



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org



16429

Distr.
LIMITED

ID/WG.468/10(SPEC.)
11 May 1987

United Nations Industrial Development Organization

ENGLISH

Expert Group Meeting and
Study Tour on Standardized
Small Hydropower Plants

Hangzhou, China
18-29 May 1987

THE ASIA-PACIFIC REGIONAL
NETWORK FOR SMALL HYDROPOWER**

Prepared by
Zenaida A. Santos**

175

* This document has been reproduced without formal editing.

** Co-ordinator of RN-SHP and Executive Director, Mini-Hydro Development Office,
National Electrification Administration, Philippines.

BACKGROUND

The significance of small hydropower (SHP) as a source of renewable energy in developing countries, particularly in respect to the supply of electric power in remote and isolated rural areas not covered by the national grid network, is being increasingly recognized by developing and developed countries. A series of seminars, workshops and study tours have been held and various documents have been published by different organizations in the development and transfer of technology and exchange of experiences in the development and application of SHP.

Since 1979, UNIDO and ESCAP, in co-operation with other countries and UN agencies, have organized three workshops on SHP. The first one, held in Kathmandu, Nepal in September 1979, focused on the technological, economical, policy and institutional aspects of SHP planning and project implementation through the exchange of experience and technology transfer. The second seminar-workshop/study tour held in Hangzhou, China and Manila, Philippines in October - November 1980 provided an opportunity of looking into a system's approach to the establishment of SHP for industrial promotion and development, and cost reduction schemes. The third SHP workshop was held in Kuala Lumpur, Malaysia in March 1983. The workshop discussed, among other things, the centralized and decentralized management of SHP development, simple methodology for feasibility and other studies appropriate for SHP, and promotion of local design and manufacture of SHP equipment, materials and ancillaries.

China, in response to the recommendations of the first and second workshops on SHP, took a decision to establish, with the support and co-operation of UNDP, UNIDO and ESCAP, a Regional Centre for Research, Development and Training on Small/Mid Hydro Power in Hangzhou, China. This was to be an extension of their national centre.

In recognition of the important role being played by SHP in the region, the Senior Experts Group Meeting (SEG) on the Creation of a Regional Network System and the Assessment of Priority Needs on Research,

Development and Training in the Field of Small/Mini Hydro Power Generation was organized jointly by UNDP, UNIDO, ESCAP and China in July 1982 in Hangzhou, China. The Meeting recommended the establishment of an ESCAP Regional Network System for Small Hydro Power and defined its main objectives, composition and institutional structure, as well as interim arrangements for putting the Network and the Centre into operation. These recommendations were formally endorsed by the First Session of the REDP Steering Committee held in Bangkok, Thailand in May 1983. It was stated that the Regional Network for Small Hydro-power (RN-SHP) was not to be viewed as an institution, but as representing a co-operative arrangement among member institutions for carrying out specific activities. The Steering Committee agreed that REDP support should be provided for well-defined activities carried out within the RN-SHP framework, taking into account the work programme proposed by the third SHP workshop in 1983. It further confirmed that the Technical Advisory Group (TAG), which would assist the Steering Committee to provide overall guidance for the RN-SHP would be formed by requesting the REDP national focal points to nominate national sub-focal points for SHP.

THE REGIONAL NETWORK FOR SMALL HYDRO POWER

The RN-SHP was formally established in May 1983. The TAG, consisting of the nominated focal points for SHP, was likewise established. It was planned to meet annually, and would provide guidance to the RN-SHP Co-ordinator in the formulation of the work programme, project activities and their implementation, and would give advice to the Senior Co-ordinator of the REDP.

Upon the recommendation of the SEGM in 1982, HRC assumed the role of the Interim Secretariat of the Network, with its Director acting as Co-ordinator. This arrangement was initially set for two years, but was extended until 1986 to coincide with the end of the first cycle programme of REDP. The second meeting of the TAG in October 1986 supported the principle of rotating the Co-ordinator. It was agreed that the term of Co-ordinator should be two years, with extensions of one year subject to evaluation of the TAG, for a maximum of five years. It was also agreed that the Secretariat will be located with the Co-ordinator. The National Focal Point (NFP) for SHP was elected as the new Co-ordinator starting 1 January 1987.

Functions/Objectives

The Network has, as its main objectives, a scope of work consisting of the following functions:

- a. organize an information service (technical and general)
- b. Make available short term advisory services
- c. undertake R&D projects depending on the facilities available to the focal points
- d. organize meetings for the benefit of the Network
- e. establish links with institutions outside the Network.

Membership

Invitations for membership to the Network were made through the REDP NFPs. Nominations for SHP NFP were then submitted to the RN-SHP Co-ordinator. At present, the Network has 18 member countries, 11 from Asia and 7 from the Pacific Region. Donor agencies from developed countries are also encouraged to participate in the Network as Co-operate members.

