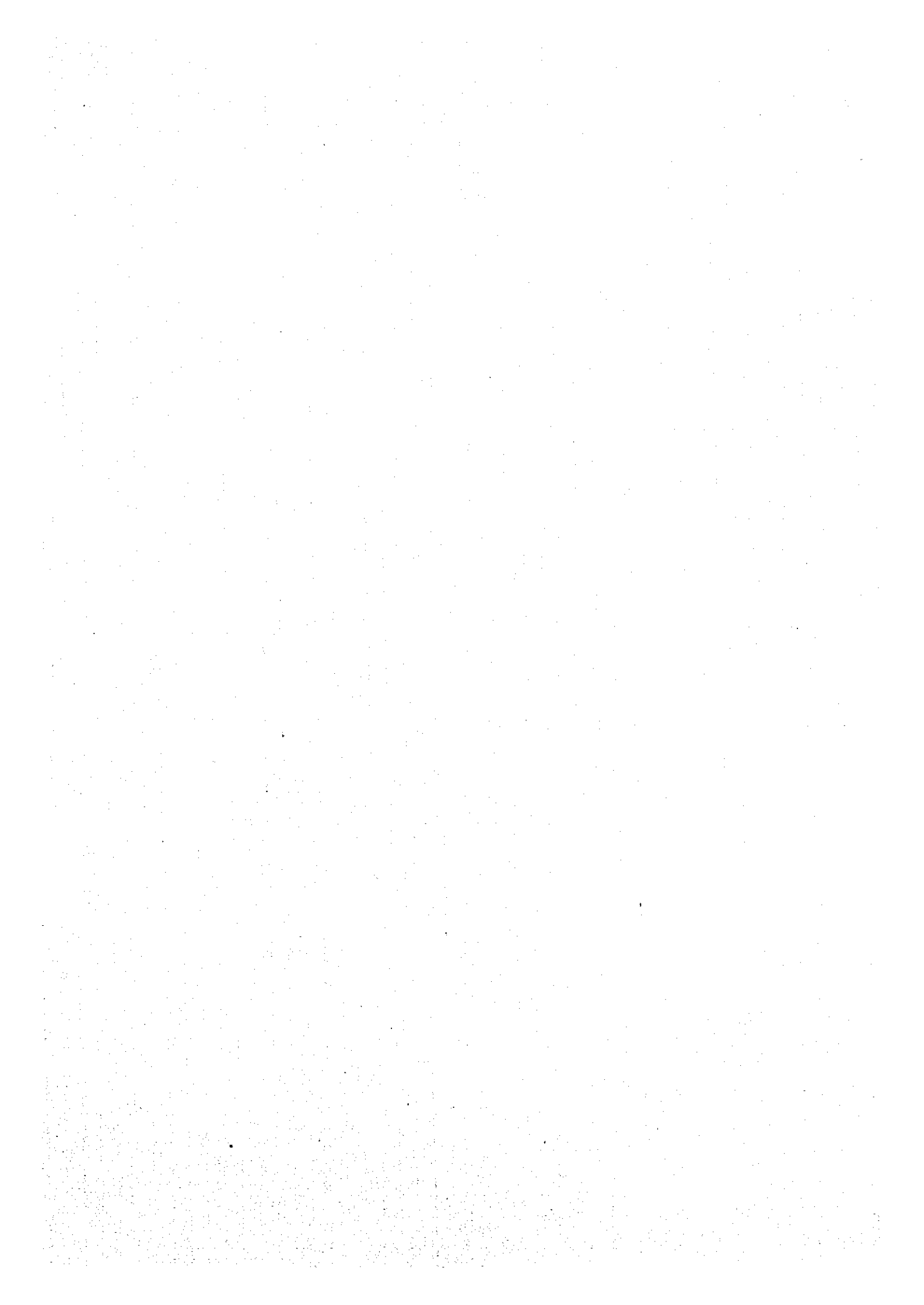
Location Number	35
Name of Household Head	School
Number of Rooms	4 (cement)
Number of people in family	Total: (Men: , Women:)
Occupation	
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	Lighting
Water	How? What for? Quantity? Price?
Others	

Private House Survey Results (Zarzita)

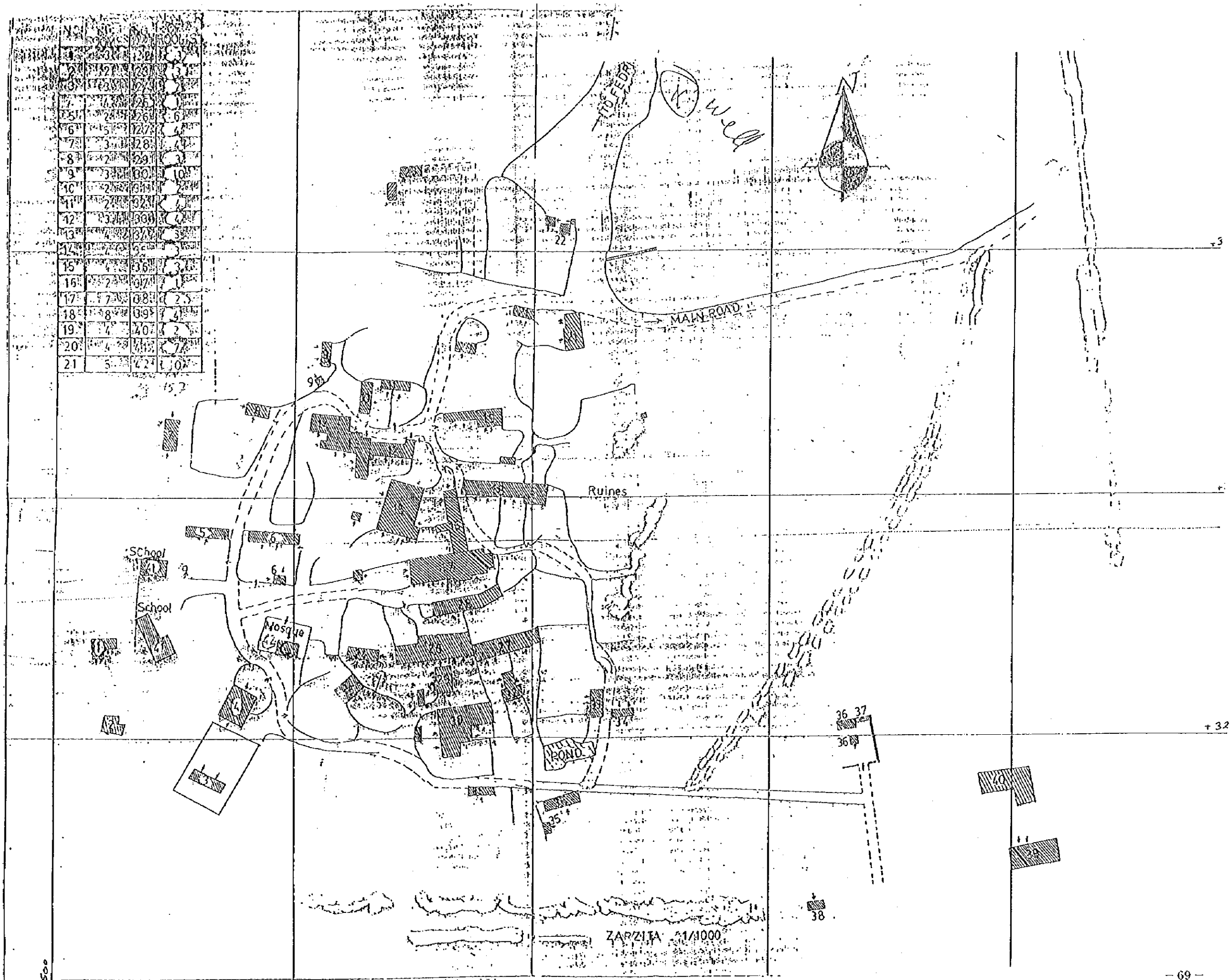
Location Number	36
Name of Household Head	School
Number of Rooms	2 (cement)
Number of people in family	Total: (Men: , Women:)
Occupation	
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	
Water	How? What for? Quantity? Price?
Others	

