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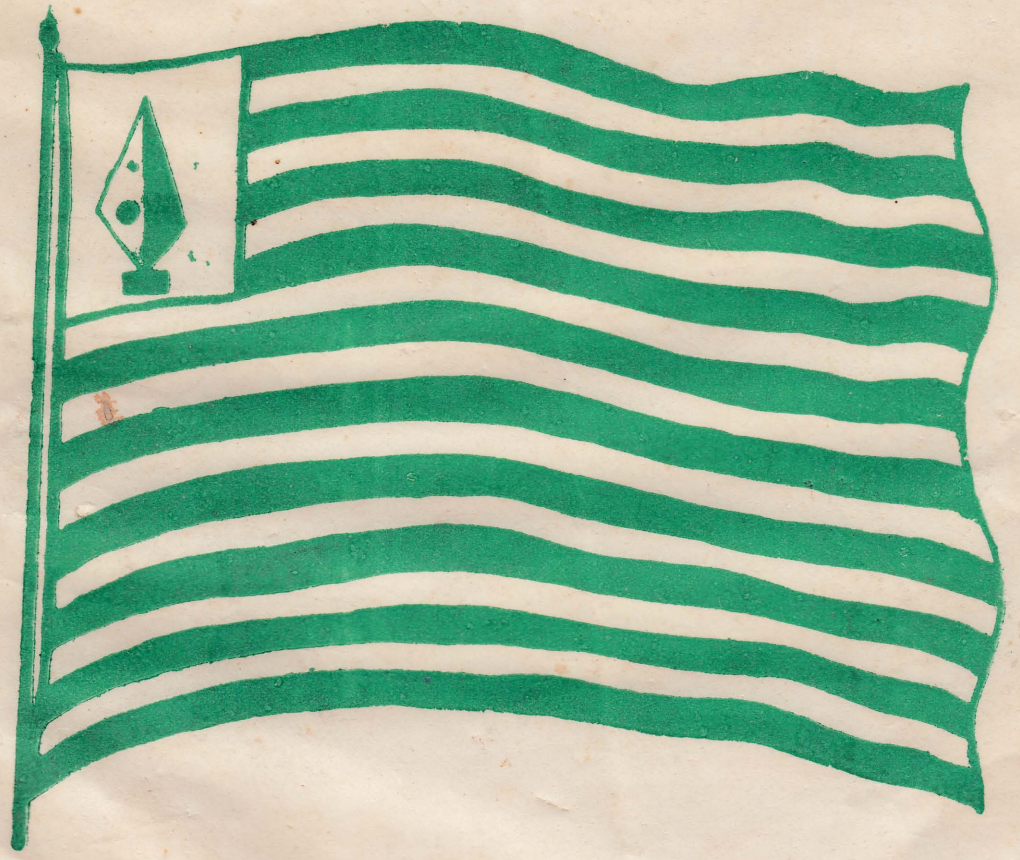

1982

FIELD WORK CENTRE
THONDAIMANARU (SRI LANKA)

FWC

NEWS LETTER

1982

FIELD WORK CENTRE

THONDAIMANARU (SRI LANKA)

F W C News Letter

Volume : XIII

Number : I

1982

EDITORIAL BOARD

P. Nadarajah

K. Sivapathasundaram

K. Sinnathamby

FIELD WORK CENTRE - THONDAIMANNARU

Office Bearers - 1982

The following were elected as Office bearers at the Annual General Meeting held on 1982-02-21.

President : Mr. K. Ponnampalam

Vice-Presidents : Mr. S. Roy Kantharaj
Mr. N. Ganesapillai

Joint Secretaries : Mr. K. Selvavinayagam
Mr. N. Swaminathan

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Research Council : Dr. K Chitravadivelu
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Mr. K. S. Kugathasan
Mr. K. Shanmugasundaram

Examination Council : Mr. K. Ponnampalam
Mr. S. Kamalanathan
Mr. S. Roy Kantharaj
Mr. N. Ganesapillai
Mr. V. Satchithanantham

Curricular Oriented Science Work Shop : Mr. K. Selvavinayagam
Mr. N. Swaminathan
Mr. A. Jeganathan
Mr. V. Satchithanantham
Mr. N. Ganesapillai
Mrs. M. Paramananthan
Miss T. Thillaiampalam

Junior Club : Miss T. Thillaiampalam
Mrs. M. Paramananthan

Board of Survey : Mr. C. S. Subramaniam

Directors of Studies:
Mr. N. Ganesapillai
Mr. K. Shanmugaratnam

FWC - NEWS LETTER

Vol. XIII January - July 1982 No. 1

Understanding Science

At a time when most people - students, teachers, parents and the like seem inclined to beam their main focus of attention on the competence of securing high passes at the examinations, it is most opportune, to delve, least cursority, into the arena of 'teaching science for understanding'.