Funding

Since the establishment of the Network, initiation of the project activities had been limited due to financial constraints. It was recommended by the SEGM in 1982 that specific activities be implemented on the resources made available by the UNDP, UNIDO, ESCAP, REDP, RCTT, UNCTAD, etc., as well as contributions from donor countries and bilateral and multilateral agencies and organizations of developed and developing countries.

ACCOMPLISHMENTS/STATUS OF ACTIVITIES

In spite of the limited funds available to the Network, several activities were completed which were participated in by its member countries. Implementation of these activities had been increasingly decentralized through the past four years. This approach was felt appropriate because the implementation of the work programme components could be better shared among participating member countries towards achieving a reasonable level of activity-implementation under the RN-SHP.

Technical Advisory Group (TAG)

The TAG has met three times, primarily to review the past activities of the Network and provide advice to the REDP Steering Committee on matters related specifically to SHP and to the general orientation of activities of the RN-SHP. Since the TAG is composed of the SHP NFPs of member countries, its growth can be seen in the increasing number of participants in the past three meetings (from 5 countries in 1984 to 10 in 1986). The meetings were also participated by representatives from HRC, ESCAP-REDP and UNIDO.

The First Meeting of the TAG was held in Hangzhou, China on 11-13 December 1984. Among the issues discussed were the decentralization of RN-SHP activities, priority subject areas and projects, guidelines for future activities, financial resources for priority projects, and suggestions for strengthening Network activities. Representatives of participating countries signified their interest in taking the lead in some activities, such as hosting of apprenticeship/fellowship programme and the preparation of training materials and conduct of the training programme.

A special session of the TAG was held in Manila, Philippines on 22 - 24 July 1985 to discuss the Network activities and to formulate new ones for the remainder of the present cycle and the forthcoming 1987-91 cycle. The Meeting agreed to recommend to the next session of the Steering Committee that the tenure of the Interim Co-ordinator of RN-SHP be extended until the end of 1986. The Meeting also noted the readiness of HRC to accommodate, if necessary, short term experts from member-countries or international institutions to join the RN-SHP Interim Secretariat in Hangzhou.

The Second TAG Meeting was held on 21-25 October 1986 in Penang, Malaysia. The Meeting prepared a list of activities under the 1987-1991 Work Programme together with a time schedule for their implementation. (Annex 2). New administrative arrangements were also agreed upon, and the Secretariat was transferred to the Philippines, with its NFP acting as Co-ordinator. The shortfall in total financial resources for the implementation of the Network's programme for 1987-1991 was noted by the participants, and an appeal was made to UNDP to consider the provision of continued funding for Secretariat/Administrative support for the Network and additional funding

for Pacific member countries through the PEDP or other channels as appropriate. The Meeting also agreed that every effort should be made to arrive at self-sustaining co-operative arrangement of the Network by 1991.

Training

Nine training/workshops have been conducted by the Network as of this date. While most of these were held in China, other countries actively participated in the preparation of the training materials, presentation of cases/lectures, and other activities. Philippines and Malaysia took the lead in the workshop (1985) and training (1986) on feasibility study preparation and civil works design, respectively. Norwegian, Canadian, Filipino and Indian experts were also invited as lecturers. Details of the training courses are shown in Annex 3.

Information

Several materials on SHP have been published by the Network, including those used in the training courses. HRC also started collecting data for the roster of SHP experts, research organizations and equipment manufacturers. These will eventually be published and distributed to participating countries.

HRC produced video films on the different activities conducted at the Centre. "SHP News", the RN-SHP newsletter, is published quarterly. Since 1986, each issue features the SHP programme of a member country. Papers and articles from other countries/organizations on new developments in the field of SHP are also published in the newsletter for information of members.

Research and Development (R&D)

Two projects have been initiated in China - the electronic load controller (ELC) and the SHP Automation and Remote Control. ELC was implemented by HRC in collaboration with the Intermediate Technology Development Group (ITDG) of UK. Locally assembled controllers have been field tested in China and will be tested in two countries in the Region. Its first co-operative research group meeting, held on 15-21 March 1986 in Hangzhou, China was attended by representatives from ITDG, Nepal and Sri Lanka. The second project is being implemented in co-operation with various institutes in China. The project aims to develop a system to give an intermediate level of automation appropriate to needs of developing countries. Design of system hardware and the software is almost complete.

In line with the plan to decentralize the Network activities, the "Guidelines for the Preparation of Feasibility Studies for SHP and Guidelines for Simplified Low Cost Civil Works Design and Construction of SHP Stations" were prepared by Philippines and Malaysia, respectively. These were the basis of the workshops held in Manila, Philippines in 1985 and training workshop in Hangzhou, China in 1986. During the TAG Special Session in July 1985, it was agreed that the Guidelines on both topics would be suitably amended, and submitted to the Secretariat who would decide on an appropriate review procedure before publication.

