

1. SUBJECT CLASSIFICATION	A. PRIMARY Science and technology	TA00-0000-0000
	B. SECONDARY General	

2. TITLE AND SUBTITLE
 Intermediate technology (IT) organizations in Africa and the Indian sub-continent

3. AUTHOR(S)
 (101) AID/TA

4. DOCUMENT DATE 1976	5. NUMBER OF PAGES 97p.	6. ARC NUMBER ARC
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7. REFERENCE ORGANIZATION NAME AND ADDRESS
 AID/TA

8. SUPPLEMENTARY NOTES (*Sponsoring Organization, Publishers, Availability*)
 (Issued as Appen.to Proposal for a program in appropriate technology: PN-AAE-693)

9. ABSTRACT
 One function of the Intermediate Technology Development Group in the United Kingdom (ITDG) is to assist in building up such organizations in the developing countries. It has been closely associated with the formation of ITDGs in Botswana, Ghana, India, Pakistan, and Sri Lanka. This paper by the ITDG in the UK describes African and Asian IT organizations and some of their activities. All fourteen of the organizations discussed were originated in the 1970s. In Botswana, the Technology Center proposed by the government is planning to investigate low-cost housing designs and materials, low-cost water and power supplies, and post-harvest processing facilities. In Ethiopia, the Appropriate Technology Unit of the Christian Relief and Development Association is engaged in information dissemination and technical assistance consulting. The Engineering Department of the National University at Addis Ababa is conducting experiments in small-scale technologies. In Ghana, the University of Science and Technology, Kumasi, is providing consulting services. In Tanzania, the Small Industries Development Organization is conducting work in food processing, building materials, and textiles. In Zambia, the Family Farms Ltd. is providing assistance with agricultural technology, as is the University of Zambia. In Bangladesh, the Appropriate Agricultural Technology Cell in Dacca is active on several fronts. In India, four organizations are active: the Appropriate Technology Cell, sponsored by the government; the Appropriate Technology Unit, sponsored by Christian Aid, the Gandhian Institute, and others; the Indian Research Institute sponsored by the AT Unit of India; and the Application of Science and Technology to Rural Areas, sponsored by the I.I.S., Tata Institute, and others. In Pakistan, the AT Development Unit is sponsored by the government. In Sri Lanka, the AT Group is sponsored by the government and industry.

10. CONTROL NUMBER PN-AAE-699	11. PRICE OF DOCUMENT
12. DESCRIPTORS Africa Asia Intermediate technology Organizations	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/TA
	15. TYPE OF DOCUMENT

ATTACHMENT "I"

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IT ORGANISATIONS IN AFRICA AND THE INDIAN SUB-CONTINENT

SUMMARY OF ORGANISATIONS

	Name	Sponsoring authority	Approx. date of origin
Botswana	Technology Centre	Botswana Government	1976
Ethiopia <i>7 in 5</i>	Appropriate Technology Unit	Christian Relief and Development Association	1975
	Engineering Dept., National University	University Volunteers	1974
Ghana	Technology Consultancy Centre	Kumasi University	1972
Tanzania	Small Industries Development Organisation (and TAMTU)	Tanzanian Government (Ministry of Industries)	1973
Zambia	Intermediate Technology Machinery Agency of Family Farms Ltd.	Christian Aid, Barclays Bank etc.	1973
	Technology Development & Advisory Unit.	University of Zambia	1975
Bangladesh	Appropriate Agricultural Technology Cell	Bangladesh Agricultural Research Council	1975
India <i>7 in 4</i>	Appropriate Technology Cell	Government of India	1970
	Appropriate Technology Unit	Christian Aid, Gandhian Institute of Studies et al.	1972
	Indian Research Institute	I.T.D.G., A.T. Unit, India ^x	1975
	Application of Science and Technology to Rural Areas	I.I.S., Bangladore, Tata Institute, et al.	1974
Pakistan	Appropriate Technology Development Unit	Government of Pakistan	1974
Sri Lanka	Appropriate Technology Group	Government and Industry (Dutch funds?)	1976

^x Started some years ago but current programme with ITDG unit started in 1975.

INTERMEDIATE TECHNOLOGY ORGANISATIONS IN AFRICA
AND THE INDIAN SUB-CONTINENT

Introduction

This paper describes what the Intermediate Technology Development Group, UK knows about other organisations concerned with intermediate technology in Africa and in the Indian sub-continent (India, Pakistan, Bangladesh and Sri Lanka).

The information is presented in three sections. Sections A and B cover IT organisations and activities in the two regions, Africa and continental India; and the final section C discusses future possibilities of getting IT centres started in developing countries, and draws some conclusions based upon the Group's experience in many African and Asian countries over the past ten years.

It should be noted that the material in this paper largely reflects working relationships that have been built up between the IT group in London, and bodies with similar interests in the developing countries. It is open to the criticism that it is patchy and incomplete; on the other hand we think it unlikely that any significant centre of IT activity has been omitted altogether.

A quick survey of the fourteen organisations we describe reveals that seven - in Ethiopia, Botswana, Tanzania, Sri Lanka and India - are in quite early stages of development. It should be born in mind that virtually all the fourteen have been created within the past three years, and most of them are less than two years old. It has been - and continues to be - ITDG's policy to build up such organisations in the developing countries, and the Group has been particularly closely associated with the formation of those in Botswana, Ghana, India, Pakistan and Sri Lanka.

A word of explanation is needed about the phrase "intermediate technology organisations." A broad interpretation of this would involve one in an impossible description of overseas activities, because very many voluntary agencies could legitimately claim to be interested in, or using, or trying to develop, appropriate technologies as some part of their activities. For present purposes we have adopted a much more restrictive definition for the

main text of this paper: we are concerned with organisations whose principal objectives are to mobilise knowledge on appropriate technologies, promote relevant r. and d. work and get field-tested information on technologies into the hands of people who can use them. In short we are concerned with organisations set up with the specific purpose of filling the "knowledge gap;" and this (excludes) the very large number of organisations which are mainly concerned with projects or programmes of development mostly using technologies developed elsewhere. (By definition we also exclude ITDG projects overseas where these are not under the wing of a local IT organisation).

Of course, voluntary agencies of all kinds in the field are unquestionably the spearhead of innovation and adaptation in the rural areas; some may be innovators, all are users and potential users of intermediate technologies. Accordingly we have added an Appendix listing organisations about which we know little beyond the fact that they contacted us expressing their interest in IT as users, as innovators, and as extension agents in the field. ^x

Finally, all the IT organisations referred to in the main text of the paper are located in countries where English influence predominates, and English is mostly the language of higher education and of administration, at least at the centre of government. The Group have had relatively little contact with French-speaking territories; and although we have some contact with the Centre d'Etude et d'Experimentation du Machinisme Agricole Tropical (CEEMAT - agricultural equipment) it is only recently that a deliberate effort to further IT work in general has been undertaken in France. The organisation concerned is the Groupe de Recherche sur les Techniques Rurales (GRET), 34 rue Demont d'Arville, 75116 Paris. It is a small non-profit body created by the Technical Co-operation Department of the French Ministry of Foreign Affairs. Its technical adviser is Jean M. Collombon. GRET is engaged in compiling a directory of names and addresses of organisations concerned with rural technologies and although this is still in its early drafts, it would be worth referring to GRET for more information about Francophone countries. ^{xx}

^x This list should be cross-checked with the TAICH Register in New York.

