MOZAMBIQUE

National Human Development Report 2008

The Role of Information Communication Technologies in Achieving the Millennium Development Goals

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Southern African Research and Documentation Centre

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Preface

The importance of Information Communication Technologies (ICTs) for developing countries such as Mozambique is still the subject of strong debates. Some circles view ICTs as luxuries, especially for people who live in conditions of poverty. Others argue, with equal passion, that the ICTs open doors for economic development, for the promotion and expansion of health and education, and for political mobilisation.

In Mozambique, the government, as part of its Science and Technology strategy, grants to ICTs an "essential role (...) in preparing and promoting economic growth through innovation" and "in poverty reduction", as established in the Action Plan for the Reduction of Absolute Poverty (PARPA II, 2006-2009). Within this vision, PARPA II attributes two key characteristics to Science and Technology, namely:

- that Science and Technology, including the ICTs, is not a sector in itself, but is a cross-cutting area, "a source for solutions in all sectors where the battle against poverty is waged, from health to education, housing, and job creation;" and
- that Science and Technology, including the ICTs, should be popularised within each sector.

The prime objective of the introduction of ICTs into PARPA II is to promote innovative forms of using them in solving specific sector challenges, and to encourage trans-sector cooperation and the sharing of information. Thus, in its vision for Science, Technology and Innovation up to 2015, the Mozambican government has adopted a strategy that seeks to ensure:

"The omnipresent availability and equitable use of Science, Technology, Innovation and Information Communication Technologies (ICTs), as a right of all Mozambicans to speed up poverty reduction, the generation of wealth, and the improvement of their social well-being."

The present report is an expanded and critical study of the conditions and process of integrating the ICTs into the various sectors of social and economic development in Mozambique, in the context of the contribution they can make in the struggle against absolute poverty and, as a result, in the promotion of human development.

In recognising the existence of a framework of national policies and strategies appropriate for integrating ICTs as tools to drive the struggle against absolute poverty, the report also notes the prevalence of significant obstacles to success, particularly the following which, taken as a whole, compose the Digital Access Index:

- first, *connectivity*, i.e., the availability and reliability of the Internet access infrastructure;
- second, the *cost* involved in Internet access on a regular basis;
- third, *content*, referring to the substance, language and relevance of the information available; and
- fourth, the *digital capacity* of society, i.e., the electronic readiness and availability of resources to invest in the information, research and development infrastructure.

The present report publishes reflections made by independent specialists on the benefits – potential and actual – of the use of ICTs in strategic areas such as governance, poverty alleviation, education, health, the environment and community development, while including the main points of weakness which affect their full implementation. Among others, the following findings stand out.

Poverty alleviation The inclusion of ICTs in PARPA II is a positive indicator of the stress laid by the government on the role they can play in the range of poverty alleviation programmes. Alongside this fact, the report also notes the absence of indicators in PARPA to monitor this integration. There are also few ICT activities that are sufficiently integrated and embedded in national polices and strategies, and particularly in the form of plans of action. Likewise, the report encourages the government to earmark, in the State Budget, funds intended specifically for developing the integration of ICTs into national development programmes.

Education The pace, coverage and quality of the programmes seeking to integrate ICTs into the education sector are still modest, and it is critical to ensure the broadest use of ICTs in secondary education, since it is the students from this level of education who will form the basis for the generalized integration of ICTs into society. It is thus regarded as a pressing need to turn round the education system so that education in sciences is strengthened, as the point of entry for a gradual and sustainable technological revolution, alongside the expansion and improvement in the quality of distance learning.

Health The National Health Service (SNS) covers only about 40% of the population and the level and quality of the services provided are still modest. Although funding and the shortage of skilled staff are part of the problem, archaic and inadequate communication procedures inside the system worsen the levels of performance. Furthermore, there has been little exploration of the potential of ICTs to overcome the weaknesses of the SNS, namely physical distances and the scarcity of medical and auxiliary staff, through remote diagnosis and medical and epidemiological control.

Governance The Public Sector Reform Programme, now in its second phase, took as an implementing instrument, the ICT Implementation Strategy approved in 2002. Among some of the major achievements made thanks to the Strategy, the following stand out:

- the launch of electronic government;
- adoption of an efficient financial management system (SISTAFE);
- digitalisation of the land register;
- computerisation and simplification of the criminal record system, among others.

However, in a country such as Mozambique, with limited inherited systems and an extensive public sector reform, the focus of electronic government should be on strengthening internal collaboration between institutions, transparency in procurement, consolidating efficient Single Attendance Counters (BAUs), and central databases (for example, for civil identity records, etc).

Community Access The report finds that, through the setting up of Community Radios and Community Multimedia Centres in more than 30 district capitals or municipalities, ICTs have contributed to greater access to information and interchange between local communities in the rural areas, thus promoting horizontal communication, as advocated by PARPA. Impact studies undertaken in 2006 in Inhambane, Sofala, Manica and Zambézia provinces, on the contribution made by Community Radios and the Multimedia Centres to improving the quality of life of the local communities show that they have:

- facilitated communication about public and family events;
- helped to save money that otherwise have been spent on long distance transport; and
- encouraged improvement in the quality of services provided to citizens, thanks to criticisms broadcast by the community radios.

Like the previous National Human Development Reports (NHDR) produced in Mozambique since 1998, this is the result of independent intellectual reflections, led by a team of specialists, under the general coordination of a Consultative Group, formed by prominent figures of recognized merit in Mozambican society, selected from among academics, civil society and the media.

The credibility that the NHDR has won to date was achieved through rigorous collection and analysis of data, and through inclusive and participatory processes which together ensure a high quality product. This process included strengthening national analytical and statistical capacity, in a dynamic partnership involving the Higher Institute of International Relations (ISRI) as a thematic partner, and the National Statistics Institute (INE), which produces the annual Human Development Index (HDI).

The Mozambique office of the Southern African Research and Documentation Centre (SARDC) established the process 10 years ago with the United Nations Development Programme (UNDP) for preparing and producing Mozambique's National Human Development Report (NHDR). SARDC has played the role of lead agency in six quality NHDRs (1998, 1999, 2000, 2001, 2005, 2007), produced over the past decade for UNDP.

The institutions involved in producing this report, namely ISRI, INE and SARDC Mozambique, recognize the important collaboration and support by UNDP at all levels, in particular the important contribution and support of the UN Resident Coordinator and UNDP Resident Representative in Mozambique, Ndolamb Ngokwey. Comments and suggestions received from other UN agencies, including from outside Mozambique, have also contributed to enriching the final document.

We wish once again to express our thanks for the opportunity to produce this document, which we present to the public, not as a closed and finished work, but as an instrument to stimulate reflection and public debate around a topic that runs through all sectors of the country's social, economic, political and cultural life.

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Foreword

by UN Resident Coordinator

Fostering Development Through Access to Knowledge

This National Human Development Report, the seventh in a series, focuses on *The Role of Information Communication Technologies (ICTs) in achieving the Millennium Development Goals.*

The timing is quite opportune given the heightened interest and the significance of ICTs for development. This is underlined at global level by commitments made at the World Summit on an Information Society, and at national level through the government's ICT Policy and its "e-government" strategy.

Information Communication Technologies – the conveyor belt of globalisation – have tremendous influence on the functioning of global and national economies. ICTs are changing production systems with greater importance given to "high tech" products and services.

ICTs are bringing together people of different nationalities, religions, and cultural backgrounds. However, differences in technological development, with Africa lagging far behind, indicate that unless developing countries come to grips with the challenge of ICTs, they may be left behind in the ICT revolution, thus increasing their marginalisation.

This study examines the emergence of ICTs for development in Mozambique in the context of the overall human development thrust. It updates the various human development indicators (the human development index, the human poverty index, and the gender development index) and provides a technology achievement index. Given much more accurate and up-to-date data, the indices are better than those of the Global Human Development Report for the analysis of human development at the national level. This report analyses the impact of ICTs in enhancing service delivery in various sectors critical for the attainment of the Millennium Development Goals (MDGs), such as education, health, environmental sustainability, and the promotion of partnerships for development.

