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REPORT OF THE EXECUTIVE SECRETARY
ON THE ACTIVITIES OF THE COMMISSION

PROGRESS MADE IN THE IMPLEMENTATION OF THE
PROGRAMME OF WORK FOR THE BIENNIUM 1988-1989

Report on

The identification and promotion of suitable projects for regional and subregional co-operation in the ESCWA region on new and renewable sources of energy

89-0486

CONTENTS*

* For ease of comparison, the presentation and system of identification of this document follow those of the Arabic original.

Preface

This report was prepared as part of the work programme and priorities of the Economic and Social Commission for Western Asia (ESCWA) secretariat for 1988-1989, according to subprogramme 2 of the energy programme entitled "Regional co-operation on research and development and practical demonstration of new and renewable sources of energy".

This programme element consists of a report to the Commission. Part I contains a follow-up on the recommendations of the Intergovernmental Technical Meeting on New and Renewable Sources of Energy (Amman, 4 December 1986); this includes the final form of the regional pilot projects on new and renewable energy, steps to obtain financing from regional and international funds, finance agencies and organs of the United Nations in order to begin the implementation of these projects. This part also contains a review of ESCWA activities to implement the Nairobi Programme of Action, a strategy to attain the development objectives of these regional projects, proposals for contributions of the relevant authorities of countries of the region to the implementation of these projects and the ESCWA secretariat's plan of action to promote and implement these projects.

Part II is devoted to follow-up of the activities of the ESCWA secretariat in supporting the Regional Centre for the New and Renewable Sources of Energy Information Network (NRSEIN) since it became an independent entity at the end of 1987.

Part III deals with the intense activities engaged in by the ESCWA secretariat in preparing studies on resource evaluation, organizing seminars, study tours and demonstrations on biogas technology in the Western Asia region.

Part One

REGIONAL PILOT PROJECTS IN NEW AND RENEWABLE ENERGIES

1. Background

The United Nations Conference on New and Renewable Sources of Energy, held in Nairobi in 1981, adopted the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy,[1/] which is the main document on which there is international agreement on this topic and is considered a framework for the steps which could be taken to promote and utilize renewable sources of energy, with a view to satisfying future energy needs by strengthening international co-operation in the fields of research and development, mobilizing financial resources and providing opportunities, within the framework of international efforts, to co-operate in the exchange of information and training, according to national plans and priorities.

It was agreed from the beginning that the implementation of the Nairobi Programme of Action should be a long-term undertaking, and that the decision to carry it out should not be affected by short-term fluctuations in the energy markets, such as the recent fluctuations in the oil markets, which have left their mark on the priorities of some governments concerning questions of new and renewable energies.

2. ESCWA Secretariat activities to implement the Nairobi Programme of Action

The ESCWA secretariat has assumed its responsibility and prepared studies, evaluated resources, held technical seminars, formulated guiding principles and offered technical aid to implement the programme at the regional level in a technical and comprehensive manner. It has prepared a number of demonstration projects and programmes on the basis of the priorities contained in the Nairobi Programme of Action. In the light of these activities, the Standing Committee for the Programme adopted a resolution at its second session to convene an Intergovernmental Technical Meeting to review ESCWA programmes and projects in the field of new and renewable energy and to establish high-priority pilot projects that would boost regional co-operation.

With support from the United Nations Development Programme (UNDP), the secretariat held a "Seminar on the use of solar energy and low-capacity wind energy technologies in rural and remote areas" from 29 November to 3 December 1986 in Amman, to which Arab experts were invited to discuss a number of high-priority regional projects, listed in the annex. The Intergovernmental Technical Meeting on New and Renewable Sources of Energy, held in Amman on 4 December 1986 agreed to all the high-priority regional projects discussed by the Seminar.[2/]

1/ See Report of the United Nations Conference on New and Renewable Sources of Energy, Nairobi, 10-12 August 1981 (United Nations publication, Sales No. E.81.I.24), chap. I, sect. A.

