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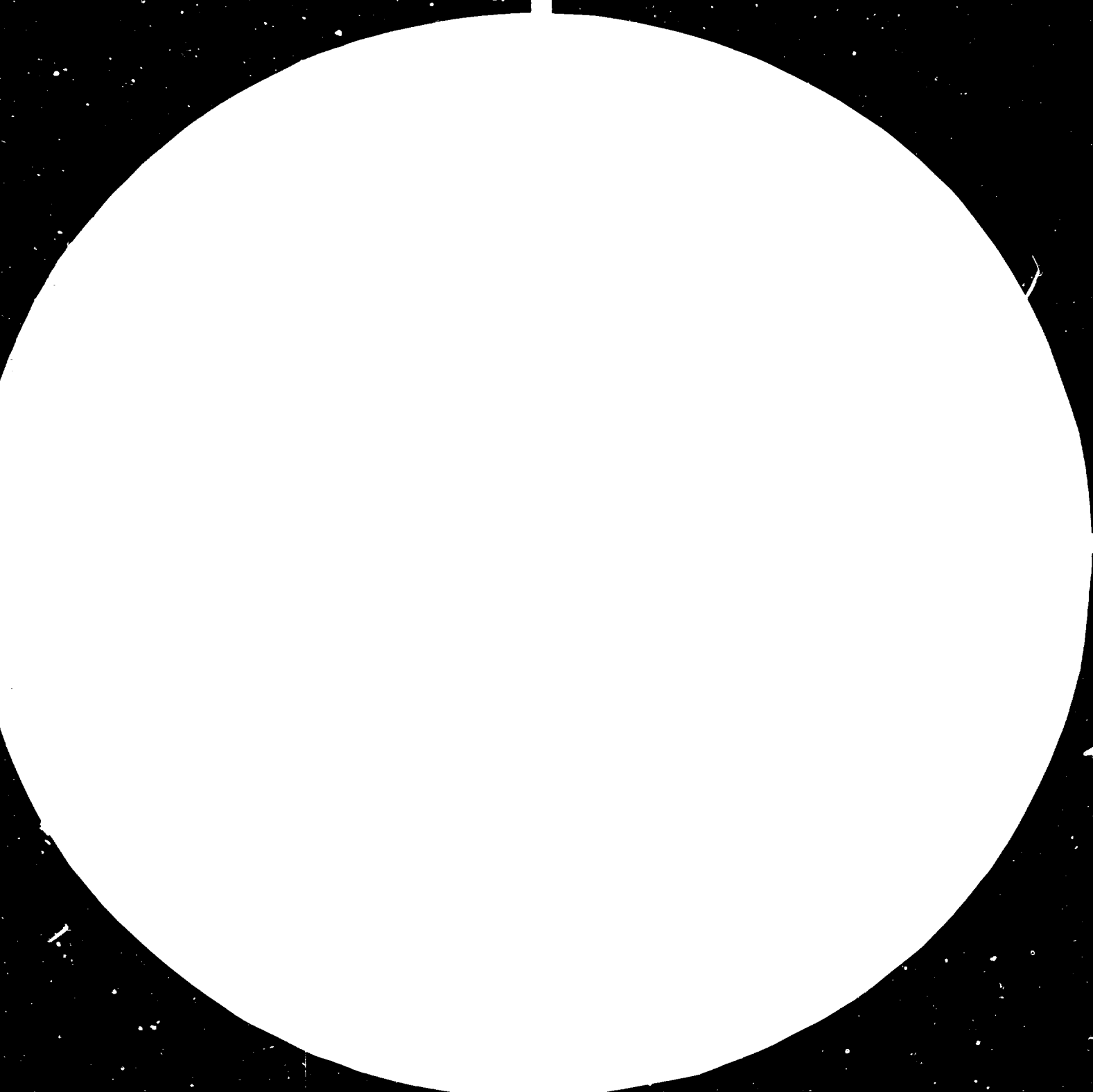
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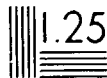




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Distr.  
LIMITED

UNIDO/IS.250  
23 September 1981

English

UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

FIRST JOINT NATIONAL SEMINAR  
ON TECHNOLOGY TRANSFER, MANAGEMENT AND DEVELOPMENT

16-21 February 1981

Georgetown, Guyana

Mission report\*

by

W.H. Tanaka

Head

Development and Transfer of  
Technology Branch  
Division for Industrial Studies

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### OBJECTIVES

The First National Seminar on Technology Transfer, Management and Development was jointly organized by UNIDO and the Technology Transfer Unit of Guyana, from 16 - 21 February 1981, in Georgetown, with the objective to:

- 1) Create awareness of technology transfer problems and opportunities among decision-makers in private, public and co-operative sectors;
- 2) Pave way for necessary institution building to facilitate effective technology transfer management;
- 3) Assist in the industrial and socio-economic development in Guyana; and
- 4) Serve as a model for wider use in adapted forms in the Caribbean as well as in other developing countries.

The Mission was undertaken to assist the Government of Guyana to organize and implement the National Seminar, and for this purpose, the UNIDO staff member visited Guyana from 14 to 21 February 1981.

### BACKGROUND

1. In early 1980, following the visit of the Senior Industrial Development Field Adviser (Caribbean), Mr. William P. Millager, to Guyana, contacts were established with Mr. Frank Long, Special Advisor on Technology Transfer to the Government, concerning ways and means of strengthening the scientific and technological capabilities in Guyana and the promotion of technology transfer, with the aim of supporting and stimulating the industrial and socio-economic development process in the country.

Through a number of exchanges of correspondence, it was agreed that since the subject of technology transfer and development as well as its management had very broad consequences, and without the full support, participation and co-operation between and among all the relevant institutions and organizations related to the subject of science and technology in its broadest sense, it would be difficult or even impossible to ensure a sound

basis upon which the subject of science and technology capability strengthening, and technology transfer and development could be built. It was further acknowledged that the Government had an important role to play in identifying and setting up priorities, and enacting necessary supportive laws and legislative measures within an overall framework provided on basis of clear-cut technology policies and programmes. In this respect, it was considered most useful, as a first step of sensitization of the problem, to organize a national seminar where decision makers at the Government as well as private, public and co-operative sectors would participate and exchange views on how the matter could be tackled in a manner best suited to the circumstances and environment in Guyana.

2. Accordingly, it was decided that the Technology Transfer Unit<sup>\*/</sup>, jointly with UNIDO, would organize a one week National Seminar with the support and co-operation of the National Science Research Council of Guyana, CARICOM, The Caribbean Development Bank, and other relevant organizations. UNIDO's contribution was the participation of Mr. W.H. Tanaka, Head, Development and Transfer of Technology Branch, as the Co-Director of the Seminar and Mr. William P. Millager, SIDFA (Caribbean).