^{xx} Brace Research Institute, McGill University, Montreal may also have some Francophone contacts.

SECTION A : AFRICA

Botswana: Proposed Technology Centre

In many respects Botswana offers a text-book instance of a small country lacking technologies appropriate to its needs and resources. The population is small (about 600,000), rural, dispersed, and living at a low level of income and activity. Its economy is overshadowed by that of South Africa. There are few prospects for successful introduction of conventional technology.

But there are plenty of natural resources, and what is needed is a technology appropriate for this economy - which might take the form of scaling down a conventional technology to make the same product more economically, or making an alternative product by using a different technology altogether.

The Botswana government are now supporting a proposal to set up a Technology Centre. Its objects would be to ensure that knowledge of technologies appropriate to the needs and resources of the country can be identified, investigated, developed and applied. In pursuing these objectives, the Centre would make maximum use of existing research and development facilities, especially within Botswana, and would give particular attention to clearly identifying the problem areas that inhibit economic development, as perceived by those faced with these problems, and to providing the right technological solutions by field testing under operating conditions.

The Centre, it is proposed, would be a non-profit company set up by the Botswana Development Corporation; its board would include representatives from development corporations, ministries, the university and a voluntary organisation.

Subjects for early investigation would include:

- Housing:
- Alternative forms of cement
 - Small-scale production of Portland cement
 - Design of, and materials for, low-cost roofing
 - Design of low-cost housing to utilise environmental advantages of traditional forms of houses
 - Alternative materials for ceilings and partitions

- Water:**
- Low-cost supply to small rural communities
 - Methods of low-cost small-scale storage
 - Small-scale sewerage plants
- Power:**
- Utilisation of local coal as substitute for wood in rural areas
 - Uses of solar energy e.g. for water heating and pumping
 - Uses of methane, e.g. for water pumping and heating
 - Uses of wind power, e.g. for milling and water pumping

Post-harvest Agricultural Activities:

- Grain storage in rural communities
- Small-scale processing of abattoir by-products
- Small-scale sorghum milling
- Small-scale processing of dairy products

In many of the above subjects, there has already been extensive research, development and application of appropriate technologies in various parts of the world, but the transfer or adaptation of such technologies to Botswana has not been carried out.

It is expected that the costs of this project will have to be met by external aid, for the first few years at least, and funds are now being sought.

Further information can be obtained from David Wright, the ITDG representative at the Economic Commission for Africa, Addis Ababa.

Ethiopia: The Appropriate Technology Unit of the Christian Relief and Development Association.

This is a non-government unit. It was set up early in 1975, to provide technical information and advise on appropriate technology for rural development. Its main terms of reference stated that the Unit should "provide an information centre for appropriate technology for personnel in Ethiopia concerned with development and interested in sharing their experience"

After a year's operation the Unit had become well known in Ethiopia, with demands for its services steadily increasing. At the same time it came under increasing pressure to do more than give information, and it is now reorganising itself to provide a new range of services.

In brief, the proposal for an expanded work programme for the Unit include:

An information and communication service: this may have to be more selective than hitherto, as it is becoming difficult to sustain a comprehensive service in addition to the other activities proposed.

Indirect operational assistance: mobilising the knowledge and expert services of people skilled in various technologies, whether for advice or short-term consultancy assignments; it is hoped to secure such services from outside Ethiopia as well (e.g. an Austrian hydrologist who advised a number of projects during a short tour of Ethiopia, funded by the Austrian government).

Direct operational assistance: The Appropriate Technology Unit should itself employ people qualified in those skills most in demand by member agencies in Ethiopia; for example, a full-time water engineer familiar with water supply problems of developing countries (such as ITDG's Peter Stern) could be made available to work for some weeks on a number of different field projects.

Adaptation and demonstration of hardware: The commissioning of full-scale working models of rural equipment, for demonstration and teaching purposes at village level. The production (and necessary adaptation) of such models could be done in Addis workshops, or at the Village Technology Centre at the Technical School. Follow-up action after demonstration would be of critical importance.

Research and development: In such cases the Unit would act as a referral service, helping to identify the need and then presenting the problem to, say, the Faculty of Technology at the National University in Addis, or the IIS in Bangalore, ITDG UK etc.

Further information on this project can be obtained from David Wright, ITDG's officer attached to the ECA.

It should be added that currently the Ethiopian Ministry of Commerce and Industry are proposing to set up a Small-Scale Cottage and Handicraft Industries Bureau within the Ministry; its chief function will be to service a para-statal organisation (HASIDO - Handicraft and Small Industries Development Organisation) to be established or lines similar to SIDO in Tanzania.

Ethiopia: Engineering Department, National University, Addis Ababa.

The staff of the Engineering Department have been visiting the Department's workshops during the past 18 months, to carry out a number of experiments in small-scale technologies having special application to rural problems in Ethiopia. These include experiments with Savonius rotors, Humphrey pumps and various other water lifting devices.

Further information can be obtained from David Wright, as above, and Professor Jensen, Engineering Department, National University.

Ghana: The Technology Consultancy Centre, University of Science and Technology, Kumasi.

The Technology Consultancy Centre at the University of Science and Technology, Kumasi, Ghana, was formed in 1972 on the basis of proposals drawn up by ITDG, London, and with the support of UNIDO and the Inter-Universities Council, UK. It is a semi-autonomous unit within the University. Through the nucleus directing staff of the TCC (a director, a deputy and four technical assistants), the University makes available its expertise and resources to promote the industrial development of Ghana. The Centre enables government departments, existing industries and individual entrepreneurs to draw upon the services that can be provided by Kumasi's faculties of art, agriculture, architecture, engineering, pharmacy, science and social services.

The TCC has already established a reputation for stimulating grass-roots development through intermediate technology. Its work has included the upgrading of existing craft industries such as textiles, woodworking and pottery, and the introduction of new products based on local and indigenous raw materials.

Consulting services for government departments: One of the first achievements of the TCC was to organise the repair of the air-conditioning plant at Korle Bu Hospital, Accra, which had lain idle for seven years. Other work under this head has included the surveying and design of feeder roads, the valuation of public corporation assets, and the supply of metric weights for use in post offices.

The TCC's largest single project is the soap pilot plant. A prototype plant was built at Kumasi, and in 1975 another was completed at Kwamo. In all the Centre is engaged on commissioning seven small-scale soap making plants (200-500 bars per day) using mostly local raw materials and serving rural markets.

Consulting services for small industries: A very wide range of consulting services is now undertaken. Thus the Faculty of Engineering has been dealing with such matters as electric motor rewinding, the installation of a carbon dioxide welding machine, the design and manufacture of cheap feeder tubes for rabbit farming and the design of metal stamping dies. Requests for the chemical analysis of products cover cassava starch, soaps, sea shells and latex fluid. Advice to would-be entrepreneurs has been given on the manufacture of such products as gunpowder, rubber mouldings, wood and cocconut charcoal.

cosmetic powder, leather bags, paper envelopes, sugar, alcohol and chlorine.