Private House Survey Results (Zarzita)

Location Number	37
Name of Household Head	Mosque
Number of Rooms	4 (cement)
Number of people in family	Total: (Men: , Women:)
Occupation	
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	Lighting, Radio
Water How? What for? Quantity? Price?	
Others	

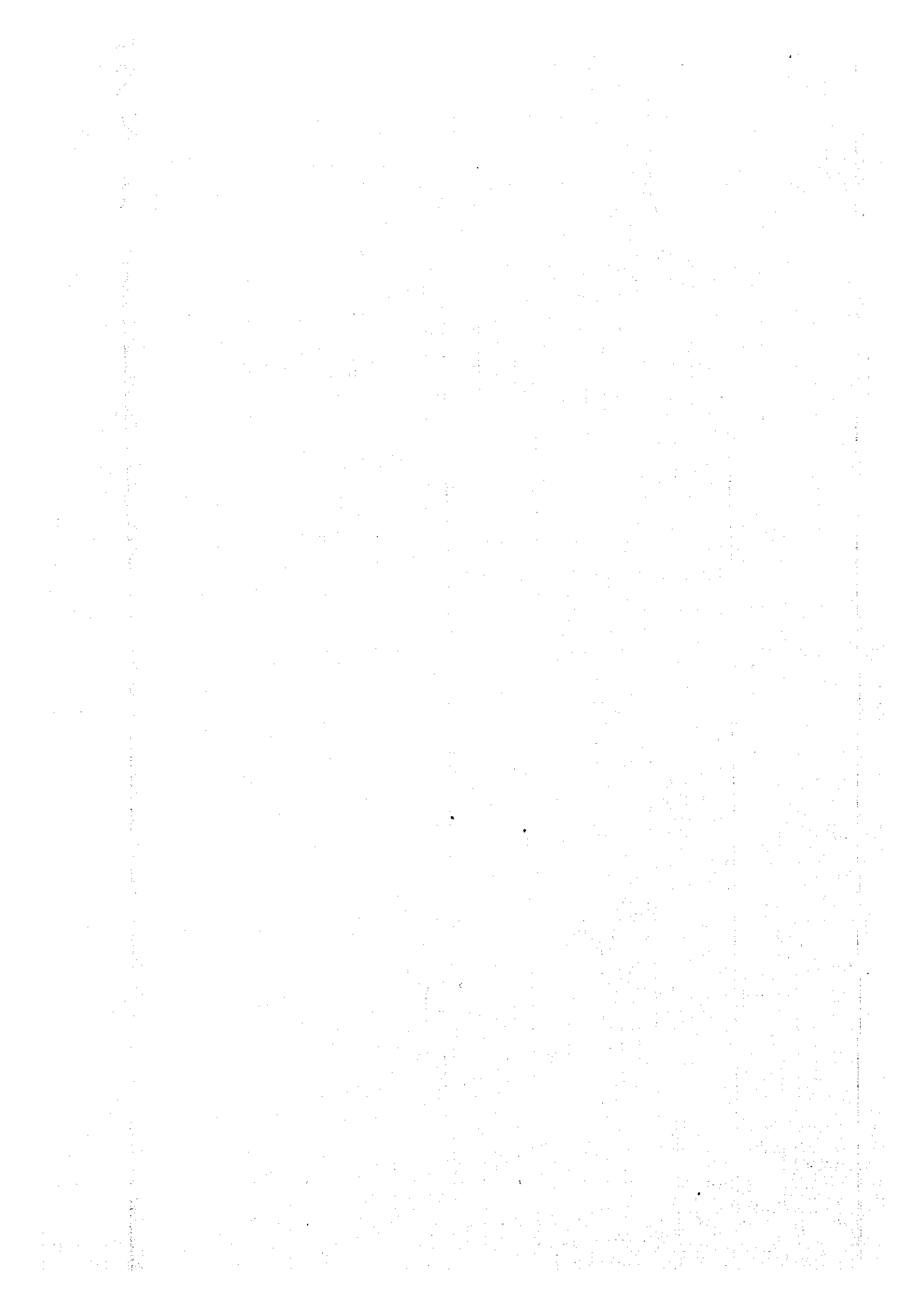


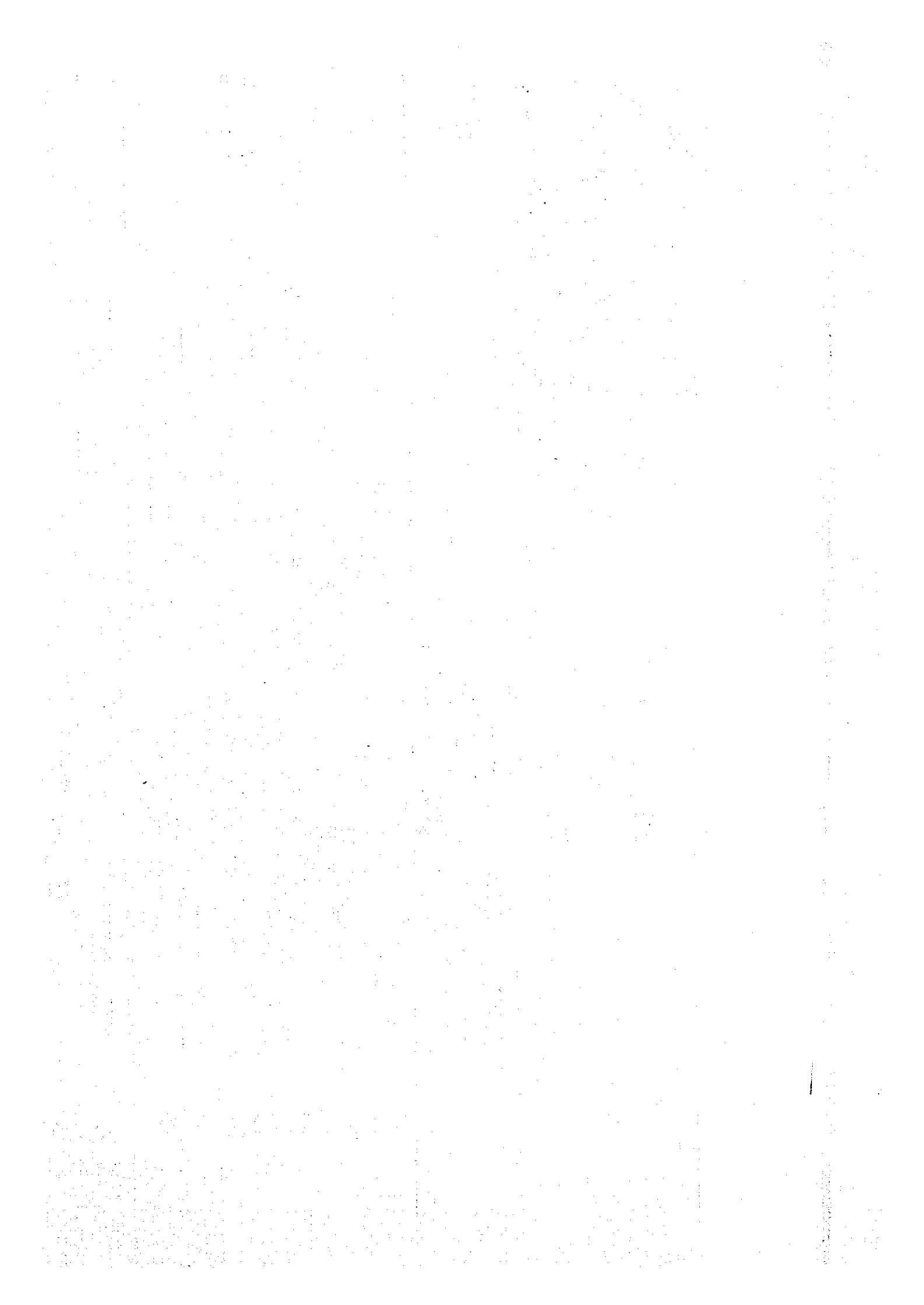
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100



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7.2

Private House Survey Results

-- Fedre --

Private House Survey Results (Fedre)

Location Number	1
Name of Household Head	Warda Hasan Hardoch
Number of Rooms	1 (stone)
Number of people in family	Total: 1 (Men: 1 , Women: 0)
Occupation	Agriculture
Income (SP / month)	800
Expense (SP / month)	+ Fuel : 100 + Lighting : 100 + Foods : 500 + Others : 100
Purpose of Energy Use	
Desired Electric Appliances	Lighting
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	2
Name of Household Head	Omar Dabbe
Number of Rooms	1 (stone)
Number of people in family	Total: 9 (Men: 5 , Women: 4)
Occupation	Agriculture + Teacher
Income (SP / month)	3,500
Expense (SP / month)	+ Fuel : 400 + Lighting : 150 + Foods : 2,200 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	3
Name of Household Head	Ahmad Dabbe
Number of Rooms	1 (cement) + 1 (mud)
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	2,000
Expense (SP / month)	+ Fuel : 400 + Lighting : 200 + Foods : 800 + Others : 800
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	4
Name of Household Head	Mohamed Abdul Hameed Maatok
Number of Rooms	1 (stone)
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	1,000
Expense (SP / month)	+ Fuel : 200 + Lighting : 100 + Foods : 600 + Others : 100
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	5
Name of Household Head	Suma Maatok
Number of Rooms	1 (cement)