#### ORGANIZATION

1. The National Seminar took place at the Conference Room of the Guyana Pegasus Hotel, Georgetown, from 16 - 21 February 1981. The officially registered participants counted up to 92, representing the originally planned target group of senior officials of civil service, public co-operation, co-operatives, private firms, representatives of the trade union congress, consumers' association, as well as representatives from CARICOM ..... and the U.N. organizations. The List of Participants is attached as Annex I.

An outstanding fact to note was that during the course of the six-days Seminar, the number of participants took a constant increase, contrary to the usual experience of a decreasing tendency in similar events.

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\*/ During the exchange of correspondence, further developments took place in Guyana resulting into formulating this Technology Transfer Unit within the National Science and Research Council, Guyana, with Mr. Frank Long as the Head.

2. The Seminar was opened by Cde Desmond Hoyte, Vice President and Minister of Economic Planning and Finance. Key note addresses were presented by Mr. R. Rainford, Deputy Secretary General of CARICOM, and Dr. Dennis Irvin, Vice Chancellor of the University of Guyana and Chairman of the National Science and Research Council.

Responses were presented by Mr. A. Fre-Hivet, UNDP Resident Representative, and Mr. W.H. Tanaka, on behalf of Dr. A. Khane, the Executive Director of UNIDO. Acknowledgement was made by Dr. Dennis Irvin at the end of the opening session.

3. The Seminar was then proceeded by holding nine sessions which had the following four main focusses, and based upon a series of lectures, each followed by a period of questions and answers:

- Session II - Industrial Development and Management in Guyana
- Session III - Role of Technology Transfer in National and Industrial Development
- Session IV - Technology Transfer Issues in Guyana (cases)
- Session V - Approaches and Technology Transfer Management.

..... The Programme of the Seminar is attached as Annex II.

Although originally aimed to be only the first step of sensitization, it also turned out to be the first step of mobilizing the active participation of the relevant groups and personalities in a co-ordinated manner, to create a mechanism for future action in this area. Namely, in view of the very high intellectual and responsible level of participants and their active interest and engagement, the Seminar management decided that the opportunity should be taken to carry the activities one step further by developing systematic mechanism which could support the activities of the Technology Transfer Unit on a continuous basis, in order not to loose positive momentum that had been witnessed during the Seminar.

Accordingly it was decided to develop a two-fold action parallel to the implementation of the Seminar programme. These were:

- a) the formulation of a number of Task Forces; and
- b) the elaboration of project concepts.



4. Technology Transfer Advisory Task Forces

It was recognized that in spite of the fact that the Government authorities expressed their positive support to take measures in strengthening the technological capabilities in the country, and have created a Technology Transfer Unit, there was still a lack of a mechanism linking the Technology Transfer Unit with the private, public and co-operative sectors of the academic as well as the business and commercial fields. Thus, a proposal was presented to the Seminar to create seven Advisory Task Forces which would elaborate on the state-of-the-art, problems, possible ways and means of solution and recommendations in their respective fields.

The seven Advisory Task Forces, with the relevant focus points were:

1) Technology Transfer Manpower Development

- Management and Technical Training Programmes
- Educational System
- Motivation and Incentives
- "Reverse braindrain" programme

2) Technology Transfer Operations

- Project identification and preparation system
- Technology acquisition, regulatory functions
- Techno-economic support
- Decision-making process
- Technology transfer promotion, screening, negotiations
- Measurement, evaluation
- Investment promotion

3) R+D Co-ordination and Promotion

- R+D requirements
- R+D opportunities and priorities
- Resources and allocation
- Appropriate technology development
- Indigenous technology development
- Technology adaptation
- Commercialization/liaison

4) Twinning and TCDC including Regional and Interregional Co-operation

- Twinning and co-operative arrangements among R+D institutions on problems of common interest
- Regional and interregional co-operation with other developing countries within and outside the Caribbean region
- Joint ventures and other forms of organizational and institutional co-operation.

5) Quality Assurance in Technology Transfer

- Standardization
- Quality control
- Testing services
- Consumer education and protection

6) Technological Advisory Services System for Medium-Small Industry

- Maintenance
- Spares production
- Consultancy and engineering
- Requirements
- Institutional arrangements
- Resources

7) Technology Transfer Information System

- Requirements
- Sources and (outside) linkages
- Institutional arrangements
- Networking
- Advisory services

A tentative list of candidates of the Task Force Members was compiled through the expressive indication of interest of the Seminar participants. The list was expected to be further elaborated by the Technology Transfer Unit to include representatives from other sectors and groups which would have important relation to the subject matter.

It was further agreed upon that each of the task forces would be supported by representatives from the Technology Transfer Unit and that the chair persons of the seven Task Forces together with the Head of the Technology Transfer Unit would comprise a Technology Transfer Steering Committee which could function as an advisory group to the Government.

## 5. Project Concepts

During the course of the Seminar, it was recognized that there were a number of problems which required definitely some appropriate measures to be undertaken by the Government for its solution. There were also a number of promising ideas which deserved proper follow-up or further elaboration for practical implementation. In view of these facts, it was decided to collect from all participants project concepts, which when compiled in a concise manner, could be used as the first step of a number of practical actions to be followed-up by the Advisory Task Forces and the Technology Transfer Unit. In spite of the availability of only two days, 47 project concepts were submitted for further compilation by ..... the Technology Transfer Unit (Annex III). The inputs required seem to cover areas of technological, financial as well as manpower support, and it was agreed upon that a closer analysis and further elaboration of the proposals could lead to a number of project proposals for financing by the Government, UNDP, UNIDO or other U.N. organizations and agencies, including the UNCSTD Interim Fund for Science and Technology, or by bilateral aide agencies.

