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**FOLLOW-UP ACTIVITIES  
ON  
UNIDO WORKSHOP, NEW DELHI-1990**

**DECEMBER 1990**



**Telecommunications Consultants India Ltd.**

**( A Government of India Enterprise )  
CHIRANJIV TOWER, 3RD FLOOR, 43, NEHRU PLACE,  
NEW DELHI-110 019 INDIA**

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**CHAPTER I**

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# 1. INTRODUCTION

## GENERAL

1.01 The "Conference on National Strategies and International Cooperation for the Telecommunications Industry in Africa" held at Arusha, United Republic of Tanzania, during 11-15 December 1989 recommended that UNIDO (United Nations Industrial Development Organisation, Vienna) and ITU (International Telecommunication Union, Geneva) may, subject to funding, support technical and economic cooperation for the development of telecommunications industry in Africa, specially by assisting African attendance and participation in the "Electronics '90-Exhibition and Conference on Electronics Industries in India" with a view to promoting technology transfer projects between the developing countries.

1.02 As a follow-on of the Arusha Conference recommendation, UNIDO organised a Workshop for African & Arab Country Representatives from Telecommunications Industry at New Delhi during 3-12 September 1990 to coincide with Electronics India '90 Fair and Conference. The Workshop was attended by 59 participants, 23 from 13 countries outside India. For the conduct of the Workshop, UNIDO engaged Telecommunications Consultants India Limited, New Delhi, (TCIL) as consultants.

1.03 TCIL, in association with UNIDO, identified areas of industrial cooperation between Indian industrialists and African country representatives both prior to and during the Workshop. This enabled extensive bilateral discussions among the participants. As a result, a total of 41 working agreements, including 17 signed Memoranda of Understanding, were arrived at between the representatives and Indian counterparts. These included exchange of information, preparation of detailed project proposals for technology transfer and feasibility studies and supply of components and equipment. Although the main focus was on telephone sets, rural telecommunication systems, EPABXs and cable manufacture, more sophisticated items in the Indian equipment palette attracted attention, such as intelligent terminals and PCM equipment.

1.04 Considering the successful outcome of the Workshop, UNIDO entrusted TCIL with follow-up activities on some of the specific project proposals arrived at during the Workshop and to give a report to UNIDO on possible realisation of these projects and recommendations on future activities to promote telecommunication industries in the different countries in Africa. This report outlines the follow-up activities so carried out by TCIL.

## FOLLOW-UP ACTIVITIES

1.05 Prior to the UNIDO Workshop, two Experts from TCIL (Mr. K.R. Nayar, Chief Consultant, and Mr. B.L. Arora, Senior Manager) visited seven countries in Africa (Mauritius, Madagascar, Kenya, Zimbabwe, Nigeria, Cameroon and Tunisia) to identify and elaborate a few country-specific project proposals in preparation of the Workshop. Considering the project proposals made during the Workshop, TCIL, in consultation with UNIDO, identified five countries (Nigeria, Uganda, Tanzania, Angola and Zimbabwe) for sample study for technical and economic cooperation with India by association with Indian manufactures and technical institutions to promote telecom industries in Africa. Accordingly, TCIL deputed the same team of Experts to visit these five countries and to hold discussions with Telecommunications Administrations and the industry representatives with specific reference to the projects identified during the New Delhi Workshop.

1.06 The TCIL team visited the five countries for follow-up activities from 17 November 1990 to 10 December 1990 as per itinerary given in the Annex to this report. The last country of visit was Zimbabwe during 4-9 December 1990 when Mr. A. Spina of UNIDO was also present to represent UNIDO in the Africa Telecom 90 Exhibition organised by ITU at Harare during this period. The results of the mission undertaken by TCIL team were discussed with Mr. Spina and the suggestions made during these discussions have been considered in formulating this report.

1.07 The observations of the TCIL team in the course of the follow-up mission in the different countries are given in the following pages. In addition to the specific project proposals made during the UNIDO Workshop, the suggestions made by the country representatives during the mission are also given. A summary of the observations has been incorporated at the end of the reports relating to each of these countries.

**CHAPTER 2**

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## 2. NIGERIA

### BACKGROUND

2.01 The projects identified at UNIDO Workshop by the Nigerian delegation (Nigerian Telecommunications Limited, BTN (Nigeria) Limited and Murhi International (Nig.) Limited) with Indian counterparts were:

- (i) C-DOT: Technology transfer for RAX/MAX/digital radio MUX and assistance to set up R&D centre for NITEL (Nigeria Telecommunications Limited) for electronic switching and software centre.
- (ii) Bharti Telecommunications Limited: To set up a joint venture in Nigeria to manufacture 100,000 telephone sets per annum.
- (iii) Indian Telephone Industries Limited: Transfer of technology for manufacture of telephone sets, RAX, EPABX and PCM equipment.
- (iv) Crompton Greaves Limited: Transfer of technology for manufacture of telephone sets, RAX and EPABX.
- (v) APLAB: Transfer of technology for manufacture of 5,000 card-operated payphones per annum.

### FOLLOW-UP ACTIVITIES

#### Discussions with NITEL

2.02 NITEL convened a meeting on 20 November 1990 under the chairmanship of Mr. G.A. Falode, Managing Director, NITEL, with participation by the three delegates from Nigeria for the New Delhi Workshop (Mr. Fola Alamudun of NITEL, Mr. Adeniji Raji of BTN Ltd. and Mr. Ishaq Tunde Okunola of Murhi International (Nig.) Ltd.), Director International Relations of NITEL, and the two-member team of TCIL as consultants to UNIDO.

2.03 The delegation to the UNIDO Workshop at New Delhi had presented a report to NITEL on their observations and outlining the conclusions arrived at during the Workshop. NITEL had set up a committee to give their recommendations on follow-up activities; the committee was yet to give their recommendations. Accordingly, NITEL authorities were not ready to commit themselves on the policy aspects involved in setting up of manufacturing units to meet NITEL needs for telecom equipment.