2/ See the Final Report, Seminar on Small-Scale Solar and Wind Technologies for Rural and Remote Areas in the ESCWA Region, 29 November - 3 December 1986, Amman, Jordan (E/ESCWA/NR/WG.1/18) and also the Final Report,

The Meeting recommended that the ESCWA secretariat should ensure that steps should be taken to finalize these projects and to look for the necessary sources of finance from regional and international financing bodies and agencies of the United Nations.

On this basis, the ESCWA secretariat proceeded to reformulate these projects according to models used by UNDP in order to make it easier for the financing bodies to evaluate them objectively.

In addition to their environmental considerations, the overall development objective of all of these projects was to contribute to rural development efforts and the well-being of the population, especially women. Thus the success of these projects and the evaluation of their effectiveness and ability to spread depended on improving social and environmental conditions and the circumstances of the rural population. The implementation of this project meant setting up solar pumps and wind pumps, using biogas and photovoltaic cells for lighting and other purposes, to provide energy and improve social, environmental and economic conditions in these areas.

3. Strategy to attain the development objectives of the regional projects

Each of these projects comprises activities connected with the preparation of, procurement for, construction and implementation of the testing, evaluation and dissemination programmes, as well as special studies for each project on the environmental, social and economic consequences in the sites and countries proposed for the demonstration of the pilot systems, and lastly discussion of these studies by the final beneficiaries of each project.

The matter of teaching, training and practical demonstration was borne in mind for each project. The goal is to attract trainees from the national institutions participating in each project, to have training methods prepared at each site by the "project team" and to hold training courses.

All of these projects are in implementation of the recommendations of the Nairobi Programme of Action, as applicable to the ESCWA region, and have the following strategies:

(a) Participating countries should be encouraged and assisted in the implementation of each project, by joint and effective co-operation, and particularly financial and technical arrangements for the exchange of experts and specialists between the countries of Western Asia in order to benefit from study and training grants, as well as to strengthen the horizontal exchange of data and information on renewable energy projects;

(b) The implementation of these projects should help to finalize arrangements for co-operation in the form of regional and subregional co-operation networks to monitor the results of demonstration and implementation, to exchange expertise between the national institutions concerned with renewable energies and to allocate responsibilities for training among the institutions participating in the projects;

Intergovernmental Technical Meeting on New and Renewable Sources of Energy, 4 December 1986, Amman, Jordan (E/ESCWA/NR/86/IG.1/5); details of the ten regional pilot projects are found in E/ESCWA/NR/88/10-19, September 1988.

(c) Each project in itself should be a laboratory to conduct field demonstrations to ascertain the overall technical and economic performance of complete pilot systems at the field demonstration sites and to become fully familiar with the technical and economic aspects of these systems. This should be of great benefit to Arab countries which intend to apply these technologies in the future;

(d) The project training programmes, as an important part of each project, should help to boost the number of engineers, technicians and specialists in renewable energy source development. Furthermore, demonstration courses should attract the attention of engineers, planners, policy-makers and economists to the real potential of these technologies;

(e) The result of each project should be publicized by the exchange of information between all institutions participating in the projects, thus promoting the activities of the Regional Centre for the New and Renewable Sources of Energy Information Network (NRSEIN).3/ Plans for the activity of the Centre include the distribution of reports, publications, documents, results and tests to each project and also the preparation of a constantly updated directory of experts, specialist institutions and current projects in the region, to be distributed to all participants in the activities of the network and the projects.

It is important that the Arab countries in general, and countries of Western Asia in particular, should work actively to encourage research, development and application, both at the national and regional levels, to strengthen their own capacities for creation and invention so as not to become mere importers of renewable energy technologies in coming decades.