Today, science has become an integral part of the curriculum of all schools, mainly because it is looked upon as a systematised body of knowledge worthy of study by all students at all educational levels. The Child-centred approach to the teaching of science to young children concentrates on 'science as a way of life' rather than on 'science as a body of knowledge'. Hence it follows the main aim of science education should be one that develops an enquiring mind and a scientific approach to problems.

In other words, an individual cannot achieve his potential unless he gains some understanding of the powerful and pervasive ideas of science and learns how to use some of the processes of science. An understanding of the relevant science, is essential for the future farmer, technician, doctor and scientist.

In this respect, teachers of science subjects in our schools have the committed responsibility of getting their pupils to gain atleast that little understanding of science that is necessary for the respective individual. As Brune- states, the basic ideas that lie at the heart of all science and the basic themes that give form to life and literature are as simple as they are powerful

A continual deepening of these basic ideas helps the individual to be in command of them and to use them effectively. This understanding can come only from learning to use them in progressively more complex forms. This implies that for a child to develop basic concepts, he has to be assisted progressiucly from concrete thinking to the utilization of formal thinking.

Speaking of concrete thinking in Piagetian ideology, takes one to the provision of direct experiences to the child learning science Over emphasis and rote learning of factual requirements of the examination syllabus, is a common feature of the present day teaching - learning situations found in several classrooms. Another drawback in most of the teaching - learning

instances is the neglect of the 'training in scientific methods' and the non-realization by teachers of the importance of practical work in the teaching of science relating the work to their environment.

In teaching science, one must always bear in mind that science is not an end in itself, but is closely assoeiated with life, with the experiences and situations which children face in everyday life. Formal classroom situations with a rigid time control over their activities serve little in providing the children with the opportunity of confronting real situations necessary for a deeper understanding of the various processes in science. Acquisition of the basic knowledge of science by every student is not guaranteed in such situations because, in reality, a normal classroom can rarely provide a learning situation for all the pupils, from the least able to the most able child, at the same time.

When children are allowed to work themselves with little or limited assistance and guidance from the teacher, as in the case of work cards or field trips, the sense of curiosity in them gets rfined in a manner that leads to their independent and intelligent thinking. For example, a well organized field-trip allows children to employ observation and recording activities for increased. understanding of the environment and several such instances introduce to logical thinking and the scientifie method.

Time and again, Educational Psychologists and science Educators had innovated several such methods and devices outside the normal classroom practices as the improvisation of apparatuses, field trips, work cards, science fairs, museums and exhibitions, group projects, problem solving approaches and programmed lessons for providing the child with relevant science based experiences. The worthiness of these innovations is in their actual practising. The proof of the pudding is in the eating.

Field Work Centre - Thondaimanaru

Secretary's Report for the Year - 1981

It is with great pleasure we are submitting the Secretary's Report for the year 1981. We were able to conduct many programmes in the way of Out of School Education and Community Development.

The following is a brief summary of the various activities being conducted during the year 1981.

Administration:

As usual the administration of the Centre was conducted by the Executive Committee under the guidence of our Patron the Director of Education, Northern Region Jaffna Mr. K. Sivanathan.

The Executive Committee met eighteen times (18) to plan out the programmes of the Centre and to execute them effectively. These meetings were always well attended and all the ex-co members had rendered valuable service in running the Centre very successfully. The two Directors of Studies and the supporting staff attached to the Centre assisted the ex-co in every respect.

Residential Camps:

Three residential camps on themes of academic interest and contemporary value were conducted this year. The themes for these camps were:

1. Pest and Pest Control — Participants 62
2. Alternate ways of obtaining Energy — ,, 52
3. Leaders camp for Teachers on Electronics & Astronomy — ,, 33

The above camps were financed by the Ministry of Education through research grants. The findings of these camps have been published as hand outs and distributed to the participants and also to other Field Centres in the Country.