- 2.04 MD NITEL outlined about the industrial activities in Nigeria for some of the items needed by NITEL. Small capacity cables, drop wire and some items of external plant material are already locally produced. A factory set up at Kano by Siemens for external plant items has been functioning for a few years. Soon, they expect, all supplies of cable items could be met by local production.
- 2.05 For telephones sets, two local companies are already assembling the instruments by importing kits of parts. Murhi International and AMTEK are two such companies. NITEL proposes to test their products and to hold talks with them to see whether the local firms would be able to supply telephone sets to NITEL. NITEL is interested in having more of local content in the indigenous production.
- 2.06 NITEL has obtained loans from World Bank and OECF (Overseas Economic Cooperation Fund, Japan) for improvement and expansion of telecom services. For these, substantial quantities of reliable equipment are needed.
- 2.07 For small capacity rural electronic exchanges, three 500-line digital exchanges supplied by a firm in Turkey are to be tried in NITEL network at three selected places and if, on trial, these are found acceptable to NITEL, manufacturing of similar exchanges in Nigeria is contemplated.
- 2.08 Recently, a delegation of Nigerian industrialists in the private sector had visited Malaysia and Indonesia and had talks with manufacturers of telecom items in these countries. Some of these industrialists may set up manufacturing units for telecom items with assistance from Malaysian and Indonesian counterparts.
- 2.09 Thus, activities are currently on in Nigeria to promote telecom industries. However, considering India's progress and the similarities in the environmental conditions in India and Nigeria on climate, etc., NITEL has interest in the Indian products and would like to have further dialogue with Indian manufacturers under the auspices of UNIDO.
- 2.10 The areas of cooperation with Indian industries and institutions identified in the UNIDO Workshop could be classified under two broad categories for follow-up activities:
- (i) Cooperation between NITEL and C-DOT of India for R&D activities for development of designs for electronic switching, including a software centre, suited to Nigerian conditions and conversion of designs to production of prototypes and subsequent manufacturing activities; and
  - (ii) Cooperation with selected Indian Manufacturers for transfer of technology for production of items identified during the UNIDO Workshop in an industrial undertaking in Nigeria.

2.11 After considering the views of the participants of the meeting, the following conclusions were arrived at for speedy implementation of the recommendations made in the UNIDO Workshop:

(i) **Cooperation in R&D activities for development of telecom items and conversion of design to production**

NITEL has already set up an R&D centre for tackling the technical problems involved in the NITEL telecom network and development of electronic switching systems. A consortium of consultants is working in the R&D centre in the design of digital systems. NITEL has interest in cooperation with C-DOT of India for furthering the activities of the centre and gaining from the experience of C-DOT. To identify the areas of assistance needed from C-DOT, NITEL desires to send two of their engineers to C-DOT for a period of one month. The objective of the visit is to study the projects undertaken by C-DOT in switching and transmission, including organisational aspects, and to identify specific areas where expertise of C-DOT are needed by NITEL. After such a study, specific project proposal could be made on the assistance needed from C-DOT. UNIDO assistance is needed by NITEL in the form of Fellowship, if possible, for deputing two of their engineers to C-DOT for a period of one month for such a study. NITEL considers this as an important activity for aiming at some degree of self-reliance for development, and subsequent local production, of telecom equipment on a long term basis.

(ii) **Cooperation for setting up of teleccm industries**

The few industries now functioning in Nigeria for telecom items are in the private sector. NITEL's endeavour is to promote local industries if they are able to produce items of required quality and reliability. However, private industrialists are hesitant in investment because of want of assured market from NITEL.

Setting up a joint venture with equity participation from NITEL and industrialists in the private sector for manufacture of telecom items required by NITEL is a policy matter to be decided in consultation with the government. If such a joint venture is set up, that undertaking could take up manufacture of identified items with the selected collaborators. NITEL expects to arrive at a policy decision on setting up of joint ventures quite soon as one of the follow-up activities of the UNIDO Workshop.

NITEL is interested in further dialogue with the identified Indian parties to consider possibilities of local manufacture with maximum of local content. These discussions are desired to be done under the auspices of UNIDO. The approach suggested by NITEL is for the interested Indian parties to visit Nigeria, make an assessment

of the possible local content considering the industries already available in Nigeria. hold discussions with NITEL on the proposed project for manufacturing, and thereafter prepare a Feasibility Report for setting up a manufacturing unit.

## POSSIBLE PRODUCTS FOR LOCAL PRODUCTION WITH INDIAN PARTICIPATION

2.12 The possible products identified in the UNIDO Workshop are:

<i>Product</i>	<i>Indian Party</i>
Telephone sets	i) Bharti Telecom Ltd. (BTL) ii) Crompton Greaves Ltd. (CGL)
EPABX	i) Crompton Greaves Ltd. (CGL)
RAX	ii) Indian Telephone Industries Ltd. (ITI)
Digital MUX for Radio	ITI
Card-operated payphone	APLAB

Tentative project profiles have been prepared by BTL and CGL. Broad aspects of the proposals are:

(i) **BTL**

Product: Electronic Push Button Telephone sets.

Capacity: 100,000 units per annum on single shift.

Phased manufacturing programme over a two year period:

Phase 1: SKD level assembly and testing.

Phase 2: Inward goods inspection, component preforming, PCB loading, wave soldering, assembly for keyboard.

Phase 3: Manufacture of large plastic parts, assembly and testing of change-over switch.

Phase 4: Manufacture of small plastic parts.

Phase 5: Manufacture of set of transducers, PC Boards, contact foil and metal parts of change-over switch.

Estimated cost of capital goods	US\$ 1.2 million
Know-how fee (lump sum)	US\$ 50,000
Documentation fee (lump sum)	US\$ 25,000
Royalty fee	2%

Samples of telephone sets have been supplied to NITEL for tests

(ii) CGL

<i>Product</i>	<i>Capacity</i> (annual production)
EPABX	50,000 lines
RAX	50,000 lines
Telephone sets	100,000 units

Phased manufacturing programme:

Phase 1: SKD local assembly and testing.

Phase 2: CKD assembly, including manual assembly of PCBs, wave soldering, cleaning, testing of PCBs, sub- assemblies and final product.

Estimated capital investment of plant & machinery:

Phase 1: US\$ 650,000 for EPABX

US\$ 57,000 for RAX

Phase 2: US\$ 550,000 (additional capital items)

US\$ 150,000 (programming/software)

Cost of moduls for plastic parts of telephone sets:

US\$ 150,000

Cost of test sets for PCBs:

US\$ 280,000

NITEL desires the identified Indian parties to hold further discussions with NITEL under the auspices of UNIDO and prepare a realistic project report as suggested in para 2.11 (ii).