Consultation Mission

The first RN-SHP Consultation Mission was composed of three members from HRC. Three countries were visited (Thailand, Nepal and the Philippines) for the period 26 October to 20 November 1984. The Mission reviewed the Phase I (1982 - 1983) of the work programme, presented and exchanged views on the work programme for Phase II (1984 - 1986), and discussed actual needs and priorities of members to increase the involvement of SHP NFPs.

The second Consultation Mission, held on 12 November to 4 December 1985, was composed of representatives from HRC, India, Sri Lanka and Thailand. The Mission visited India, Sri Lanka, Malaysia and the Philippines. The Mission observed the operation and maintenance of SHP plants in countries visited, and discussed the proposed R&D project on computer-aided approach for optimum design of SHP stations.

PLANS

Under the HRC, the smooth flow of the RN-SHP activities has been initiated. It is hoped that this would continue through the next cycle programme, 1987 - 1991. The implementation of the components of the work programme would be decentralized as much as possible. This would be done to have greater participation of member-countries and expedite the implementation of the programme.

One of the projects of the Network, the roster of SHP experts, research organizations and equipment manufacturers, will provide a better idea on the existing facilities and capabilities of the Network member countries. Research and development and training activities can be conducted by countries which meet the required facilities. There is also a plan to organize a core of experts

within the members which can provide advisory services to other countries in the establishment of their SHP programme.

The HRC would continue to be the lead institution for the preparation of the quarterly SHP newsletter, with substantial inputs from the Co-ordinator and contributions from other Network members. To enhance the effectiveness of the newsletter as a medium for the exchange of news among members, its format and contents would be reviewed periodically. There is also a proposal for the publication of a book on the SHP experience of Asian countries. For the member-countries, in the Pacific Region, the book can include their SHP potential and existing/proposed programme. Video films showing the above information, as well as the activities of the Network are currently being prepared.

The RN-SHP also plans to establish linkages with other networks/organizations that are engaged in activities related to SHP. Through this, sharing of experiences, materials and facilities may be fostered not only within the RN-SHP member-countries, but with the other developed and developing countries as well.

Finally, it is hoped that by 1991, the UN system will have given enough support to the Network, so that self-sustaining co-operation among countries had been fostered. For the 1987 - 1991 programme, the Network welcomes support from members as well as concerned organizations.

Regional Network for Small Hydro Power
SHP NATIONAL FOCAL POINTS
As of April 1987

- Bangladesh : Mr. Mansur Murshed
Deputy Chief Planning Officer, Energy Division
Ministry of Energy & Mineral Resources
Bangladesh Secretariat
Dhaka
- China : Mr. Deng Bingli
Deputy Director
Rural Electrification Department
Ministry of Water Resources & Electric Power
P.O. Box 2905
Beijing
- Cook Islands : Mr. Richard Sankey
Acting Director of Energy
C/- EPS
P.O. Box 112
Rarotonga
- Fiji : Mr. B. Dutt
The Permanent Secretary
Ministry for Lands, Energy & Mineral Resources
P.O. Box 2256
Government Buildings
Suva
- India : Dr. J. Gururaja
Director
Department of Non-Conventional Energy Sources
Ministry of Science and Technology
Block No. 14, C.G.O. Complex, Lodi Road
New Delhi - 110 003
- Indonesia : Dr. A. Arismunandar
Director General for Electric Power
and New Energy
Jl. H.R. Rasuna Said Blok 2,
Kav. 07 dan 08 Kuningan
Jakarta - 12950
- DPR Korea : The Ministry of Power Industry
Pyongyang, P.O. Box 27
- Malaysia : Mr. Jalaluddin bin Zainuddin
General Manager
National Electricity Board
129 Jalan Bangsar
Kuala Lumpur

- Micronesia**
(Federal States of) : Mr. Marcelino K. Actouca
National Energy Advisor
Department of Resources and Development
Government of FSM
Kolonias, Pohnpei
Eastern Caroline Is 96941
- Nepal** : Mr. R.B. Shrestha
Project Director
Nepal Electricity Authority
SHP Department
Kathmandu
- Pakistan** : Mr. M. Sohail Qureshi
Director General Energy Resources
Secretary National Energy Policy Committee
Ministry of Petroleum and Natural Resources
Islamabad
- Papua New Guinea** : Mr. Chris Cheatham
Power Systems Planner
Energy Planning Unit
Department of Mineral and Energy
P.O. Box 2352
Konedobu
- Philippines** : Ms. Zenaida A. Santos
Executive Director
Mini-Hydro Development Office
National Electrification Administration
1050 Quezon Avenue, Quezon City
- Solomon Islands** : Mr. Stephen Danitofea
Chief Geologist
Ministry of Energy, Mines and Conservation
P.O. Box G24
Honiara
- Sri Lanka** : Chief Engineer, Energy Unit
Ceylon Electricity Board
P.O. Box 540
Colombo
- cc : Secretary, Ministry of Power and Energy
P.O. Box 576
Colombo
- Thailand** : Mr. Prapath Premmani
Secretary General
National Energy Administration
Pibultham Villa
Kasatsuk Bridge
Bangkok