This report should contribute to further sharpening of development thinking on how the wheels of development can be oiled through rapid technological advance and innovation. It should facilitate the mainstreaming of ICTs into national development frameworks, strategies and programmes.

By sponsoring this report, UNDP sought to contribute to raising awareness and triggering action on critical human development concerns with special emphasis on ICTs for development; and to contribute to strengthening national statistical and analytical capacity.

This would not have been possible without the dynamic partnership with the Higher Institute of International Relations (ISRI), the Southern African Research and Documentation Centre (SARDC) in Mozambique, and the National Institute of Statistics (INE), whose President is the Co-chair of the Consultative Group that has guided the independent team of national consultants in the preparation of this report.

The UN is pleased to have provided its technical assistance in support of the NHDR process; it appreciates greatly the national buy-in and ownership, and expresses the hope that the report will help to further enhance Mozambique's resolve to close the digital divide, to strengthen ICT capacity and its effective use as a powerful tool for poverty eradication and sustainable human development.

Ndolamb Ngokwey
UN Resident Coordinator &
UNDP Resident Representative
Maputo, December 2008

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Acronyms

AISI	Africa Information Society Initiative
ARA	Regional Water Board
ARAPKE	Africa Regional Action Plan on the Knowledge Economy
AU	African Union
BAUs	Single Attendance Counters
BPO	Business Process Outsourcing
CAICC	Community Information and Communication Support Centre
CAP	Agricultural and Livestock Census
CD-ROM	Compact Disk – Read Only Memory
CDS	Sustainable Development Centre
CIUEM	Computer Centre of Eduardo Mondlane University
CMC	Multimedia Community Centre
CPRD	Provincial Digital Resource Centres
CSIR	Centre for Scientific and Industrial Research, South Africa
CSO	Civil Society Organisations
DAI	Digital Access Index
DL	Distance Learning
DMM	Modern Methods Definition
DNA	National Water Board
DNS	National Directorate of Health
DSC	Community Health Department
EAD	Distance Learning
EASSy	Submarine Cable System
EDM, E.P.	Publicly-owned Electricity Company
EP1	First Level Primary Education
EP2	Second Level Primary Education
EPC	Complete Primary Education
e-SISTAFE	State Financial Administration System
ESPERE	Environmental Science Published for Everybody Round the World
FAO	United Nations Food and Agriculture Organisation
FNI	National Research Fund
FORCOM	National Community Radio Forum
G8	Group of the 8 Most Industrialised Nations
GCP	Global Canopy Programme
GDI	Gender-related Development Index
GDP	Gross Domestic Product
GHDR	Global Human Development Report
GIS	Geographical Information Systems
GMD	Mozambican Debt Group
GNI	Gross National Income
GoM	Government of Mozambique
GovNet	Mozambican Government Electronic Network
GVA	Gross Value Added
HDI	Human Development Index
HIV and AIDS	Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome
HPI-1	Human Poverty Index
IAF	Household Survey
IBGE	Brazilian Geography and Statistics Institute
ICT	Information Communication Technologies
ICT4D	Information Communication Technologies for Development
IDRC	International Development Research Centre
IFTRAB	Work Force Survey
IJEDICT	International Journal of Education and Development using ICT
IMAP	Primary Teacher Training College
INAM	National Meteorology Institute
INCM	Mozambique National Communications Institute
INE	National Statistics Institute
INFOR	Informal Sector Survey
INGC	National Disasters Management Institute
IOM	International Organisation of Migration
ISP	Internet Service Provider
ISRI	Higher Institute of International Relations
ITU	International Telecommunications Union
IXP	Internet Exchange Point
KWh	Kilowatt-hour
MDGs	Millenium Development Goals
MEADOS	Multilateral Environmental Agreements
MEC	Ministry of Education and Culture
MICOA	Ministry for Environmental Action Coordination
MICTI	Mozambican Information Communication Technologies Institute
MINAG	Ministry of Agriculture
MISAU	Ministry of Health
NEPAD	New Partnership for Africa's Development

NHDR	National Human Development Report
ORAM	Rural Mutual Aid Organisation
PAP	Programme Aid Partnership
PARPA	Action Plan for the Reduction of Absolute Poverty
PC	Personal Computer
PEEC/PE-MEC	Strategic Education and Culture Plan
PES	Economic and Social Plan
PPC	Purchasing Power Parity
PPP	Private Public Partnership
PQG	Government Five-Year Programme
PRSP	Public Sector Reform Programme
QAD	Assessment and Performance Framework
QUIBB	Questionnaire on Basic Indicators of Well-Being
RGPH	General Population and Housing Census
SADC	Southern African Development Community
SADC-HYCOS	SADC - Hydrological Cycle Observing System
SAP	Early Warning System
SARDC	Southern African Research and Documentation Centre
SDNP	Sustainable Development Network
SIFIM	Indirectly Measured Financial Intermediation Services
SIL	Inherited Information Systems
SIS	Health Information System
SMS	Short Message Service
SNS	National Health System
SWAP	Sector Wide Approach Programming
TAI	Technology Achievement Index
TDM	Publicly-owned Telecommunications Company
TIA	Labour and Agricultural Survey
TLM	Net Enrolment Rate
UA	Universal Access
UEM	Eduardo Mondlane University
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nation Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
UNO	United Nations Organisation
UPU	Universal Postal Union
USAID	United States Agency for International Development
UTICT	Technical Unit for Implementing Computer Policy
WHO	World Health Organisation
WHYCOS	World Hydrological Cycle Observing System
WSIS	World Summit on the Information Society
WWW	World Wide Web

Key Concepts and Definitions

Throughout the various chapters of the NHDR, the authors draw on key concepts directly related to the ICTs, and to their integration to drive human development. In order to allow the non-specialist reader to understand them, definitions of some of these concepts are presented here.

Information Communication Technologies (ICTs) This is a general expression that covers computer hardware and software; digital broadcasting and telecommunications; as well as stores of electronic data, such as the World Wide Web (www) or the contents incorporated into discs such as CD ROMs. The expression ICTs thus represents a wide range of elements in continual evolution and also includes television, radio, cell phones, and the policies and laws that regulate all these resources.

Knowledge Technology Information is all around us. Never has it been so easy to collect. Never has it been so easy to store. Never has there been such easy access to it. And yet this info-bonanza is seen all too frequently not as a boon, but as a burden. The information we actually need is often concealed by information that we do not need. To realise the opportunity of our information-rich environment, we need to extract knowledge from information. New resources, such as the semantic web, are the key to extracting the value from our informational assets.

Let us define knowledge as usable information. What does "usable" mean here? If information is usable, then that information can be matched with, and brought to bear upon, the particular problems our business or organisation is addressing. To turn our information into knowledge, it is necessary to understand the connections between it and our business processes. It is necessary to understand what information to use when, how to find it, and how to present it to the relevant people. The trouble is, that is easy to say and hard to do. We generally lack the capabilities required to transform our information into knowledge. Put bluntly, we have information technology, but we don't have knowledge technology.

So what is knowledge technology all about? It is hard to define knowledge but we can say knowledge is awareness about useful or harmful information gained through experience or learning. In this context we can say that the knowledge technology is the technology that gives the learning ability to a device (or intelligent systems in general) and creates tools and techniques for transforming information into knowledge and knowledge into wisdom.

Therefore, knowledge technology is one that adds a layer of intelligence to information technology, to filter appropriate information and deliver it when it is needed.

The term *knowledge technologies* refers to a fuzzy set of tools including languages and software enabling better representation, organization and exchange of information and knowledge. Among knowledge technologies are ontologies, topic maps, blogs, groupware, document management, expertise locaters, latent semantic analysis, semantic networks, social networking engines, and wikis.

Information Society The ICTs are the tools that shape the "information society". In the absence of a universally accepted definition of the information society, it can be described as a society where "the creation, distribution and manipulation of information have become the most important economic and cultural activity". An Information Society can be contrasted with societies in which the economic base is still primarily Industrial or Agrarian (Tech Target 1999). In human history, there has always been an exchange of information between people and networks of people. However, the exchange of information based on ICTs has radically changed the scale of this exchange, and factors such as non-temporal patterns of information and the dissemination of information have become more important than ever.