Number of people in family	Total: 4 (Men: 2 , Women: 2)
Occupation	Agriculture
Income (SP / month)	1,500
Expense (SP / month)	+ Fuel : 300 + Lighting : 150 + Foods : 800 + Others : 300
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	6
Name of Household Head	Osman Maatok
Number of Rooms	2 (cement)
Number of people in family	Total: 3 (Men: 2 , Women: 1)
Occupation	Agriculture
Income (SP / month)	1,500
Expense (SP / month)	+ Fuel : 400 + Lighting : 250 + Foods : 700 + Others : 200
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	7
Name of Household Head	Ali Maatok
Number of Rooms	1 (cement)
Number of people in family	Total: 3 (Men: 1 , Women: 2)
Occupation	Agriculture
Income (SP / month)	1,500
Expense (SP / month)	+ Fuel : 300 + Lighting : 120 + Foods : 800 + Others : 250
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	8
Name of Household Head	Ahmad Maatok
Number of Rooms	2 (cement)
Number of people in family	Total: 7 (Men: 3 , Women: 4)
Occupation	Agriculture
Income (SP / month)	2,000
Expense (SP / month)	+ Fuel : 600 + Lighting : 250 + Foods : 900 + Others : 300
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	9
Name of Household Head	Juma Mohamad Maatok
Number of Rooms	2 (cement)
Number of people in family	Total: 5 (Men: 3 , Women: 2)
Occupation	Agriculture
Income (SP / month)	2,000
Expense (SP / month)	+ Fuel : 500 + Lighting : 300 + Foods : 800 + Others : 200
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	10
Name of Household Head	Abdul Ghani Zaaza
Number of Rooms	2 (cement) + 1 (mud)
Number of people in family	Total: 8 (Men: 3 , Women: 5)
Occupation	Agriculture + Teacher
Income (SP / month)	3,600 + 2,400
Expense (SP / month)	+ Fuel : 350 + Lighting : 350 + Foods : 1,500 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Buying + Well Drinking, Livestock 4 L per day 300 SP / 5 m ³
Others	

Private House Survey Results (Fedre)