Production units on the University campus: The work of the faculties of the University sometimes leads to the discovery of a need for a new product or process. It is not always possible, however, to persuade an entrepreneur to embark on the new venture. In some cases the business may not appear to be immediately profitable. In others, there is a reluctance to adopt unfamiliar techniques and to accept that the necessary skills can be mastered; or there are reservations about the market prospects of a new, locally made product. To meet such situations, the University establishes small-scale production units on the campus. The purposes of production units are:

- to train craftsmen and managers in the skills of the new industry;
- to complete product development under production conditions;
- to test the market for the product in a realistic way; and
- to demonstrate to entrepreneurs the viable operations of the new industrial activity.

It is not intended for the University to become a manufacturer in any permanent sense, although it may retain a financial interest in some of the industries it initiates. It is hoped that production units will eventually be established off the campus as permanent commercial enterprises operated by entrepreneurs or co-operatives of craftsmen.

Production units are operated by the faculties of art, agriculture, architecture and engineering. Others are planned by the faculties of science, and pharmacy. Some production units are joint projects with the Technology Consultancy Centre and the Centre is represented on all production unit management committees to form a link with the industrial community at large.

Production units in operation include: steel bolts, plant construction, weaving, metal products design, ceramics, building blocks and sanitary ware, traffic lights, well pumps, electric motor rewinding and metal plating.

Promotion of rural industries: During the past two years a programme has been launched for the setting up of craft centres in some 40 Ashanti villages. Other rural-based projects include brass casting, glass bead making, oil and citrus plantation development, coconut by-products and a blacksmith's training workshop. The TCC is now demonstrating the practicality of local manufacture of agricultural equipment such as pumps, driers and bullock carts.

The TCC has created a great deal of interest among other universities in developing countries. In 1975 the Director of the TCC was invited to Kenya to advise on the establishment of a similar centre at the University of Nairobi; and recently the director designate of a similar centre in Upper Volta has completed a period of training at the TCC.

The TCC is financed partly by the University, partly by its own earnings from consultancy, and partly by external sources such as the Rockefeller Foundation, Bread for the World, Oxfam Quebec, et al.

The Director of the TCC is Dr. J.W. Powell; the Deputy Director Dr. B.A. Ntim.

Tanzania: Small Industries Development Organisation and TAMTU

Although there is no unit or organisation in Tanzania specifically charged with the tasks of developing, making known and introducing appropriate technologies, these tasks - among others - are in fact being taken on by the Small Industries Development Organisation. This was formed in 1973, replacing the very urban-biased (and ineffective) National Small Industries Corporation. The basic difference in purpose is that SIDO is charged with the development and diffusion, on a regional basis, of small industries that will promote rural development in each of Tanzania's 20 provinces.

SIDO is operated on government funds, but largely dependent upon external sources for project funds and technical know-how.

The IT Group, London, is undertaking a brick and tile project for SIDO, and another on the development of an appropriate leather and footwear industry. At least one small-scale (OPS) sugar unit is being imported from India; and it is evident that SIDO would undertake a much wider programme of intermediate technology if funds were available.

The current SIDO programme, for which it is seeking both technical and financial assistance, includes the following small-scale technologies:

Food Processing

- Sugar
- Vegetable oil extraction
- Fruit and vegetable canning
- Grain milling, threshing and winnowing
- Meat processing
- Fish drying and packing
- Food waste products

Building materials and clay products

- Bricks and tiles
- Lime, pozzolana and lime blocks
- Portland cement
- Pottery and ceramics
- Glass

Textiles, clothing

- Integrated textile workshops
- Wool spinning and wool garments
- Leather tanning
- Leather products

Rural Mechanised Workshops

Other

- Salt, Fertilisers, Methane.

Although not part of the SIDO programme, and pre-dating SIDO by a number of years, reference should be made to the Tanzanian Agricultural Machinery Testing Unit, Arusha (TAMTU). This unit manufactures a wide range of animal-drawn farm equipment - ox-carts and donkey carts, harrows, planters, weeders, winnowers and so on. These are sold to local farmers - who in the Arusha area are relatively prosperous. An "inner unit" at TAMTU also developed very simple do-it-yourself technologies for villages and engaged in extension work. ITDG was instrumental in the appointment of the field officer, George McPherson, who carried out this work and who has since published his practical experience in an excellent manual First Steps in Village Mechanization. One of the objectives of SIDO is to get rural workshops on lines similar to TAMTU started in each province.

Zambia: Family Farms Ltd.

Family Farms Ltd. is a non-profit organisation which resettles and upgrades farmers in Southern Zambia. It provides a complete "package deal" including training in improved farm practice, credit, and improved technology for farm communities resettled on land made available by the government. During the six years of its existence, Family Farms has successfully trained and resettled over 500 farmers, and there are nearly 1000 on its waiting list.

The work on technology being done by Family Farms was stimulated by the ITDG Farm Equipment project which was based at Magoye Agriculture Research Station (see IT Publication, Rural Africa Development Project), and in 1973 Family Farms started a programme on rural intermediate technology (ITMA). The objectives of this programme are:

- to investigate and introduce appropriate and alternative devices, systems and use of resources related to agricultural development;
- to provide appropriate training (primarily by means of short courses) to: craftsmen and workshop operators and their assistants, farmers, their sons and employees and fishermen;
- to provide follow-up training or on the spot training on the basis of an evaluation of the preceding; and
- to liaise with other interested parties and to record and publicize information and experience gained.

A prosperous farming community creates new needs - for schools, clinics, shops and centres where equipment can be bought and repaired. To provide new and improved equipment the Family Farms intermediate workshop (near Chesekesi) is training men in blacksmithy and how to make and repair carts, groundnut lifters and a variety of hand-tools. More than 40 items of equipment have been made in the workshops. These include chisels and punches for metal, axes and adzes, blacksmiths' tongs and vices, cutting and stocking implements for harvesting, winnowing fanning mills, a sunflower thresher, water pumps, ox and bicycle carts, a sorghum syrup extractor, a washing machine and a solar cooker. All of these can be made by a trained blacksmith or carpenter. After training, the young Zambians will be assisted to set up repair shops in the different settlements.

Family Farms is financed from charitable sources, Christian Aid and

Barclay's International being major donors, and the unit is currently seeking funds to continue and expand its work.

The general manager of Family Farms is Lee Holland, P.O. Box 42, Magoye, Zambia.

Zambia: The Technology Development and Advisory Unit, University of Zambia.

The success of the TCC at Kumasi inspired the University of Zambia to set up a Technology Development and Advisory Unit early in 1975, after discussions with the Group in London amongst others; and it is clear that the Kumasi experiment has been used as an example upon which to build up the Unit's own areas of activity. The objectives of the TDAU are:

- to help and advise on the design and production of agricultural and household equipment locally;
- to serve as a development centre for new equipment and processes aimed at replacing imported models; and
- to serve as a centre to pool advice from UNZA personnel to various local industries.

The Unit will concentrate on rural development, small-scale industries and low-cost housing. In the case of development of implements and processing plants, the Unit will concentrate mainly on primary design and development up to prototype manufacture and testing.

In the agricultural field efforts will be made to develop farming equipment covering cultivation, harvesting and processing. The Unit also intends to work on processes for preserving agricultural produce.

In the long term, although the Unit wishes to avoid getting involved in full-scale commercial exploitation, the University may wish to expand the activities of the Centre and establish it as a Centre for Industrial Studies similar to that of Loughborough University of Technology. The aim may be to establish a workshop which will manufacture certain items.