## **POLICY ON CARD-OPERATED PAYPHONES**

2.13 NITEL proposes to give franchise to private organisations to instal and operate card-operated payphones in Nigeria. NITEL will provide the telephone lines from the public telecom network to such licencees. The licencees will have to make arrangements for direct purchase of payphones type-approved by NITEL. The manufacture of such payphones may be undertaken in the private sector.

2.14 Based on the discussions held by the Nigerian delegation during the UNIDO Workshop, card-operated payphone manufactured by APLAB was considered to have potential for use in Nigeria. To suit the network requirements of NITEL, APLAB has modified one of their payphones suitably and they intend to demonstrate this unit for trials in NITEL network during December 1990 when a representative of APLAB is due to visit Lagos. Further follow-up action on this project can be undertaken thereafter, in conformity with the policy of NITEL.

## **OTHER ACTIVITIES OF TCIL TEAM DURING THE VISIT**

2.15 The team visited the works of Murhi International (Nig.) Limited. They have an extensive assembly plant for production of telephone sets from imported kits of parts from Korea. They have also a well equipped testing laboratory. This factory has potential for introducing phased manufacturing programme at CKD level by providing facilities for PCB fabrication, mechanical parts assembly, etc.

2.16 TCIL team made a courtesy call on His Excellency Engineer Olawale Adeniji Ige, Minister of Communications on 19 November 1990. The Minister was appreciative of the efforts of UNIDO to promote local industries in Nigeria with the cooperation of Indian industrialists. The Minister hoped the studies currently in progress by the ITU under UNDP, together with the efforts of UNIDO, will bring about local production of telecom items to meet the requirements of Nigeria and neighbouring countries. The government is considering a policy to limit procurement of telecom items from local factories only once such indigenous production becomes available to encourage local industrial undertakings.

### **SUMMING UP**

2.17 UNIDO assistance sought by NITEL:

- (i) Fellowship to two NITEL engineers to visit C-DOT of India for a period of one month to study the projects undertaken by C-DOT and to identify specific areas where expertise of C-DOT are needed by NITEL to strengthen their R&D activities; and
- (ii) Preparation of Feasibility Reports for setting up of manufacturing units by organising further dialogue with the identified Indian parties under the auspices of UNIDO.

2.18 NITEL is to arrive at a policy decision on setting up of joint ventures with equity participation from NITEL and industrialists in the private sector for manufacture of telecom items required by NITEL.

**CHAPTER 3**

## 3. UGANDA

### BACKGROUND

3.01 The possible project activities identified at the UNIDO Workshop held at New Delhi by the delegation from Uganda with the Indian counterparts were:

- (i) Indian Telephone Industries Limited: Transfer of technology for manufacture of telephone sets.
- (ii) BPL Limited: Transfer of technology for manufacture of telephone sets and EPABXs.
- (iii) Bharat Electronics Limited: Transfer of technology for manufacture of RAXs and push button telephones.
- (iv) Bharati Telecommunications Limited: Transfer of technology for manufacture of telephone sets.

3.02 The delegates from Uganda for the UNIDO Workshop were: (i) Mr. Sembuya and (ii) Mr. K.M. Venkatesh of Sembule Electronics Limited, Kampala. The delegate sponsored by Uganda Posts & Telecommunications Corporation (UPTC) was Mr. Pascal Mukasa, Managing Director, UPTC, but he was unable to participate in the Workshop. The bilateral discussions held at New Delhi were, accordingly, by the representatives of Sembule Electronics Limited. The proposed telecom industry in Uganda was to be set up by this company.

3.03 Sembule Electronics Limited had further correspondence with the identified Indian parties to get project proposals. Their representatives also visited the works of Indian Telephone Industries Limited and Bharti Telecommunications Limited. They were able to get further response only from these two firms. Accordingly, any follow-up action for project proposals for the proposed industry is to be now limited to these two companies.

### FOLLOW-UP ACTION

#### Discussions with Uganda PTC

3.04 In the absence of Mr. Pascal Mukasa, Managing Director, UPTC, a meeting was held with Mr. Sam S. Tusabe, Chief of Planning, UPTC, on 23 November 1990 along with the two delegates from Uganda for the UNIDO Workshop (Mr. Sembuya



and Mr. K.M. Venkatesh of Sembule Electronics Limited). Mr. Tusabe stated that UPTC has no plans to set up telecom industries under the administration of UPTC and they welcome such industries in the private sector for local production of telecom items for supply to UPTC. Currently, UPTC is obtaining all items of equipment from foreign countries by inviting competitive tenderers. Any supply of equipment from local production should meet the specifications of UPTC and should be cost-effective. Giving any preference to local production at a higher cost may be difficult. Mr. Tusabe agreed that local production will have its advantage in repair service and, possibly, faster supplies. In this respect, proposal for setting up of an industry by Sembule Electronics Limited for manufacture of telephone sets and EPABXs will have the support of UPTC.

3.05 Currently, the telecom network in Uganda is having serious limitations due to disruption of the services over a long period. The immediate task of UPTC is for upgradation of the external plant network in the different telephone systems by replacement of the existing cables by new ones. These projects are in progress in Kampala, Jinja and Entebbe.

3.06 Uganda is now having a telephone network of about 50,000 telephone lines, bringing a telephone density of 0.4 telephones per 100 inhabitants. The expansion plans now contemplated is to add another 25,000 lines over a period of two years to bring the number of lines to 75,000. Thereafter, they propose to have an annual growth rate of about 5%. Thus, considering the requirements for new lines and replacements, the yearly requirement of telephone sets by UPTC would be 7,000. To this could be added another 5,000 sets for direct sale to subscribers as extensions to PABXs, etc. Thus, the annual requirement for telephone sets in Uganda could be taken as 12,000. Accordingly, establishing an industrial unit with a production capacity of 15,000 sets per annum could be a viable unit from considerations of market potential.

3.07 For PABXs, the policy of UPTC is for the subscribers to directly buy PABXs from traders; however, these are to be of make type-approved by UPTC.

3.08 Mr. Tusabe advised Sembule Electronics Limited to get the telephone set and EPABX proposed to be manufactured by them type-approved by UPTC. He agreed to supply copies of UPTC specifications for these items and also a list of approved makes to enable Sembule Electronics Limited to take up these aspects with the Indian parties to confirm that the products offered for manufacture meet the UPTC specifications and, if necessary, to effect suitable modifications.