## 6. Review

On the last day of the Seminar, the final session provided the opportunity of reviewing the discussions that took place during the Seminar for crystallizing activities that could or should be translated into a concrete programme of action of follow-up to be undertaken, particularly on the initiative of the Technology Transfer Unit. These included, among others:

- a. the further elaboration and official establishment of the Technology Transfer Advisory Task Forces including the selection of the Task Force Members and the Chairman;
- b. the compilation and assessment of the project concepts including the selection of priority projects and further formulation of project proposals;
- c. the necessary approaches, particularly towards the Government in respect to the outcome of the Seminar and the request for appropriate supportive measures;

- d. the organization of a follow-up seminar approximately one year from the present Seminar, to monitor the actions undertaken and results achieved, and to elaborate further actions required in order to ensure positive impacts in the overall field of technology transfer and development in general, and the work of the Technology Transfer Unit in particular; and
- e. apart from the project concepts submitted and prior to their analysis, the following area seemed to deserve further consideration for potential programme and projects in the future:
- twinning and co-operative arrangements for R+D projects with institutes within and outside the Caribbean region;
  - participation in the UNIDO - TIES system;
  - establishment of a national system for standardization and quality control;
  - creation of a laboratory and testing centre;
  - strengthening of local production capacities for fabrication of equipment and machines (particularly for Mini Hydro Generation Turbines, etc.)
  - participation in UNIDO and other training and fellowship programmes, etc.;
  - participation of UNIDO project on the conversion from cellulosic material into ethanol by Guysuco (Guyana Sugar Corporation); and
  - formulation and implementation of projects on mini hydro power generation units, including the power supply (about 2MW) to a already constructed glass factory; etc.

## 7. Observations

It should be expressively recorded that in organizing the First National Seminar on Technology Transfer Management and Development, the Technology Transfer Unit has accomplished an excellent work in taking the first step of sensitizing the importance of the problem and mobilizing the interest and co-operation of a great number of top-level decision makers, managers and entrepreneurs in the country, whose work is closely related to technology transfer, development and management. It was noted that there was a keen interest among the participants in seeking viable and practical solutions for improving the overall economic and technical environment including appropriate Government and public supportive measures, to enable a smoother implementation of the work in their respective fields. On the other hand, it was recognized that there was a certain lack of a systematic approach and a mechanism which could pull together the various existing driving forces towards a goal-oriented-action to support the sound and successful economic and industrial development process in the country.

The first step had already been taken in the form of establishing a Technology Transfer Unit. It was considered, therefore, of great importance, that an overall system was needed to take advantage of, as well as to support the activities of the Technology Transfer Unit. It was also felt necessary that a technology development policy would have to be developed, supported by operation plans in the long, medium and short-term perspectives with appropriate priority ratings and required financial support, set-up by the Government. The creation of the Technology Transfer Advisory Task Force Committee could become the central focal point in taking up these problems and making appropriate recommendations to the Government. The Advisory Task Forces could also function as an important mechanism to identify actions and projects, to be elaborated by the Technology Transfer Unit for securing financial facilities from within the country, the U.N. system or from bilateral and other multilateral sources.

It was felt that in many developing countries there were needs of similar nature, i.e. the need to pull together and to co-ordinate various activities in the field of science and technology ongoing in the country and to organize an effective mechanism so that those various activities would contribute

directly and indirectly to the overall economic and industrial development process. From this view point, it was considered that the First National Seminar in Guyana could be used as an example of an approach which other developing countries could follow. For this purpose, it was agreed that the various papers and experiences exchanged at the Seminar should be collected and compiled into one volume. The proceedings would be edited by the Technology Transfer Unit jointly with UNIDO for consideration and inclusion in UNIDO's Development and Transfer of Technology Series.

Also the procedures of setting up Technology Transfer Advisory Task Forces and an Advisory Committee composed of the chairmen of the various Task Forces could be one example of a practical and realistic approach. It was therefore agreed that the experiences accumulated in Guyana should be collected and disseminated to other developing countries.

Finally, the author wishes to put on record his gratefulness for the friendly and close support, guidance and co-operation given to the UNIDO-Mission during its stay in Georgetown.

## Annex I.

LIST OF PARTICIPANTS

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16.	Pitaroy Collins	Executive Officer	N.S.R.C.	53922
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44.	Vi-Jay Sharma	Lecturer II	IN Service T.Training Programme	56521
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80.	Eileen Cox	President	Consumers' Association	68456/9
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82.	P. Munroe	Secretary General	NSRC U.G. Campus	54841
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89.	Gordon	Food Scientist	I.A.S.T. U.G. Campus Turkeyen	53922
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W.R. Millager	Sen. Ind. Development Field Adviser for the Caribbean (SIDFA)	UNDP/UNIDO Barbados

ANNEX II

PROGRAMME

(16 - 21 February 1981)

Monday, 16 February

- 8.30 a.m.            Registration
- 9.00 a.m.            Session I: Opening
- Opening Address    - Cde. Desmond Hoyte, Vice President  
Minister of Economic Planning and  
Finance
- Keynote Address    - Mr. R. Rainford, Deputy Secretary-  
General, CARICOM
- Keynote Address    - Dr. Dennis Irvine, Vice Chancellor  
University of Guyana, and Chairman  
National Science Research Council
- Response            - Mr. A. Fre-Hivet, UNDP Resident  
Representative
- Message from Executive - Mr. W. H. Tanaka, Head  
Director of UNIDO        Development and Transfer of  
Technology Branch
- Acknowledgement    - Dr. Dennis Irvine

Tuesday, 17 February

- 9.00 a.m.            Session II: Industrial Development and  
Management in Guyana
- a) Introduction to Session        - W.H. Tanaka, UNIDO
- b) Industrial Management        - Cde. T.A. Joseph, Director  
Challenges in Guyana            Management Development  
Centre
- c) Institutional Aspects of        - Cde. O. Baptist, Vice  
Industrial Development and        President, Guyanao.  
Management in Guyana
- 2.00 p.m.            Session III: Role of Technology Transfer in National  
and Industrial Development
- a) Technology and Industrial Development - Dr. F. Long  
Technology Transfer  
(Policy) Unit
- b) Technology Transfer Management    - Mr. W. Millager  
UNIDO/SIDFA

Wednesday, 18 February

- 9.00 a.m.      Session III (continued)
- c) Industrialization and Technology      - Mr. W.H. Tanaka  
Transfer Management as part of an      UNIDO  
Overall National Policy on Technology
- 2.00 p.m.      Session IV: Technology Transfer Issues in Guyana (cases)
- d) Overview      - Dr. F. Long, Technology  
Transfer (Policy) Unit
  - e) Patents and Trademarks      - Cde. M. Sankies,  
- Cde. H.W. DeFreitas  
Technology Transfer  
(Policy) Unit  
(Research Group)  
- Ms. Julian Pollard (TTU)
  - f) R+D Technology Transfer and Aspects      - Dr. N. Trotz, Director,  
of Industrial Development      Inst. of Applied Science  
and Technology
  - g) Consumer Protection and Technology      - Cde. Eileen Cox  
Transfer