In summary, the activities of the Technology Development and Advisory Unit cover three areas of operation:

- a) Traditional Consultancy: This mainly looks after the problems of big business concerns, pooling together expertise and other resources

available at the University. Normal consultancy fees will be charged.

- b) Consultancy to small business enterprises: This is regarded more as a service to the community and the nation. This **is not expected to bring in much in terms of income to the TDAU and others involved; but it is a vital contribution to the economic development of the country.**
- c) Pilot projects: This is a scheme whereby when a process is developed, a production unit is set up within the campus to prove its capability and viability. Eventually this is transferred outside the campus to an interested entrepreneur. The process development may be at the initiative of the entrepreneur himself.

Projects

Currently the following projects are in progress:

- Design and manufacture of block-making machines
- Design and manufacture of cashew-nut processing plant.

Both projects are undertaken on behalf of the Ministry of Rural Development. The block-making machine project, on hand-operated, single cell machines, has reached a stage where an entrepreneur, in collaboration with the TDAU, can establish production on a commercial basis. The School of Engineering has already produced 8 prototypes and a further 20 are on order.

The next stage of the block-making machine project is development of multi-cell units which will be mechanically or hydraulically operated.

Some possible areas of action in the immediate future are:

- Development and manufacture of paper (spider) glue using cassava starch and potash obtained from husks of plantain. Luapula Province where both cassava and plantain are available can be a target for the development of such an industry aimed at reducing the importation of paper glue into Zambia.
- Manufacture of some household electrical components and other household implements.
- Manufacture of nuts, bolts and rivets.
- Development of processes for soap making adapting traditional methods.
- Design and manufacture of low-cost housing units and components.

- Agricultural implements and similar undertakings.
- Food processing and preservation development.
- Wind-powered generators and pumps for rural use.
- Manufacture of wire clips.

Other ideas from industry, government and the general public have been invited.

The Unit relies on funding by the University, and is chronically short of money; sources of external funds are a priority.

The acting manager of the Unit is Professor B. Fergusson, Head of the Department of Mechanical Engineering, University of Zambia.

SECTION B : THE INDIAN SUB-CONTINENT.

Bangladesh: Appropriate Agricultural Technology Cell

The need for technologies appropriate to the conditions of rural Bangladesh was clearly recognised during a three-day workshop on "Appropriate Agricultural Technology" held in Dacca under government auspices in February 1975. One of the consequences was the setting up of a Cell for Appropriate Technology, under the administration of the Bangladesh Agricultural Research Council. The objectives of the Cell are:

- to develop, adapt and promote labour intensive and capital saving machinery, implements and techniques for agricultural production;
- to develop and promote the manufacture of machinery and implements involving greater utilisation of local resources and reducing dependence on import of machinery and implements;
- to develop appropriate drying, storage, processing and milling facilities to prevent post-harvest losses;
- to encourage setting up of agricultural workshops for the manufacture of agricultural machinery and implements; and
- to develop techniques to increase production per unit of capital investment.

Functions: To achieve these objectives, the Appropriate Agricultural Technology Cell is entrusted with the following functions:

- Collection and dissemination of information on appropriate technology for those connected with such technologies.
- Initiation and promotion of action research on appropriate technologies.
- Financing, co-ordinating and evaluating research on appropriate agricultural technologies.

Programme: Within the above broad guide lines, the following programme has been drawn up for the Cell:

- Surveys to record the existing and new innovations in Bangladesh
- Holding workshops on special topics.
- Study tour to developing countries, mostly in Asia.
- Establishment of linkages with other similar institutes or organisations elsewhere.

- Production of policy documents in relevant areas of technology.
- Circulation and information, using newsletters in Bengali and English, as well as slides and demonstrations.
- Display and demonstration of appropriate technology equipment and appropriate organisational arrangements.
- Supporting research on appropriate technologies by giving grants to researchers in universities, institutions and individuals.
- Import of prototypes of potential appropriate technology.
- Obtain expatriate and local consultants in specific areas of appropriate technology.
- Establishment of a Library and Documentation Centre for the purposes of collecting reports and information concerning appropriate technology in Bangladesh coming out from government agencies, voluntary agencies, foreign donors and other sources; collecting books and journals dealing with appropriate technology; and publishing research reports, some of which will be financed by the Appropriate Agricultural Technology Cell.

Organisation: To formulate policy and guide the activities of the AATC it is planned to have a body at national level comprising:

Secretary, Ministry of Agriculture	Chairman
Secretary, Ministry of Forests, Fisheries and Livestock	Member
Secretary, Ministry of Co-operatives and Rural Development	"
Chief, Agriculture Division, Planning Commission	"
Executive Vice-Chairman, Bangladesh Agricultural Research Council	"
Director, Appropriate Agricultural Technology Cell	Member/Director

The national body may co-opt new members, as and when necessary.

The representatives of donor countries may be invited to attend the meetings.

The Appropriate Agricultural Technology Cell will be headed by a Director working under the guidance and the administrative control of the Executive Vice-Chairman, BARC. Working groups will be formed in specified fields such as:

Draught power
 Irrigation
 Fertiliser uses and agronomical methods
 Post-harvest operations
 Agricultural workshops etc.

The members of each group will formulate plan-programmes in their own fields.

Future plan of expansion: The present project is regarded by the BARC as a small start; future work should expand into such fields as animal husbandry, fisheries, village-based industries, rural housing, nutrition and household food preparation, health and sanitation, family planning and village-level physical planning under the umbrella of an autonomous Institute of Appropriate Agricultural Technologies. An approach has been made to ITDG to provide a mission to Bangladesh in October/November 1976, to advise and assist in the development of this Institute.

Further information should be obtained from:

The Director, B.A.R.C.,
 130-C, Dhanmoudi Residential Area,
 Road No. 1.,
 Dacca 5.

Stephen Biggs,
 Ford Foundation,
 P.O. Box 98,
 Ramna,
 Dacca A-2.

Winburn T. Thomas,
 Association of Voluntary Agencies in Bangladesh,
 Box 5045,
 Dacca - 5.

India: The Appropriate Technology Cell; The AT Unit, and M.K. Garg, Lucknow; IRI Coimbatore; ASTRA, Bangalore.

Government-sponsored action on appropriate technology in India has so far been of a token kind. In 1967 the ITDG, London, started a voluntary Appropriate Technology group in Delhi; this was disbanded in 1969, and about a year later the Ministry of Industrial Development set up an Appropriate Technology Cell within its own organisation, with one officer in charge. The Cell produced a short series of publications on the possibilities of appropriate technology in India; but it now appears to be moribund and according to rumour in Delhi, may be disbanded.

However, many non-official organisations have long been interested in the subject, and in 1972 ITDG London helped to set up the Appropriate Technology Development Unit within the Gandhian Institute of Studies, Varanasi. The Unit's remit was to identify needs for improved rural technologies; promote the necessary r. and d. and arrange for field testing and demonstration, and dissemination of results. Among its activities to date it has identified or helped to promote r. and d. work in a number of universities and institutes of technology:

- Agricultural Research Institute, Kanke, Ranchi: Aero Seed Fiddle, multi-Row Seed Drill, Soil Testing Kit.
- Banaras Hindu University, Varanasi: Paddy Thresher, Small-scale equipment for the manufacture of zip fasteners, 3-g geared cycle rickshaw.
- I.I.T., Kanpur: Algae production with the help of solar energy, small-scale construction and building.
- I.I.T. Kharagpur: Ferro-cement boats, pedal operated lathe.
- Muslim University, Aligarh: Windmill, electric generator, solar collector.
- I.I.T., Pawai, Bombay: Windmill operated water pump, solar collector, hydrant, casuarina oil expeller, evaporation of water from pond.
- Allabad Polytechnic: The curriculum Development Centre for the Polytechnics are trying to develop a curriculum for appropriate technology. Some of the IIT's, like the B.H.U. Varanasi and Bombay, have also introduced appropriate technology courses in their curricula.
- I.I.T. Delhi propose to start a survey of all IT work in India, for publication.