Most of the technologies chosen for the projects under study have reached the field testing stage and some have already been the subject of commercial applications. For this reason, the results of the regional pilot projects have practical uses such as:

(i) Technical and economic feasibility studies of the electrification of rural and remote areas, plans to provide water, educational television or telephone communications and to provide water to farms and remote oases and other such plans to improve environmental and economic conditions;

(ii) Steps taken at the national and regional levels to start production of spare parts or assembly of systems locally;

(iii) Through the experience gained at the national or subregional levels, the modification of energy policies concerning the various fields and potentials of renewable energies;

3/ The Third Technical Meeting for Participating Institutions in the NRSEIN (Amman, 25-26 November 1987) entrusted the task of the Centre to the Scientific Research Council, Solar Energy Research Centre, Iraq. A memorandum of understanding was signed between the Executive Secretary of ESCWA and the Chairman of the Scientific Research Council (Iraq) on 21 December 1987 to determine the obligations of the contracting parties concerning the work of the network.

(iv) Intensification of the exchange of information and private technical co-operation in order to satisfy the real needs and requirements of the countries participating in each project. This, in turn, would promote current national research and development activities and make them more realistic and effective, according to the requirements of the market and the expertise available at the national or subregional levels;

(v) National institutions of countries participating in any of the projects are expected to be active in pioneering the direct use of the project results.

The final results of the projects taken together will include the following:

(i) The establishment of pilot stations of regional importance, designed for selected sites in remote and rural areas in Western Asia, to obtain basic information about winds and sunshine;

(ii) Wind-driven systems to pump ground water and to generate electricity for rural household purposes;

(iii) Photoelectric generators to produce electricity for the pumping of ground water and for household purposes in rural and remote areas;

(iv) Solar or wind-driven systems to desalinate brackish ground water by reverse osmosis;

(v) Solar energy systems to desalinate sea water and manufacture ice to preserve fish in remote seaside villages in the ESCWA region.

Technicians and engineers in the region will gain technical and practical knowledge and experience of designing, constructing, installing, operating, maintaining and inspecting new technologies, in addition to data on performance capability under field conditions.

All these activities will support national institutions working on new and renewable energy applications, through institutional support to national executing institutes and centres, which will increase their capacity to assimilate and apply such technologies and enable them to provide regional or subregional support and services or to become centres for expertise and consultation in the field of renewable energies.

The final results of these projects will include the following technical reports:

(i) Reports on the optimum applications of these technologies and the technical and economic justification for the choice of equipment;

(ii) Tenders and technical specifications for each project;

(iii) Civil engineering construction specifications and stations and equipment required at the field sites;

(iv) Reports on technical, environmental, social and economic aspects of the choice of sites for the systems proposed;

(v) Detailed descriptions and rules for field tests and standards for evaluating performance;

(vi) Evaluation reports and explanations of test results;

(vii) Booklets on the design, construction, operation and maintainance of systems;

(viii) Reports on the results and environmental impact of renewable energy systems and projects;

(ix) Reports on the social implications of the choice of pilot system sites, and their acceptability to the final beneficiaries;

(x) Reports on the participation of the final beneficiaries and the social impact of these systems.

In promotion of the exchange of information, the proceedings of workshops and training courses and the directory of renewable energy experts, institutions and projects will be published. Countries of the region will exchange this information horizontally by communicating technical results to all participating countries and scientific institutions.

The final outcome of these projects will be the result of a co-ordinated effort drawing on numerous fields of knowledge and will encourage regional co-operation between the countries of Western Asia in the field of new and renewable energy.

4. Government participation in regional projects

The Nairobi Programme of Action comprises many tasks, including support, pre-investment activities and new investments in projects and programmes. Success in carrying out these tasks will require tremendous funds. Therefore, it is of the utmost importance to mobilize resources to finance them.