Seminars / Workshops:

The following seminars for teachers of Chemistry and Maths. in G. C. E. A/L classes were organised at this Centre with financial support and technical assistance from the Curriculum Development Centre and the Dept. of Education, Jaffna.

1. A/L In-service - Chemistry — Paticipants 48 Trs
2. A/L In-service Maths. (Jaffna, Vavuniya, Manner & Mullaitivu districts) — Paticipants 70 Trs

The facilities and resources available at the Centre were used by the Science In-service advisors to conduct field study programmes for teachers of science in grade 6 - 10

The Grade 8 Science Syllabus board of the F. W. C. met for a week and produced a detail Scheme of Work and handed over to the exam. council of the department of education to be distributed to all heads of schools.

As usual the Teacher trainees from Palaly Govt. Teachers' College had their environmental probe for two days.

Other Functions:

The Centre provided facilities for a batch of about 60 Geography students (Special) of the University for a seminar on "Rural Community Development Stratagies".

Rural Schools' Programme:

This programme was conducted by Mr. N. Ganesapillai, Director of Studies. Like in the past this programme has grown more popular. In spite of the recent disturbances that occured in the country and increased cost of transport 44 science teachers and 910 students participated in this programme.

A/L Schools' Programme:

Conducted by Mr. K. Shanmugaratnam Director of Studies. This was also a very popular programme among the A/L students and about 380 students and 26 A/L Sc. teachers from 13 schools participated in this programme last year.

Rosearch Council:

Students Research grants were awarded to Mr. P. Nagendrasooriyar of Karainagar Hindu College, Karainagar. and Mr. S. Sivakumar of Driberg College, Chavakachcheri. The research grants came into force on the first of December 1981 and are tenable for one year. Mr. Nagendrasooriyar is investigating some aspects of jam production from palmyrah fruit. Problems of spoilage in grape fruits have been choosen for research by Mr. Sivakumar. The Research Grantees are being guided and supervised by Dr. S. Kandiah and Dr. S. Sivapalan both from the Dept. of Botany, University of Jaffna. The research council wishes to place on record that Mr. Logan Kanagaratnam and Miss Lilamani Benjamin from our first batch of Research Grantees have been selected to follow courses in Medicine in the University of Colombo and the private Medical College respectively.

The results of the feasiblity studies on culturing of prawn in floating cages in Thondaimanaru lagoon, undertaken by Prof. K. D. Arudpiragasam of the University of Colombo and Dr. K. Chitravadivelu with funding from the International Foundation of Science, Sweeden, have been promissing and further investigation have already been started. It is intended to culture prawns and rabbit fish (Siganus species) in floating cages, during the current year.

On the invitation of section D of the Sri - Lanka Association for the Advancement of Science, Dr. K. Chitravadivelu presented a paper on "Preliminary studies on cage culture of Penaeid prawns" at a symposium on 31st, October, 1981.

Publications:

The editorial board published one news letter and sent it to all members and other institutions connected with

F. W. C. But due to increased costs in printing and newsprint, the Centre is finding it difficult to finance this project.

Library:

The Library has been well used by the clientele. New books have been added to the Library from British Council and Asia Foundation Institute and from allocation of the Ministry of Education under research grant and SIDA aid. We wish to point out that some valuable books are damaged due to natural calamity. For the better use and also for stocking of books a spacious library block is urgently needed at the Centre.

Examination Council:

The exam. council in collaboration with the Dept. of Education, Jaffna was providing evaluation materials for the conduct of Regional common examination in Science & Commerce subjects for G. C. E. A/L classes and science subjects for grades 6 - 10. These evaluation materials were used not only by all schools in Jaffna District but outstation schools from Districts of Colombo, Mannar, Vavuniya, Trincomalee etc. Further the Field Work Centre revived the practical examination on station technique for grades 6 - 9 last year and this programme was also very successful

The demand by outstation schools for evaluation materials produced by the Field Work Centre is increasing year by year because of the quality of the materials produced.

From the year 1982, the F. W. C. proposes to organise a question bank and pay the teachers for questions selected for the question bank.

Junior Club:

Science clubs from 22 schools are affiliated to the Junior Club. Two representatives from each school had met at their General meeting and elected the ex-co. for conduct of their programmes.

A science quiz was held on 24-06-81. Although the members participated in the two camps organised by the Centre they were unable to have more activities owing to the recent disturbances in this part of the country.