The Unit is about to publish an illustrated guide to rural technologies of proven utility in rural India.

Owing to recent problems in India and the virtual closure of the Gandhian Institute, the Unit is now being reorganised and established in Lucknow. For further information contact:

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C-10/1 River Bank Colony,
Lucknow.

M.K. Garg, Lucknow. M.K. Garg, one of India's leading rural technologists, is now associated with the IT Unit as its hon. consultant technologist. Garg was formerly technical director of the Planning Research and Action Institute, Lucknow, and during his service there was responsible for developing small-scale ceramics, small-scale sugar refining and a number of the rural industries. He is most noted for his work on upgrading the Open Pan Sulphitation sugar plant, which is about 1/50th capital cost of a large-scale sugar mill, and of which there are now over 600 operating in India in the private sector. Among his current activities there is one of particular interest to ITDG, namely the development of small-scale plants (20/30 tons per day) for Portland cement manufacture. The Group are currently seeking funds to complete this work. Garg is also the AT Unit's representative on the board of the Indian Research Institute, which is working on the development of a small-scale mechanised cotton spinning unit, in which ITDG are also very interested.

IRI Coimbatore. The Indian Research Institute, Coimbatore, is working to fill one of the major "technological gaps" in small-scale industry, namely the absence of a small-scale mechanized spinning unit. In this case too, the Group are seeking funds to complete the work in India.

ASTRA, Bangalore. In mid-1974 the Indian Institute of Science, Bangalore, created a unit for the Application of Science and Technology to Rural Areas (ASTRA). Its aims are:

- to catalyse the development/testing of village-oriented technologies on the Institute campus;
- to establish an Extension Centre amidst a cluster of villages near Bangalore; and

- to accomplish and monitor the transfer of the developed/tested technologies to rural areas through the Extension Centre and through established rural development agencies.

To stimulate the interest of faculty and students in rural problems ASTRA started by holding 15 seminars on a wide variety of subjects such as bullock-carts, bicycles, rural schools, solar energy, bio-gas plants, rural housing, hand-pumps for drinking-water wells, monsoon prediction and agricultural planning, algae as food, fuel and fertilizers, and small-scale manufacture of cement and paper.

As a result, work on about 12 projects has been initiated since August 1974. This work, involving over 25 faculty members, is at present focussed on windmills, hand-pumps, bullock-carts, bicycles, rural housing, low-cost teaching materials, bio-gas plants, small-scale lime pozzolana cement plants, sodium silicate from rice husks, solar air-conditioning, fluidyne engines and Humphrey pumps.

The Extension Centre will be located at Ungra village (Kunigal Taluk, Tumkur District) about 115 kms. from Bangalore and on the banks of the Shimsha river. The area holds out possibilities of work on small-scale sugar and jaggery plants, bagasse-based hand-made paper, castor-oil based plastics, rice-husk and corn-bran oil products, activated carbon from coconut shells, glass from river sand, cement plants from local limestone, silk-worm rearing, etc. In addition there are weavers, potters, blacksmiths, bullock-cartwrights and brass workers in the region. The Government of Karnataka has recently agreed to lease about 50 acres of land on the periphery of Ungra village, so that the Institute can establish its Extension Centre.

The following work at the Ungra Extension Centre is in progress:

- A survey of Ungra and the surrounding villages is being carried out in order to define the technologies appropriate for the area;
- a study is being made of agricultural and dairy operations necessary to make the small Institute group at the Extension Centre as ecologically self-sufficient as possible with regard to energy (bio-gas), cereals, milk and other perishables; and
- a master-plan for the Extension Centre campus and plans for the individual buildings.

The Council of the Indian Institute of Science has given its full support to ASTRA.

The response from the Institute faculty has exceeded expectations, and the active co-operation on ASTRA projects, which extends beyond departmental frontiers, has made ASTRA into a genuine interdisciplinary activity which may prove of considerable significance for the Institute.

About eighteen official and non-official organizations in the country have come forth with encouragement and, in some cases, help and offers of support. Mention must particularly be made of the Tata Energy Research Institute which has approved a grant of Rs.3,09,400 to support ASTRA's projects on bio-gas technology, windmills and bullock-carts.

The acting director of ASTRA is

Professor K. Krishna Prasad,
ASTRA,
Indian Institute of Science,
Bangalore 560 0012.

Pakistan: Appropriate Technology Development Organisation.

The Pakistan ATDO was set up in mid-1974, following recommendations for the establishment of such a unit made by an ITDG team which visited Pakistan (at the request of the Pakistan Government) in December 1973.

In the two years of the ATDO's existence really substantial progress has been made; as far as the IT Group in London is aware, more is being done in Pakistan than in any other country (with the exception of China).

Tables I and II overleaf summarize progress and work in hand. These are taken from a detailed report prepared by the unit's director, Ghulam Kibria.

TABLE I: PROGRESS AT A GLANCE

TECHNOLOGY	State of Development				
	I.	II.	III.	IV.	V.
Paper Pulp from Banana Plant	D	D	D		D
Dehydration of Fruits and Vegetables	D				
Screw type Sugar Cane Juice Extraction Machine	D	PD			D
Fertilizer and Gas from Gobar	D	D			D
Simple Wool Spinning Machines	D	D	D		D
Rural Unit of Insecticide from Tobacco Waste	D	D ¹	PD	PD	D
Simple Turbine (Dr. Banki's Cross-flow design) for 50 & 100 KW generators, medium heads.	D	D ²		D ³	
Pelton Wheel for 5 & 10 KW generators, high heads.	D				
Pan Charkhi for 3,5 and 10 KW generators, low and very low heads.	D	PD			D
Wind Mill for Water Lifting	D	PD			D
Wind Mill for Electric Generation ⁴					
Vinegar from Over-ripe Dates	D				
Mazri Fiber	D				D
Paddy Drier ⁵	D	D	D	D	D
Rice and Wheat Threshers	D ⁶				D
Earth-Moving devices for Agriculture and Irrigation, Ox driven.	D	D	D	D	
Electricity from Canal Falls ⁸	D	D	D	D	D
Low Cost Housing.	D	D			D
Low Cost Primary School Buildings	D			PD	D
Small Scale High Extraction Oil Expellers/ Kolhu ⁹ .					
Kundal Shahi Hydrel ¹⁰ .	-	-	-	-	-
Bio-gas as Fuel for Petrol Engine.	D				