Location Number	11
Name of Household Head	Ibrahim Zaaza
Number of Rooms	3 (cement)
Number of people in family	Total: 12 (Men: 5 , Women: 7)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 600 + Lighting : 350 + Foods : 1,800 + Others : 250
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	12
Name of Household Head	Abdala Haj Bakri
Number of Rooms	2 (cement)
Number of people in family	Total: 8 (Men: 4 , Women: 4)
Occupation	Agriculture
Income (SP / month)	3,000
Expense (SP / month)	+ Fuel : 800 + Lighting : 300 + Foods : 1,600 + Others : 300
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	13
Name of Household Head	Osman Haj Bakri
Number of Rooms	2 (cement)
Number of people in family	Total: 10 (Men: 3 , Women: 7)
Occupation	Agriculture + Livestock
Income (SP / month)	3,000 + 1,000
Expense (SP / month)	+ Fuel : 900 + Lighting : 400 + Foods : 2,000 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	14
Name of Household Head	Mustafa Zaaza
Number of Rooms	2 (cement)
Number of people in family	Total: 6 (Men: 3 , Women: 3)
Occupation	
Income (SP / month)	2,500
Expense (SP / month)	+ Fuel : 600 + Lighting : 200 + Foods : 1,200 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	15
Name of Household Head	School
Number of Rooms	4 (cement)
Number of people in family	Total: (Men: , Women:)
Occupation	
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	Lighting
Water How? What for? Quantity? Price?	
Others	

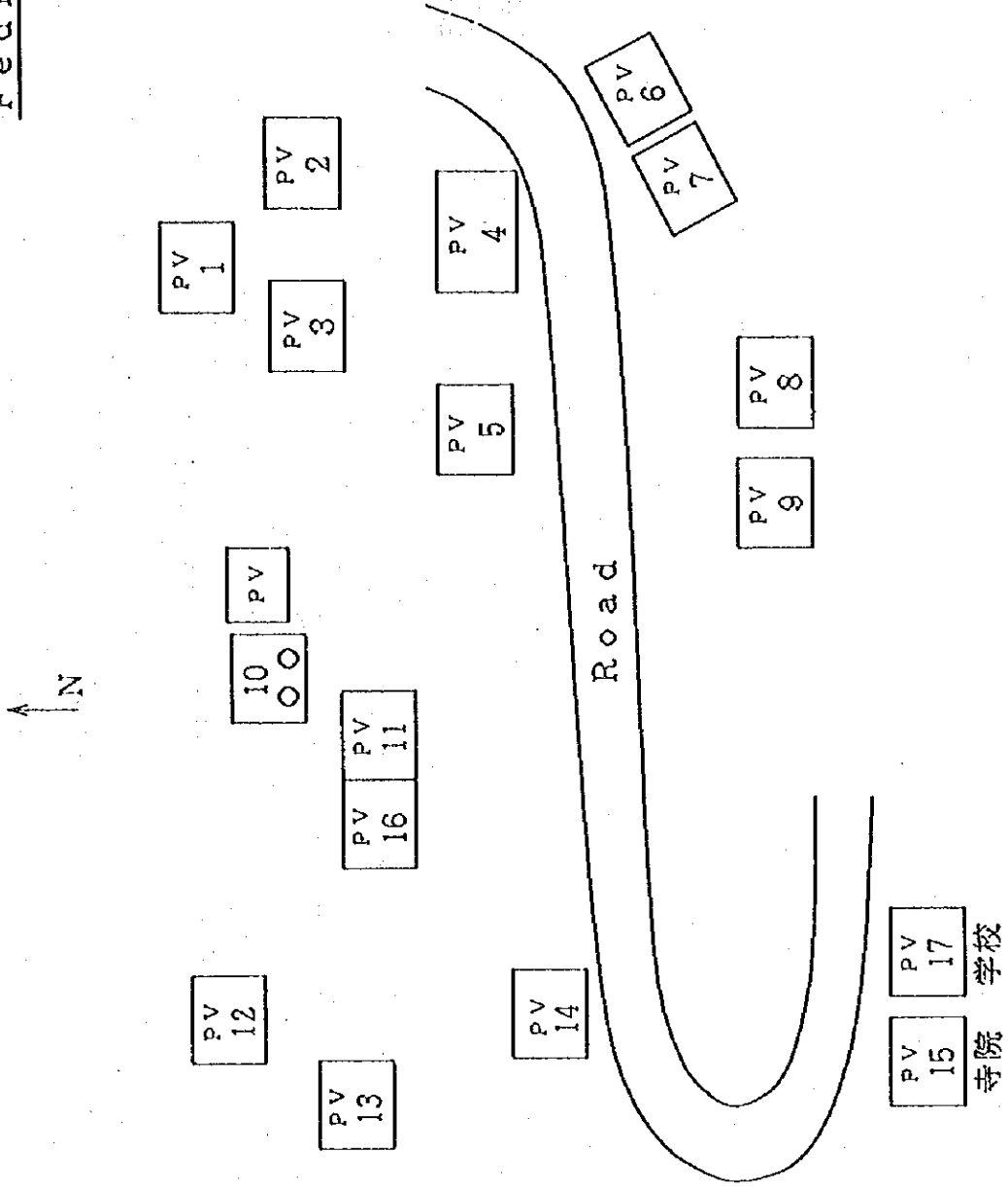
Private House Survey Results (Fedre)

Location Number	16
Name of Household Head	Ibrahim Zaaza
Number of Rooms	1 (cement)
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	1,500
Expense (SP / month)	+ Fuel : 300 + Lighting : 150 + Foods : 150 + Others : 200
Purpose of Energy Use	
Desired Electric Appliances	Lighting, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Fedre)

Location Number	17
Name of Household Head	Mosque
Number of Rooms	2 (cement)
Number of people in family	Total: (Men: , Women:)
Occupation	
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	Lighting
Water How? What for? Quantity? Price?	
Others	

Fedre



No	部屋数	セメント	土	石	備考
1	1	-	-	1	-
2	1	1	-	-	-
3	2	1	1	-	-
4	1	-	1	-	-
5	2	2	-	-	-
6	2	2	-	-	-
7	1	1	-	-	-
8	2	2	-	-	-
9	2	2	-	-	-
10	2	-	-	2	-
11	3	3	-	-	-
12	2	2	-	-	-
13	2	2	-	-	-
14	2	2	-	-	-
15	2	2	-	-	寺院
16	1	1	-	-	-
17	2	2	-	-	学校

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Private House Survey Results

-- Katoura --

Private House Survey Results (Katoura)

