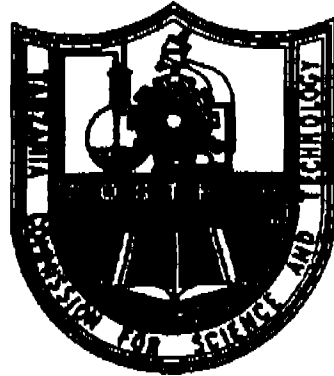


**TANZANIA COMMISSION FOR SCIENCE  
AND TECHNOLOGY**



**THE DEVELOPMENT OF INFORMATION  
TECHNOLOGY AT THE TANZANIA COMMISSION  
FOR SCIENCE AND TECHNOLOGY**

*March 1999*

## 1.0 RATIONALE

A number of authors and researchers including Alvin Toffler, Peter Drucker and Marshall McLuhan agree that a new information age is in the process of rapidly replacing the industrial era. They refer to the three major stages that the Western Civilization has ample material base, but with little knowledge. The second phase, which began with the Industrial Revolution, now considered to be coming to an end, relied on its mass production methods. The third era is the age of information and new technologies. In this phase, science and knowledge are becoming the critical rectors of the so-called value added economy. Global networks are no longer mere pathways for information, but generate new knowledge, which has a part to play in the processing of products. The importance of non-material resources such as information and knowledge, software, computer applications, programmes and services is very visible. These are now becoming the new raw materials and real wealth of the knowledge – based societies. It is therefore important to note these changes and to identify the real potentials of this third era of human development and see how these developments can be used to solve key social problems. As emphasised by a distinguished African scholar, Professor Allotey of Ghana. “We paid the price not taking part in the industrial revolution of the late 18<sup>th</sup> century because we did not have opportunity to see what was taking place in Europe. Now we see that Information Technology has become as indispensable tool. We can no longer sit down and watch passively.”

COSTECH realizes the importance of these new information and communication technologies to our country’s progress and has put some efforts towards the development of their information Technology (IT) sector

within itself and among R&D institutions in Tanzania. For example, one of the major constraints experienced by research and development institutions in Tanzania is their ability to collect, store and provide relevant, reliable and timely information to government authorities, end users and beneficiaries of research results and even among the scientific community itself. There have been efforts to establish various information systems that collect and store scientific and technological information but it was realised way back in early 1990s that the most critical constraint has been dissemination of information. Modern dissemination of information on the other hand relies heavily on IT use. Yet our studies indicate that as many as 50% of our research and development personnel have never received any IT training. It is against this background that a computer-training programme was established within COSTECH with initial funding from Unesco.

It is further realised that constant and continuous communication among scientists and researchers, nationally and internationally, improves performance of individual scientist and increases the effectiveness of research results. Thus since 1992, efforts to establish tools of information exchange and communications such as electronic mail, unified computer mediated communications network and the Internet were started at COSTECH.

## **2.0 HARDWARE AND SOFTWARE ACQUISITION**

### **2.1 HARDWARE**

Efforts to acquire computer hardware for COSTECH started way back in 1990. Since then acquisition has been growing over the period, in line with growing demands for computing facilities as well as demands to match with technological advances in computing field. COSTECH acquired the first personal computers-Olivetti 80286; 20 MB Hard disk, 1MB RAM in 1990. Today, we have 43 computer units and 15 Printers. Out of 43 computer units 22 are Pentium 166 MHZ or 233 MHZ Processors, 16 or 32 MB RAM (Memory size) and 2.5 GB (or above) hard disk capacity. Out of the 15 printers 4 are Laser printers, 2 are inkjets, and 9 are dot-matrix types.

The order of acquisition of PC at COSTECH is shown in the following table:

Year	No. of PCs	Specifications	Source of Funding
1990	1	Olivetti 80286,20 MB HDD	COSTECH
1991	1	IBM PS/1 80286, 40 MB HDD	COSTECH
1991	2	IBM Ps/2 8555,55 sx-x6, 80386 60MB HDD	IDRC Project
1991	1	NCR 80286, IMB RAM, 20MB HDD	NCR Donation
1992	4	IBM Ps/2 80386 2MB RAM, 16 MHz 60 MB HDD	NORAD
1993	3	IBM 486	UNIDO Project
1994	1	Macintosh Laptop	IDRC Project
1994	8	IBM 80486, 33 MHz, 200 MB	UNESCO
1996	2	Zentith-Pentium 100 MHz	UNESCO-RINAF
..	1	EKO Pentium 100 MHz, 16 MB RAM	UNESCO
1997	1	Compaq Pentium 133 MHz	USAID/PADIS
..	4	Pionier-Pentium 133, 16 MB, GB HDD	COSTECH
1998	2	Microbase-Pentium 166 MHz, 16 MB RAM	COSTECH
1998	1	LINX Pentium 200 MHZ 32 MBRAM, 2.1 GB HDD	LEAD PROJECT
..	10	IBM 233 MHz, 32 MB RAM 3.0 GB	COSTECH
1999	1	Computer World Pentium 300 MHZ 32 MB RAM, 3 GB	COSTECH