It may be assumed that each country will continue to bear the main responsibility for developing its own new and renewable sources of energy, including full mobilization of local and other resources. A number of countries will need additional financial resources from the advanced countries, regional and international financial institutions and international organizations, to face investment requirements for renewable energy projects. The Conference stressed the importance of this matter, urging that national efforts should be strengthened to finance projects and programmes to develop new and renewable sources of energy in the developing countries, according to their national plans and priorities.4/

Even if regional and international co-operation is necessary for the implementation of the programmes and activities in the field of renewable energy, countries of the region should do everything to encourage local industry and to give it a greater role in developing, manufacturing, utilizing, disseminating and exchanging these sources at the commercial level. In this context, countries of the region should adopt the appropriate measures with respect to duties, energy pricing and incentives, and prepare a suitable

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4/ See note 1: paragraph 76.

climate for small industries, services, basic structures and credit. They should also devote serious attention to post-construction follow-up activities on these projects.5/

In order to ensure the participation of the greatest possible number of institutions of countries of the region in these projects, the ESCWA secretariat proposes three alternative models for regional co-operation in the implementation of any one of these projects, leaving it to the countries of the region and their institutions to choose the most appropriate model:

(a) Countries prepared to implement one or more of the regional projects agree to offer all the necessary facilities and equipment at the project construction site, to provide financial support to operate and maintain the project, as well as to provide specialists to assist in the design, construction, and installation stages and to undertake special studies and to provide technical performance methods;

(b) Countries willing to host some of the activities of these projects, especially those concerning training, field demonstrations, teaching and exchange of information, should undertake to offer the necessary facilities such as meeting halls, secretarial, computing and printing services for reports, and the servicing of conferences, seminars, training courses and the like;

(c) Countries are encouraged to participate in the activities of the projects. Countries that agree undertake to facilitate the flow of information, data and technical expertise between the other countries and institutions in the region by providing the results of current field demonstration programmes in their own countries and facilitating visits by experts from the countries participating in these projects to national project sites, in order to benefit from and exchange expertise. Similarly, all the participating countries undertake to offer the services of the appropriate specialists to work with project team employees and consultants during their work on the project in the host country and to provide the services of some local employees, in temporary working consultation with the ESCWA secretariat, in its capacity as the executing authority for some of these projects, to work on projects in other countries of Western Asia.

The participating countries also have a responsibility to select trainees to take part in training and teaching activities organized within the framework of each project. These countries also agree to take the appropriate steps to train a suitable number of their nationals in the design, construction, operation and maintainance of the systems.

Each of these projects is accompanied by a chart with columns showing the periods of activity on the project, the estimated initiation and completion dates and the main relations between these activities and the final results.

Each of the countries of the region that wishes to participate in any of these projects is asked to choose one of its national institutions for

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5/ See "New and renewable sources of energy in the Arab countries: solar, wind, biomass and geothermal energy", paper presented by ESCWA to the Fourth Arab Energy Conference, 14-17 March 1988, Baghdad.

implementation. In this context, the national institutions must be granted full competence and responsibility for the implementation and management of the work and studies required. It is also possible to bring in a further national institution such as a research institute or a teaching and training institution, and finally to undertake private technical studies.

Obviously, the assistance offered by regional and international funds as well as other granting authorities to the countries participating in the implementation of these projects depends on the extent to which the aid-receiving authorities and countries fulfil their commitments and the following prerequisites:

(i) To grant the national executing institution the necessary competence to assume its responsibility in the framework of the project and according to the work programme stipulated for each project;

(ii) To provide the national executing institution with the building space and amenities necessary for the project;

(iii) To grant the national executing institution the legal power to transfer trainees and employees to work on the project;

(iv) To place the financial resources demanded by the participating countries at the disposal of the national executing institution, according to the work plan for each project.

(v) To grant the national executing institution the legal authority to exchange technical information and data with other participating institutions and to consider this national institution as the sole agency responsible for the exchange of all information and data concerning the project with the Regional Centre for the New and Renewable Sources of Energy Information Network (NRSEIN).

It should be added that financial and technical assistance from regional and international funds and the United Nations are subject to the satisfaction of the granting agencies that these commitments can be fulfilled or are about to be fulfilled.

5. ESCWA secretariat's plan of action to promote and implement the projects

In implementation of the recommendations of the Intergovernmental Technical Meeting on New and Renewable Sources of Energy (4 December 1986, Amman, Jordan) the ESCWA secretariat proceeded to reformulate the projects and exerted intense and continuous efforts to mobilize the necessary financial resources for the implementation of these projects. In this context, the projects were sent to international and regional funds as well as to other possible granting agencies such as governments and international institutions, in order to promote and mobilize financial resources.