Location Number	1
Name of Household Head	Ali Alabdalha
Number of Rooms	2
Number of people in family	Total: 9 (Men: 8 , Women: 1)
Occupation	Agriculture
Income (SP / month)	2,400
Expense (SP / month)	+ Fuel : 600 + Lighting : 250 + Foods : 1,400 + Others : 150
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	2
Name of Household Head	Ali Alabdalah
Number of Rooms	2
Number of people in family	Total: 7 (Men: 4 , Women: 3)
Occupation	Agriculture
Income (SP / month)	3,800
Expense (SP / month)	+ Fuel : 400 + Lighting : 200 + Foods : 2,000 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	3
Name of Household Head	Ismael Alsaed
Number of Rooms	2
Number of people in family	Total: 11 (Men: 5 , Women: 6)
Occupation	Agriculture
Income (SP / month)	6,200
Expense (SP / month)	+ Fuel : 850 + Lighting : 250 + Foods : 4,000 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 6 m ³
Others	

Private House Survey Results (Katoura)

Location Number	4
Name of Household Head	Saleh Saleh
Number of Rooms	4
Number of people in family	Total: 7 (Men: 4 , Women: 3)
Occupation	Agriculture + Worker
Income (SP / month)	5,500
Expense (SP / month)	+ Fuel : 900 + Lighting : 300 + Foods : 3,200 + Others : 800
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 6 m ³
Others	

Private House Survey Results (Katoura)

Location Number	5
Name of Household Head	Mahmond Alsaheed
Number of Rooms	2
Number of people in family	Total: 12 (Men: 6 , Women: 6)
Occupation	Agriculture + Worker
Income (SP / month)	6,500
Expense (SP / month)	+ Fuel : 350 + Lighting : 250 + Foods : 4,000 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 6 m ³
Others	

Private House Survey Results (Katoura)

Location Number	6
Name of Household Head	Abdulla Khasho
Number of Rooms	2
Number of people in family	Total: 10 (Men: 5 , Women: 5)
Occupation	Livestock
Income (SP / month)	2,500
Expense (SP / month)	+ Fuel : 750 + Lighting : 250 + Foods : 1,000 + Others : 300
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 6 m ³
Others	

Private House Survey Results (Katoura)

Location Number	7
Name of Household Head	Ahalad Abdel Kaderr Akel
Number of Rooms	2
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	2,200
Expense (SP / month)	+ Fuel : 800 + Lighting : 300 + Foods : 700 + Others : 300
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	8
Name of Household Head	Mohamed Alsaed
Number of Rooms	2
Number of people in family	Total: 5 (Men: 3 , Women: 2)
Occupation	Teacher
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 800 + Lighting : 300 + Foods : 2,000 + Others : 800
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 5 m ³
Others	

Private House Survey Results (Katoura)

Location Number	9
Name of Household Head	Soubhi Alabdalla
Number of Rooms	1
Number of people in family	Total: 5 (Men: 3 , Women: 2)
Occupation	Agriculture + Pension
Income (SP / month)	3,800
Expense (SP / month)	+ Fuel : 450 + Lighting : 150 + Foods : 2,100 + Others : 700
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	10
Name of Household Head	Juma Alsaed
Number of Rooms	2
Number of people in family	Total: 3 (Men: 2 , Women: 1)
Occupation	
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 450 + Lighting : 250 + Foods : 2,000 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	11
Name of Household Head	Abdul Rahman Ali
Number of Rooms	4
Number of people in family	Total: 19 (Men: 11 , Women: 8)
Occupation	Agriculture + Worker
Income (SP / month)	10,000
Expense (SP / month)	+ Fuel : 1,000 + Lighting : 600 + Foods : 6,000 + Others : 2,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 5 m ³
Others	

Private House Survey Results (Katoura)

Location Number	12
Name of Household Head	School
Number of Rooms	4
Number of people in family	Total: (Men: , Women:)
Occupation	
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	Lighting
Water How? What for? Quantity? Price?	
Others	

Private House Survey Results (Katoura)

Location Number	13
Name of Household Head	Taha Hamadi Obied
Number of Rooms	2
Number of people in family	Total: 4 (Men: 3 , Women: 1)
Occupation	Agriculture
Income (SP / month)	2,900
Expense (SP / month)	+ Fuel : 750 + Lighting : 300 + Foods : 1,200 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	14
Name of Household Head	Abed Al Kareem Akel
Number of Rooms	2
Number of people in family	Total: 3 (Men: 1 , Women: 2)
Occupation	Agriculture + Worker
Income (SP / month)	2,500
Expense (SP / month)	+ Fuel : 850 + Lighting : 250 + Foods : 1,000 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 5 m ³
Others	

Private House Survey Results (Katoura)

Location Number	15
Name of Household Head	Hamdo Tesho
Number of Rooms	4
Number of people in family	Total: 9 (Men: 6 , Women: 3)
Occupation	
Income (SP / month)	6,000
Expense (SP / month)	+ Fuel : 1,000 + Lighting : 450 + Foods : 3,300 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 5 m ³
Others	

Private House Survey Results (Katoura)

Location Number	16
Name of Household Head	Soubhi Tesho
Number of Rooms	2
Number of people in family	Total: 5 (Men: 2 , Women: 3)
Occupation	
Income (SP / month)	3,300
Expense (SP / month)	+ Fuel : 800 + Lighting : 250 + Foods : 1,500 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	17
Name of Household Head	Ahmad Hamade Akel
Number of Rooms	2
Number of people in family	Total: 3 (Men: 1 , Women: 2)
Occupation	Agriculture
Income (SP / month)	2,500
Expense (SP / month)	+ Fuel : 850 + Lighting : 250 + Foods : 1,000 + Others : 400
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	18
Name of Household Head	Adell Hameed Abrad
Number of Rooms	2
Number of people in family	Total: 3 (Men: 2 , Women: 1)
Occupation	Agriculture
Income (SP / month)	2,600
Expense (SP / month)	+ Fuel : 800 + Lighting : 300 + Foods : 1,000 + Others : 450
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	19
Name of Household Head	Mohammed Brakat Ibrahim
Number of Rooms	2
Number of people in family	Total: 4 (Men: 1 , Women: 3)
Occupation	Agriculture
Income (SP / month)	2,800
Expense (SP / month)	+ Fuel : 800 + Lighting : 250 + Foods : 1,000 + Others : 600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	20
Name of Household Head	Brakat Ibrahim
Number of Rooms	3
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	2,400
Expense (SP / month)	+ Fuel : 800 + Lighting : 400 + Foods : 700 + Others : 300
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	21
Name of Household Head	Mohamed Drab Obad
Number of Rooms	4
Number of people in family	Total: 4 (Men: 2 , Women: 2)
Occupation	Agriculture
Income (SP / month)	4,000
Expense (SP / month)	+ Fuel : 1,800 + Lighting : 500 + Foods : 1,200 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well
Others	