Also during 1993 COSTECH received two IBM Servers under the UNIDO project on Technology Transfer.

As it may be noted from the table the rate of acquisition has been growing, also equipment specification has been changing all the time, which reflects COSTECH's efforts to cope with current technological trends.

Lastly, COSTECH vision is to ensure that each scientific staff has access to a computer either at his/her desk or in a general pool area. It is also intended to ensure that all administrative, and all-managerial and financial activities are IT mediated for efficiency and accuracy

## **2.2 SOFTWARE**

The Commission efforts in Software acquisition follow similar trend of Hardware. From early versions of DOS Operating Systems Version 4.0 to Windows 98 and from simple Wordprocessors to Internet Web Browsers. These efforts reflect our aim of coping with the technological changes as shown in the list of possessed software below:-

### **2.2.1 Operating Systems**

Microsoft Dos Version 6.0; 6.22  
Windows Version 3.1; 3.11; 95; 98

### **2.2.2 Networking Software**

Novell 4.1  
Unix  
Window NT

### **2.2.3 Wordprocessors**

Word perfect 6.0  
Microsoft Word 6.0; 7; 97

### **2.2.4 Spread Sheets**

Lotus 1-2-3 Version 3.0  
Excel 5; 7; 97

### **2.2.5 Database Software**

Dbase IV  
Dbase 5  
Microsoft Access 7, 97

### **2.2.6 Desk top Publishing and Graphics**

Ms Publisher  
Page Maker 5  
Corel Print House

### **2.2.7 Utilities**

Norton Utilities  
Mcfée Antivirus

### **2.2.8 Presentation Software**

Power point

### **2.2.9 Object oriented Programming**

Visual Basic

### **2.2.10 Bioliographic Database packages**

Unesco CDS/ISIS

### **2.2.11 Statistical Analysis**

Unesco IDAMS

EPI-INFO

### **2.2.12 Internet Server Proxy Software**

- 602 Pro

### **2.2.13 Web Browser**

Netscape Navigator Version 4

## **3.0 ELECTRONIC MAIL SERVICES**

### **3.1 THE BEGINNING**

Electronic mail activities in Tanzania began as three separate projects in 1992, which worked together at the system operator level. The system was based on dial-up telephone lines. COSTECH was one of the nodes. The node at COSTECH began by linking government research institutions and testing the most effective ways to link internationally. The node initially linked to GreenNet in London through Environmental Liaison Centre International ELCI in Nairobi. It was later changed to Worknet based in Johannesburg and again was transferred back to GreenNet.

The highest number of points, which were connected to COSTECH, was 60 in 1995. However, when commercial Internet Service Providers (ISP) entered the market, other points opted to get full Internet services through

them. On the other hand, other institutions have remained with COSTECH mode with the expectation of having upgraded full Internet services in future. There were also some other initiatives that complemented these efforts. These included RINAF project and training programmes.

### **3.2 REGIONAL INFORMATICS NETWORK FOR AFRICA (RINAF)**

UNESCO established RINAF Project late in 1991 with the major goal of improving the element of communication between African researchers and scientists among themselves and with their peer in other continents. The project aimed at meeting the great need of sharing information and knowledge and to exchange data and messages in order to advance, not only the acquisition of scientific and technical knowledge, but also to share experiences and ability and discuss difficulties encountered and solutions found. COSTECH as a national focal point received equipment worth over Tsh. 4,500,000 in 1996. The equipment comprised of two Pentium systems, 4 modem, one printer and 7 line testers.

One major limitation of RINAF project is the assumption that at national level, R&D organisations have already established a working electronic network. Assistance is directed towards strengthening national and regional focal points. In the case of Tanzania, the need of assisting institutions with hardware, connectivity and training is of as great importance as equipping national and regional focal points.