Thursday, 19 February

- 9.00 a.m.      Session IV (continued)
- a) Training and Education Aspects      - Dr. D. Irvine  
of Technology Transfer and      - Cde. J.a. Monize  
Industrialization      (TTU)  
- Cde. B. Scott  
- Ms. Lucille Harper
  - b) Industrialization and Technology      - Cde. Lance Brotherson  
Transfer Issues      - Mr. Godwin  
- Mr. Lopes (TTU)
- 2.00 p.m.      c) Institutional Aspects of Technology      - NSRC  
Transfer with particular regard to  
Guyana
- d) Standardization in aid of Technology      - Cde. Lorna Lawrence  
Transfer

Friday, 20 February

9.00 a.m.      Session V: Approaches in Technology Transfer Management

a) Public Corporations

- i) The sugar industry Guysuco      - Cde. Harold Davis
- ii) Guyneec      - Cde. Clinton Williams

b) Private Firms

- i) Representative      Georgetown Chamber  
of Commerce
- ii) Representative      - Cde. Karan  
Guyana Manufacturers'  
Association

2.00 p.m.      c) Co-operatives

- i) A technique of national      - Cde. G.A. Hoyte  
development especially in  
other developing countries
- ii) National Institutional Aspects      - Mr. W.H. Tanaka  
(The case for systematic      UNIDO  
mechanism for co-ordination and  
management of technology transfer)
- iii) Aspects of regional co-operation      - Cde. Byrone Blake  
and technology transfer management      CARICOM  
- Mr. W. Millager  
UNIDO/SIDFA

Saturday, 21 February

9.00 a.m.      Session VI: Conclusions and Closing Ceremony

- a) Synthesis      - UNIDO and  
Technology Transfer  
(Policy) Unit
- b) Closing Remarks      - Mr. W.H. Tanaka  
UNIDO

TITLE	COOP. INST. (IF APPROPRIATE)	OBJECTIVE
1 Utilization of wood Wastes - Briquetting and Carbonizing	I.A.S.T. Guyana	To examine the feasibility of installing a briquetting and carbonizing facilities for the utilisation of wastes generated by the sawmilling industry
2. Indigenous dyestuffs for textiles	I.A.S.T. G.F.C.	To produce plant dyestuffs for use in textile and printing ink etc.
3. Rice Bran Oil	GFC, IAST	To introduce appropriate technology at the community level for the extraction of oil from rice bran



ANNEX III

PROJECT CONCEPT

BACKGROUND JUSTIFICATION	DESCRIPTION (WORK PLAN)	INPUTS REQUIRED	PREPARED BY
<p>Tremendous amounts of wood waste are generated each year in the saw-milling industry. Most of it is not utilised. The saw dust is thrown away. Briquetting followed by carbonisation affords a way in which a good grade charcoal can be produced and used</p>	<p>(a) Survey of different areas in Guyana to quantify waste generated.                      (b) Choice of locality for trial run                      (c) Acquisition and installation of "pilot" plant                      (d) Assessment</p>	<p>(a) Manpower - to perform collection duties apart from the quantification exercise also determine possible markets locally and regionally.                      (b) On basis of information in (a) equipment, briquetting &amp; carbonising plant and technical help for the installation and commissioning of plant.</p>	<p>Ulric O. O. Hoza</p>
<p>The development of a local textile industry leads to increase importation/need for dyes</p>	<p>Identify plants with potential dye content</p>	<p>Cost effective ways of extraction of dyes</p>	
<p>The industrial plant for the extraction of oil from rice bran will be utilising less than half of the rice bran that is available in the country</p>	<p>Locate details of appropriate technology</p>		

4 Liquid Soap / Detergent	GPO	To maximise the local inputs for production of liquid soap. To evaluate the technology for the production of sucrose ester detergent that would be based on locally produced sugar and oil (triglyceride)	To use local raw materials for production.			
5 Fermentation Technology	GPO	To develop a capability in fermentation technology to use biomass as a raw material for the production of chemicals	With the escalating price of oil as a feedstock, biomass will become more and more the source of material for production of a wide variety of chemicals. Guyana has the land potential for the production of biomass	Work a strategy for the development of capability and capacity in this area	Technical assistance pilot plant/equipment	
6 Balata	IAST, GPO	To maximise the utilisation of balata, an indigenous raw material for local use and for export	Diminishing world markets for balata	IAST to determine the properties of balata. GPO to explore the markets for potential products		
7 Solvent for extraction of Rice Bran Oil	IAST, GPO	To determine the conditions for the utilisation of alcohol for the solvent extraction of rice bran oil	A plant for solvent extraction of rice bran oil is being installed. This plant was designed to use hexane as solvent, which is imported.			

<p>8. A "Forest Industry Development Centre"</p>	<p>It is recommended that the Centre be organized as part of the Ministry of Forestry. Other cooperating institutions will be the Guyana Forestry Commission and the Guyana Timber Export Board</p>	<p>1. Forest Resources more fully utilised. 2. Forest Products for local and export markets satisfied. 3. Forest Sector Economic activity increased. The Centre will function for the following purposes: 1. To provide developmental services to the wood processing industry. 2. To promote the establishment of new wood processing enterprises and the improvement of existing ones. 3. To provide demonstration and training opportunities for forest resources and industry personnel.</p>	<p>In spite of the large forest reserve in Guyana the industry is at a rudimentary stage of development and is showing little growth in terms of volume of production and employment in new industry categories, improved technological processes, expanded markets or the establishment of new wood processing enterprises. In addition product design and product quality leave much to be desired.</p>	<p>1. Establish an Information Bank for the Industry 2. Develop new knowledge or adapt existing knowledge to the needs and conditions of the industry. 3. Conduct training 4. Advise on the selection of machinery &amp; equipment 5. Conduct marketing activities 6. Provide a link between the industry and finance institutions 7. Coordinate developmental services provided by AID agencies 8. Operate pilot plant for demonstration purposes 9. Identify wood processing opportunities for establishment</p>	<p>1. Plant machinery and equipment for Research &amp; Development, demonstration and training. This is available locally. 2. Raw materials and Supplies. Available locally 3. Buildings. Available locally 4. Library resources. Assistance needed for acquisition 5. Overseas expertise for various sections. 6. Training of local staff overseas to upgrade skills and give employe 7. Money for initial operating expenses</p>	<p>Carlton P. Collins</p>
<p>9. Medicinal Plants &amp; the Natural Plants</p>	<p>GFC, IAST, TTT</p>	<p>To determine feasibility of exploitation of Medicinal plants commercially</p>	<p>Abundance of potential Medicinal plants and establish Pharmaceutical Industry</p>	<p>Define thereby roles of each Institution</p>	<p>Technical &amp; Financial Assistance</p>	
<p>10. Essential oils</p>	<p>GFC, IAST, GIC</p>	<p>To investigate the production of essential oils for local market needs initially</p>	<p>Not sure it is justified, but above agencies are involved</p>	<p>Justify e.g. determine the economic impact of such an industry</p>		