Digital Divide Knowledge access is the new facilitator of sustainable development; and its absence is a catalyst for underdevelopment. The former UN Secretary-General, Kofi Anan, in his Millennium Report calls this the "digital divide", and it is rapidly widening the economic gulf that divides the developing South from the digitalizing North.

The role that knowledge currently plays in all human activities is so critical that the concepts of development and progress need to be redefined in terms of the capacity to generate, acquire, disseminate and use knowledge. The presence or absence of

this capacity is thus a fundamental dividing line between rich and poor nations, and even within each nation or society, between those parts of the world where individuals enjoy the potential to decide and act autonomously, and those other areas where individuals still lack the power to realize to their full potential as human beings.

In the language of the ICTs, this reality of a "fractured world" (Sagasi, 1980) is known as the digital divide, which refers above all to the dividing line that prevents potential users from gaining access to the Internet and benefiting from it.

Several factors may contribute to the digital divide:

- first, *connectivity*; i.e., the availability and reliability of the infrastructure giving access to the Internet;
- second, the *cost* involved in regular access to the Internet;
- third, the substance and language of the *content*; i.e., relevance, comprehension of the information, etc; and
- fourth, the *digital capacity* of society – at individual and collective level, particularly the private and public sectors, i.e., electronic readiness; and,
- finally, whether resources are available or not to invest in the information, research and development infrastructure.

Electronic Government *versus* Electronic Governance The terms "government" and "governance" are nowadays often used as synonyms, wrongly. It is important to develop a separate understanding of the two concepts, since both will be mentioned in some sections of this study. Government is an institutional superstructure, which societies use to translate policy into guidelines and legislation. But governance is the result of interaction between government, the public service and citizens through political processes, policy development, programme definition, and service provision (Ketti, 2002). In the World Bank's definition (1991) governance is the way in which power is exercised in managing a country's economic and social resources. The UNDP (1997) offers a more general definition of governance, regarding it as the exercise of political and administrative authority for the management of a country's affairs at all levels. In this way, electronic governance must be electronic interaction through consultations and the active involvement of citizens with the government. This process takes place within the scope of electronic government, or e-government.

Production of local content In Africa, several ICT initiatives for development have failed because they did not provide relevant, comprehensible and useful information to the target group. This challenge is shown by a study which indicated that in Africa, with the exception of South Africa, only 0.02% of Internet content is produced locally (UNDP, 2001). Local communities are aware of the information they need to develop their activities, and thus their involvement is fundamental. A definition of local content is "the expression of knowledge locally produced and adapted of a given community – where a community is defined by its location, culture, language or area of interest" (Ballantyne 2002). Thus, local content refers to that information which is specific to a given community, which is generated, disseminated and consumed through a process which strengthens transparency, greater access to information, public participation, training, etc.

The initial determinants for producing local content are research and mapping of sources of local information and knowledge. In other words the content does not appear *motto proprio*; it needs owners or creators with motivation to create, adapt and transport it... (UNESCO, 2007).

Community Multimedia Centres (CMCs) The CMCs make ICTs available to the population, and disseminate them at local community level, through mechanisms of active appropriation, particularly for the production and consumption of local content. The definition of CMCs, according to UNESCO:

The CMCs provide a way for active membership of the global knowledge society. A CMC combines community radio (or television) by local people in local languages with ICT applications in a vast range of social, economic and cultural areas. This ensures that the ICTs are technologies working in favour of all members of the community. In its most basic form, the CMC offers a portable radio station, plus a computer linked to the Internet, e-mail, and a basic office, library and training and learning applications. In its more developed form, the CMC is an important infrastructure, offering a complete range of multimedia facilities, linking to the local hospital for telemedicine applications, downloading and printing national papers for local circulation, and so on.

Technological convergence Convergence means coming together, approaching the same point from different directions, a combined or joint effort, or union. Technological convergence in the field of ICTs

Technological Convergence

	IT	Telecom	Other media
Content/ Services	Software based content	Telecom based services and content	Film, music, newspapers, etc.
Transport/ Software	Software	Network services	Cinemas, video rentals, etc.
Equipment/ Hardware	IT hardware	Telecom equipment	Reproduction of films, printing, etc.

refers to the elimination of previously existing boundaries between sectors, specifically between IT, telecommunications, broadcasting and other information and entertainment media. The table below classifies the activities of the "traditional" sectors into three levels, and shows the bases for convergence.

The use of digital technologies in all these sectors is one of the key factors, enabling for example the horizontal convergence of content, as the same content can now be conveyed by more than one form of carrier. Technological convergence can also be vertical, as when a telecoms company expands into services delivery, or an IT hardware company moves into content development.

The advent of broadband technologies (cable, wireless or satellite) could in principle provide low cost, high quality access to communication, information and entertainment for all. It is amazing to think that only a decade or so ago the height of aspiration even in the city of Maputo was to be able to communicate by e-mail in a dial-up system, using DOS, while today broadband access is demanded even in the rural areas, to enable Internet access 24/7 so that music, films and software can be downloaded directly.

In other words, it is now possible to listen to Radio Mozambique on your computer, to access Internet through your television or mobile phone, to make a phone call to a landline through your computer, to check television news headlines on an Internet website, to send instant messages anywhere in the world via mobile phone or Internet, to watch a Hollywood film on your computer using a DVD, to follow a distance education course that combines use of all these technologies, to participate in a video conference from your own home or office, and so on. What were previously considered separate sectors may now begin to be characterised as a single new ICT sector.

National and international regulators have to take account of these new developments: Should the individual sector regulators of the past be merged into a single body? What does the concept of technology-neutral regulation mean in the new context? How to guard against the dangers of monopolistic control of content? Do existing rules of responsibility applied to print media or public radio and TV also apply to Internet-based media? Who should decide? How to preserve the principle of equitable delivery?

However, the implications of ICT convergence are too important to be left to the operators, or even to the regulators, alone:

- As ICTs are cross-cutting tools employed in all socio-economic sectors, policy on national ICT goals, priorities and strategies must be "convergent" with general economic development strategies;
- A fundamental role of regulators such as the Mozambique National Communications Institute (INCM) is to act in defence of the public interest when implementing government policy, and to safeguard consumer interests – in the case of ICTs one specific goal is to promote universal service or universal access;
- The new opportunities opened up could make a qualitative contribution to facilitating civic participation and empowerment, but the technology is not empowering in itself – it is up to governments to give primacy to the way it can be used to reduce the "digital divide".

Government and civil society both have a responsibility in bringing these issues into the arena of public debate. Decisions have to be taken that will determine the extent to which the ICTs will contribute towards achieving the MDGs.

Chapter 1

Using ICTs for Human Development

The Concept of Human Development

Human development has to do, first and foremost, with the possibility of people living the kind of life that they choose – and with the provision of instruments and opportunities so that they can make their choices (UNDP, 2004). This statement expresses a new way of conceiving the scientific thought that guides the problem of development today, centring it on human beings. It is the meeting place for the currents of thought and theories which, in the last half of the 20th century, dominated economic thought and the human sciences.

Arising out of the search for sustainable and adequate means for achieving development, there appeared several currents and trends of thought around the concept and how to approach the challenge of development. The field of development economics, for example, as that which has been most prominent in dealing with the theme, has a history which, from the 1950s to today, falls into three distinct periods:

- the era of economic growth and modernisation of the 1950s and 60s, when development was largely defined in terms of the average growth of per capita income;
- the period of growth with equity as from the 1970s, when the concerns of many economists about development expanded, and came to include the distribution of income, employment and nutrition; and,
- the era of economic growth and policy reform of the 1980s (Staatz and Eicher, 1990) which saw the introduction of economic structural adjustment policies, in response to which the human development paradime was developed.

During these various phases in the evolution of the approach to development, critical voices were raised and, by around the 1970s, there was universal recognition that aggregate economic growth did not necessarily lead to the elimination of poverty. This finding led to the formulation of the basic needs approach which was adopted by the International Labour Organisation (ILO) in 1976. At that time the ILO defined basic needs as adequate food, shelter and clothing, as well as some domestic requirements, including social services provided to individuals and communities, namely drinking water, sanitation, public transport, health and education.