## **4.0 INTERNET IN TANZANIA**

### **4.1 QUIET START AND POLICY CHANGES**

The Internet in Tanzania has come a long way in a short time. It started from a quiet start in the early nineties when all what was there was a very basic store and forward electronic mail facility through connections to Healthnet via Muhimbili, GreenNet via COSTECH and the University of Dar es Salaam. Tanzania Online was one of the first commercial companies to join the bandwagon.

Today, full Internet connectivity is available from over 13 Internet Service Providers and this is attributed mainly to policy changes. Policy changes in telecommunication sector started in 1993 when Parliament passed an Act to establish the Tanzania Communications Commission (TCC) to regulate telecommunications services and to provide for the designation of public telecommunications license in Tanzania. Provision of such services until then had been a state monopoly through the now defunct Tanzania Posts and Telecommunications Corporation, which was split into the Tanzania Posts Corporation and Tanzania Telecommunications Corporation Limited (TTCL) which, continues with the provision of Telecommunications services.

## **4.2 NEW ERA OF COMPETITION**

A new era of competitive services in communication has been ushered in through private companies. TCC would license new companies them to complement as well as introduce new services and compete with TTCL. Early players to start off were Mobitel who provided cellular telephone services, with Tritel starting soon after. Others were companies like BeepMe and ACG Telesystems who introduced Paging services. The latter also introduced card payphones.

In the data communications arena, the companies who were given licenses were Datel, a joint venture company between TTCL and Nexus (a France Telecom subsidiary), SITA, and Wilken Afsat. At this time, these companies were envisaged to facilitate wide area computer networking within Tanzania. Although by 1995, the HealthNet and GreenNet connections were transferring huge volumes of Email, they were severely under-resourced and were not commercially oriented. Internet Service Provision was then deemed as a value-added service by the TCC. It could be re-sold by an Internet Service Provider (ISP) as long as they bought their Internet Access connection through one of the three licensed data communication operators. This has recently been changed by TCC who now allow individual ISPs to have direct international access.

CyberTwiga was the first company off the ground in providing Internet through a connection from SITA. In 1996, Datel made Internet Access available through VSAT (Very Small Aperture Terminal) satellite connections through France and IntAfrica were the first ones to provide Internet services



through a Datel link in December 1996 with HeartBeat starting almost immediately after them. IntAfrica, Heartbeat and Cats-net were all using VSAT connections through Datel who had not anticipated the level of traffic, which was generated by the Internet users. The Datel satellite channel was being shared by the ISPs using Time Division Multiplexing/ Time Division Multiple Access (TDM/TDMA). Because of the high volume of traffic the maximum speed which the ISPs could use was 38.4kbps.

Depending on the number of users who are subscribed to the ISP and their usage patterns as well as the services hosted, ISPs will have to go for faster access speeds to accommodate the additional traffic generated by their subscribers. Heartbeat has changed to 256kbps since last year to accommodate the extra traffic.

The University of Dar es Salaam is currently serving its academic community through it's own VSAT link which is mainly for it's own internal usage and some commercial subscribers.

The improved telephone access through the TTCL telecommunication infrastructure improvement programme which has resulted in improved telephone connections, is enabling computer owners all around Tanzania to connect to ISPs and check out the services offered by them to chose among what is available and connect to the net to use e-mail, the world wide web, newsgroups, web hosting and the various other Value Added Services. In another development, Datel and Wilkens have introduced Wireless Local Loop (WLL) connections in Dar es Salaam which may bring Internet access costs down for providers.

However, it can be observed that most of the research and development (R&D) institutions are yet to fully take the advantage of the available Internet services in the country. The main reason is the high costs involved. Since the available commercial ISPs have to pay for Internet Access, running costs and also reserve a reasonable profit margin, most institutions that depend on the Government for subsidy find that having full Internet services is beyond their financial means. COSTECH is thus continuing with its efforts of establishing a national science and technology network which will be registered with TCC as a closed network and enjoy the benefits of a not for profit status in terms of taxes and other restrictions and consequently establish an affordable network for the Tanzania scientific community.

## **5.0 INTERNET CONNECTIVITY AT COSTECH**

After the introduction of e-mail services at COSTECH in 1992, there has been a gradual increase of electronic communications services within the scientific community. Although there was a rapid appearance of commercial Internet Service Providers (ISP's) in 1995 and 1996, the need for establishing a scientific network supported by its own ISP was becoming even more urgent considering the high initial and running costs demanded by the commercial ISPs and also their limited coverage. It was for this reason that COSTECH was determined to establish itself as an ISP to act as a hub for a national information network.