Employees of the Centre:

The three employees paid out of the funds of the Centre and a parttime laboratory attendant extended their co-operation in the conduct of our programmes. We have deposited Rs. 125,000/- with the National Savings Bank on fixed deposit scheme to obtain a monthly interest to meet the salaries of these minor employees and payment of electricity bills, fuels etc. This fund has to be increased at least to Rs 200,000/- to make the Centre self supporting in paying the minor employees, meeting incidental needs of the Centre and maintanence of the Centre. It is hoped that this target is achieved within the next two years at least.

Expansion programme of the Centre:

For the proposed expansion of the aquaculture programme G. A. Jaffna was very kind enough to release an

additional one acre of land on the southern side of the Centre.

We are also taking steps to construct a strong room to house the valuable equipment at the Centre.

A spacious Library cum Teachers hut is urgently required.

Felicitation:

We Congratulate the following:-

1) Mr. K. Ponnampalam C. E. O. (Sc.) our Vice President on his promotion to class IV of the Sri-Lanka Educational Service.

2) Mr. C. Ambihawaran, In-service Adviser on his Casmi award by British Council.

Condolences:

We record with deep sorrow the death of Mr. K. Navaratnam, E. O. who had been closely associated with the Centre's activities. We convey our condolences to the breaved family.

Thanks:

We sincerely thank the following for their advise and assistance towards the running of the Centre last year:-

1) We sincerely thank the Ministry of Education for channeling SIDA aid for purchase of equipment and books to the Centre and the SIDA organisation for providing this Aid.

2) The District Minister, Jaffna and the G. A. for donating an additional one acre of land for aquaculture programme.

3) Mr. K. Sivanathan, Director of Education Jaffna and Patron for his keen interest in the Centre and valuable guidence towards the successful running of the Centre.

4) Mr. M. Ranaweera, D. D. G., C. D. C, Mr W. S. Perera, D. E. Educational Planning, Prof. V. K. Ganeshalingam, Mr. S. B Arumainayagam for their valuable expert advice and guidance to the Centre whenever they are approached for.

5) Mr. V. V. Ramasamipillai for providing uninterupted drinking water supply to the Centre from his mill.

6) Miss L. R. Navaratnasingham E. O. for her guidance in the organisation of F. W. C. programmes.

7) Mr. K. Ponnampalam C. E. O. (Sc) our Vice President, Mr. S. Kamalanathan C. E. O. (Sc) our Liason officer for their keen interest and valuable guidence in every activity of the Centre.

8) To all members of the ex-co. for their unstinted support to us for the successful administration of the Centre.

N. Ganeshapillai
C. S. Subramaniam
Joint Secretaries

Solar Radiation

P. Sumanasekara

Managing Director,
Vidya Silpa,
Wellampitiya.

Solar Irradiance

The earth-atmosphere system continously receives energy from the sun at the rate of $5{\cdot}445 \times 10^{24}$ Joules or $1{\cdot}5125 \times 10^{18}$ Kilowatt hours per year. The total output of all man-made energy producing devices in 1970 was less than 2×10^{20} Joules ie. 0 004% of the solar irradiance.

Of this man-made energy output, 96% was derived from rapidly dwindling fossil fuels ie. oil and coal. As the energy crisis worsens, and conventional fuels become more expensive, more attention is being given to the subject of putting to use the continuing supply of energy from the sun.

Solar energy is the only form of non-polluting, renewable source of energy available to man. The supply is abundent, free of charge and inexhaustible. Its distribution at ground level however, is thin, variable in time and space.

Since solar energy conversion systems are expensive to build, they have to be made cost-effective. Hence we need to know how much is available

Solar Constant

When solar radiation passes through the atmosphere, a part of it is depleted due to scattering and absorption by atmospheric constituents. The total energy falling on a unit area noramal to the sun's rays at the top of the atmosphere when the sun and earth are at their mean distance is called the Solar Constant S.

The standard value is

S = 1353 Watts por sq. metre = 1·940 Cals. per sq. cm. per min. (NASA/ASTM standard 1970)
error is + or — 1·5%

Spectral Distribution of Solar Radiation

Solar energy is received at the earth in the form of electromagnetic radiation ranging in wavelength from 0·3 μm (microns) in the ultraviolet through the visible (0·4 μm to 0·72 μm) and infra-red ranges to radio waves (1000 μm). While only 1% of the total radiation is in the UV wavelengths less than 0·3 μm, 4% is in IR whose wavelengths are greater than 0·72 μm. Nearly 95% of the total radiation is in the wavelength range 0·3 μm to 2·6 μm.