#### **DISCUSSIONS WITH SEMBULE ELECTRONICS LIMITED (SEL)**

3.09 The progress of projects identified for Uganda in the UNIDO Workshop was discussed with Sembule Electronics Limited. They indicated that further progress has been possible only with Indian Telephone Industries Limited and Bharati Telecom.

munications Limited. They are awaiting further information from these two companies to enable them to finally select the Indian party and take investment decisions. The status of the projects under coorespondence with these two companies is outlined below:

(i) **Indian Telephone Industries Limited (ITI)**

ITI has given pricing information for supply of 5,000 telephones in SKD kit form for assembly in Kampala. Similarly, pricing information has been given for supply of 5 units of 48-line EPABXs, fully assembled, for tests.

To enable SEL to proceed with the imports, they have asked ITI for invoices for these items and also for the capital equipment needed to convert SKD kits to fully assembled telephone sets.

The proposal of SEL is to set up an annual production capacity of 15,000 telephone sets. To take investment decision, they need information on the following:

- cost of capital equipment for assembly
- cost of test equipment
- proposals of ITI on installation supervision and training of SEL personnel at Uganda together with recommendations on requirements of manpower for production.

On receipt of these details, SEL will work out a feasibility study considering local costs, costs of labour, etc. to arrive at an investment decision. Assistance of UNIDO will be helpful for such a study.

ITI is also to give specifications of the telephone sets and EPABXs to consider whether these comply with the stipulations of UPTC.

(ii) **Bharati Telecommunications Limited (BTL)**

BTL has given to SEL proposals on capital equipment needed for the production of 15,000 telephone sets per annum on SKD and CKD basis. They have also given costs for experts for installation and training.

The following additional information is needed by SEL to take investment decision:

- pricing of SKD kits; and
- recommended manpower for production.

BTL is also to give specifications of telephone sets to check up compliance with those of UPTC.

(iii) **Action to be taken by SEL**

On receipt of the details from ITI and BTL, SEL will arrive at a decision on the selection of the Indian party for collaboration for the production of telephone sets. UNIDO's assistance is considered helpful in the choice of the party. SEL also proposes to send a team to India for contract negotiations, including participation in a joint venture, and finalise arrangements with the selected Indian party. The target set for this part of the activity is January 1991. Activities for setting up of the factory can commence immediately thereafter and production towards the end of 1991.

**OTHER ACTIVITIES OF TCIL TEAM DURING THE VISIT**

3.10 TCIL team called on Mr. Bjasne Larsen, Programme Officer, UNIDO Kampala. He indicated that, with the new Investment Policy announced by the Government of Uganda, incentives are given to foreign investors to promote industrial units in Kampala. These are in the form of repatriation of profits, customs duty relaxation for import of capital equipment, materials for production, etc. He, therefore, hoped that there are bright prospects of new industries for the production of telecom items in Uganda with participation by Indian companies.

**SUMMING UP**

3.11 UNIDO's assistance is considered helpful in the preparation of Feasibility Reports for the project with the offers from the two Indian companies and the selection of the party for collaboration for setting up a manufacturing unit.

3.12 SEL is keen to set up the unit for assembly of telephone sets during 1991.

**CHAPTER 4**

## 4. TANZANIA

### BACKGROUND

4.01 The delegates from Tanzania for the UNIDO Workshop held at New Delhi were:

- (i) Mr. Bachubila I Mbakileki, Tanzania Posts and Telecommunications Corporation (TPTC); and
- (ii) Mr. Isack Loi Masala, Director of Operations, National Development Corporation (NDC).

4.02 NDC, being the main agency of the Government of Tanzania to promote, finance, develop and manage industrial development and operations in Tanzania, the possibilities for setting up of industries in telecommunications and electronics with cooperation from Indian parties were considered in the UNIDO Workshop by the delegate from NDC in association with TPTC delegate, the bilateral discussions by the delegate from TPTC with Indian counterparts were primarily related to improvement of quality of telecommunication services and expansion of the services.

4.03 The possible areas of cooperation identified during the UNIDO Workshop were:

- (i) **NDC:** Cooperation with Crompton Greaves Limited for manufacture of telephone sets, EPABXs, Diesel Engines, Rural Sub-stations, etc. Modalities for implementation were to be worked out between NDC and Crompton Greaves Limited.
- (ii) **TPTC:** The possible projects identified with Indian parties were:

*TCIL:* Consultancy services for computerisation of telecom management services, long-term planning, etc.

*Himachal Futuristic Company (HFC):* Supply of 1+1 and 1+7 subscriber carrier systems.

*Punjab Communications Limited (PCL):* Supply of RAXs and small capacity radio systems

*CMC Limited:* Assistance to establish a National Information Development Centre

## FOLLOW-UP ACTIVITIES

### NDC

4.04 The officer nominated by NDC for discussions with TCIL team was Mr. A.A. Shao, Senior Operations Analyst. This was because Mr. I.L. Masala, the delegate from Tanzania, was away from Dar-Es-Salaam during the team's visit.

4.05 Mr. Shao mentioned that, out of the possible items identified during the UNIDO Workshop for setting up industries with cooperation of Crompton Greaves Limited, the project proposed to be taken up in the first phase is for telephone sets. NDC is already having dealings with Crompton Greaves for supply of some items like electrical machinery and manufacturing of such items can be considered at a later stage.

4.06 For setting up an industry for manufacture of telephone sets, NDC has to get type-approval of TPTC of the set offered for manufacture. They are awaiting a sample of the set. In addition, they also require financial proposals on cost of capital items, cost of SKD/CKD kits, training costs, costs of Experts for installation supervision, transfer of know-how fees, and the like. They are already having building accommodation for the factory.

4.07 NDC was informed that the investment costs and the level of integration for local production would depend upon the production capacity to be set up. NDC indicated that this aspect was to be discussed with TPTC as the industry would be primarily to cater to the TPTC demands. They tentatively indicated an annual production capacity of 10,000 telephones, subject to confirmation by TPTC to the effect that a market for this capacity could be anticipated.

4.08 NDC is also looking for financing of the project. According to them, Crompton Greaves Limited expressed willingness to set up a joint venture with equity participation. These aspects would be further discussed after the financial implications are known. This can, however, be further proceeded with only after the demand pattern is indicated by TPTC.