Within the framework of efforts exerted to encourage joint financing for these projects, the secretariat is in contact with the Special Co-ordinator, New and Renewable Sources of Energy at the Office of the Director-General for Development and International Economic Co-operation at the United Nations, in order to co-ordinate co-operation with agencies of the United Nations for the holding of a regional consultative meeting to mobilize financial resources for the implementation of these projects.

The secretariat attaches special importance to the preparation of such a meeting, which will constitute a mechanism for the mobilization of the necessary resources for the implementation of the projects. In this connection, the ESCWA Natural Resources, Science and Technology Division is engaged in the task of arranging visits to a number of countries of the region and to regional and international funds to prepare for this regional consultative meeting and to confer with officials on ways of facilitating financial arrangements for the implementation of these projects.

It should be noted that the Economic Commission for Latin America and the Carribean, the Economic and Social Commission for Asia and the Pacific and the Economic Commission for Africa received financial support from the United Nations in order to hold such regional consultative meetings in 1984-1986.

If financial resources become available, the ESCWA secretariat, in its capacity as the executing agency of the project, will provide a team composed of a number of specialists from the region, according to each project, entrusted with assisting the participating countries in planning, co-ordinating and supervising the activities of each project. Consultants will be appointed to offer assistance for each of the activities of the projects. They will be placed at the disposal of the countries participating in the implementation of the activities within the scope of each project. This team should be chosen in co-operation with the participating countries and the financing agencies of the projects.

Each project will be headed by a Chief Technical Consultant, who has experience in managing projects and organizing research and development activities connected with new and renewable sources of energy. These projects will also require technicians such as: teaching and training specialists; specialists in the documentation, collecting, treatment, storage and publishing of information; specialists in photoelectrics; specialists in environment studies; consultants for mechanical/electrical equipment; electronics consultants familiar with renewable energy technologies; civil consultants to prepare the layout of tender documents; consultants in economics/energy to choose the a priori economic evaluation method and to estimate the organizational effectiveness economically; and operations engineers to offer advice on the choice of desalinization stations, how to obtain them, install them and follow up their performance.

The basic team will perform its tasks as a working group and will use the ESCWA secretariat, in its capacity as the executor or participating executor of the project, as a base which will provide whatever backup may be needed for the duration of the project.

One of the tasks of the Chief Technical Consultant for each project will be to prepare a detailed plan of action for the implementation of the project, in consultation with the national executing institutions in the participating countries.

Part Two

ESCWA SECRETARIAT ACTIVITIES ON SUPPORT FOLLOW-UP FOR THE REGIONAL CENTRE FOR THE NEW AND RENEWABLE SOURCES OF ENERGY INFORMATION NETWORK (NRSEIN)

In stressing the importance of collecting and exchanging information, the Nairobi Programme of Action identified a number of high-priority measures such as: (a) the establishment of national centres, or "information axes"; (b) the establishment of information systems for new and renewable sources of energy at the national level, to be linked to information networks at the subregional, regional and international levels; (c) the establishment of regional information networks that can be linked to an international information network and whose regional efforts should concentrate on new and renewable energy technologies.

On the basis of these orientations, the ESCWA secretariat adopted the project of establishing a regional information network on new and renewable energy, and undertook the necessary studies for it.6/

The ESCWA project for establishing the Network included the holding of three technical meetings during 1985-1987 with regional experts and representatives of documentation centres to discuss the basic design of the information gathering models, to define the institutional obligations, the organizational arrangements and the preparatory activities for the network, the scope and contents of the network and the role and obligations of participants, in addition to the choice of a centre for the network.

The third technical meeting for NRSEIN entrusted the Solar Energy Research Centre of the Scientific Research Council, Iraq, with the task of providing a centre for the network, called the Regional Centre for the New and Renewable Sources of Energy Information Network.7

A memorandum of understanding was exchanged on 21 December 1987 between the Scientific Research Council, Iraq, and the ESCWA secretariat on the foundation of the Regional Network for New and Renewable Sources of Energy in the ESCWA Region.