Private House Survey Results (Katoura)

Location Number	22
Name of Household Head	Abdalla Akel
Number of Rooms	2
Number of people in family	Total: 8 (Men: 6 , Women: 2)
Occupation	Agriculture
Income (SP / month)	5,000
Expense (SP / month)	+ Fuel : 800 + Lighting : 250 + Foods : 2,800 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 5 m ³
Others	

Private House Survey Results (Katoura)

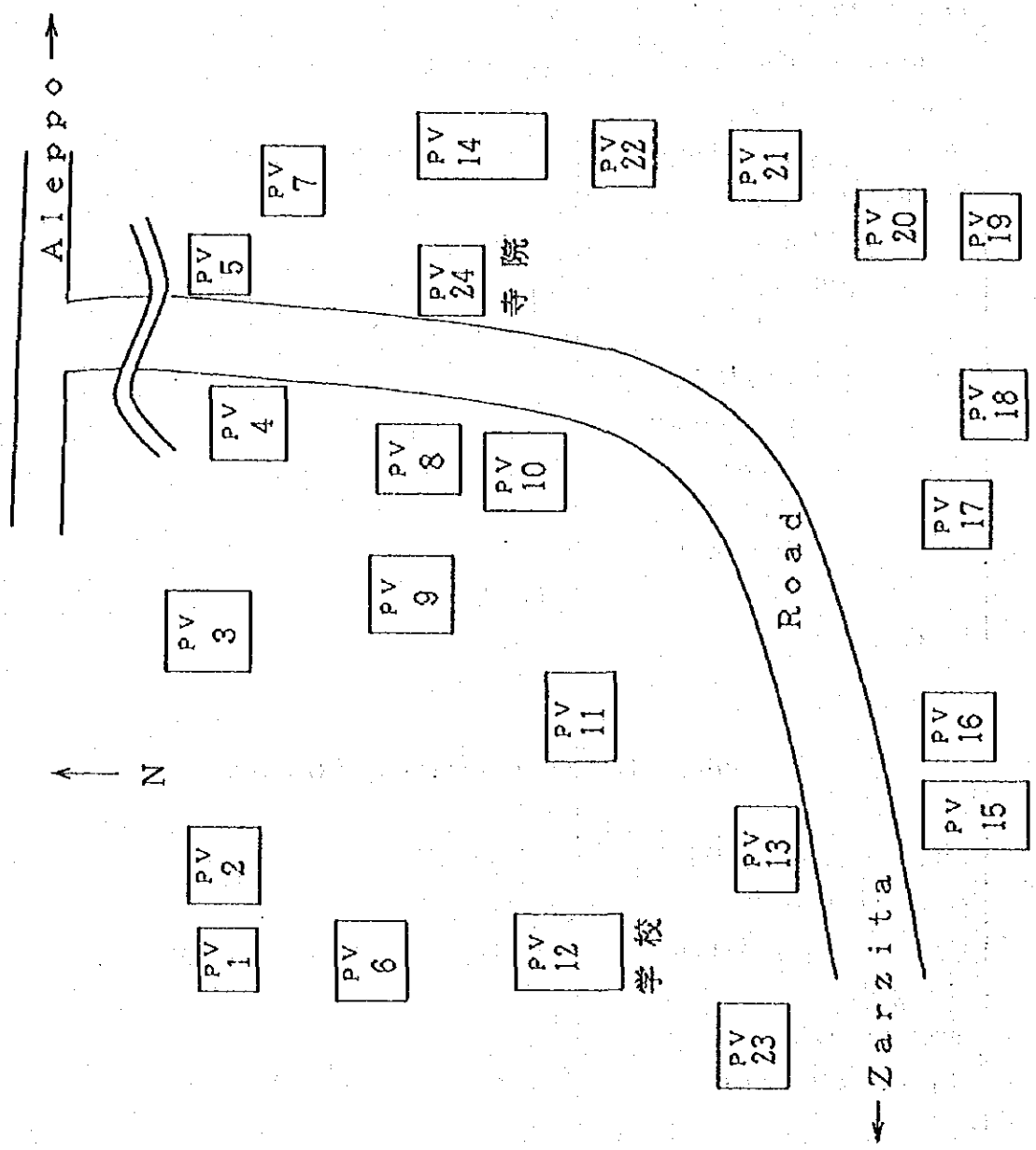
Location Number	23
Name of Household Head	Mohamed Hamadi Abkad
Number of Rooms	2
Number of people in family	Total: 8 (Men: 7 , Women: 1)
Occupation	
Income (SP / month)	5,000
Expense (SP / month)	+ Fuel : 650 + Lighting : 250 + Foods : 2,700 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How? What for? Quantity? Price?	Buying in summer + Well 250 SP / 5 m ³
Others	

Private House Survey Results (Katoura)

Location Number	24
Name of Household Head	Mosque
Number of Rooms	2
Number of people in family	Total: (Men: , Women:)
Occupation	
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	Lighting
Water How? What for? Quantity? Price?	
Others	

Katoura

No	部屋数	備考
1	2	-
2	2	-
3	2	-
4	4	-
5	2	-
6	2	-
7	2	-
8	2	-
9	1	-
10	2	-
11	4	-
12	4	学校
13	2	-
14	2	-
15	4	-
16	2	-
17	2	-
18	2	-
19	2	-
20	3	-
21	4	-
22	2	-
23	2	-
24	4	寺院



7: 4

Private House Survey Results

-- Rasem-alshikh --

Private House Survey Results (Rasem-alshikh)

Location Number	1
Name of Household Head	Mahmod Almchamed
Number of Rooms	3 (cement) + kitchen
Number of people in family	Total: 11 (Men: 6 , Women: 5)
Occupation	Agriculture
Income (SP / month)	12,000
Expense (SP / month)	+ Fuel : 4,000 + Lighting : 600 + Foods : 4,300 + Others : 1,700
Purpose of Energy Use	Heating, Cooking, Lighting
Desired Electric Appliances	Lightung, TV, Radio, Fridge, Washing machine
Water	How? Buying + Well (salty)
	What for? Drinking, Washing, Livestock
	Quantity? 20 L, 80 L, 200 L per day
	Price? 50 SP / m ³
Others	1 tractor

Private House Survey Results (Rasem-alshikh)