<p>11. Appropriate Packaging for Agricultural Produce</p>	<p>GMC, GPC, Forestry Dept.</p>	<p>To find urgently packaging for agricultural produce in order to reduce post harvest losses</p>	<p>Post harvest losses by GMC of order of 40%</p>	<p>Evaluate technologies for manufacture of wooden crates. 10,000 per annum. Evaluate the appropriateness of corrugated cardboard as a form of packaging for agricultural produce especially for export</p>	<p>Technologies for wooden crates</p>	
<p>12. The study of the Impact of Technology Transfer on Community Development.</p>	<p>Min. of Co-operatives Technology Transfer Unit.</p>	<p>To look in-depth at how Community Development is affected by the transfer of Technology and the resultant effect on production</p>	<p>Technology Transfer in Community Development has little or not direct effect on production. However the spill-off effects could tremendously facilitate production by  a) Making hitherto unavailable resources (or underutilized) available to production;  b) providing facilities from which production personnel will benefit</p>	<p>Identifying personnel &amp; equipment  Accumulating data  Documenting and disseminating information acquired</p>	<p>1 Finance  2 Technology</p>	
<p>13. Developing public catering and canteens</p>	<p>1. ZEMA Catering Coop. Society Ltd.  2. Min. of Coop</p>	<p>1. To establish and maintain food canteens and catering services  2. To advise and promote new techniques in food handling and management</p>	<p>Lack of trained personnel and inadequate accommodation  Inadequate equipment and facilities</p>	<p>1 Reconditioning of existing site  2 Re-organising and identifying staff  3 Identifying equipment and upgrading present technology</p>	<p>Capital and Operational Financing  Commodity (food) export.  Procurement Technology.  Training of staff</p>	<p>Min. of Co-operatives</p>

14 Pineapple, Cassava Cherries	Min. of Agri- culture, GIC	To introduce varieties of pineapple, cassava and cherries which are used in processing and which should maximise the economic returns to the farmer and are suitable for process- ing	Current varieties and agronomic practices are contributory to low productivity. The prices as a result are prohibitive in terms of producing indus- trial products that could be competitive.	Obtain and test var- ieties Determine mechanisms to be used for intro- duction to farmers	
15 Technology Transfer Human Develop- ment	ITF	To ensure effective management and tech- nical capacity	Problem of motivation and incentives Brain Drain		
16 Traditional Medicine	Min. of Health, UG, MPP, SEC, MHC/M	To determine to what extent traditional medicine should be maintained or even expanded	Many developing countries have an extensive use of traditional medicine	Sociological study of the extent and value of use of traditional medicines Scientific evaluation of important tradit- ional medicines	Manpower and finance to carry out
17 Inorganic- Chemicals	M.C. VAST	To use appropriate technology for the ex- ploitation of local minerals to produce simple chemicals with significant market values e.g. Titanium Dioxide as paint pigment. Talc as filler in plastics etc. Sulphuric acid as basic industrial raw material.	Imports of .5 million for substitution to be used as base market.		Small scale tech- nology Capital financing

18. Organic Chemicals	IAST, GIC	To create a productive capacity and a capability for the manipulation of organic chemicals based on sugar, cassava and other biomass materials.
19. Institutional mechanisms to ensure co-operation amongst technology utilising agencies and co-ordinating agencies	MIO, SFC, NED, CEMUSO, UFALB, UYSTAC, GFC, SFD, SMC, State Planning Commission	To ensure the adoption and adaptation of technology for the optimum economic benefit to the nation
20. Turbine Factory	LACT, TUU	To supply Hydro Turbines and Motor Pumps in the Caribbean and Guyana

<p>The increasing importance and value of biomass raw materials</p>			
<p>Lack of co-ordination (technological) between central agencies such as State Planning, NSAC, I&amp;DT and productive agencies</p>	<p>Defining clearly the roles of related agencies</p>		
<p>With the expansion of Mini Hydro Generation in the Caribbean and Guyana in particular, the need to supply turbines will certainly be there. The cost of turbines abroad is in foreign exchange into which is built in cost of materials, labour and profits. In this case the raw material is imported and local skill developed. With no extra cost in capital, pumps can be produced from a turbine factory.</p>	<p>A Model Ranki Turbine was designed and constructed in 1979. This is in the process of being tested.</p>	<p>Suitable electrical generators and foreign exchange for capital expenditures</p>	<p>J. O'Lall</p>

21 Crease resistance  
to cotton fabrics

To make the locally  
made cotton fabrics  
with a finish which  
requires little or  
no ironing

22 Mini Hydro for  
powering the  
Glass Factory

RECO, TNU, IACT

To power Ayuda's  
Glass Factory

23 Mini Hydro Gener-  
ation

TNU, WRO  
IACT

To serve isolated  
communities which  
shall not be con-  
nected to the nation-  
al grid



<p>Cotton is made from a local fibre and one of the property of such fabrics is that they crush readily. Addition of polyester can help to solve this problem, but polyester has a petrochemical origin and the world is experiencing a petrochemical problem. A resin finish can furnish the desired effect. Kamate is thinking about this, but since we are a new entity, we would certainly appreciate some assistance in this area of product development.</p>		<p>Machinery and training</p>	
<p>Since the Guyana Electricity Corporation cannot supply the Glass Factory which has already been completed, hence hydro power must be made to supply the necessary power which is about 2 M.W.</p>	<p>suitable site is being identified, after which construction shall have to take place very quickly</p>	<p>Foreign Exchange</p>	<p>J. O'Lall</p>
<p>Guyana's hinterland where isolated communities are found is literally filled with potent Mini Hydro Generation potential. The development of this will certainly improve life in these communities</p>	<p>To develop small sites moving gradually to larger &amp; still larger sites. At the moment TETERU &amp; NOSORORO are under consideration.</p>	<p>Foreign exchange</p>	<p>J. O'Lall</p>

24 Refining of sea salt  
at Jh. Chhava  
Cor. D. S. S.

To meet the needs of  
local manufacturers  
e.g. Sanata Textiles  
GPO etc.