Box 1.1 The basic purpose of development

" The basic purpose of development is to enlarge people's choices. In principle, these choices can be infinite and can change over time. People often value achievements that do not show up at all, or not immediately, in income or growth figures: greater access to knowledge, better nutrition and health services, more secure livelihoods, security against crime and physical violence, satisfying leisure hours, political and cultural freedoms and sense of participation in community activities. The objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives." Mahbub ul Haq, the late visionary creator of the concept of Human Development, quoted in UNDP 2007.

Today the concerns of development activists to satisfy people's needs has led and influenced the problem of development towards the search for responses to immediate and not-so-immediate human needs. Development is thus being understood within a perspective which recognises that economic growth is a necessary but not a sufficient condition for development, it should be based on equity and on the participation of individuals in designing, implementing ad evaluating development programmes.

Thus development now wears a human face, shifting from its statistical and numerical identity, and coming to encourage the welfare of the individual, bringing together his or her material and immaterial needs, namely access to clean drinking water, an adequate and balanced diet, physical and emotional security, physical, mental and spiritual peace, as well as cohabiting in sustainable systems of sexual reproduction, systems of social education grounded on cultural preservation and continuity, and political systems with transparent leadership and decision-making processes, etc. (Burkey, 1996).

This perspective, which began to achieve some expression after the launch of the first human develop-

ment report by the United Nations Development Programme (UNDP) in 1990, introduced the new approach to development at the human scale, which is being used to measure the level of satisfaction of human choices and capabilites, in order to improve the lives of individuals and create freedoms that they may enjoy. Besides, in order to fulfil its humanist mission, development should provide opportunities that allow people to lead long and healthy lives, to be recognised, to have access to the resources necessary for a decent standard of living, and to be capable of participating in the life of their communities (UNDP, 2001).

Meanwhile, the recognition of a world evolution dictated by globalisation and an accelerated erosion of the terms of trade for the countries of the periphery, dependent on exports of primary products, cannot pass unnoticed in the building of the material premises for human achievement.

The combination of these issues demand a committed and sufficiently open universal mentality to find solutions that seek not only to mitigate the effects of adversities, but also promote a development model that confronts the challenges faced by the majority of people today.

Evolution and measurement of human development

Development is much more than the simple measurement of economic growth. Indeed, the indicators on aggregate income of countries (GDP and per capita income), show that between the years 1960 and 2000 the world recorded advances in the sphere of human development, which were expressed in the rise in life expectancy in developing countries from 46 to 63 years, and the reduction in infant mortality rates by more than half. In that period there was also a qualitative and quantitative jump in school attendance and particularly in adult literacy. In fact, between 1975 and 2000, the number of illiterate people fell by almost half (UNDP, 2004).

This progress, however, is still faced with a series of human deprivations, including the chronic hunger from which many people still suffer throughout the world, children of school age -- particularly girls -- who have not yet entered school, lack of access to clean drinking water or to basic sanitation, the violation of individual, political, democratic and civic freedoms, among other constraints to real human development.

Despite this, knowledge of the performance of countries in satisfying the material and non-material needs including spiritual needs of their citizens and in promoting sustainable human development has been accepted as a requirement for redirecting development strategies. To obtain this knowledge, several human development measuring instruments have been used.

For the same purposes, the UNDP has used the Human Development Index (HDI), which is based on indicators that make up three dimensions, namely:

- longevity, measured by life expectancy at birth;
- the level of knowledge acquired in the area of education, measured through a combination of adult literacy (with a weight of two-thirds), and the combined school enrolment rate at primary, secondary and tertiary levels; and,
- standard of living, measured by GDP per capita in purchasing power parity (PPP).

The measurement of human development thus takes into account the three indicators described above. This fact, however, does not exhaust the importance of other indicators in weighing the satisfaction of desires and needs that allow citizens to enjoy their rights of citizenship. For example, in an era when freedom both of expression and of participation are taken for granted as gains and unequivocal forms of democracy, the measure of participation in the decisions and destinies of a country, analysed by gender, is an important determinant for assessing to what extent citizens of both sexes enjoy the same rights enshrined in the Constitutions of particular countries.

However, the limitations that the Human Development Index (HDI) contains should be stressed. These can be mitigated by exploring other, to some extent alternative, indicators such as the Human Poverty Index (HPI), which expresses the proportion of people living below the threshold in basic dimensions of human development, as well as the Gender-adjusted Development Index (GDI), which catches the differences in achievement between men and women in the same country, among others.

Another Index has now been added to these development measures, and that is the Technology Achievement Index (TAI).

The expansion of choice

Human development thus assumes the creation of an environment in which people can develop their full potential, and lead productive and creative lives, in accordance with their needs and interests. This fact implies the creation of favourable conditions in vari-

ous spheres of social and economic life so that people may find opportunities for involvement and to contribute with their knowledge and work, participating in development and achieving their expectations.

The creation of a favourable environment for the active involvement of the individual in his or her own development process assumes expanding the choices people have to lead the lives that give them value (UNDP, 2001).

The underlying assumption here for the understanding of choices includes a discussion that faces two important data, namely:

- the premise of willingness and need, and
- the premise of supply and availability, or the duty of provision.

That said, it might be concluded that choices, in a given society, are conditioned by the production of goods and services, and by the accessible and equitable distribution of social wealth among the members of that same society.

Thus the expansion of choices assumes, among other factors, promoting and sustaining continual economic development that can generate public resources for education and health services, and raising the income of individuals such that they may enjoy a decent standard of living, and improve various aspects inherent to their daily lives.

As a result, the human development perspective is intrinsically linked to economic growth, from which a contribution is expected that may pull people out of the conditions of deprivation in which they live.

The Millennium Development Goals

The findings, recommendations and undertakings issuing from a series of UN initiatives seeking to improve global development, culminated with the adoption of the Millennium Declaration in September 2000, during the Millennium Summit, held at the UN headquarters in New York.

The need to place human beings at the centre of development that involves eradicating poverty, creating jobs, social integration free of preconception and discrimination, was the main focus of these initiatives.

The Declaration was adopted by all 189 member states of the United Nations, 147 represented by their heads of state or government. Later, all 191 UN member states adopted the Millennium Declaration.

Box 1.2 The Millennium Development Goals and Targets

Goal 1 Eradicate extreme poverty and hunger

Target 1 *Halve the proportion of people living below the national poverty line.*

Target 2 *Halve the proportion of people who suffer from hunger.*

Goal 2 Achieve universal primary education

Target 3 *Ensure that all children, boys and girls alike, will be able to complete a full course of primary schooling.*

Goal 3 Promote gender equality and empower women

Target 4 *Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015.*

Goal 4 Reduce child mortality

Target 5 *Reduce by two-thirds the under-five mortality rate.*

Goal 5 Improve maternal health

Target 6 *Reduce by three-quarters the maternal mortality rate.*

Goal 6 Combat HIV and AIDS, malaria and other diseases

Target 7 *Halt and begin to reverse the spread of HIV and AIDS, the incidence of malaria and other major diseases.*

Target 8 *Halt the incidence of malaria and other endemic diseases, and reverse the current situation.*

Goal 7 Ensure environmental sustainability

Target 9 *Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.*

Target 10 *Halve the proportion of people without access to safe drinking water.*

Target 11 *Improve significantly living conditions of slum dwellers.*

Goal 8 Develop a Global Partnership for development

Seven targets were established for this goal, with the following fundamental purposes:

- Development of an open and just international trading system;
- Addressing the special needs of the Least Developed Countries;
- Addressing the special needs of landlocked developing countries and small island developing states;
- Deal comprehensively with the debt problems of developing countries, in order to make debt sustainable in the long term;
- Guarantee decent and productive work for young people;
- Probe access to affordable essential drugs in developing countries; and
- In cooperation with the private sector, make available new information and communications technologies.