4.09 NDC has the mandate to work in partnership with any government or non-government body, if this is found appropriate. In formulating telecommunications manufacturing strategy in Tanzania, NDC has observed that the current available country data on telecommunication demand are somewhat unrealistic because

- data are project-oriented and not on long range trends; and
- projections are generally overstated.

These aspects were discussed with TPTC and the observation of TPTC are given later in this report

4.10 According to NDC, the new Investment Policy of the government has created a lot of openness to foreign influence and investment. New manufacturing investments have a five year tax holiday. Special advantages/benefits to new or expanding businesses, decided on case to case basis, are also available. All companies are also eligible for some tax allowances for new buildings and for new plant and machinery. The government has endeavoured to maintain a business and investment climate conducive to the growth of manufacturing enterprises. Under such a policy, the prospects for a telecom industry in Tanzania are bright, provided market potential for a viable capacity for production is there.

#### **TPTC**

4.11 On items relating to TPTC, discussions were held with Mr. B.I. Mbakileki, who was also a delegate to the UNIDO Workshop.

4.12 The urgent need of TPTC is to increase the reliability and the capacity of the local switching and cable networks in various towns and cities to meet the pending demands. Improvement of the reliability of the long distance network to ensure call completion and attaining acceptable standards is also needed. Along with this, automatic and STD services are also to be introduced in all regional headquarters.

4.13 To achieve the general objectives envisaged in the Seven Year Development Programme of TPTC, there are constraints in resources, especially foreign financing. TPTC is accordingly seeking financial assistance to enable them to carry out telecom development plans, especially rural telecommunication project.

4.14 Currently, under assistance from World Bank financing, a team of foreign consultants is working in TPTC to cover areas of studies to be carried out in detail, including long-term planning and financial implications. The consultants' report is scheduled to become available in about two months' time. Thereafter, TPTC proposes to float global tenders for conducting feasibility studies on various topics for modernisation of the network and expansion of the services. The suggestion of Mr. Mbakileki is for TCIL to give an offer against such a tender so that cooperation of TCIL in the improvement of the services could be considered.

4.15 The areas for which TCIL's services may be needed are

to work out feasibility and strategy for a rural telecommunication network and prepare a 15-year plan for its implementation, and

- to identify the areas/disciplines which need manpower development and training of personnel at various levels locally and abroad.

These are to be further firmed up after the receipt of consultants' report.

4.16 On the setting up of telecommunication industries to meet the TPTC requirements, Mr. Mbakileki indicated that these are aspects concerning NDC. For setting up an industry for manufacture of telephone sets by NDC, a sample of the instrument is to be sent to TPTC for tests and according type-approval. For assessment of production capacity, the consultants' report is to be awaited for finalising the long term plans consistent with the availability of resources, especially foreign financing. The views of TPTC on production capacity to meet TPTC needs will be intimated by them to NDC thereafter.

4.17 Mr. Mbakileki indicated that the items of equipment identified for supply from HFC (1+1 and 1+7 subscriber carrier system) and PCL (Terminal equipment for radio communication) are of interest to TPTC. They like to have free samples of such items for trial in the TPTC network to assess the utility under the conditions in Tanzania.

4.18 As per the original programme of visits, a representative of Crompton Greaves Limited (Mr. V. Joshi, Marketing Manager) was due to be at Dar-Es-Salam for a joint discussion with NDC; but due to upset of travel plans, Mr. Joshi was able to reach only on the evening of 27 November 1990, after completion of discussions with NDC and TPTC.

4.19 TCIL team held a meeting with Mr. Joshi to apprise him of the outcome of the discussions. He has brought a sample of the telephone set and also the required financial proposals for setting up a production unit for assembly of about 15,000 telephone sets per annum. He would be holding discussions with NDC and he was hopeful of giving the details sought for during his stay in Dar-Es-Salaam.

## **SUMMING UP**

4.20 NDC is the agency in Tanzania for setting up of industrial units for meeting the needs of TPTC for telecom items. As a first phase, they propose to set up a unit for assembly of 15,000 telephone sets per annum, subject to confirmation of the demand pattern by TPTC. Type-approval of the telephone set and financial proposals are needed by NDC to proceed with the project.

4.21 The priority of TPTC is to upgrade the reliability of the existing telecom network. A team of foreign consultants is currently working in TPTC under World Bank financing to cover areas of studies to be carried out in detail, including long-term planning and financial implications. The consultants' report is scheduled to be ready in two months.



Thereafter, TPTC hopes to make an assessment of the demand pattern for telecom items and specific projects to be undertaken for upgradation and expansion of the telecom network.

**CHAPTER 5**

## 5. ANGOLA

### BACKGROUND

5.01 Mr. Jose Gualberto De Matos, Director General, Empresa Nacional De Telecomunicacoes (ENATEL) was the delegate from Angola for the UNIDO Workshop held at New Delhi.

5.02 ENATEL is now having a telecom network of 71,136 automatic telephone lines (September 1990) and another 11,000 lines are being added. There are severe limitations in the quality of telecom services in Angola and, during the next five years, considerable part of the investment is towards improvement of the services (local and long distance) by rehabilitation of the cable networks in the main cities. During this period, emphasis is also being given to the programme of rural telecommunications and to offer new services like data and other business services.

5.03 Considering the priority areas of activity of ENATEL, the projects identified in the UNIDO Workshop were for expertise from India to assist ENATEL in the implementation of these programmes. The projects so identified for consideration in ENATEL were:

- (i) **TCIL:** Consultancy services for operation and maintenance of the network, planning, supervision of projects, material procurement, subscriber services, etc.
- (ii) **Bharat Electronics Limited (BEL):** Supply and installation of troposcatter systems and rehabilitation of existing systems, including supply of spares.
- (iii) **Himachal Futuristic Company (HFC):** Trial of 1+7 subscriber carrier systems in Angola telecom network to consider introduction of such systems.