### **5.1 DEVELOPMENTS SINCE 1996**

Towards the end of 1995, COSTECH's management found that there were a sizable number of computers within the organisation. The establishment of a LAN system was deemed to be the effective way of utilizing the equipment. The LAN could also act as a building block to a wide area network including the Internet. An Implementation plan was prepared to that effect.

In 1996 COSTECH engaged a networking expert Mr. Mike Jensen from South Africa who suggested various networking options. Following Mike Jensen's report, a TTCL consultant, Mr. J. Stefano worked out a detailed analysis of the options given. The options included:

- Having 64Kbps International Leased Circuit Services  
(est. cost USD25442)
- V-SAT Technology (est.cost USD 11657)
- Inmarsat Technology (est. cost USD15,000)

These costs were not only seen to be too high but the organisation did not have the resources to meet these expenses. Project proposals were therefore prepared to seek donor funding.

Two project proposals on establishment of national electronic infrastructure for scientific and technological institutions were submitted to the Governments of Japan and the Netherlands. However, when submitting these proposals, it became clear that unless our government made R&D and networking its priority, donors had their priorities and once agreements have been drawn, changes in focus can only be done in the following cycle. There is therefore a great need to influence our government to request donors to fully support R&D management and coordination activities.

While seeking donor support, COSTECH also investigated on other cheaper Internet connectivity technologies. The Introduction of WLL by some data companies has reduced the costs of connectivity. This option has now been acquired and, links COSTECH with Wilken's VISAT at Nyerere Road in Dar es Salaam giving our institution full Internet connectivity. However for COSTECH to be an ISP there remains the need to acquire appropriate hardware and software.

## **5.2 TASKS ACCOMPLISHED**

### **5.2.1 New Training Laboratory**

As part of the LAN implementation plan, a total of 10 new IBM personal computers were acquired in September 1998. The associated LAN equipment including network cards and cabling accessories were also purchased. A modern computer lab equipped with 15PC LAN running on Windows 95 software and Windows NT Server was established. The laboratory is currently serving as a training lab, which accommodates between 20-30 students. One regional course on national course have been organised in the last five months in this laboratory.

### **5.2.2 Internet Connection**

The Server of the new training lab is linked to a local ISP (Wilken's Afsat Tanzania Ltd.) over a dial up connection. With the help of a Proxy network software, the lab has full Internet connection. Also, two computers

have been connected to the training laboratory server and provide Internet services to scientific staff at COSTECH as well as from other R&D institutions. More PC's will be added to create an "Internet café" for use by scientists around Dar es Salaam.

Wireless Local Loop (WLL) is soon to replace the dial up Internet connection which will improve access speed and also be more economical. Equipment worth USD 8,000 was purchased using External project funds which were at the disposal of COSTECH. Configuration of this equipment and construction of line of vision for the WLL to Wilkens Afsat has been completed. Once equipemnt for ISP has been acquired and set up completed, COSTECH should be able to provide full Internet services to all R&D institutions.

### **5.2.3 ISP Equipment**

Quotations for ISP equipment have been requested from two of the leading network vendors/namely International Communications Systems (ICS) and Wilkens. The equipment to be purchased include: Web server; Backup proxy server; Router attached through wireless local loop; 10 Base T hub for local areas Network and Associated software. The total cost of these equipment is estimated to be USD 30,000

During the year 1998, COSTECH sent a proposal to UNESCO requesting assistance to purchase ISP equipment under Member States Participation Programme. This request was considered favourably and the sum of USD 20,000 has been provided to the Commission to acquire some of the ISP equipement. Additional funds will have to be sought elsewhere to finalise this acquisition as well as setting up the system before appropriate services can be provided.

### **5.2.4 Operators and Users**

A successful electronic network including Internet requires a well trained technical personnel as well as informed users. It was therefore necessary to prepare a pool of computer literate users and skilled system operators. COSTECH efforts towards this goal has been covered in detail under the training section.

### **5.2.5 Availability of network terminal equipment**

A computer system is one of the necessary components of an electronic communication system. Most of the scientists who underwent computer training at COSTECH had no access to computers after the training. Under the computer distribution programme, 150 personal computers were distributed to educational, R&D institutions and individual scientists. Plans to help the recipients with the year 2000 problem are underway.