The Declaration was followed by the adoption of the Millennium Development Goals (MDGs). These provide a common global vision of a world where the right of all peoples to development is respected. In general, the MDGs should be achieved over a period of 25 years, taking 1990 as the starting point.

The MDGs seek to drive human development up to 2015, through eradicating hunger and poverty, and grant ICTs a key role in establishing partnerships for development, between the public and private sectors, and civil society.

In 2005, a Practical Plan for Achieving the MDGs, entitled Investing in Development, was published. This report makes precise recommendations on the practical actions needed to achieve the development targets envisaged for each of the eight MDGs.

Thus, in its overall vision, the report forecasts for 2015 a world dramatically different from that of today, if the MDGs are achieved.

For each of the MDGs, there are targets and specific indicators that allow better assessment of performance by each country in the context of the international development framework, based on a common platform. There are 8 goals, 18 targets and 48 indicators. The objectives and the targets are fixed, while the indicators may undergo numerical changes resulting from an evaluation that better reflects reality.

The importance of the MDGs as a development framework

Without any pretence of analysing the debate around the concept of development, it is important to recall that it is highly controversial and generally presupposes desirable economic and social progress. But the specific nature of each country in terms of the available natural resources, the technical skills of its inhabitants, culture, religion, geography and history, are determinant in judging what is desirable.

In this context, development seen from the perspective of one country may well be different from how it is understood by others, even when analysing the same reality. Starting from this assumption, the existence of differences in the vision and interpretation of the facts inherent in development is to be accepted, which frequently makes it difficult to establish a common platform of understanding in approaching the problems of developing countries.

The MDGs fill this gap. Indeed, the MDGs are a basis for a less controversial and more objective relationship between developed and developing countries in their responses to the current challenges of development, namely poverty reduction, improving health and education conditions, and promoting peace, human rights, gender equality and environmental sustainability.

Taking into account the recommendation to harmonise national and regional strategies with the MDGs, the definition of targets and indicators for each goal allows better management, monitoring and the national and regional strengthening of the economies of developing country programmes at national and regional level. On the other hand, the MDGs facilitate clear delimitation of the scope and level of intervention by developed countries in developing countries, in the context of their development cooperation policy.

It is also important to stress the multiplier effect of the MDGs. An example of this is the fact that the willingness expressed by the international community, within the context of the MDGs, to support the African continent is one of the premises of the New Partnership for Africa's Development (NEPAD), a development programme of the African Union.

The Potential of ICTs

The potential of Information Communication Technologies (ICTs) to drive human development and help to achieve the Millennium Development Goals (MDGs) is vast and multi-faceted. ICTs can transmit large amounts of in-depth information to sectors of the population who were previously on the margins, and in this way offer extraordinary opportunities for social and economic mobility.

ICTs can become the motor of equitable redistribution of knowledge and skills in the areas of education and public health, or encourage production and trade within nations and between them, by linking, with greater ease, production centres located in the most remote areas to the great centres of consumption. They may also open the path for an inclusive economic sphere through softening or even eliminating the barriers to entry, through e-commerce and promoting the two-way flow of goods, knowledge and ideas for all, without regard for national or regional borders.

The ICTs can also open new opportunities for more transparent and inclusive public administration/governance, through the opening of direct channels of interaction between citizens and policy makers. By engendering a proliferation of public spheres and promoting networks that are ever more interlinked, the ICTs decreed, at the end of the 20th century, "the death of distance".

This potential for the ICTs to drive human development is also boosted by the extraordinary technological advances of the last 20 years. The dizzying speed of development of the scattered technologies of the early 1960s today allows the simultaneous transmission of sound, images and data, on multiple-function digital platforms, creating technological convergence.

The *gigabyte* broadband, made viable by fibre-optic technology and the innovation of the World Wide Web in the early 1990s raised dramatically the ability to accede to information through the Internet in a comfortable and economically sustainable manner. The most recent advances in satellite and wireless communication have made possible the penetration of ICTs into areas lacking the infrastructure for conventional technologies. The case of the mobile phone is paradigmatic, by placing in direct communication peasants in remote parts of Africa with their relatives in the city or in other parts of the world.

The technological infrastructure of communication today allows connection to a countless number of people, and their respective ideas, integrated to form a way of thinking that is collective, flexible and independent, capable of broadening the capacities for thought and reflection of the individuals who are connected. Use of ICTs such as e-mail, fax, computers and video conferences, as well as the services provided by satellites, have reduced the barriers of space and time.

Today it is a given fact that ICTs have transformed the concept of "source of information" or "source of knowledge". The acquisition of information, of knowledge and of skills has become a continual and multiple process in its sources, and in their forms of access. A genuinely incessant flow of production of new knowledge, of reorganising old certainties, that are turned into new questions, that seek and structure still more data, which connect to similar ideas in new fields of knowledge, restructuring the paradigms, imposes a different relationship between the objects of study and those who wish to learn the structure and properties.

However, the potential of ICTs and their capacity to promote human development do not translate into reality automatically. Implementing this implies the existence of institutional innovations to adapt ICTs to local needs: enlightened national policies and overall policy regimes that ensure favourable macro-economic and legal frameworks; creative partnerships to share knowledge and resources – these are some of *sine qua non* conditions for realizing to the full the potential of ICTs.

The technological element that characterises ICTs inspires a multiplicity of fears, whose most common practical expression is resistance to innovation, particularly in developing countries such as Mozambique. In such a context, some sectors express their resistance to ICTs because they regard them as a "luxury" when the majority of the population is living in conditions of absolute poverty. However, it is an accepted fact today, based on evidence gathered in several African countries, that "in the era of the knowledge society and the knowledge economy, access to infrastructure for sharing knowledge is indispensable to development" (UNESCO/CMC Programme, 2002). Countless examples can be found in projects such as UNESCO/WoyaaTOP50 *African web sites* www.woyaa.com.topweb showing how the ICTs open the door to economic opportunities, including for small vendors in the informal economy, for social and political mobilization, and for greater access to education and health care.

The driving role of ICTs in the development of nations is now a matter of global consensus. Since the 1990s, several initiatives have taken place in various parts of the world, at global, regional and national level, seeking to establish policies and strategies intended to put the potential of the ICTs at the service of human development.

Focusing the concept of Information Communication Technologies for Development (ICT4D) has been the dominant topic in development circles, though sometimes with certain reservations, due to a persistent difficulty in quantifying their impact on the development of nations. It should be recognised, however, that the global, regional and national movement around the ICT agenda has now taken on such proportions that it thrusts the need to take advantage of the digital revolution to the fore of the awareness of nations, with the final end of enhancing human development.

Table 1.1 presents a summary of various events throughout the world, allowing us to put ICTs into the global, regional and national contexts.