* *A Lecture delivered during the* Camp on Alternate ways of Obtaining Energy and Recycling of Natural Resources, *held from 13th to 18th October, 1980 at the FWC.*

Global, Direct and Diffuse Radiation

Much of the energy is depleted from the direct solar beam entering the atmosphere due to the following phenomena:

1) Scattering by molecules much smaller in size than the wavelength of radiation (Rayleigh Scattering) (i. e. energy is absorbed and emitted.)

2) Selective absoption by gases, particularly O_3, O_2, CO_2 and water vapuor.

3) Scattering by aerosols (dust, smoke, pollen etc.) of size greater than or comparable to the wavelength of radiation

4) Scattering and absorption by clouds

Therefore Solar radiation reaching any point on the earth is made up of two components:

1) Direct solar radiation (Short wave), which is the beam with the sun's disc as the source.

2) Diffuse or sky radiation (long wave), where the emitter of radiation is the entire hemisphere of the sky.

Global Radiation, G, is the sum total of the direct beam radiation I, and the sky radiation D, received on a horizontal plane.

Hence,

$G = D + I \cdot \sin \gamma$; γ is the solar altitude

The maximum value of G occurs when the sun is overhead and the sky is clear and is about 1·0 kW. m^{-2}. The direct beam component is about 0·8 kW m^{-2} at this time.

Daily Insolation

It is the total radiation, direct beam and sky, received per unit area on a horizontal surface in a day from sunrise to sunset.

In Sri Lanka, radiation measurements are available from 9 meteorological stations. The instruments used are the self recording bimetallic actinographs which measure Global radiation with a resolution of about 5 minutes. The mean monthly values of the daily insolation are given in the annexed charts. Any individual or organisation engaged in the practical application of solar energy will find the seasonal variation useful in planning the conversion system.

SOME USEFUL APPLICATIONS OF SOLAR ENERGY

Water Distillation

The effective rainfall over nearly 80% of the area of Sri Lanka during the 8 month period from February to September is less than 50 cm. The potential evaporation however, during this period exceeds 125 cm., so that all sources of surface water except the deep lakes and village tanks dry up as the drought progresses. In these water sources too, the level of impurities, both suspended and dissolved increase as the sun evaporates away only the pure water, making the water undrinkable. In coastal areas (Chilaw, Puttlam, Mannar), where groundwater is available, infiltration of sea water into the freshwater table turns wells brackish during drought months. Further, faecal and other organic matter seep into the wellwater posing a dangerous threat to health.

In the dry zone areas of Sri Lanka where population densities and economic levels are too low for provision of pipeborne water, and where groundwater is not available at a practical depth, solar distillation of impure water or sea water may be a feasible alternative.

A study of the rainfall in the dry zone areas of Sri Lanka, together with the results of a few distillation experiments performed, show that desalinated sea water could be made available economically and at the times of need.

Solar distillation dates back to the 19th century and the simpler forms of water stills now in use are basically unchanged from the early designs. The simple still consists of a shallow tray filled with brackish or sea water, covered with a sloping glass cover plate. Solar radiation heats the water and evaporates it. When the vapour comes into contact with the colder surface of the glass it condenses, forming fresh water which runs down the inner surface in the form of droplets. These droplets are now collected by a suitable arrangement of pipes into a vessel.

Under good radiation conditions an output of 5 litres per sq. metre of still area of fresh water can be obtained daily from a well designed still.

There are several points to be remembered when designing a still.

1. For maximum absorption of solar energy, the bottom and sides of the water trough should be lined with an energy absorbing black lining.

2. The temperature of water may rise to 70 — 80 deg. C so that the saturation vapour pressure may equal half the atmospheric pressure. Leakage of vapour may therefore occur. This must be avoided by carefully sealing the still.

3. The slope of the glass cover, if less than 6 deg. may allow condensed droplets to fall back to the trough. On the other hand if the slope is too high the distance from the water surface to the upper end of the glass cover may be too high for that part to efficiently collect vapour.

4. Conduction of heat from the sides and bottom of the still must be minimised by the use of inexpensive insulating material.

Materials to make stills

1. Glass sheet used for window panes is suitable as the cover. The thickness recommended is 2mm or 1/16th inch. This is available in sheets of 24 × 36 inches at most B. M. C. sales points. The price is Rs. 3/- per sq. ft.