25 Manufacture of  
industrial sodium  
silicate solution

To meet demands of  
local industries e.g.  
Sanata Textile  
Sterling Industries Ltd  
Construction using  
concrete

26 Wind power

1000 HP

To utilize wind power  
for domestic light-  
ing

I can speak for STL only in that our present starch consumption annually is estimated to be about 60 tons for a one shift process. Textiles that operate on a round the clock system and STL should be reaching this operational condition by 1957. Hence the starch consumption, assuming an increase in present production efficiency, should be about 200 tons/year.

There is already three cassava starch factories, but only recently has the one owned by GOC been instructed to gear itself for high quality starch production. But their Technical know-how in this field seems to be quite limited.

Some Textiles does not use an large amount of the soap and detergents manufacturers of which there are several. Sand is the essential raw material and maybe this can be incorporated in the glass factory production processes.

With the cost of domestic consumption of electricity by agrochemicals, wind power on the coast land can be used to ease the burden by using windpower for lighting

Wind propellers can drive car's alternator which can charge a bank of car batteries during the day. At night this stored energy is used for light up. The propeller blades have already been designed and constructed.

Finance for testing purposes

J. O'Fall

<p>27 Study of the Techno-Economic Feasibility of the Construction of a floating bridge across the Berbice River near New Amsterdam</p>	<p>Min. of Works &amp; Transport (Works)</p>	<p>To generate information relevant to a decision as to whether a bridge should be constructed across the Berbice River at this point in time</p>	<p>There have many complaints about the length of time and the inconvenience involved in travelling between the west and east banks of the Berbice River in the vicinity of New Amsterdam, particularly by those persons who cross the river in a vehicle</p>	<p>(a) Obtain maps of possible crossing sites.                  (b) Collect traffic information about people and goods moving across the river and prices paid and effects of delay and possible benefits from reducing delays                  (c) Carry out survey of possible crossing points                  (d) Study characteristics of traffic using Berbice River                  (e) Do preliminary design                  (f) Forecast traffic using bridge                  (g) Carry out cost benefit analysis</p>	<p>Maps from Min. of Agri. and THD                  Survey plans if any, from Survey Division                  MWT (1)                  Traffic statistics from THD                  Price information about Acrow Bridge Panels and Uniflote components                  Preliminary Design now in possession of Guybridge (MWT) (2)                  Inventory of Acrow Bridge panels and Uniflote components now stored at Teaballi, Mazaruni River</p>	<p>J. Holder</p>
<p>28 Canning of local foods, e.g. Papaya, Soup (Black eye, Pigeon etc) Black Molasses, etc.</p>	<p>Trade Planning Commission, MWT - supplying foreign exchange &amp; scientific data for use along with local Technology and materials</p>	<p>To replace things like corn bob, sardines etc. which was used by port knockers and persons going on long journeys, also for export thus assisting in earning foreign exchange</p>	<p>These items were produced and canned before, therefore we could implement these without such imported technology, in fact we may not need any technology at present</p>	<p>Canneries now in Guyana that is used for producing fruit juices could be used when the fruit season is out thus making optimum use of equipment and canning processing technology</p>	<p>Local materials about 90% local technology about 95% e.g. in the case of pepperpot, material needed - cowhool, cast-iron, water, pepper, seasoning and pork instead of beef. Black molasses - animal intestines, blood, rice, seasoning. With production of glass, could use bottles for local market</p>	<p>D. Welch</p>

<p>29 Technology Transfer Information system</p>	<p>Guyana National Bureau of Standards</p>	<p>To "institutionalize" an information system that would allow users to receive information when and where it is needed without the need to have a centralized Data Bank.</p>	<p>Economic Development - the need to promote trade expansion, the need to discuss and select technologies and subsequently develop, these require a sound technical data and international base</p>	<p>document sources of information in Guyana and the Caribbean. Document areas at the service prepare directions for use, acquire technical information and data, establish other linkages with networks such as ISOMET, TIS, UNISIST and so on</p>	<p>Cooperation for CES and UNISIST Funds for acquisition of a set of ISO standards particularly in the categories - Consumer products, Plastic &amp; Plastics Products Machinery Tools - Agricultural and Forestry Machinery Equipment Essential oils Steel products including coil and pulp Latex processing equipment</p>	<p>J. Lawrence</p>
<p>30 High level consultation by direct contact with Ministerial Officials</p>		<p>To bring about enlightenment as to the complexity and costliness of the tasks at the proposed Bureau of Standards with a view to collecting the kind of support it deserves</p>	<p>The role of standards and standardization, generally is not fully appreciated. The scope is not known to those who make decisions</p>		<p>Encouragement at the Ministerial level to put funds at the disposal of the Bureau. Principles and recommendations and back up support</p>	<p>J. Lawrence</p>
<p>31 Supply and Marketing Complex (Agri) at Bushy Run Linden Highway</p>	<p>Un. of Coops. Community Dev. Council</p>	<p>To provide farm requisites for agricultural production To provide outlet for farmers produce To provide adequate storage facilities</p>	<p>Lack of marketing facilities, High cost of transportation in relation to acquisition of farm requisites and in marketing of produce. Lack of agricultural inputs. Loss of time by farmers in acquiring supplies and marketing produce.</p>	<p>Identify suitable site and source of water supply. Preparing plan of building. Construction of building. Acquire equipment and machinery. Identify staff</p>	<p>Training of staff. Finance (Capital &amp; Operational). appropriate technology</p>	<p>Un. of Coops.</p>

32 Charcoal Pro-  
duction - Kiln  
Process, St.  
Francis Mission,  
Mahaiconj River

St. Francis  
Mission Forest  
Producers  
Coop. Society  
Ltd.  
Min. of Coops.

To utilise forest  
resources of area  
To provide employ-  
ment for residents  
To provide high quality  
charcoal for local &  
foreign markets  
To contribute to "Al-  
ternative energy pro-  
grams" of nation

35 Establishment  
of a Day Care and  
Nursery Unit

St. Francis  
Mission Soc.  
Producers-  
Coop. Society  
Local  
Council  
Min. of Health  
Min. of Coops.

To establish and pro-  
vide the facilities  
necessary for the  
care of young chil-  
dren during working  
hours, so as to enable  
mothers to be com-  
pletely employed in  
sectors prior to pro-  
duction or to the  
facilitating of such  
production

The pit method of charcoal now being used has been unsatisfactory in terms of:-  
The time lost in the production and extraction.  
Loss experienced in produce and quality.  
Exposure to weather conditions which at times is adverse.  
The supply of raw material (i.e. d) is abundant

Acquiring and siting kilns.  
Briefing co-op society's members on implications of change over.