### FOLLOW-UP ACTIVITIES

5.04 A meeting was held on 30 November 1990 in the office of Mr. Jose Gualberto De Matos, Director General, ENATEL, along with Mr. Romeu Veiga, Director General Adjunto, and a representative of TCIL (Mr. Prithpal Singh, Group General Manager). Considerable progress has been made towards the implementation of the project proposals on improvement of the quality of services. As a result of subsequent correspondence and discussions with TCIL, some of the specific activities have been identified and an agreement between ENATEL and TCIL has been entered into. The activities so identified are:

(i) **Operation and maintenance of telecom network:**

The scope of work is for detailing a team of experts in different disciplines, such as switching and transmission, for both local and long distance networks. The assessed manpower requirements are for about 200 man-months over a period of 3 years. The deployment of manpower will be in accordance with the priorities of ENATEL.

(ii) **Consultancy and Technical Assistance:**

The scope of services cover various activities: long term planning, project preparation, preparation of specifications, assistance in equipment procurement, acceptance testing of equipment and systems, installation organisation of maintenance of new equipment and financial management. The assessed manpower required for this activity is about 70 man-months.

(iii) **Training of personnel:**

Two levels of training are contemplated: (i) Higher level training to be imparted in India for managerial cadre personnel; and (ii) training of technicians and lower level supervisory personnel in Angola for operation and maintenance of switching and transmission systems, external plant, power plant, etc. The training to be organised in Angola will be with emphasis on maintenance to be carried out in association with Indian experts to be detailed under the contract for operation and maintenance. The assessed manpower requirement for training activities is about 60 man-powers.

(iv) **Supply of materials:**

These relate to items needed for organising training activities and for rehabilitation/ upgradation of the existing network. The items so required are to be identified by the experts to be detailed for maintenance activities.

5.05 An agreement has been finalised between ENATEL and TCIL for these identified areas of activities. ENATEL now needs government approval and budget provision for proceeding with these activities. Once the approval is received from the government, ENATEL will entrust the different tasks, as identified in the agreement, to TCIL.

5.06 The status of other projects identified in the UNIDO Workshop follows.

(i) **BEL:**

For upgradation and rehabilitation of the existing troposcatter links, ENATEL has sought willingness of BEL to undertake study of the systems in Angola and sub-contract the work of upgradation. BEL has intimated their interest in the project and has asked for the details of the system. This is being compiled by ENATEL. A mission from ENATEL to BEL was originally scheduled for October 1990; this has now been postponed to January/February 1991 because of foreign travel restrictions imposed by the government. ENATEL hopes to firm up the project proposals during this mission.

(ii) **HFC:**

As per bilateral discussions held during the UNIDO Workshop, samples of subscriber carrier systems were to be procured from this company for trial in Angola telecom network.

ENATEL is currently contemplating procurement of some other items of telecom equipment (telephone sets, general use components, etc.) from India and they are proposing to include an official from the Supply Department also in the mission to be sent to India during January/February 1991 to consider such purchases from Indian companies, including HFC.

## **PROSPECTS FOR TELECOM INDUSTRIES IN ANGOLA**

5.07 With the current level of demands for telecom items in Angola, the prospects for telecom industries in Angola to meet the needs of ENATEL is considered to be only for the manufacture of telecom cables. The projects for rehabilitation and replacement of the existing cable system in the different cities over the coming years will need substantial quantities of cables. This, together with the contemplated expansion plans, will justify a cable manufacturing plant as per the assessment of ENATEL.

5.08 At present, two factories for manufacture of power cable and small capacity telephone cables and wiring materials exist in Angola. These could be rehabilitated for manufacture of telecom cables to the specifications of ENATEL, in addition to electrical cables. Accordingly, ENATEL is contemplating setting up a joint venture with some of these companies in association with a foreign manufacturer. 51% of the equity participation is proposed to be by ENATEL and the local companies together and the balance 49% by the foreign company. A tender for participation by a foreign manufacturer was floated by the Ministry for Industry and the offers are under evaluation.

5.09 For the establishment of such a manufacturing plant for producing quality products. ENATEL is keen to have a Quality Assurance Cell in the cable factory. Because adequate expertise for setting up such a cell is not available in Angola, UNIDO assistance in the form of experts on quality control is considered to be helpful. Under the conditions prevalent in Angola, support from UNIDO in such an activity will assist in the promotion of an industrial undertaking to meet the needs of ENATEL for obtaining quality telecom cables from indigenous sources. This is an aspect to be considered by UNIDO. The representative of TCIL indicated about the availability of such expertise in India.

### **SUMMING UP**

5.10 ENATEL is keen to have assistance from India for maintenance of telecom network, long term planning, training of personnel, supply of materials for maintenance, and rehabilitation of troposcatter radio links. Approval of the government is being sought for to proceed with the identified projects.

5.11 UNIDO assistance in the form of experts is desired by ENATEL for setting up of Quality Assurance Cell in the cable factory proposed to be set up in Angola for obtaining quality products to meet ENATEL needs.

**CHAPTER 6**

## 6. ZIMBABWE

### BACKGROUND

6.01 The projects identified during the bilateral discussions at New Delhi were:

- (i) Technology transfer and training for the manufacture of card-operated payphones in association with APLAB;
- (ii) Manufacture of PCM equipment (2 Mbps) under collaboration with Punjab Communications Limited;
- (iii) Manufacture of telephone sets-possible Indian Companies for collaboration: Tata Keltron, Crompton Greaves Limited, Gujarat Communications & Electronics Limited, and Shyam Communications Limited; and
- (iv) Manufacture of EPABXs - possible Indian companies: Crompton Greaves Limited and Shyam Communications Limited.

### FOLLOW-UP ACTIVITIES

6.02 A meeting was held on 5 December 1990 at Harare with the following from Zimbabwe Posts and Telecommunications Corporation (ZPTC):

Mr. O.N. Jinya, Director Manufacturing & Contracts  
Mr. T.E. Dickenson, Assistant Director Manufacturing & Contracts  
Mr. S.D.C. Duma, Executive Manager Factory.

6.03 The ZPTC representatives were appreciative of the interest taken by UNIDO in providing opportunities for establishing manufacturing capabilities in Zimbabwe for the equipment requirements of its telecommunication networks. The various project offers received from the Indian manufacturers as a result of the UNIDO Workshop are presently in process of initial review and assessment in the ZPTC. They anticipate the process of assessment of the Indian offers, along with offers received from other countries, will take a considerable period of time and various formalities are involved for obtaining funds and approval of projects



6.04 A review of the projects identified at the UNIDO Workshop is given in the following paragraphs.

(i) **Technology transfer and training for the manufacture of card-operated payphones.**

ZPTC is currently considering policy decisions on the following:

- (a) Relative merits/demerits of coin-operated and card-operated payphones under the conditions in Zimbabwe; and
- (b) Whether manufacturing of payphones is to be undertaken in ZPTC factory or by Telkom Systems, a joint venture undertaking in Zimbabwe.