Vanuatu : Mr. Morten Jorgensen
Energy Planner, Energy Planning Unit
Ministry of Lands, Energy and Rural Water Supply
Port Villa

Western Samoa : Mr. Michael H. Wolfe
ADB Resident Energy Planner
Prime Minister's Office
P.O. Box 193
Apia

AN - SHP PROGRAMME FOR PERIODS 1987/1991

ITEM	1987	1988	1989	1990	1991
<p>INFORMATION EXCHANGE 1987</p>					
<p>B0. SOCIO ECONOMIC IMPACT STUDIES</p>	→				
<p>MINI TAG (SWEDISH/UNIDO)</p>	-				
<p>B2. PLANNING AND DESIGN GUIDELINES</p>	←→				
<p>CONSULTATION MISSION 3</p>	-				
<p>TRAINING PROGRAMME A1. SOCIO-ECONOMIC ASPECTS OF SHP DEVELOPMENT</p>		-			
<p>INFORMATION EXCHANGE 1988</p>					
<p>TAG 3 (AT FIJI)</p>		-			
<p>B1. STANDARDIZATION OF CIVIL WORKS AND ELECTRO-MECHANICAL EQUIPMENT</p>	←→				
<p>TRAINING PROGRAMME A2. CONSTRUCTION MANAGEMENT FOR SHP STATIONS</p>		-			
<p>INFORMATION EXCHANGE 1989</p>					
<p>TAG 4 (COLOMBO)</p>			-		
<p>CONSULTATION MISSION 4</p>			-		
<p>EGM ON B2. PLANNING AND DESIGN GUIDELINES</p>			-		
<p>B3. LOCAL MANUFACTURE OF SHP EQUIPMENT</p>			-		
<p>TRAINING PROGRAMME A3. WATERSHED MANAGEMENT AND ENVIRONMENTAL IMPACT ASSESSMENT</p>			-		
<p>B4. UNMANNED AND REMOTE OPERATION OF MINI-HYDRO STATIONS AND GRID SYSTEMS</p>			-		
<p>INFORMATION EXCHANGE 1990</p>					
<p>TAG 5 (ISLAMABAD)</p>				-	
<p>EGM ON B1. STANDARDIZATION OF CIVIL WORKS AND ELECTRO-MECHANICAL EQUIPMENT</p>				-	
<p>TRAINING PROGRAMME A4.</p>				-	
<p>INFORMATION EXCHANGE 1991</p>					
<p>TAG 6 (DAM?)</p>					-
<p>TRAINING PROGRAMME A5.</p>					-
<p>EGM ON B3 & B4 (AS ABOVE)</p>					-

• EGM - SPECIAL ASSESSMENT MEETING
 4 - TRAINING PROGRAMME
 B - RESEARCH AND DEVELOPMENT

Regional Network for Small Hydro Power
 TRAINING/WORKSHOP CONDUCTED
 As of April 1987

<u>Course/Workshop</u>	<u>Date</u>	<u>Venue</u>	<u>Participants</u>
First Training Workshop on SHP for Asia-Pacific Region	22 May to 23 June 1983	Hangzhou, China	14
Second Training Workshop on SHP for Asia-Pacific Region (Hydrology)	3-14 September 1984	Hangzhou, China	12
Workshop on Guidelines for Simplified Low Cost Civil Works Design and Construction of Small Hydropower Station	18-20 July 1985	Manila, Philippines	16
Workshop on Preparation of Simplified Feasibility Studies for SHP	15-17 July 1985	Manila, Philippines	11
Training Course on Co-operative Approach in the Management of Construction and Operation of Micro Hydropower for Rural Areas	18-22, November 1985	Chiangmai, Thailand	16
Training Workshop on Simplified SHP Feasibility Studies	9-16 June 1986	Hangzhou, China	20
Workshop on Simplified Low Cost Civil Works Design and Cons- truction of SHP Installation	19-27 August 1986	Hangzhou, China	17
Training/Workshop on Operation, Maintenance and Management of SHP Stations	5-14 November 1986	Hangzhou, China	24
Training/Workshop on Electro- Mechanical Equipment	7-15 January 1987	Hangzhou, China	21