Metal kilns  
Training of members

Many women who have small children are deprived of the opportunity of engaging in employment in the productive sectors even though they may have the necessary skills. In some instances where circumstances force such women to seek employment, the children are not assured of proper care and attention and the ill-effects of such affliction tend to affect their psychologically and otherwise, even into later life, as well as to affect adversely the work performance of the mothers. Men left responsible for the care of children can also be so affected. The undertaking of the project would benefit levels of production.

Identification of site.  
Preparation of structured plan.  
Identification of personnel staff and other resources and of equipment.  
Identification of training requirements and sources thereof.  
Implementation of physical aspects of project.

Finance  
Technology (Hardware & software)

<p>34 Facilitating logging and sawmilling operations. St. Francis Mission, Mahai-cou River</p>	<p>St. Francis Mission Forest Producers Producers Coop. Society Ltd.</p>	<p>To exploit Timber resources of Mission area and provide employment for men-bers and other residents</p>	<p>The Mission area has abundance of marketable species of timber and exploitation at present is limited to the efforts of individuals making mainly fence posts and staves. Project could provide a boost to the nation's housing drive by increasing the supply of lumber for which there is a great demand</p>
<p>35 Fubari Cassava Mill Coop Society Ltd. to visit the area.</p>	<p>Cassava</p>	<p>To produce farine, cassava bread, cerseep for local and export consumption</p>	<p>The Amerindian Community at 72 miles E/oa Iotero Road, Since 1972 embarked on the making of cerseep and cassava bread for selling to make an income. This involved large cultivation of cassava and creating employment for a large section of the community.</p>
<p>36 Laboratory chemicals and reagents of alcohol, ethano, ethano, ethanol, ethanoic acid, iatere etc etc.</p>		<p>For school laboratory and industrial laboratories, hospitals etc.</p>	<p>In my teaching career laboratory practicals were severely restricted because of limited supply of these essential chemicals. In such only Teachers demonstrations were done or very limited student oriented practicals. We need our technologist and scientist and this shortage will certainly put a spoke in the wheels of Technological development so vitally necessary</p>



Identification of equipment required and sawmill sites. Identification of personnel for training in proper use of equipment. Assessment of re-education requirements and possibilities. Preparation of necessary infrastructure.

Finance  
Technology (hardware and software) including portable sawmill

To construct a proper building, with all the necessary equipment and ventilation for making the finished product

Local Hire Place,  
Clay bricks, aluminum pots, Containers to store cerecrop, lighting plant, Fans, linetape, Management skills

37 Metallurgical  
Analysis Unit

University of  
Guyana

The testing and  
analysis of re-cycled  
non-ferrous metals

38 Adequacy to avail-  
ability of  
equipment for  
major sectors  
of the economy,  
such as bauxite,  
for example (A  
small test unit  
has been installed  
at the site and  
will be used for  
testing of the  
parts)

Bank of Guyana.  
This inst. will  
be expected to  
look at request  
for foreign  
exchange based  
upon the size  
and importance  
of the particu-  
lar industry  
to the economy  
for example  
of the bauxite,  
or of the  
tourist tripods  
to the economy  
at present,  
all efforts  
should be made  
to render  
priority assis-  
tance in for-  
eign exchange.

To impact on increased  
production and pro-  
ductivity so that in  
turn the good market  
price obtained from  
sale of bauxite  
products could earn  
foreign exchange  
and generate more  
surpluses.  
To encourage the  
few available  
skilled  
personnel to en-  
deavour to increase  
output and not to  
be totally dis-  
illusioned due to  
scarcity of spare  
parts which are  
immediately needed

<p>To eliminate mistakes in metal compounds ie. Nifos/Phosphorous Branzas for use in Technology Transfer Maintenance</p>		<p>Laboratory &amp; staff</p>	<p>P. Lucas</p>
<p>The opportunity to earn an abundance of foreign exchange due to increasing prices, customers are prepared to pay for exotic products is dwindled at a time in particular when the ore is available, but the use of non-availability of the required equipment due to an important piece of spare part this ore simply cannot be mined, transported &amp; processed, so as to be shipped to foreign markets</p>	<p>A schedule showing estimated times for repairs &amp; breakdown indicating the most likely parts to be changed or serviced must be prepared. After consultation with the operators &amp; mechanics long in advance so that the necessary parts could be procured with the required time</p>	<p>Follow-up planning Section to ensure that workforce is fully prepared with necessary working aids for the job to be done. Planning section will also ensure that what is required has been properly understood and communicated to the authorities. Planning &amp; Finance Personnel must be able to show those persons responsible for granting foreign exchange permission the nation and that could be accrued for benefit of the economy for example: More production &amp; productivity will lead to more foreign exchange earnings</p>	<p>Edgar H. Leonard</p>

<p>39 Testing Services Development of Metrological Capability</p>	<p>Guyana National Bureau of Standards and Institutions that would participate in the Bureau's National Laboratory Accreditation Scheme.</p>	<p>To establish relevant metrological facilities for component material and product testing necessary to the promotion of standardisation, quality control and technology levels. Since the Guyanese emphasis is on indigenous technology the initial focus would be material science metrology.</p>	<p>"To measure is to KNOW"</p>	<p>To determine or catalogue indigenous technologies to be developed. Evaluate/analysis requirement for follow-up and implementation. Prepare list of equipment needs, laboratory designs, laboratory problems and documentation to be used.</p>	<p>Provision of essential metrological equipment. Metrologist to advise on organization for realization of relevant output - on the job training; for would be metrology technicians.</p>	<p>L. Lawrence</p>
<p>40 Community production of charcoal</p>	<p>I.S.T. Charcoal Unit Ministry of Energy</p>	<p>To increase significantly the local production of charcoal by use of Mark V kilns. Beehive brick kilns.</p>	<p>Guyana has a tremendous potential for the production of charcoal. To date the major method of production is by the pit-burn method. Two of the technologies are now available - Mark V &amp; beehive brick kiln. Guyana needs a significant increase in its production for the local and overseas market and project aims at utilising newer techniques to improve production.</p>	<p>Choice of two communities (probably two cooperatives) Training in use of Mark V kiln (available locally) and in building and use of beehive kilns. Production</p>	<p>Mark V kilns (constructed locally 10 for each project) Beehive kilns - bricks etc. All to be constructed locally. Cash used for general infrastructural work (storerooms, bins etc.) Training - I.S.T. will provide this Mark V kilns - Charcoal unit for beehive kilns. Quality control provided</p>	<p>H. Trow</p>