ZPTC hopes to arrive at a decision quite soon. Meanwhile, they desire to have a sample of the payphone for an assessment of the compatibility with the national telecom network. As per discussion with the representative of APLAB (the identified Indian party), they are willing to supply a sample adjusted to suit the requirements of ZPTC. They suggest deputing an engineer from ZPTC to their works in Bombay to assess the needs for setting up manufacturing capabilities. The sample could be sent for trials in ZPTC free of cost after such an assessment. UNIDO assistance in the form of Fellowship for such a visit will be helpful.

(ii) **PCM System (2 Mbps)**

ZPTC is engaged in engineering of the future telecom network in Zimbabwe to access the annual requirements of PCM systems to decide on the viability of local production. Meanwhile, the PCM equipment offered by Punjab Communications Limited will be studied by ZPTC to consider its suitability.

(iii) **Telephone sets**

The Indian companies identified in the UNIDO Workshop for transfer of technology are:

Tata Keltron  
GCEL  
Crompton Greaves Limited  
Shyam Communications Limited.

The following activities are involved in arriving at a decision on selection of the collaborator and setting up a manufacturing unit:

- (a) Obtaining samples from the Indian parties of telephone sets modified to suit ZPTC specifications if necessary;
- (b) ZPTC is currently reviewing the financial proposals given by the Indian companies; after review, ZPTC will be addressing the Indian companies for additional information, if any required, for bringing all offers on a uniform basis;
- (c) Once complete financial proposals are received and the samples are tested to the satisfaction of ZPTC, the offers from Indian parties will be evaluated along with similar offers from other companies and a decision on selection of the party for collaboration will be taken; and
- (d) The options for setting up the manufacturing unit are: ZPTC Factory, Telkom Systems, and Communications Systems of Zimbabwe. The decision is to be taken by the government.

(iv) EPABX

For purposes of manufacturing, EPABXs fall into two categories:

- (a) Small capacity EPABXs upto 20 lines; and
- (b) Large capacity EPABXs.

The policy of ZPTC is to entrust large capacity EPABX manufacturing to private industrialists who are to get the EPABXs type-approved by ZPTC for direct sale to the subscribers.

Small capacity EPABXs are mainly for government subscribers and these are to be supplied by ZPTC. Manufacture of such EPABXs is to be undertaken by ZPTC. Two Indian companies identified at the UNIDO Workshop for such EPABXs are: Crompton Greaves Limited and Shyam Communications Limited. The procedure to be adopted for the selection of the collaborator is the same as that indicated for the manufacture of telephone sets.

## **GENERAL OBSERVATIONS OF ZPTC**

6.05 A decision on setting up of manufacturing units involve completion of quite a few formalities in coordination with different Ministeries of the government- Commerce, Industry, Finance and Communications. ZPTC expects about one year's time to complete these formalities.

## **OTHER AREAS OF INTEREST TO ZPTC**

6.06 ZPTC is desirous of strenghtening its R&D capabilities for development of telecom items, especially digital switching systems, suited to the requirements of ZPTC and conversion of the designs to production. ZPTC has interest in cooperation with C-DOT. To identify the areas of assistance needed from C-DOT, ZPTC likes to send two of their engineers to C-DOT for a period of one month to study the projects undertaken by C-DOT in switching and transmission, including organisationsl aspects, and to identify specific areas where expertise of C-DOT are needed by ZPTC. After such a study, specific project proposals could be made. UNIDO assistance is desired by ZPTC, if possible in the form of Fellowship, for deputing two of their engineers to C-DOT for a period of one month for such a study.

## **DISCUSSIONS WITH COMMUNICATIONS SYSTEMS OF ZIMBABWE (CSZ)**

6.07 Mr. Beau Friend, General Manager, CSZ who was a delegate to the UNIDO Workshop, had identified a few Indian industrialists engaged in PCB fabrication. As a follow-up activity, CSZ is interested in extending the range of PCB fabrication facilities available in CSZ in association with some of the Indian companies like Micropack and U.V. Circuits Pvt. Limited, considering the cost-effectiveness of the Indian products by these manufacturers. Assistance is sought for by CSZ through UNIDO/TCIL to help initiate action in this direction. A visit to India by a representative of CSZ for concluding cooperation agreements with Indian companies will be useful to promote such an industrial activity in Zimbabwe. UNIDO may consider whether such a visit could be sponsored under a Fellowship.

## **SUMMING UP**

6.08 ZPTC is keen to set up production capabilities in the ZPTC Factory for manufacture of electronic items of equipment by change-over from the present electro-mechanical systems. However, policy decision of the government, involving coordination with different Ministeries, is to be arrived at. ZPTC will be making efforts to expedite decision

- 6.09 As parallel action, ZPTC will be considering the offers received from the Indian parties and from other countries for the selection of products and collaborators for local production.
- 6.10 UNIDO assistance in the form of Fellowships is desired by ZPTC for sending two of their engineers to C-DOT of India for a period of one month to study the projects undertaken by C-DOT and to identify specific areas where expertise of C-DOT are needed by ZPTC to augment their development activities to production-oriented telecom items.
- 6.11 UNIDO assistance in the form of Fellowship to one ZPTC engineer to visit the factory of APLAB at Bombay will be helpful to promote industry for manufacture of card-operated payphones modified to suit the requirements of ZPTC.
- 6.12 Assistance is needed by CSZ in extending the range of PCB fabrication facilities available in CSZ in association with Indian companies considering the cost-effectiveness of Indian products. UNIDO Fellowship for concluding cooperation arrangements will be helpful to promote such industrial activity in Zimbabwe.
- 6.13 ZPTC was appreciative of the efforts of UNIDO in the promotion of telecom industries in Zimbabwe for meeting their requirements of telecom items.