Explanatory Notes

- | | |
|-------|--|
| Stage | <ul style="list-style-type: none"> I. Lab. Research/Drawing board/Fabrication. II. Field Testing/Testing in Industrial Plant. III. Social/Industrial acceptance. IV. Evaluation of social and economic benefits. V. Identification of extension organization. D. Signifies completely done. PD. Signifies "Partly done." |
| Notes | <ul style="list-style-type: none"> 1. Testing of bigger plant has been successfully done by PCSIR's leasing of process to Industries. Nicotine sulphate is recognised as a useful insecticide by experts. 2. This turbine was developed in co-operation with Nepal. It was installed in North Western Nepal and was found successful. 3. Reports from Nepal establish its social and economic viability. 4. Literature for fabricating a test unit is being collected. 5. Prototype was designed, fabricated and tested by IRRI and many units are since working in different Far Eastern Countries. 6. Development has been done on the basis of IRRI drawings but Pakistan rice stem being longer lots of changes had to be made, and thus it has become altogether a new design, and thus it has become altogether a new design. Wheat thresher has passed drawing board stage and is under fabrication by the designer. 7. It has been tested in Turkey and Afghanistan and found useful by VITA. |

- Notes
8. Development was done in France and many units have been installed and have proved effectiveness of technology.
 9. U.S. Aid want development of an expeller or kohlu with about 90% extraction, to replace conventional kolhu with maximum 55% extraction. Some private firms in Lahore have agreed to undertake this work.
 10. This work was entrusted to ATDO only two months back. It was pending for the last two years. As a first step, machinery has now been acquired from WAPDA where it was lying idle at Gunjial near Jauherabad.

TABLE II : FINANCING OF ATDO PROGRAMME

S.No.	Technology	Financed by	Date of starting	R & D Agency	Amount allocated	Amount spent	Bottle necks
					Rs	Rs	
1.	Paper pulp from	P B A	June 1974	Prof. Naqvi of Sind University	10,000.00	10,000.00	--
2.	Dehydration of fruits and vegetables.	Federal Government	Sept. 1974	PCSIR Peshawar Lahore.	106,000.00	6,000.00 Balance funds not released.	Release of funds
3.	Screw type sugar can juice extraction machine.	Muslim Commercial Bank loan. U.S. aid	Dec. 1974	Prof. Ahmad Ali.	50,000.00	35,000.00	Unavailability of field test facility.
4.	Fertilizer and Gas from Gobar.	Federal Government.	May 1974	Basic know-how obtained from India and China Local agencies, Energy Resources Cell. Sind University.	27,500.00	7,500.00 Balance funds not released.	
5.	Simple wool spinning machines.	Federal Government. Habib Bank Ltd.	March 1974	PCSIR Peshawar	10,000.00	9,720.00	Sickness of workshop in charge of PCSIR Lahore.
6.	Rural Unit of Insecticide from tobacco waste.	P B A	April 1974	PCSIR Lahore	9,000.00	9,000.00	Sickness of workshop in charge of PCSIR Lahore.

S.No.	Technology	Financed by	Date of starting	R & D Agency	Amount allocated Rs	Amount spent Rs	Bottle necks
7.	Simple Turbine (Dr.Banki's Cross-flow design) for 50 & 100 KW generation medium heads. a. Turbine b. Generator	P B A	Jan. 1975	Nepal.Dr.Tufail Ahmad. Mr. Ghulam Kibria.	26,000.00 a. 2,750.00 b.15,000.00		Lack of facilities to visit and inspect machine working in Nepal.
8.	Pelton Wheel for 5 & 10 KW generation, high heads.	P S F	Oct. 1974	Dr.Abdullah & S.Farooq Ahmad of Peshawar University.	10,000.00	5,000.00	
9.	Pan Charkhi for 3, 5 & 10 KW generation at low and very low heads. a. Water Wheel b. Generator	Federal Government. P B A Siemens	Oct. 1974	Dr. Abdullah & Farooq Ali of Peshawar University.	80,000.00 10,000.00 15,000.00	(Only Rs. 32,000.00 released) 1,500.00 15,000.00	Lack of transport facilities.
10.	Wind Mill for water lifting.	United Bank Ltd. loan.	April 1975	Mr. Mahmood A. Futehally. Mr. Ghulam Kibria.	30,000.00	Not known	
11.	Wind mill for electricity generation.	-	-	Mr. Mahmood A. Futehally. Mr.Ghulam Kibria.	-	-	
12.	Vinegar from over-ripe dates.	P C S I R	Nov. 1975	PCSIR Peshawar	15,000.00	Not known	

S.No.	Technology	Financed by	Date of starting	R & D Agency	Amount Allocated Rs	Amount spent Rs	Bottle necks
13.	Mazri Fiber	Federal Government Baluchistan Government	Nov. 1975	PCSIR Karachi	24,000.00 1,000.00	Funds not released Funds not released	Funds not released Funds not released
14.	Paddy Drier	Funding agency not yet found	Dec. 1975	I R R I	Funds not yet allocated		
15.	Rice and wheat threshers	Federal government	Sept. 1975	Mr. B.Y.Khan	5,000.00	Funds not released	Funds not released
16.	Earth moving devices for Agriculture and Irrigation Ox-driven.	Federal government	Oct. 1975	V I T A	10,000.00	Funds not released	Funds not released
17.	Electricity from Canal Falls.	UNDP/ILO	Nov. 1975	Alsthom Nyrepic France	Allocation not yet made.		
18.	Low Cost Housing	Federal Government	March 1975		26,000.00	Funds not released	Funds not released
19.	Low Cost Primary School Buildings.	Federal Government	Nov. 1975				
20.	Small Scale High Extraction Oil Expellers/kolhu		Nov. 1975		Allocation not made.		
21	Kundal Shahi Hydel		<u>Sept. 1973</u> Sept. 1975		Funds not allocated.		
22.	Bio-gas as fuel for petrol engines.	Federal Government	Aug. 1975	Prof.Iqbal Hussein Shah of Peshawar University.	4,300.00	Funds not released	Funds not released

The Unit is attached to the Planning & Development Division, Government of Pakistan. Although substantial funds (8½ million Rupees) were allocated to the programme, it is only during the past year that any funds have been released; until then, it seems that the banks largely supported the Unit's work. (The head of the National Bank of Pakistan has long been a supporter of IT) and they continue to do so in no small measure. But the Unit is still obviously short of funds. So far, the bulk of the r. and d. work is being undertaken by Government research units, chiefly the PCSIR, the universities, but more recently private industry has become involved. Following meetings with industrial experts organised by the Lahore Chamber of Commerce, industries have provided the ATDO with a list of technologies on which they are prepared to do development work of the kind required by the ATDO. These include:

- Cotton Ginning Plant
- Oil Expellers
- Rubber and plastic goods
- Rope making
- Spinning
- Sugar making
- Workshop machinery
- Rice-husking plant
- Flour milling
- Paper
- Agricultural machinery
- Dyes and colour plant

The Lahore Chamber of Commerce, besides widely publicising the work of the Unit, has appointed a team to carry out economic studies on the technologies developed, and has published one on the cottage match industry and another on hand-loomed terry towels.

The Punjab Government have shown particular interest in the ATDO and have commissioned the Unit to undertake the technical direction, planning and supervision of its rural housing scheme under which 500,000 plots of land are being distributed free to homeless rural poor.

Further information can be obtained from:

Ghulam Kibria, Director,
 Appropriate Technology Development Organisation,
 Planning & Development Division,
 Government of Pakistan,
 17-B Satellite Town,
 Rawalpindi.