Location Number	2
Name of Household Head	Geasem Al Mohamed
Number of Rooms	2 (cement) + 2 (wood) + kitchen
Number of people in family	Total: 15 (Men: 7 , Women: 8)
Occupation	Agriculture
Income (SP / month)	15,000
Expense (SP / month)	+ Fuel : 2,000 + Lighting : 700 + Foods : 6,400 + Others : 2,100
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water	How? From their neighbor's well
	What for? Drinking, Washing, Livestock
	Quantity? 30 L, 100 L, 200 L per day
	Price? Free
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	3
Name of Household Head	Hamzeh Jasem
Number of Rooms	1 (cement) + kitchen
Number of people in family	Total: 7 (Men: 2 , Women: 5)
Occupation	Agriculture
Income (SP / month)	7,500
Expense (SP / month)	+ Fuel : 1,200 + Lighting : 250 + Foods : 2,900 + Others : 1,100
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How?	Buying + From their neighbor's well
What for?	Drinking
Quantity?	
Price?	50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	4
Name of Household Head	Faysal Alskran
Number of Rooms	1 (cement) + kitchen
Number of people in family	Total: 7 (Men: 5 , Women: 2)
Occupation	Agriculture
Income (SP / month)	11,500
Expense (SP / month)	+ Fuel : 3,200 + Lighting : 250 + Foods : 4,300 + Others : 1,300
Purpose of Energy Use	Heating, Cooking, Lighting
Desired Electric Appliances	Lighting, TV, Washing machine
Water How?	Buying + Salty water well
What for?	Drinking, Washing, Livestock
Quantity?	14 L 60 L
Price?	50 SP / m ³
Others	1 tractor

Private House Survey Results (Rasem-alshikh)

Location Number	5
Name of Household Head	Abdallah Alsekran
Number of Rooms	3 (cement or wood) + kitchen
Number of people in family	Total: 6 (Men: 5 , Women: 1)
Occupation	Agriculture
Income (SP / month)	
Expense (SP / month)	+ Fuel : + Lighting : + Foods : + Others :
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water	How? Buying + from a well
	What for? Drinking, Washing, Livestock
	Quantity? 12 L 40 L 200 L per day
	Price? 50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	6
Name of Household Head	Adel Alskran
Number of Rooms	2 (cement) + kitchen + 3 (for livestock)
Number of people in family	Total: 11 (Men: 7 , Women: 4)
Occupation	Agriculture
Income (SP / month)	9,000
Expense (SP / month)	+ Fuel : 1,500 + Lighting : 450 + Foods : 5,000 + Others : 1,600
Purpose of Energy Use	Heating, Cooking, Lighting
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water	How? Well
	What for? Drinking, Washing, Livestock
	Quantity?
	Price? Free
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	7
Name of Household Head	Wees Alahmad
Number of Rooms	2 (round mud hut) + kitchen
Number of people in family	Total: 3 (Men: 1, Women: 2)
Occupation	Agriculture
Income (SP / month)	6,000
Expense (SP / month)	+ Fuel : 800 + Lighting : 300 + Foods : 2,000 + Others : 500
Purpose of Energy Use	Heating, Cooking, Lighting
Desired Electric Appliances	Lighting, TV, Radio
Water	How? Buying + From their neighbor's well
	What for? Drinking, Washing, Livestock
	Quantity?
	Price? 50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	8
Name of Household Head	Ghazi Debo
Number of Rooms	2 (cement) + kitchen
Number of people in family	Total: 12 (Men: 6, Women: 6)
Occupation	Agriculture
Income (SP / month)	16,000
Expense (SP / month)	+ Fuel : 1,100 + Lighting : 350 + Foods : 5,200 + Others : 1,500
Purpose of Energy Use	Heating, Cooking, Lighting
Desired Electric Appliances	Lighting, TV, radio, Fridge, Washing machine
Water	How? Buying + From their neighbor's well
	What for? Drinking, Washing, Livestock
	Quantity? 24 L, 100 L, 200 L
	Price? 50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	9
Name of Household Head	Mohammed Ali
Number of Rooms	3 (round mud hut) + kitchen
Number of people in family	Total: 6 (Men: 3 , Women: 3)
Occupation	Agriculture
Income (SP / month)	7,500
Expense (SP / month)	+ Fuel : 1,500 + Lighting : 500 + Foods : 3,000 + Others :
Purpose of Energy Use	Heating, Cooking
Desired Electric Appliances	Lighting, TV, Radio, Washing machine
Water How?	Buying + From their neighbor's well
What for?	Drinking, Washing, Livestock
Quantity?	12 L 40L 200L
Price?	50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	10
Name of Household Head	Ahmad Alarbash
Number of Rooms	3 (cement) + kitchen + 3 (livestock)
Number of people in family	Total: 7 (Men: 4 , Women: 3)
Occupation	Agriculture
Income (SP / month)	11,500
Expense (SP / month)	+ Fuel : 3,200 + Lighting : 700 + Foods : 4,000 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How?	Buying + Salty water well
What for?	Drinking, Washing, Livestock
Quantity?	14 L 50 L 200 L
Price?	
Others	1 tractor

Private House Survey Results (Rasem-alshikh)

Location Number	11
Name of Household Head	Khalil Al Saleh
Number of Rooms	1 (cement) + 2 (round mud hut)
Number of people in family	Total: 2 (Men: 1 , Women: 1)
Occupation	Agriculture
Income (SP / month)	5,000
Expense (SP / month)	+ Fuel : 1,200 + Lighting : 600 + Foods : 2,000 + Others : 700
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge
Water How?	Buying + From their neighbor's well
What for?	Drinking, Washing, Livestock
Quantity?	
Price?	50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	12
Name of Household Head	Saleh Khalel
Number of Rooms	3 (cement)
Number of people in family	Total: 11 (Men: 5 , Women: 6)
Occupation	Agriculture
Income (SP / month)	9,500
Expense (SP / month)	+ Fuel : 2,000 + Lighting : 400 + Foods : 5,000 + Others : 1,600
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water How?	Buying + Salty water well
What for?	Drinking, Washing, Livestock
Quantity?	20 L 80 L 200 L per day
Price?	50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	13
Name of Household Head	Shaaban Al Molhem
Number of Rooms	2 (round mud hut) + kitchen
Number of people in family	Total: 6 (Men: 5 , Women: 1)
Occupation	Agriculture
Income (SP / month)	5,600
Expense (SP / month)	+ Fuel : 900 + Lighting : 300 + Foods : 3,000 + Others : 800
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water How? What for? Quantity? Price?	Well Drinking, Washing, Livestock Free
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	14
Name of Household Head	Diab Al Molhem
Number of Rooms	2 (round mud hut) + kitchen
Number of people in family	Total: 5 (Men: 4 , Women: 1)
Occupation	Agriculture
Income (SP / month)	3,500
Expense (SP / month)	+ Fuel : 600 + Lighting : 200 + Foods : 1,800 + Others : 500
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge
Water How? What for? Quantity? Price?	Well Drinking, Washing, Livestock 14 L 40 L Free
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	15
Name of Household Head	Faysal Aljuma
Number of Rooms	1 (cement) + 1 (round mud hut)
Number of people in family	Total: 8 (Men: 5 , Women: 3)
Occupation	Agriculture
Income (SP / month)	5,200
Expense (SP / month)	+ Fuel : 600 + Lighting : 200 + Foods : 3,200 + Others : 1,200
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge
Water	How? Buying + From their neighbor's well
	What for? Drinking, Washing, Livestock
	Quantity? 16L 60L 200L per day
	Price? 50 SP / m ³
Others	