## **6.0 COMPUTER TRAINING PROGRAMME**

Towards the end of 1993, COSTECH embarked on Computer Training programme for various scientific cadre. The philosophy behind the projects is the imperative to take advantage of recent advances in technology in Research and Development (R&D) activities. Computer technology is one of such technological advances. Utilization of this technology increases the effectiveness of R&D efforts.

The need for computer training was realized based on a survey conducted countrywise which showed that most of our research scientists at that time (1993) lacked skills in computer usage compared to their counterparts elsewhere. It was also realized that due to the fast developments in computing technology, many of our scientists and technologists could not upgrade their skills due to lack of resources.

COSTECH has organized and conducted a number of Computer Training Courses with over 300 scientists, researchers and technologists trained. Funding for these courses was solicited from donors through project proposal prepared by the Commission. The following are some of the course undertaken since 1994:-

## **6.1 COMPUTER TRAINING PROGRAMME FOR SCIENTISTS, RESEARCHERS AND TECHNOLOGISTS**

A series of 8 computer training courses were conducted from 1994 through 1997. This programme was specifically conducted to women scientists, researchers and technologists. A total of 160 women have been trained so far out of which 80 were trained at basic level and 80 women at advanced level. Course contents were modified and developed each time to match with the state of practice. Funding for these courses came from Unesco, the Rockefeller Foundation and the Commonwealth Science Council.

## **6.2 TRAINING FOR INFORMATION SPECIALISTS**

The Commission was able to organize and conduct three training courses for Information Specialists. Two of these courses were for Tanzanian participants while the third course was a regional one. The courses for Tanzanians were financially supported by Pan African Documentation Information System (PADIS) of the Economic Commission for Africa, and the International Association for Agricultural Information Experts. They were mainly geared for specialists in fields of agriculture and food security.

The third training course for information specialists was a regional workshop organized and conducted in collaboration with Technical Centre for Agriculture and Rural Cooperation (CTA) of the Netherlands. This was an advanced training workshop for experts with a strong computer background, aimed at enhancing the participating institutions to manage and disseminate research data and information from and about the region using Internet Technologies. The workshop was attended by 16 participants from nine countries in the Eastern Africa region.

### **6.3 TRAINING OF NETWORK SYSTEMS ADMINISTRATORS**

Another deficiency in Information and Communication Technologies identified by the Commission was lack of adequately trained Network Systems Administrators for implementing and managing telematic services. The Commission therefore organized and conducted a special course for individuals who have responsibilities for designing, implementing and maintaining data communication networks. The course drew 17 participants from scientific and technological institutions in the country. This course was supported by the Commonwealth Secretariat through the Commonwealth Network of Information Technology for Development ( COMNET-IT) based in Malta.

### **6.4 TRAINING OF MICRO CDS/ISIS USERS**

COSTECH is the National distributor of Unesco CDS/ISIS a bibliographic database software package. In order to support users of this package, a series of courses have been conducted for Librarians and Documentalists in computer applications to improve information handling (storage and retrieval) capabilities. A total of 60 Librarians and Documentalists have been trained in these courses. As a result of these courses, a number of institutions, both public and private, have already established information databases using this freely available software. Participants to these courses are normally charged fees so as to make the training self financing.

## **6.5 ELECTRONIC NETWORKS AND CONNECTIVITY TRAINING**

A special course supported by the Commonwealth Secretariat, was organised and conducted in 1998 for representatives of Tanzania women professional groups. The aim of the course was to sensitize women groups on interconnectivity through electronic networks, access and sharing of information through the Information Super highway (Internet).

The course attracted 20 participants from women groups in Tanzania. Among the groups represented were: Tanzania Association of Women Leaders in Agriculture and Environment; Tanzania Media Women Association (TAMWA); Catalyst Organisation for Women Progress in Zanzibar; Tanzania Women Lawyers Association; Zanzibar Women Cooperation; Tanzania Gender Networking Programme; and Women's Research and Documentation. It is hoped that these professionals will act as catalysts in matters related to networking using IT methodologies.

## **6.6 OTHER WORKSHOPS**

The Commission has also facilitated other institutions to conduct courses using COSTECH training facilities. These courses were conducted using COSTECH instructors and/or facilities. Some of the institutions/organisations who have conducted courses using COSTECH's facilities are the Meteorology Department; Network for Users of Scientific Equipment in the Southern Africa (NUSESA); the Department of Research and Training of the Ministry of Agriculture and Livestock Development; and the Building Research Unit. It is hoped that with the development of a new computer laboratory, more and more R&D institutions will use the facilities to impart IT knowledge to their staff.