The ESCWA secretariat allocated the necessary technical assistance from its own resources and concluded a consultation agreement with the Regional Centre for the Network to ensure that the Centre organized, prepared and published information and data from the participating countries on the projects, institutions and experts working in the field of new and renewable energies.

6/ See Report on the Establishment of a Permanent Network on New and Renewable Sources of Energy in the ECWA Region and its Programme of Action (E/ESCWA/NR/85/5) and The Role of the Regional Network in Dissemination of Information in the Areas of New and Renewable Sources of Energy (E/ESCWA/NR/85/7).

7/ See Report on Progress Achieved in Setting up a Regional Network for New and Renewable Sources of Energy in the ESCWA Region (E/ESCWA/NR/87/20) 17 December 1987 [Arabic only].

In implementation of the recommendations of the third technical meeting of the institutions participating in the Information Network, the secretariat of the Regional Centre allocated the necessary financial resources, in the framework of the agreement on consulting services, to enable a representative of the Centre to visit some of the ESCWA countries in order to explain the objectives of the Network and to prompt countries not yet participating to join the Network and thus concretize horizontal co-operation in this field between the ESCWA countries.

In the light of this, the Regional Centre for the Information Network, in co-ordination with the ESCWA secretariat, initiated contacts with scientific institutes and national institutions working on problems of new and renewable energy from Bahrain, Qatar, and Saudi Arabia and officially invited them to join the Information Network.

Part Three

RESOURCE EVALUATION STUDIES, ORGANIZING SEMINARS AND STUDY TOURS AND IMPLEMENTING DEMONSTRATION PROJECTS FOR THE DISSEMINATION OF BIOGAS TECHNIQUES

1. The prospects for biogas in the Syrian Arab Republic

The ESCWA secretariat remains interested in supporting efforts in the evaluation of resources, research and development, demonstration, training, energy planning, and the identification of regional and subregional projects to develop diverse sources of new and renewable energy. In this connection, the Natural Resources, Science and Technology Division undertook in 1988-1989 an evaluation of biomass as a source of energy in the Syrian Arab Republic. A detailed study was made of biomass, which was described as a promising source of energy that had not yet been developed in the Syrian Arab Republic.[8/] The objective of this study was to strengthen national efforts to exploit biogas energy and to boost previous activities which aimed at creating a base from which to accelerate the implementation of projects connected with the use of this new and renewable source of energy in the Syrian countryside.

The study consists of three parts. The first part deals with general characteristics and the energy situation in the Syrian Arab Republic, including institutions connected with energy, oil resources and production, the development of consumption and prices of oil and petroleum derivatives. It also deals with sources of electric energy, current and future projects and investment needs in order to develop the electric energy sector.

The second part of the study deals with technical and and economic aspects of biogas technology, including the energy situation in the countryside, livestock production and other raw materials, in order to evaluate the good prospects for biogas in the Syrian Arab Republic. The evaluation of resources includes the availability of biomass and a theoretical estimation of biogas production, as well as the potential difficulties faced by this technology and a comparison of the various systems and designs in order to be able to make an ideal choice of site, size and design. The study

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8/ See The Prospects for Biogas Energy in the Syrian Arab Republic (E/ESCWA/NR/88/6) 6 July 1988 [Arabic only].

goes on to estimate the numbers of family-size, community-type and large-scale biogas digesters needed in the Syrian countryside, using as a basis for the pre-feasibility study the family-size Chinese model, the community-type West German model and the large-scale tunnel type. The study also proposes illustrated stages of implementation for demonstration purposes.

The third part of the study deals with the social aspects of this technology, including social services in the countryside (sources of energy and fuel, drinking water, education and health services, farmers' co-operatives, migration, social and economic constituents of income, the State's rural development plan) as well as the social impact of this technology, especially on the health and work of rural women and the cleanliness of their environment. Finally, the study sums up the results and social implications of the comprehensive statistical field survey of the Syrian countryside.