The Relationship between ICTs, the MDGs and Human Development

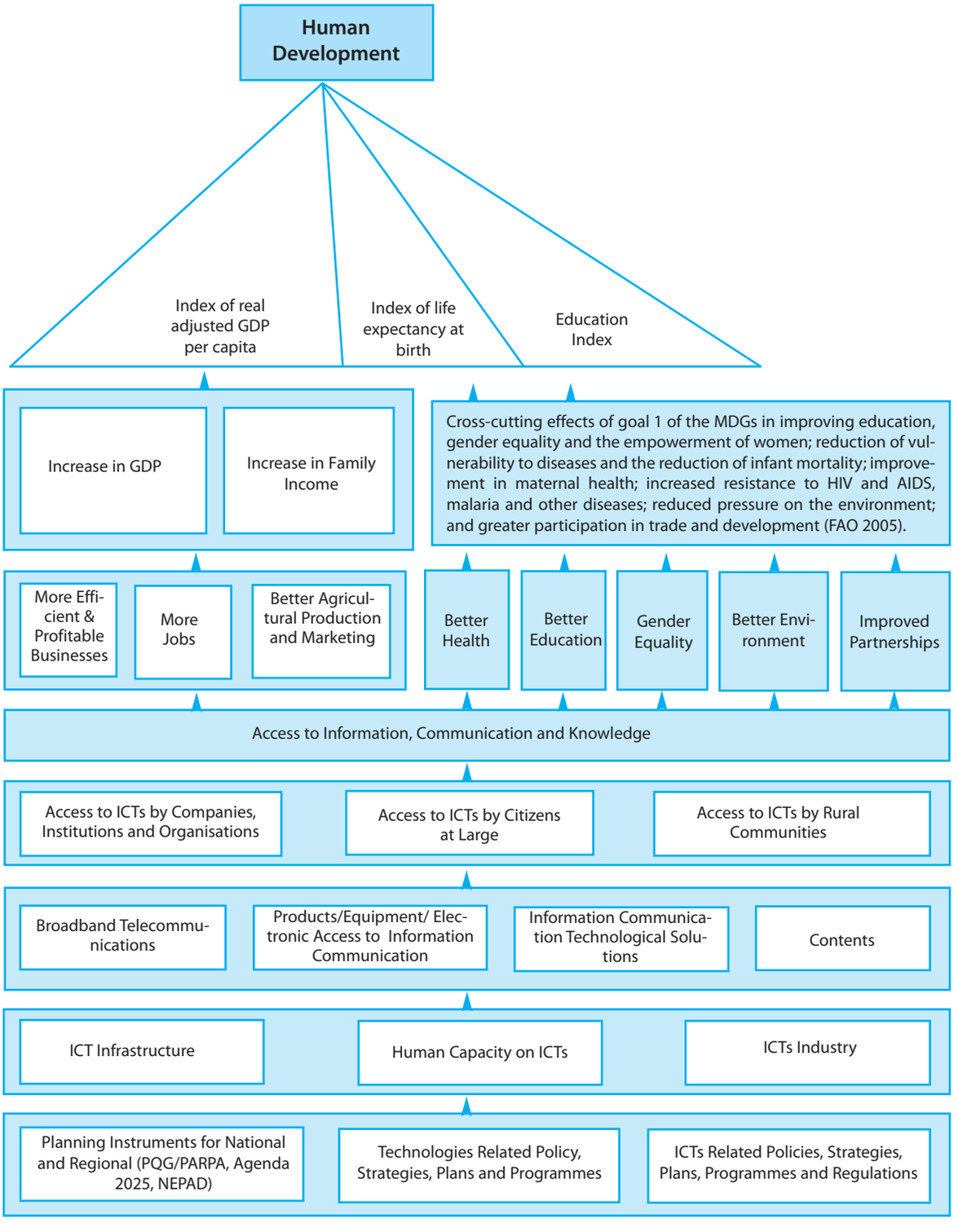
From the perspective of the MDGs (NHDR 2005), access to ICTs is clearly laid down as one of the targets of Goal 8, since this provides access to information, communication and knowledge.

Furthermore, recognising the fact that the ICTs can have an important role in achieving the millenni-

Table 1.1 ICTs in the Global, Regional and National Contexts

Context	Date	Event	Organiser	Subject	Result
Global / International	July 2000, Okinawa/Japan	Okinawa Summit	G8	New focus on Information and Communication Technologies for Development (ICT4D)	*Charter on the World Information Society*
	September 2000, New York / USA	Millennium Summit	UN	ICTs in the framework of the Millennium Development Goals (MDGs)	*Millennium Declaration*
	December 2003, Geneva/ Switzerland	World Summit on the Information Society - Phase 1 (WSIS/2003)	UN	Building the Information Society	*Declaration of Principles and Plan of Action*
	November 2005, Tunis/Tunisia	World Summit on the Information Society - Phase 2 (WSIS/2005)	UN	Building the Information Society	*Tunis Undertaking and Tunis Agenda for the Information Society*
African	May 1996, Addis Ababa / Ethiopia	22nd Meeting of Ministers of Planning and Social and Economic Development	UNECA	Launch of the AISI Initiative (*African Information Society Initiative*)	Resolution: *"Implementation of the African Information Society Initiative"*
	2001	Creation of the African Commission for ICTs	NEPAD	Creation of the African Commission for ICTs	*e-Africa Commission*
	August 2001, Blantyre / Malawi	Summit of SADC Heads of State and Government	SADC	Various topics in the ICT area	*Declaration on ICTs*
	May 2002, Bamako / Mali	African Regional Preparatory Conference for WSIS 2003	UN	Preparatory Activity for the 2003 WSIS Summit	*Final Declaration of the African Regional Preparatory Conference for the 2003 WSIS Summit*
	February 2005, Accra / Ghana	African Regional Preparatory Conference for WSIS 2005	UN	Preparatory Activity for the 2005 WSIS Summit	*Accra Undertaking for the 2005 WSIS Summit*
	April 2005, Addis Ababa / Ethiopia	African Symposium on Telematics for Development	UNECA	Telematics for Development	Report and Recommendations
	September 2005, Addis Ababa/ Ethiopia	Meeting of African Union Ministers	African Union	ARAPKE Initiative (African Regional Action Plan on the Knowledge Economy)	Adoption of the Plan of Action *(African Regional Action Plan on the Knowledge Economy)*
National (Mozambique)	1998	Establishment of the ICT Policy Commission	Mozambique Government	Drafting of the ICT Policy	Commission and policy
	2000	Approval of the ICT Policy of Mozambique	Mozambique Government	ICT Policy	ICT Policy
	2002	Approval of the ICT Policy Implementation Strategy	Mozambique Government	Implementation of the ICT Policy	Policy implementation strategy
	2002	Creation of the ICT Policy Implementation Technical Unit (UTICT)	Mozambique Government	Implementation of the ICT Policy	Implementation through UTICT and others
	2006	Approval of the Electronic Government Strategy	Mozambique Government	Implementation of Electronic Government	First steps toward e-government

Figure 1.1 **Relationship between ICTs, MDGs and Human Development**



um goals, the United Nations ICT Task Force presented the World Summit on the Information Society, held in Geneva (WSIS/2003), with a matrix that defines the role and indicators of ICTs in each of the MDGs. This matrix of indicators defines ICT targets that relate ICTs and GDP, which strengthens the idea that these technologies can contribute to the economic growth of nations.

It is precisely in Goal 1 of the MDGs – "Eradicate extreme poverty and hunger" – that the matrix defines increased access to information on markets and the reduction in transaction costs for farmers and traders in rural areas, as a form of contribution of ICTs to poverty reduction and to facilitating economic growth. In this context, these targets are measured by the correlation between the ICTs and GDP, that is, the correlation of average income with ICTs as a % of GDP (UN ICT Task Force, 2003).

Establishing a correlation between the use of ICTs and the growth of GDP implies relating the use of ICTs with Human Development, since one of the components of the Human Development Index is precisely the GDP index.

Figure 1.1 attempts to show the intrinsic relationship between ICTs, access to information, communication and knowledge, economic growth, the MDGs and human development.

The diagram starts by describing the three human development indices (index of real adjusted GDP per capita; life expectancy index and education index) which are directly and intrinsically related to key factors such as more efficient and profitable business which in turn allows for more job creation and income generation, more productive agricultural activity, access to better health and education services, as well as better environment and improved partnerships.

Access to information communication technologies by all relevant actors is presented as a key factor for sustainable economic growth, access to education and knowledge and to health services. The effective functioning of this value chain is dependent on three intertwined, crucial prerequisites:

- national policies and strategies;
- infrastructure; and
- trained human capacity.

The use of ICTs in rural areas, for example, can allow greater access to information by farmers and traders, with the mastery of meteorological information, prices and circuits of the agricultural market, through chains of disseminating information, combining the various information and communication technologies.

The integration of the various types of ICT, such as telephone, radio, television and the Internet can improve public access to assorted contents, such as information on better practices, new products, new crops and new production techniques, and thus farmers and small- and medium-sized companies can increase the efficiency of their production.

With improved communication between producers, sellers and buyers, the power of negotiating produce also increases, particularly perishable agricultural produce (fish and vegetables), thus contributing to raising the producers' income.