**CHAPTER 7**

## 7. CONCLUSION

### GENERAL

7.01 With the efforts of TCIL as consultants to UNIDO in the conduct of the New Delhi Workshop and follow-up activities, remarkable achievements were possible in attaining the objectives of UNIDO to support technical and economic cooperation for the development of telecommunication industry in Africa by assisting African countries to promote technology transfer projects between them and India. Prior to the Workshop, TCIL identified possible areas of cooperation by visiting seven countries in Africa. The possible products identified were: Telephone sets, EPABXs, RAXs, Intelligent Terminals and cables. This, together with the support extended in the bilateral discussions during the Workshop, enabled formulation of 41 working agreements, including 17 memoranda of understanding between the African representatives and Indian counterparts. A list of industries to be set up with in African countries with Indian assistance is given below:-

<i>Country</i>	<i>Product</i>
Nigeria	Telephone Sets EPABXs Card-operated pay phones
Uganda	Telephone Sets EPABXs
Zimbabwe	Telephone sets EPABXs Card-operated Pay phones PCM

A few more industries in Mauritius, Angola and Tanzania are under active discussions. Possible items are: telephone cables in Mauritius, telephone sets in Tanzania and assistance for improvement of telecom network in Angola

7.02 By the follow-up activities carried out by the TCIL soon after the Workshop, identification of specific activities involved for the implementation of the projects became possible. In Nigeria, Uganda and Zimbabwe, technology transfer projects with India can materialise quite soon with further follow up by the telecom administrations and the identified Indian industries. Some assistance is needed from UNIDO, especially in the preparation of Feasibility Reports and selection of collaborators. In Angola, cooperation with India is desired for the rehabilitation of the telecommunication network. To attain

some measure of self-reliance for the development of telecommunication items to suit the local conditions and to undertake production in local factories, many of these countries are keen to study the Indian experience in R&D activities done by C-DOT and are desirous of having UNIDO assistance in the form of Fellowships for their engineers to visit India as brought out in the report. With these measures, concrete shape in setting up of telecommunication industries in African countries should become possible in the coming years. The UNIDO Workshop, with the preparatory work and follow-up activities carried out by TCIL, can be considered as a turning point in the realisation of the objectives of UNIDO to assist countries in Africa to promote telecom industries.

7.03 Like many other developing nations, Telecommunication Administrations of the countries visited have laid stress on improvement of the quality of services alongwith plans for massive expansion and modernisation of the network during the coming years. Though targets for expansion over a decade has been set, the Administrations are unable to commit on realisation of targets because of the uncertainty of funds availability, especially the foreign financing needed for the import of practically all items of telecom equipment. The Administrations are, therefore, eager to have production units to attain some measure of self-reliance for obtaining telecom equipment from indigenous sources.

7.04 The production capacity of a factory assumes importance to determine viability of the industrial project. Some of the studies carried out in the past (for example, feasibility study report "SADCC Telecommunications Manufacturing Strategy-March 1990") show that units set up on anticipation of market potential on a regional basis have become non-viable as they are all operating at only a small percentage of their capacity - the anticipation of regional market did not materialise. Accordingly, to reduce the risk factor in investment, production capacity is to be planned initially to meet the country's requirement with minimum of investment. This could be later expanded to meet regional requirements, if found feasible.

7.05 Financial constraints, especially foreign financing, are major impediments faced by many countries in Africa for the development of telecommunication facilities and setting up of industries. Possibly, bilateral arrangements in the form of exchange of goods between partner countries in cooperation agreements could be beneficial

7.06 To initiate action for establishment of manufacturing units to meet the needs of Telecom Administrations, many formalities are to be completed in consultations with the government and in coordination with different Ministries of the government. Examples are the situations in Nigeria and Zimbabwe, as brought out in this report. In Zimbabwe, for example, they anticipate about one year's time to arrive at a decision

7.07 In some of the countries in Africa (for example, Nigeria), ITU is engaged in a study of the quantum of various types of telecom equipment needed for telecom development on a long term basis to consider local production of such items. The UNIDO

assistance for promotion of telecom industries in the different countries in Africa is directed towards making an initial start for a basic industrial unit with capability for manufacture of electronic items. Considering the various policy aspects to be sorted out before such an industrial unit could be set up in a country, the UNIDO efforts would result in expeditious realisation of a factory with basic infrastructure which could take off to produce various items as per ITU studies when these become available. Thus, the ITU and UNIDO studies are to be considered complementary with some degree of coordination. This aspect is touched in this report because the question of both ITU and UNIDO conducting studies for promoting telecom industries was raised in some of the discussions TCIL team had during the visit.

7.08 The approach adopted by UNIDO in conducting the Workshop at New Delhi to promote technology transfer projects between developing countries was highly appreciated during the discussions with officials of Telecom Administrations which participated in the Workshop. This was seen as a further step in the ongoing UNIDO programme offered to industrialists seeking to initiate or expand their long-term cooperation with counterparts in other developing countries.

## **ACKNOWLEDGEMENTS**

7.09 TCIL acknowledges its thanks to UNODO, Vienna, for having given an occasion to associate with them in their continuing activities supporting the development of telecommunications industry in the different countries in the African continent. TCIL has been extending cooperation to many countries in Africa for the development of telecommunication services and rehabilitation of the network for improving the quality of service. This background of experience has enabled TCIL to make a realistic assessment of the situation relating to local production of telecom items as reflected in this report. TCIL reaffirms its cooperation with UNIDO for furtherance of its objectives.

7.10 The arrangements made by UNIDO for extending assistance to the TCIL team during the visits are gratefully acknowledged. Though some of the Telecom Administrations viewed this visit as somewhat premature so soon after the UNIDO Workshop (held in September 1990) to have any worthwhile progress, they were appreciative of the benefit of detailed discussions with the TCIL team to elaborate on the deliberations of the Workshop and formulate specific follow-up activities. The local representatives of UNDP/UNIDO and the Telecom Administrations, including the industry representatives, were most cooperative. The TCIL team appreciates the guidance and assistance received during the visits and discussions.



## ANNEX

## ITINERARY OF VISITS

DEPARTURE			ARRIVAL		
Date	Place	Time	Date	Place	Time
17.11.90	Delhi	0310	17.11.90	Lagos	2300
21.11.90	Lagos	0030	22.11.90	Kampala	1700
25.11.90	Kampala	1500	25.11.90	Dar-Es-Salaam	1915
28.11.90	Dar-Es-Salaam	0815	01.12.90	Luanda	0930
03.12.90	Luanda	0945	04.12.90	Harare	1805
09.12.90	Harare	0600	10.12.90	Delhi	1000