## **6.7 FUTURE DEVELOPMENTS**

As it may be noted from the summary of course conducted, the Commission's training capability have grown from training in standard office applications (word processing and spreadsheets) to Database Design, Networking and Internet & Intranets and Webpage Design. In order to meet the training requirements and delivery of advanced course modules, the computer laboratory has been improved over the period. Initially the Laboratory had 10 units of which 6 were IBM P/2 486 2x 33 Mhz, 4MB RAM 200 MB Hard disk and four 386 2MB RAM, 60 MB Hard disk. Today the laboratory has been moved to a bigger room with 16 PCs, mainly Pentium 233 MHz, 32 MB RAM 2.5 GB Hard disk. The Commission's future plan is to equip the laboratory with 22 PCs with state-of-the-art technology, so as to support 20 participants at time (with one terminal each) and one unit for the instructors presentation and demonstration.

The number of scientists trained so far is still too small compared to the employees in our R&D institutions. It is the Commissions plan to carry on these trainings to ensure that most of the scientific staff have adequate computer skills for supporting their work. The Commission also plans to conduct similar training to other professional groups like science teachers, doctors, Heads of R&D institutions etc.

Finally, the training programmes listed above have been delivered using COSTECH's trained staff as well as instructors from other institutions inside and outside the country. It is also COSTECH's plan to have its training staff exposed to the latest state-of-the practice technology through training and seminars locally and overseas.

## **7.0 COMPUTER ACQUISITION AND DISTRIBUTION**

It was realized that, many R&D institutions lacked computer equipment due to high costs involved in procuring them at the local market. Some R&D institutions lacked IT culture and did not therefore allocate resources in computer acquisition.

COSTECH therefore embarked on another project aimed at providing educational and R&D institutions as well as individual scientists, with low cost computers. The programme began in 1997 where 50 computer units Pentium 133 MHz were acquired from Austria and Holland and distributed to R&D institutions and individual scientists on cost recovery basis. The cost of a new unit under this programme was Tshs.1,050,000/= compared to Tshs.1,600,000/= at the local market at that time.

In order to further assist scientists and other institutions who can not afford the cost of new PCs, the Commission also embarked on ordering used refurbished units which were distributed at Tshs.408,000/=. Up to now, the Commission has distributed a total of 61 new Pentium PC and 75 refurbished units.

All the units distributed have been working well and more requests are being received.

Among the institutions that have benefited from this programme include: National Institute for Medical Research; University College of Lands and Architectural Studies; the Open University; Muhimbili University College of Health Sciences; Tanzania Fisheries Research Institute; University of Dar es Salaam; National Social Welfare Training Institute; and Civil Service Training Institute. It is the hope of the Secretariat that future resources will be allocated for this programme so as to ensure easy availability of IT among R&D institutions as well as among individual scientists in the country.

## **8.0 SOFTWARE PROMOTION AND DISTRIBUTION**

In an effort to popularize Information Technology in R&D activities, the Commission also embarked on identification, promotion and distribution of Computer Software relevant to scientific applications and for effective usage of computers. Part of the software promotion was done by incorporating some modules of the applications in the training programme conducted to scientist and researchers.

Among the software promoted and distributed by COSTECH is the UNESCO CDS/ISIS. CDS/ISIS, an acronym for **Computerized Documentation System/ Integrated Set of Information Systems**, was developed by UNESCO Office of Information Programmes and Services for library and documentation units applications. The software is used for information storage and retrieval and is available free of charge to non-profit organizations. The Commission was able to distribute this package to 22 institutions. Some of the organisations that are using the package include East African Statistical Training Centre, Bank of Tanzania, Institute of Accountancy-Arusha, Women Research and Documentation project, National Institute for Medical Research and Tanzania Development Finance Company Limited.

It is the intention of the Commission to ensure that CDS/ISIS is promoted among information centres in Tanzania so as to enable future information sharing among R&D institutions.

The other two statistical analysis software packages also promoted and distributed by COSTECH are EPI-INFO and IDAMS. Other useful packages will be identified and promoted in the future.

## **9.0 CONCLUSION**

“The poor countries of the world today are those which came late in the industrial revolution. The poor countries of the world in future will be those who will be the late comers in the information revolution”.

Members of the Commission are requested to receive and discuss the development of IT at COSTECH and provide guidance of future initiatives.