The study estimates that some 157,000 digesters could be set up in the Syrian countryside, with capacities ranging from 1.5 to 90 cubic metres and an annual production of around 285 million cubic metres of biogas. The survey of farmers' and villagers' attitudes confirms the acceptability of this technology and that the rural population is prepared to contribute to the cost of building community-type and family-size digesters.

The ESCWA study suggests that field demonstration and experimental projects should be implemented according to local conditions, preparatory to the generalization of such technology.

2. Organizing seminars, study tours and demonstrations for the dissemination of biogas techniques

The activities of the ESCWA secretariat with respect to the dissemination of biogas technologies have not been confined to undertaking resource evaluations and research, but have also included the organization of scientific seminars and study tours concerned with this technology and the implementation of experimental projects covering technical aspects and the socio-economic and environmental feasibility of these technologies.

After the ESCWA secretariat's pioneering and successful experiment in building three experimental biogas plants in Al-Habeel village in Lahej Governorate in Democratic Yemen,[9/] the secretariat began work on a project for the dissemination of biogas technology and the advancement of women in Al-Habeel village.

This project aims to cover most of the energy needs of the village through the introduction of biogas technology. It is not confined to the energy aspect alone. Rather it includes most of the rural and social development needs of the village in an integrated framework, which includes the eradication of illiteracy, public health, nutrition, maternity and child

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9/ For more details, see the ESCWA report Introduction of Biogas Technology in Democratic Yemen: A Case Study (ESCWA/UNIFEM Project PDY/86/WO1). Document E/ESCWA/SDP/87/5/Rev.1, E/ESCWA/NR/87/1/Rev.1, dated 13 October 1988

care, as well as household budgeting and village crafts. The project also contains components for training in operation and maintenance of biogas plants, to ensure that they keep running once the operational phase of the project is completed.10/

The ESCWA secretariat remains interested in participating in seminars and study tours, holding seminars, making field visits and inviting officials concerned with renewable energy in the region to attend such activities under its programme element components pertaining to teaching and training in the field of new and renewable energy.

The ESCWA secretariat has already held a seminar on biogas technology11/ and it has also presented a paper to the Regional Training Workshop on the Utilization of Biomass, held in Saudi Arabia.12/

As a continuation of these activities, and with support from the United Nations Development Programme (UNDP) for the implementation of a more comprehensive project, the ESCWA secretariat organized a Seminar on Biogas Technology for Rural Areas in Selected Arab Countries.13/

Experts from 11 Arab countries and representatives of regional and international institutions took part in this Seminar, in addition to field experts from China and India, to explain technical, economic, social and environmental aspects of these technologies, which are widespread in their countries.

The secretariat prepared a number of technical documents for this Seminar, at which a number of country papers were also discussed. The Seminar concentrated on the role that could be played by rural Arab women in the use of biogas technology and the benefits accruing from it.14/

10/ The ESCWA paper prepared in co-operation with the Ministry of Energy and Minerals of Democratic Yemen entitled Renewable Sources of Energy and Satisfying the Needs of Rural Women: the Experience of Democratic Yemen [Arabic only] was discussed at the seminar organized by the Regional Bureau of the United Nations Food and Agriculture Organization in Amman, 4-8 October 1987.

11/ This Seminar was organized in co-operation with the Ministry of Energy and Minerals, Aden, 11-16 April 1987, in the framework of a project on the suitability of this technology for the conditions of remote and rural regions in the two least developed countries of the Western Asia region. The project was implemented with financial support from the Netherlands.

12/ Training Workshop on the Importance of Utilizing Biomass Energy - Organic Waste - in the Arab Countries, King Abdul Aziz Technical Sciences City, in co-operation with the Federation of Arab Scientific Research Councils, Riyadh, 20-22 April 1987.

13/ Held in Cairo, 26 November - 1 December 1988, in co-operation with the Egyptian Environmental Affairs Agency.