<p>41 Appropriate Technology for rural development</p>	<p>Dept. of Mechanical Engineering, Faculty of Technology, UC.</p>	<p>In most developing countries R &amp; D and Technology only benefit the urban areas. The majority of the population lives in the rural areas but are totally neglected. The aim of the project is to:-          Prepare and design a methodology for Technology transfer to the rural areas.          To prepare and implement a desired project, evaluate its success.          Training programme and improving capabilities in the rural areas to handle the technology.</p>	<p>As in (3) To transfer technology and improve indigenous technology in the rural areas of Guyana so as to improve on the quality of life</p>	<p>Study of pattern of rural Development.          Prepare and design methodology for technology transfer.          Select a particular area after discussions with the people for a small project.          Implement and evaluate</p>	<p>Professional and Technicians, perhaps a socio-economist.          Money for equipment, materials, etc. for the project.          Financing, for study and travelling in the rural areas.</p>	<p>Dr. Sanjiva</p>
<p>42 Industrial Management Training for Senior Managers in the Guyana Rice Board</p>	<p>Guyana Management Training Centre, UG, National Industrial Training Centre</p>	<p>To make Managers more aware of the role they have to play in a developing industrial society; and to familiarise them with the basic practices of industrial management</p>	<p>In the Guyana Rice Board, most senior managers cannot cope with varying industrial management grievances and it is fair to say that they had no formal training in industrial management practices</p>		<p>Overseas and local training.          Projects to assimilate typical industrial situations.          Expert advice.</p>	<p>D. Frim</p>

43 Training of Personnel in the Technology of Food Science (Food processing, food engineering, food production) of a Private organization - Squirrel Kn. P. Industries Co. Ltd.

Help in terms of financial and technical could be possibly had from international institutions such as UNO, UNCTAD or Government within the country which have similar projects in this field with private organizations in Guyana. The Public Service Training Ministry of Guyana (hopefully)

Formal training would facilitate the following:- Technicians & Research & Development staff would now have the knowledge of maintaining proper standards stipulated by the food & drug regulations of Guyana which is very important to the local and foreign markets. The general improvement in the standard of processed food produced in Guyana. The power of competing with the foreign market thus earning needed foreign currency. Creating more jobs for Guyanese (viz. with effective and proper techniques of processing foods. The possibility of an increase in production is not remote, thus creating an opening for expansion

There is no faculty of Food Science at this Country's highest degree of learning - the University of Guyana. The government of Guyana is not willing to train any person in Food Science unless of course he/she signs a contract to work in their food processing organization. What would eventually happen to the private firms, should the technical personnel be trained formally and finally work in Govt. institutions.

Finance, (allocation of foreign currency to pay fees etc. to a foreign University) and Technical help.

Raymon Saheed

4. Establishment  
of a number of  
"Pottery Villages"  
in Guyana

Dept. of  
Craft Pro-  
duction &  
Design,  
Min. of  
Coops.

Abundance of clay for  
the development of a  
pottery industry, hence  
base material is low  
cost.  
Pottery has not devel-  
oped throughout the  
years due to a non-  
scientific approach  
Pottery has income-  
generating potential  
especially in the  
rural communities where  
labour is in abundance

Training in technical skills, productive skills & marketing techniques.  
Production of utility and other pottery items.  
Building of brick kilns.  
Management of pottery concerns.

Specialist in Pottery & Kiln making (preferably with bricks) & manufacture of local glass.  
Equipment - An electric kiln for experiment & production at the Design Centre  
Financial assistance to effect training programmes according to work plan.

Staff Dept.  
of Craft  
Production  
& Design



45 Construct a  
road/railroad  
link between  
Linden International  
and (Linden)

Min. of Transport  
and Works

To impact on the large areas of cattle rearing & timber.  
To transport such products easily to the capital for foreign markets.  
To install relevant factories in the actual localities such as Tannery, cheese factory, tinned corned beef, milk pasteurisation, canned pepperpot.  
To earn foreign exchange.  
To acquire new skills & to improve existing skills.  
To improve the cattle industry in that area.  
To specialise in quality control for beef product.

Cost of beef at present is in the area of \$4 to \$6 a pound.  
Acquiring beef from this region will reduce such cost to about \$1.50 a pound or less depending upon the cost of labour generated.  
At present the cost of transport by air is extremely high and not competitive to be used by most of us.  
This road link will minimize the costs of beef & beef product in the Supurani region.

A survey to see the best route. If we are going to use a railroad then we must endeavour to find a route with the least amount of lands, if possible none at all (use culverts & bridges to cross over existing waterways such as creeks.)  
Plan must show the development of lands along the route, but essential condition development must be discouraged since we need more extensive development going inland from the route.

Assistance from local planning authorities and local inter-regional democratic authorities recently formed.  
Assistance from organisations and people who know about construction & maintenance of roads.  
Brazil should be interested since their products can more quickly reach international markets by a shorter route via Linden Highway to our International Docks at Georgetown

Edgar M.  
Leonard

46 Charcoal Pro-  
duction - Kiln  
Process - 3 mile  
Linden Highway

Ne 1 Highway  
Producers Coop.  
Society Ltd.  
Guyana Coop.  
Society, Ltd.  
Linoumru Land  
Coop. Society  
Ltd.  
Min. of Coops.

To utilise the vast  
forest resources on  
the Linden- Soosdyke  
Highway.  
To provide self-  
employment for High-  
way Settlers.  
To produce high  
quality charcoal  
for local and inter-  
national market.  
To contribute mean-  
ingfully to the  
alternative Energy  
Programme

47 Research Infor-  
mation, Communi-  
cation and  
Documentation  
Centre for Coops.  
and Community  
Development  
Activities.

Min. of Coops.

To provide facilit-  
ies for the under-  
taking of research  
on Cooperative  
and Community Dev-  
elopment Activities  
To compile and  
document infor-  
mation relevant to  
Coops. and Comm-  
unity Development  
Activities.  
To disseminate  
such information  
to Coops. Community  
Councils and the  
public.  
To monitor progress  
and achievement of  
Coops. and Comm-  
unity Dev. Activities  
To provide develop-  
ment support in-  
formation service to  
Coops and C. A.

The production of charcoal by the pit method now employed by the settlers has proven unsatisfactory owing to the following:-  
Loss of time in terms of production and extraction.  
Consistently poor quality and loss in production.  
Abundant supply of wood.

Brief members of the Community of the implications of setting up of kilns

Training in use of kilns(metal).  
Kilns for three(3) Coop.Societies, two (2) each totalling six (6).

Min. of Coops.

Lack of resources to provide facilities to enable the kind of information necessary for proper collection, documentation and dissemination

Identify Organisational Structure.  
Identify premises  
Recruit and train staff.  
Identify and procure equipment.

Finance.  
Technology

Min. of Coops.