2. Black polythene is a suitable lining material. Also roofing sheet may be suitable. Bitumen may be used for pasting the lining to the trough.

3. The trough may be made of either masonary, timber or plain asbestos sheets (ceiling sheets). The cost of asbestos is Rs. 46/10 for a 4 × 4 ft.

At the present costs of materials and labour, it should be possible to construct a still at the rate of Rs. 100/- per sq. metre. This will yeild 5 litres of drinking water per day, which should be sufficient for a small household. A still 10 × 10 metres will cost less than Rs. 10,000/- and will

veild drinking water at the rate of 500 litres per day.

Photovoltaic Effect and Solar Cells.

When ionising radiation from the sun (or any other source) strike certain semiconductor materials, the photons are absorbed liberating free electrons (and positive charge carriers or holes) with higher energies capable of electrical conduction. By providing a junction of two materials that have different electrical properties, an electric field is set up which drives the electric charges. The photovoltaic effect, as the phenomenon is named, is defined as the generation of an electromotive force as a result of absorption of ionising radiation.

Energy conversion devices which are used to convert sunlight into electricity through the photovoltaic effect are called Solar Cells.

Efficient solar cells were developed in the 1950's primarily for use in spacecraft. There are more than 1000 satellites powered by solar cell arrays, that have made tremendous changes in world-wide communications, weather forecasting and many other fields.

Silicon Solar Cells which convert 12 to 14% of the radiation falling upon them are available commercially. Although the cost is high at present, prices are expected to drop to a tenth within the next few years.

Even at the present cost solar cells are found to be economical in certain applications. A 1 Watt solar panel costing around Rs. 500 will generate in a day more than 8 Watt. hours if mounted to follow the sun, or 6 Watt. hours if fixed in a horizontal position under moderate radiation conditions in Sri Lanka. This is the amount of electricity available in 6 torch cells each costing Rs. 3-50. Thus in one day the 1 Watt solar panel generates Rs. 21/- worth of electricity. In its minimum anticipated lifetime of 25 years it will therefore generate nearly Rs. 200,000/- worth of electricity.

It can therefore be used economically to charge batteries in areas where no power supply is available.

A hybrid power supply consisting of a silicon solar cell array and a rechargeable storage battery may become feasible for rural areas in the near future. Floureseent electric tube lights are now available in various ratings of power. A 6 Watt tube provides as much light as a 20 Watt electric bulb of the incandescent filament type. Sufficient illumination can be provided to a rural home with two such tubes if the interior of the house is painted white. The power requirement for lighting is therefore 36 Watt. hours which could be obtained from a 6 Watt solar panel during the day.

The power generated by a silicon solar cell array consisting of 32 cells each 2×2 cm, during a day at Mannar can be shown graphically. The total energy converted to electricity during the day was 8.12 Watt. hours when the panel was always placed normal to the sun's rays and 6 08 Watt. hours when the panel was fixed in a horizontal position. Thus 1 sq. km. of solar panels fixed in a horizontal position in a location like Mannar would have generated 300 MWH (Megawatt Hours) of electrical energy.

There are three basic difficulties encountered when planning photo Voltaic power generation at a national level. The cost of Solar cells which is very high but is expected to decrease to one tenth its present price within the next few years, the insufficiency of Solar radiation during the winter months and the need of a storage system to store electricity for use during the night. Radiation measurements available through out the year for economic power generation in most parts of Sri Lanka. The hydro - reservoirs of Sri Lanka are situated within 50 miles of the dry zone of Wellawaya - Hambantota where sunshine is abundent when the reservoirs run dry annually. It may probably be feasible to generate Solar electricity in the dry zone, pump the water released from the hydro generators back in to the reservoirs and re - cycle the water.

Leaders' & Students' Camps - 1982

1. May 26th - 30th: District Camp for Students I
   Theme: ELECTRONICS

2. June 9th - 13th: District Camp for Students II
   Theme: ELECTRONICS

3. July 7th - 11th: District camp for Students
   Theme: ENERGY

4. July 21st - 25th: National Camp for Students
   Theme: ENERGY

5. July 30th - August 3rd: District Camp for Leaders
   Theme: ELECTRONICS & ASTRONMY

* 6. August 11th - 15th: National Camp for Students

7. September 28th - Oct 2nd: District Camp for Students I
   Theme: SCIENCE TECHNOLOGY

* 8. October 13th - 17th: National Camp for Students

9. October 28th - November 1st: District Camp for Students
   Theme: TECHNOLOGY

10. November 10th - 14th: National Camp for Leaders
    Theme: FIELD - WORK TECHNIQUES

* Themes will be notified later.