Sri Lanka: The Appropriate Technology Group

Evidence of interest by individuals and small groups (e.g. of engineers) in appropriate technology was reaching ITDG as early as 1967; but it was not until Dr. E.F. Schumacher's visit, sponsored by the ILO in 1975 that an Appropriate Technology Group was formed. In the intervening years the potential for intermediate technology had built up, both in government and outside it. On the government side, the work of the Regional Development Division (Ministry of Planning and Economic Affairs) increasingly exposed the need for new and better rural technologies; and among other things a major programme for upgrading village blacksmiths has been started. On the non-government side, the extensive activities of the Savodaya Shramadana movement in 1000 villages provided another segment of the 'market' for intermediate technologies.

The Appropriate Technology Group (Sri Lanka) is a broadly-based organisation, representing government, industry and the professions (on the lines of the IT Group in London). The Chairman is Dr. A.M.N. Amarakone, who is President of the Association of Scientific and Technical Workers of Sri Lanka, and Secretary, Ministry of Housing and Construction. The university, private industry and public corporations are also represented. The Group's immediate work programme is to:

- collect and catalogue information from firms offering specialised services in the manufacture of engineering tools;
- survey small industries which have been sponsored through banking institutions, to discover their problems, and find ways of helping to solve them;
- identify manufacturers of dies and moulds for small-scale rubber mouldings;
- collect technical information on formulations, process conditions etc. relating to small-scale rubber moulding;
- identify specialised welding techniques available in Sri Lanka;
- identify firms offering services for the recovery of broken/worn machine components;
- catalogue manufacturers of machine tools for woodworking;

- collaborate with the Light Engineering Industrial Co-operative Union Ltd. to ascertain whether services are needed by metal working units functioning within their orbit; and
- identify manufacturers of accessories for textile machinery both handloom and powerloom.

TOOL (Eindhoven, Netherlands) are collaborating technically with the ATG - they have recently been working on windpower applications there - and it also seems possible that they will provide some funds for the Group's operations. The budget for the first two years is estimated at some £13,000, of which about one-quarter represents capital expenditure and the rest operating costs.

The Secretary of the ATG (Sri Lanka) is C.S. de Saram, c/o Chemical Industries (Colombo) Ltd., P.O. Box 352, Colombo 5.

APPENDIX:

Organisations with IT interests in Africa
and the Indian Sub-Continent

B A N G L A D E S H

Canadian Hunger Foundation,
Project Director,
P.O. Box 27,
Iqbal Road,
Chittagong.

Jatio Church Parisad Bangladesh,
(Emergency Food Programme Relief &
Development Corps),
P.O. Box 220, Ramna,
Dacca 2.

Association of Voluntary Agencies in Bangladesh,
P.O. Box 5045,
Dacca 5.
549F Road 14,
Dhanmandi,
Dacca 5. tel: 313923

Swallows in Sweden,
Thanpara Project,
Sardah,
Rajshadi District.

Azharul Huq, Secretary,
Bangladesh Agricultural Research Council Task Force.
on Appropriate Technology,
Bangladesh Agricultural Institute,
Sher-e-Bangla Nagar,
Dacca.

Canadian University Service Overseas, (CUSO),
37, Indira Road,
Dacca. tel: 317084

International Voluntary Service,
549F, Road 14,
Dhanmandi,
Dacca 5. tel: 313923

Organisation of Netherlands Volunteers,
296 Elephant Road,
Dacca.

Australian Baptist Missionary Society,
42 Green Road,
Dacca.

BANGLADESH

Bangladesh Academy of Rural Development,
Kotbari, Comilla.

L. M. Lockwood,
Storage & Handling,
Appropriate Technology Cell,
Bangladesh Agricultural Research Council,
130C, Road 1,
Dhanmandi, Dacca.

Dr. Zafrullah Chowdhury,
Gono Shasthaya Kendra (People's Health Centre)
Nayarhat District.

Cottage Industry Project,
Islamic University,
Santosh, Tangail.

For Those Who Have Less, (Australian/Asian rural relief)
14/24 Shahjahan Road,
Block - "A", Mohammadpur,
Dacca 7. tel. 311676

HEED Bangladesh (Health Education Economic Development)
240, Road 21, Dhanmondi, Dacca 5.
P.O. Box 5052, Newmarket, Dacca 8 tel: 311601

B O T S W A N A

Serowe Brigades Development Trust,
Secretary: Patrick van Rensburg,
P.O. Box 121,
Serowe.

Veruon Gibberd,
Private Bag 5,
Serowe Farmers Brigade,
Serowe.

Clement M. Oliphant, (Director, Service Dept)
Botswana Christian Council,
P.O. Box 355,
Gaberone.

Kweneng Rural Development Association,
Private Bag, 7,
Molepolole. tel: 58

Mochudi Farmer's Brigade,
Kgatleng Development Board,
P.O. Box 208,
Mochudi.

Rural Industries Innovation Centre,
P.O. Box 18,
Gaberone.

Ms C. A. Bond,
Women's Extension,
Division of Agricultural Extension,
Ministry of Agriculture,
Private Bag 3, Gaberone.

Agricultural Information Service,
Minsitry of Agriculture,
Private Bag 3, Gaberone.

Pelegano Village Industries,
P.O. Box 464,
Gaberone.

BEDU,
P.O. Box 438,
Gaberone.

B.E.D.C.O.,
P.O. Box 1216,
Maseru.

Boikanyo Engineering & Service Station,
P.O. Box 102, Molepolole.
Manager - Ulrich Dehler

B U R U N D I

I.N.A.D.E.S.,
B.P. 2520,
Bujumbura.

Gabrielle de Marneffe,
B.P. 2520, (via INADES)
Bujumbura

Geoff Bishop (Australian - engineer- building - water)
HOpital de Buhiga,
D.S. 127,
Bujumbura.

Eglise Protestante Episcopaleane de Burundi,
Buye,
B.P. 58,
Ngoze.

C A M E R O U N

I.N.A.D.E.S.,
B.P. 5 Douala.

Association Suisse d'Assistance Technique,
B.P. 32,
Buea. tel: 32 72 14

Commission pour le Development,
Federation des Eglises et Missions
Evangeliques du Cameroun, (FEMECC)
B.P. 790,
Yaounde. tel: 2243 ;4

Oxfam,
s/c B.P. 547,
Yaounde. tel: 22 50 40

John Pilgrim,
Director,
Centre of Applied Research,
Pan-African Institute for Development,
P.O. Box 4056,
Douala.

Institut Pedagogoi Appliquee a Vocation Rurale,
B.P. 8,
Buea.

CENTRAL AFRICAN REPUBLIC

Comite National de Recherches Scientifiques
et Techniques,
B.P. 701 et B.P. 801,
Bangui.

C O N G O

Conseil National de la Recherche Scientifique
et Technique, Ecole Supérieure des Sciences,
Brazzaville,.

Project de Developpement Rural,
Bureau Internationale du Travail,
Nations Unies,
B.P. 465,
Brazzaville.

tel: 20.74

DAHOMEY

Centre d'Etudes et de Promotion des
Enterprises Dahomeennes (CEPED)

B.P. 2022,
Cotonou

tel: 31 35 51
31 23 59

African Rural Storage Centre.

E T H I O P I A

Baptist Mission,
Mehal Meda,
Shoa,
Menz.