Private House Survey Results (Rasem-alshikh)

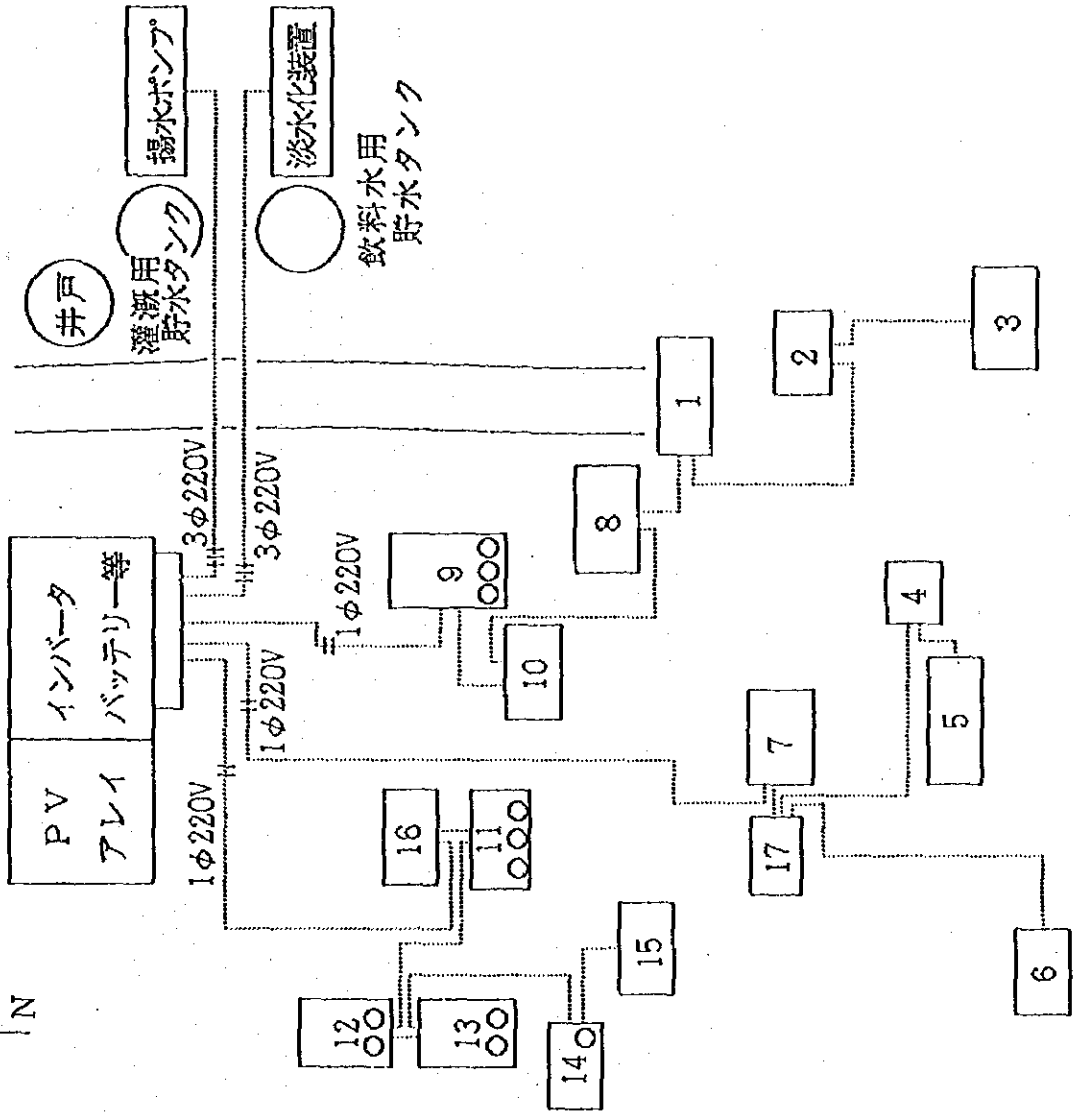
Location Number	16
Name of Household Head	Hafez Alsaleh
Number of Rooms	1 (cement) + kitchen
Number of people in family	Total: 5 (Men: 2 , Women: 3)
Occupation	Agriculture
Income (SP / month)	3,800
Expense (SP / month)	+ Fuel : 500 + Lighting : 200 + Foods : 2,000 + Others : 750
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio
Water	How? From their neighbor's well
	What for? Drinking, Washing, Livestock
	Quantity? 10 L 40 L 200 L per day
	Price? Free
Others	

Private House Survey Results (Rasem-alshikh)

Location Number	17
Name of Household Head	Secran Al Mohamed
Number of Rooms	3 (cement) + kitchen
Number of people in family	Total: 5 (Men: 3, Women: 2)
Occupation	Agriculture
Income (SP / month)	15,500
Expense (SP / month)	+ Fuel : 3,300 + Lighting : 800 + Foods : 3,000 + Others : 1,000
Purpose of Energy Use	
Desired Electric Appliances	Lighting, TV, Radio, Fridge, Washing machine
Water	How? Buying + From their neighbor's well
	What for? Drinking, Washing, Livestock
	Quantity? 10 L 50 L 200 L
	Price? 50 SP / m ³
Others	1 tractor



No	部屋数	セメント	土	木材
1	4	4	-	-
2	5	3	-	2
3	2	2	-	-
4	2	2	-	-
5	4	4	-	-
6	3	3	-	-
7	3	-	3	-
8	3	3	-	-
9	4	-	4	-
10	4	4	-	-
11	3	1	2	-
12	3	-	3	-
13	3	-	3	-
14	3	-	3	-
15	2	1	1	-
16	2	2	-	-
17	3	3	-	-



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