Regional Work-shop for Key Personnel concerned with out-of-school Scientific Activities by Young People

K. Ponnampalam,
President,
F W C, Thondaimanaru,
& Education Officer,
Jaffna.

I had the privilege to represent Sri Lanka at the above workshop held in Bangkok from 24th August to 2nd September 1982, as a key contributor to the Development of Thondaimanaru Field Work Centre. This workshop was organised by the Science Society of Thailand, in collaboration with the Asian Centre of Educational Innovation for Development (ACEID), in pursuance of Resolution No. 1/01 of the General Conference of UNESCO adopted at its Twenty-first session and under objective 1/4.4/02 of the Medium - Term of UNESCO.

The main objectives of the workshop were:

(i) to discuss the role of out-of-school scientific activities both in formal and non-formal education programmes.

(ii) to exchange expriences in the planning organization and evaluation of science activities by young people.

(iii) to identify trends, problems and issues in this regard, and

(iv) to develop guidelines for and outline of a hand book on the organization of out-of-school science activities.

Fifteen Asian and Pacific countries ie. Australia, Bangaladesh, China, Indonesia, India, Japan, Korea, Malaysia, Newzealand, Pakistan, Philipines, Singapore. Sri Lanka, Thailand and Vietnam were invited to participate. All the countries except Japan and Vietnam participated at the workshop. Dr. G. Teterin from UNESCO headquaters in Paris, Dr. Pant from the UNESCO Regional Office in Bangkok, Dr. Twee Hormchong, Vice-president of I C C for S. E. Asia and a few other members from the Science Society of Thailand served as resource personnel.

The participants from each country presented their paper describing their experience in out-of-school programmes in their countries and with this background a composite report describing the possible out-of-school programmes that may be adapted by the participating countries was prepared along with guidelines for training personnel to man such out-of-school programmes.

The consensus of opinion at these workshop is that the out-of-school scientific and Technological Education programmes have been expanding during the past ten years and this programme needs further expansion in an organised way and also requires institutionalisation. The out-of-school programme has to not only to help the students enrolled in schools but also the large number of youth who have dropped off from the normal school system or those who never had an oppertunity for formal education and also those youth who have completed their formal Education and the adults.

The possible programmes that could be organised to achieve these objectives are,

1. Science Museums
2. Seience Centres
3. Field Centres
4. Science Clubs
5. Science Parks
6. Science Camps and
7. Mass Media

The programmes may be selected by each country according to its need and resources.

It was also felt that the personnel in charge of such programmes must be trained in order to maintain the programmes and also to develop these programmes. Also the mass media are to be co-ordinated with such programmes, so that these programmes could be given greater publicity to attract the youth and also to reinforce these programmes.

It is hoped that the new thoughts in out-of-school scientific and Technological activities will be taken up by the Field Work Centre at Thondaimanaru and its activities extended to meet the new trends in out of school Educational programmes.

FIELD WORK CENTRE
THONDAIMANARU, SRI LANKA.

Programme of Work - 1982

1. Continuous Programmes

1. Rural Schools Programme
2. G. G. E. (A/L) Schools Programme

2. Special Programmes

FEBRUARY: First week - Workshop to draw Common Scheme of works in Art Subjects.
2nd week - Curriculer Oriented Science Workshop
21st - Annual General Meeting

MARCH: 2nd week - Youth Camp (4 days)

APRIL: 2nd week - Leaders Camp (4 days)

SEPTEMBER: 3rd week - Youth Camp (4 days)

OCTOBER: Asian Youth Camp (5 days)

NOVEMBER: 2nd week - Leaders Camp (4 days)

3. Common Exams.

March 2nd week - Grade 12
3/4 week - Grade 6 - 10 Science & Maths.
July 2nd week Grade 12 (Aug. 1982) Arts & Science
Grade 12 (Aug. 1982) Arts & Science
3rd week - Grade 6 - 10 Science & Maths.
November 4th week - Grade 11 - Science & Arts

Chairman Prem. Maths.

FIELD WORK CENTRE
THONDAIMANARU, SRI LANKA.

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Chettiar Press, Jaffna.