14/ See Draft Manual on Design, Construction, Operation and Maintenance of Family Biogas Plants (E/ESCWA/NR/88/9), 25 August 1988; Safety Measures for

Regional and international organizations also contributed papers to the Seminar, which helped to finalize the conclusions and recommendations of the Seminar, to be published by the ESCWA secretariat in the form of a final report, which will be distributed to the participants of the Seminar as well as to the research and development institutions and funds interested in financing the dissemination of these technologies in the Western Asia region.15/

As regards field visits and study tours, the ESCWA secretariat, within the framework of its project of the above-mentioned Biogas Seminar, organized field visits for the experts participating in the Seminar to biogas production sites in Egypt. These were followed by a study tour for a number of candidates proposed by the Governments of countries of the region to both China and India from 2 to 12 December 1988, as a complementary part of the project.

The objective of the project was to provide first-hand knowledge of the experiments, designs, efficiency, and operation of biogas technologies and their role in energy production and the improvement of rural economic, environmental and social conditions of the Arab countries.

Biogas Plants (E/ESCWA/NR/88/WG.1/WP.1); Health and Safety Indicators for Rural Women in the Light of the Introduction of Biogas Technology to Rural Homes (E/ESCWA/NR/88/WG.1/WP.2); Economic Aspects of the Technology of Biogas from Animal Waste (E/ESCWA/NR/88/WG.1/WP.3); The Environmental Impact of the Introduction of Biogas Technology to Rural Areas of the Arab Countries (E/ESCWA/NR/88/WG.1/WP.4).

15/ For more information about the discussions that took place at the Seminar and the conclusions reached and recommendations made, see document E/ESCWA/NR/88/WG.1/19

Annex

REGIONAL RENEWABLE ENERGY PROJECTS

Regional NRSE priority projects	Participating countries	Suggested host country for the project in priority scale	Estimated budget in thousands of US dollars
1. Establishment of Solar and Wind Energy Measuring Network	Bahrain, Democratic Yemen, Egypt, Iraq, Jordan, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Yemen	(1) Egypt, (2) Jordan, (3) Syria	1 095
2. Solar and Wind Energy for Water Pumping in Remote Areas	Democratic Yemen, Egypt, Oman, Saudi Arabia, Syria, UAE, Yemen	(1) Syria, (2) Yemen, (3) Democratic Yemen	1 145
3. Solar and Wind Energy for Water Desalination of Brackish Sea Water in Remote Areas	Bahrain, Democratic Yemen, Egypt, Oman, Saudi Arabia, UAE	(1) Saudi Arabia, (2) Oman, (3) UAE	1 145
4. Demonstration of Wind and Solar Ice Making in a Fishing Community	Democratic Yemen, Egypt, Oman, Saudi Arabia, Yemen	(1) Democratic Yemen, (2) Oman, (3) Saudi Arabia	548
5. Training Programme on Biogas, Solar and Wind Technologies	All ESCWA countries	(1) Jordan, (2) Egypt, (3) Syria	243
6. Solar Energy Based Herders Settlement	Egypt, Democratic Yemen, Iraq, Jordan, Oman, Qatar, Saudi Arabia, Syria, Yemen	(1) Oman, (2) Syria, (3) Iraq	1 630
7. Solar Agro-industrial Demonstration Farm	Egypt, Democratic Yemen, Iraq, Jordan, Oman, Syria, Yemen	(1) Iraq, (2) Syria, (3) Jordan	415

8.	Dissemination Programme for "Do-it-yourself" Small-scale Solar Equipment in Remote Areas	Egypt, Jordan, Syria, Iraq, Yemen	(1) Iraq, (2) Jordan (3) Yemen	130
9.	Solar Pond Technology for Electricity Generation in Remote Areas of the ESCWA Region	Bahrain, Egypt, Iraq, Jordan	(1) Qatar, (2) Jordan, (3) Egypt	1 240
10.	Development of Demonstration of Mini-hydro Plants	Yemen, Syria, Iraq, Egypt	(1) Syria, (2) Iraq, (3) Egypt	6 176