Here one should stress the role of organisations specialising in community work in the selection, processing and presentation of contents in line with the needs of the communities, as well as in supporting these communities in producing contents that are relevant locally. Particular attention should be paid to training women and young people, providing them with opportunities for self-employment, in order to raise family income. Here the empowerment of women can help to reduce the disparities in the Gender-adjusted Development Index

In general, productivity and economic growth increase with the use of ICTs. The productivity increases induced by the ICTs are a source of job creation (European Commission on ICT).[1] Although jobs may be eliminated in particular sectors, the global dynamism provided by the use of the ICTs leads to job creation in other spheres that greatly surpasses the losses.

An important role is played by the media, in disseminating information about ICTs, mainly from the viewpoint of using ICTs for development. This action may increase citizen demand for this important tool, thus stimulating the growth of ICT private businesses.

As for the acquisition of knowledge, institutions such as libraries, museums and archives should be empowered with ICTs, providing access to electronic newspapers, books, archives and deposits of information and contents that assist in developing the bases of local and regional knowledge.

The ICTs also provide government with instruments for improving governance, and facilitating the involvement of the public in taking knowledge-based decisions.

As for communication, the experience of the Internet is a demonstrative example that we are currently living in the era of networks. Through the Internet, networks of contacts can be established between people, thus facilitating communication, inter-

1. In: "O impacto da e-economia nas empresas europeias: Análise económica e implicações políticas - Comunicação da Comissão das Comunidades Europeias ao Conselho e Parlamento Europeu".

change and cooperation between them. In these networks, the merit lies in providing low cost, non-hierarchical communication at local level and over long distances. These networks allow the development of alliances and interest groups, focused on research. In democratic processes, they also allow a rapid and collective reaction to decisions that affect the lives of many people.

The ICTs thus become an important instrument driving the circulation of information, capital, ideas, people and goods. These important tools offer a great opportunity for empowering citizens and communities. Furthermore, they revolutionise the process of learning and exchange of knowledge, and confer a new dynamic to the world of business, markets and organizations, contributing significantly to the economic growth of nations.

The Mozambican Context

Mozambique is one of the countries that have recorded high rates of economic growth since the late 1990s, and this is reflected in the steadily rising Human Development Index for Mozambique (see Chapter 2).

The government defines as its priority the reduction of absolute poverty, and re-launching economic and social development. The strategy to attain this goal is enshrined in the Action Plan for the Reduction of Absolute Poverty (PARPA), the executive's main instrument that puts the short- and medium-term government programme into operation (see Chapter 3).

Apart from this, the government also has at its disposal Agenda 2025, a document on a long-term vision of development for Mozambique and the strategic options for attaining the country's development objectives, produced jointly by state and non-state actors.

Since Mozambique adopted the MDGs, the government has been concerned to adjust its programmes and development plans to this international framework.

In Mozambique there is, in this regard, a wide-ranging and well-documented official recognition of the role of ICTs as crosscutting tools driving development in various areas (MCT, 2006). Indeed, the government believes that ICTs constitute a strategic crosscutting and facilitating sector, with the potential to drive scientific and technological research in the country, within the national agenda for the struggle against absolute poverty.[2]

The implantation of ICTs for development is taking place in the framework of the programme for universal access (ICT Policy, 2000), which envisages the right of citizens to information and to knowledge. It implies:

- Promotion of universal access;
- Provision of incentives for telecommunication service providers in poor areas;
- Stimulation of access to the Internet and new services;
- Support for the creation of a national network of points of public access to ICTs, within a reasonable distance of people's homes and at tolerable prices for people on low incomes;
- Exemption of computer and communications equipment intended for universal access from import duties;
- Adoption of measures that lead to reduced telephone tariffs, in order to expand the network to the largest number of users;
- Establishment of a single tariff for calls to ISPs from any point in the country, equal to the cost of a local phone call;
- Establishment of a community tariff for electricity and telecommunications services provided to the universal access points;
- Exploring of modern technologies, appropriate to the reality of the country.

As a result of implementing this strategy, the environment of integration and the efficient use of ICTs for promoting development have been noteworthy, although still far from the average levels desired.

There has been an improvement in tele-density in the country – from about 6.16 mobile phone lines per 100 people in 2005, to 8.35 mobile lines per 100 people in 2006. However, the disparity between those who have access to the Internet and those who do not remains large, due above all to shortcomings in the infrastructure (which is being addressed), and also to the high costs of connectivity, particularly in the rural areas.

It is in this context of the ICT Policy and its corresponding strategy and implementation procedures that this present report has been produced, not merely as an exercise describing the achievements of the various stakeholders but, above all, as a reflection, as critical as possible, of the path so far taken by Mozambique as it moves towards an information and knowledge society.

Structure of the Report

Within these contexts, this report deals with the potential of ICTs in driving human development

2. GoM. 2006. Science, Technology and Innovation Strategy of Mozambique. Maputo.

through promoting the MDGs, and also analyses the integration of ICTs into key areas of the Action Plan for the Reduction of Absolute Poverty (PARPA II, 2006-2009), with the following structure:

Chapter 2 presents the updated framework of the achievements in support of human development in Mozambique in the 2007/2008 period, in accordance with the three indicators that comprise the HDI, namely level of access to knowledge, life expectancy at birth, and income for a decent life measured by GDP per capita. It also provides current calculations for the HPI, GDI and TAI for Mozambique as a whole, as well as by region and province.

The subsequent chapters discuss the levels of integration and relevance of ICTs in the key human development areas, as stressed by PARPA II and by the MDGs, namely:

Chapter 3 deals with the place of the ICTs within Mozambique's national development policies, including the legislative framework, from the government's approval of the ICT Policy in 2000 up to the approval of the Electronic Government Strategy in 2006. The principle underlying the analysis is that the ICTs, as tools and not ends in themselves, are a sub-area of Science and Technology, a crosscutting area in both PARPA II and the Government's Five Year Programme (PQG). A general vision of the relationship between ICTs and the various development instruments at national, regional and international level, including PARPA II, the ICT Policy, the Electronic Government Strategy, and the Science, Technology and Innovation Strategy, as well as the MDGs, is shown in Table 3.1

This chapter also considers the challenges of creating an efficient and reliable infrastructure that promotes the expansion of ICTs and connectivity, including in the rural areas. This implies the extension of a good quality national electricity grid; the expansion of the telecommunications network, including through the National Transmission Network, which includes stretches with microwave, satellite and fibre-optic links; and seeking to increase the capacity to transmit voice, data and images at national level (broadband). An efficient response to the infrastructure challenge is an essential condition for reducing the cost of connectivity, which is currently among the highest in Africa.

The implementation of electronic governance (E-government) is also reviewed, as an instrument to promote transparency, efficiency and probity in public administration, thus seeking to improve citizens' lives and facilitate the development of business.

Chapter 4 is about the promotion of education through ICTs and the promotion of ICTs themselves in teaching-learning processes, including through distance learning (e-tutoring).

Chapter 5 covers the promotion of public health, where the resort to ICTs offers extraordinary opportunities for distance diagnosis and treatment, and more efficient epidemiological records and control, all framed within a new dimension of teaching and practicing medicine, telemedicine.

Chapter 6 is on sustainable management of the environment, a sector in which ICTs can make valuable contributions by promoting monitoring and the provision of information that allows timely alerts and preparedness to protect communities from natural disasters, a theme that is dear to Mozambique, a country subject to devastating floods and cyclical droughts.

Chapter 7 The full participation of citizens in identifying their main development challenges and the solutions that are most appropriate to local reality can be encouraged by dissemination and equitable access to ICTs at community level, with the potential to stimulate democratic participation, horizontal communication and open dialogue with the local public powers.

Chapter 8 is the closing chapter, discussing partnerships of government, private sector and civil society, and ends with the Conclusions and Recommendations.

Chapter 2

Update on Human Development in Mozambique

This chapter analyses and updates the human development indicators, which provide an assessment of the achievement of Mozambique in general, and of the country's administrative regions in particular, in the various areas of human development.

The chapter is divided into four main parts. The first analyses the economic performance of Mozambique in general, and of the administrative regions within Mozambique in particular, in the 2002-2007 period.

The second analyses the evolution of the human development of Mozambique, based on the behaviour of the main indicators for measuring the concept, and resorting to official statistics and methodologies that make it possible to compare Mozambique's level of human development to that of other countries.