Carl & Vera Hanse, (work with Mennonites)
Box 102,
Dire Dawa.

Camille de Stoop,
B.P. 3406,
Soddo-Wolhamo (via INADES)

Ato Asfaw Yemirru,
Asere Hawariat School,
P.O. Box 21495,
Addis Ababa.

Brian Thorogood,
TAIDL,
P.O. Box 26,
Makele.

Margaret Snyder,
African Training & Research Centre for Women,
U.N.E.C.A.,
P.O. Box 3001,
Addis Ababa.

Ministry of Agriculture,
Chilalo Agricultural Development Unit (CADU)
P.O. Box 3376,
Addis Ababa.

Colin Ellis,
British Transport & Road Research Lab,
Box 40125,
Addis Ababa.

Institute of Agricultural Research,
P.O. Box 2003,
Addis Ababa.

Christian Relief & Development Association,
P.O. Box 5674,
Addis Ababa.

Harold Pearson,
Selekleka Agricultural Implements Project,
P.O. Box
Tigre.

Peter Stern,
National Water Resources Commission,
P.O. Box 1008.

ETHIOPIA

Dr. Metches,
Head, Dept. of Civil Engineering,
Faculty of Technology,
National University,
P.O. Box 518,
Addis Ababa.

Village Technology Innovation Experiment (VTIE)
c/o Peace Corps,
P.O. Box 1096,
Addis Ababa.

Ato Abraham Tesfamariam,
Village Technology Innovation Experiment,
P.O. Box 1107,
Asmara.

David Wright (ITDG),
Box 60039,
Africa Hall,
Addis Ababa.

Office tel: 447200 ex 163
Home tel: 154548

World Vision of Ethiopia,
P.O. Box 3330,
Addis Ababa. tel: 152100

The Workshop (making artificial limbs, wheelchairs,
crutches and walking sticks)
St. Pauls Hospital,
Addis Ababa.

Institute of Development Research,
Haile Sellassie I University,
P.O. Box 1176,
Addis Ababa.

Association for the Advancement of Agricultural
Sciences in Africa,
P.O. Box 30087,
Addis Ababa.

Ethiopian Technological Pioneers Centre, (E.T.P.C.)
The Technical School,
Addis Ababa.

International Livestock Centre for Africa,
P.O. Box 5689,
Addis Ababa.

Journal for Social Work Education in Africa,
Association for Social Work Education in Africa,
P.O. Box 1176,
Addis Ababa.

ETHIOPIA

Marilyn Carr,
Women's Centre,
U.N.E.C.A.,
P.O. Box 3001,
Addis Ababa.

G A M B I A

A. Neilson,
Small Enterprises Adviser,
Presidents Office,
Bathurst.

W.E.C.,
P.O. Box 86,
Banjul.

Bishop Rigal Elisee,
P.O. Box 51,
Banjul,

R.D. Mann,
c/o Methodist Church,
P.O. Box 288,
Banjul.

Fabalah-A-Kinteh,
c/o Community Development Centre,
Masseme,
Kiang East,
L.R. Division.

Gambia Co-operative Union Ltd.,
P.O. Box 505,
Banjul.

G H A N A

Dr. J. W. Powell,
Director,
Technology Consultancy Centre,
University of Science and Technology,
University Post Office,
Kumasi. tel: Kumase 5351-5360

Prof. G. J. J. Hunt,
Dept of Building Technology,
U.S.T.,
Kumasi.

Ghana Rural Reconstruction Movement,
P.O. Box 2338,
Accra.
(Secretary Kwadwo Ohene-Ampofo tel: Accra 23688 - office
24190 - home)

New Ayoma Youth Association,
c/o P.O. Box 16,
New Ayoma, (Chairman - Francis K. Agbo)
Volta Region.

Norman H. F. Owen,
Secretary,
Y.M.C.A.,
P.O. Box 738,
Accra. tel: 24700

Dept of Nutrition and Food Science,
P.O. Box 134,
University of Ghana,
Legon.

Karl Amsler,
W.E.C.,
Tuna,
via Bole, Northern Region.

Mrs. Martha Doni Kwame, (nutrition)
P.O. Box 21,
Laura,
Upper Region.

Dr. G. Benneh, (ecologist)
Lecturer,
Dept. of Geography,
University of Legon,
Accra.

Dr. Oracca Tetteh,
Dept of Nutrition, (nut protein and nut grinders)
University of Ghana,
Legon.

GHANA

Moise Mensah,
P.O. Box 1628, (Exec Sec Advisory Cttee on Food Prod.)
Accra.

Mrs. Justice A. R. Jiagge,
Chairman,
National Council on Women & Development,
Court of Appeal,
P.O. Box 119,
Accra.

Ghana Science Association,
P.O. Box 7,
Legon.

Anthony Max Cobbina,
Ghana Water & Sewerage Corp.
P.O. Box 24,
Bolgatanga.

INDIAN "DEVELOPMENT" ORGANISATIONS

M.K.GARG,

C-10/1, River Bank Colony,
Lucknow, U.P. tel: 26969

Venkat Rao, (manufacturing methane plants)
28, New Street,
Tenkasi (627811)
Tirunelveli District,
Tamil Nadu,
South India.

Dr. Y. Nayudaamma, (Y.N. built up the Leather Research
Director General, Inst at Mysore)
Council of Scientific & Industrial Research,
New Delhi, 110001.

Edward Loring,
Auma Interfunction, Postal Address: Sri Aurobindo Ashram,
3 & 5 rue Dupuy, P.O. Pondicherry 605002
Pondicherry. tel: 130

Skills for Progress, (SKIP),
72, Brigade Road,
Bangalore - 560025

Institute of Social Service, (Miss Dorothy Baker)
Nirmala Niketan, (hammering banana stalks)
38 New Marine Lines,
Bombay 400 020 tel: 292615

Vimala Welfare Centre, (associated with the Institute
Vimalalayam, of Social Service in Bombay)
Eruakulam,
Cochnin 18,
Kerala State.

Dr. Janet Duncan,
Tibetan Mission House,
Kalimpong,
Darjeeling District,
West Bengal.

J. Rajan Alexander,
Water Development Society,
C-2 & C-5 Industrial Estate,
Moula Ali,
Hyderabad 500040

Rev. J. John,
Rural Life Centre,
Deenabandupuram,
Shanti Nilayan, R.K. Pet,
Chingleput Dt.,
Tamil Nadu.

Central Indian Medicinal Plant Organisation,
Haldwani,
U. P.

INDIA

Sethi,
National Industrial Development Corp Ltd.,
Chanakya Bhavan,
Vinay Marg,
New Delhi, 110 021, tel: 70179

Boy's Town, (training craftsmen- sheet metal working,
via Melakkal Road, welding, forging, carpentry etc.,)
Madurai 625019.

Village Industrialisation Association,
"Pragati",
Civil Lines,
Wardha, M.S.

Protein Foods & Nutrition Development Ass. of India,
22 Bhulabhai Desai Road,
Bombay 400/026

Centre for Development Studies,
Aakulam Road,
Ulloor,
Trivandrum 695011,
Kerala State. tel: 8412

International Crops Research Institute
for the Semi-Arid Tropics (ICRISAT),
1-11-256, Begumpet,
Hyderabad 500016, A.P. tel: 72091, 72628

Prof A.K.N. Reddy,
Cell for the Application of Science and Technology
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