The third part of the chapter analyses the behaviour of human development and of its components in the interior of Mozambique. The difference between this and the previous section lies in the fact that the first adopts scrupulously the methodology of the Global Human Development Reports (GHDR) which allows the resulting indicators to be comparable with those of other countries and the figures published in the GHDR. The second section resorts to an adaptation and adjustment of the methodology to allow comparison between the various administrative regions within Mozambique.

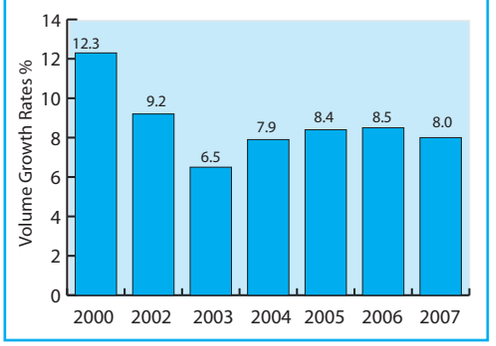
It is important to bear in mind the difference between the two methodologies used in calculating the indicators since this implies that, in practical terms, the final figures for the HDIs calculated in the two sections are not comparable.[3]

The fourth and final part deals with aspects concerned with the theme of this report, analysing the performance of Mozambique in the creation and diffusion of technologies and in building the basic human skills of its citizens.

Economic Performance of Mozambique[4]

Mozambique is still cited, in many reports, as one of the countries with the highest growth rates in the world. Indeed, as Graph 2.1 shows, in five years the Gross Domestic Product (GDP) grew in real terms by 52.8 percent. According to the National Statistics Institute (INE), in 2006 alone the Mozambican economy grew by 8.5 percent, which was an acceleration of 0.1 percentage points compared with 2005, when the statistics showed a growth rate of 8.4 percent. INE's preliminary estimates point to a growth in GDP up to the third quarter of 2007 of about 8.0 percent – that is, a slowdown of about 2.3 percentage points compared with the same period in the previous year.

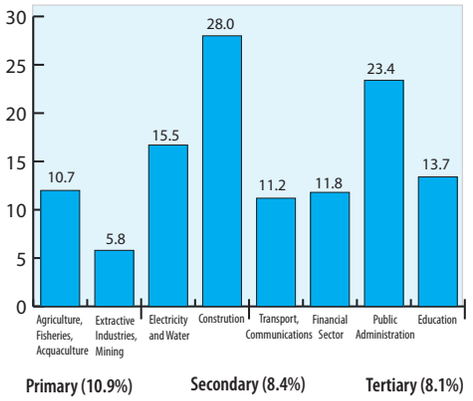
Graph 2.1 GDP Growth Rates, 2001-2007



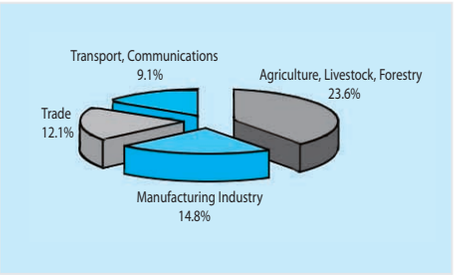
The growth in economic activity in 2007 (Graph 2.2) is largely attributed to the primary sector with growth of 9.7 percent, followed by the secondary and tertiary sectors, both with about 8 percent. The impressive growth of the primary sector is essentially due to agriculture which grew by 10.7 percent, and the contribution from mining which, by the third quarter of 2007, grew by about 5.8 percent. The performance of the secondary sector was led by the dynamism of the building

3. We draw the reader's attention in particular to the importance of this key aspect to avoid the habitual misunderstanding of, on the one hand, comparing the two figures obtained with the two methodologies and, on the other, to compare the figures for the regions with those for other countries.
4. We draw the reader's attention to the fact that, because the base year for the National Accounts changed from 1996 to 2003, the estimates for both the national GDP, and the GDP of the Mozambican regions will differ from estimates published in previous NHDRs.

Graph 2.2 Most Dynamic Sectors of the National Economy in 2007



Graph 2.3 Contribution of Selected Sectors to the GDP in 2006



industry, which advanced from growth of 24.6 percent up to the third quarter of 2006, to 28 percent in the same period of 2007. Preliminary estimates indicate that in 2008 this sector will continue to grow thanks to a wave of public investment, notably in the construction of bridges and dams, the rehabilitation of national and regional roads, and the continued plans to build and repair wells, boreholes and water supply systems (PES, 2008).

The performance of the tertiary sector was driven by the dynamism of the transport and communications sector which, by the third quarter of 2007, had grown by 11.2 percent, in part as a result of the building and repair of roads and bridges, which led to an increase in road freight transport, as well as the increases recorded in air transport caused by the opening of new routes, the entry of new operators, and the larger number of users, taking advantage of the competitive prices and services offered by the operators. There was also an increase in the supply of communications services, caused by an increase in the number of subscribers both to the fixed and the mobile phone networks (PES, 2007). It is estimated that the number of subscribers to the fixed network grew by 6.5 percent in 2006, advancing from 65,992 subscribers in 2005 to 70,313 in 2006. In the same period the number of mobile phone subscribers grew by 22 percent from 1,503,943 in 2005 to 1,837,195 in 2006 (PES 2006).

Agriculture, which employs about 78.5 percent of the economically active population,[5] remains the pillar of the economy, with a share of the GDP, at constant 2003 prices, of about 23.6 percent in 2006, followed by industry and trade with 14 percent and 11.3 percent respectively, and then by transport and communications with 9.3 percent (Graph 2.3). The remaining sectors contribute with rates ranging between 6.7 percent for real estate and renting services, and one percent for the mining industry.

Economic performance within Mozambique

An assessment of the economic performance of the various administrative regions within Mozambique, confirms the growth and specialization trends recorded in previous NHDRs. In fact, as shown in Table 2.1, the north (9.4 percent) and south (8.5 percent) of the country grew at rates above the national average. The provinces that stand out are Cabo Delgado (10.9 percent) in the north, Tete (11.0 percent) in the centre and Inhambane (13.2 percent) in the south.

The impressive growth of the regional economies in 2006 was influenced by the growth of the agricultural sector associated with good climatic conditions, particularly in the north of the country (PES 2006). In the south, growth is still being generated by foreign investment projects such as the aluminium smelter in Maputo province and the natural gas in Inhambane; and by the construction sector, due essentially to road maintenance and rehabilitation, reflected in the growth of these two provinces by 8.0 percent and 13.2 percent respectively.

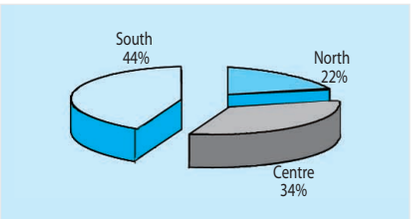
In terms of regional specialisation, Graph 2.4 shows that the economic performance in 2006 continues to show a high degree of economic concentration in the south of the country, with about 44 percent of real production. The central region follows with 34 percent and finally the north with 22 percent of national production.

5. According to the 2005 Survey of the Labour Force

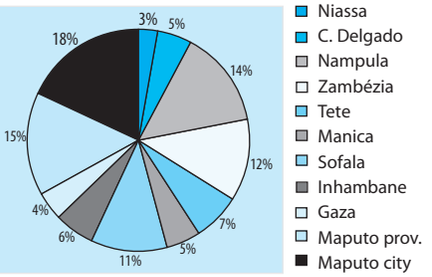
Table 2.1 GDP Growth Rates, 2001-2006

Regions/Provinces	Growth rates by volume (%)					
	2001	2002	2003	2004	2005	2006
North	8.7	10.1	9.0	7.0	8.6	9.4
Niassa	11.2	11.7	7.9	16.7	10.0	9.7
Cabo Delgado	10.3	10.4	9.7	7.1	7.8	10.9
Nampula	7.6	9.7	9.0	4.9	8.5	8.7
Centre	10.7	9.2	6.9	5.4	8.6	7.9
Zambézia	10.4	9.9	6.0	1.9	9.6	7.0
Tete	10.1	11.0	8.6	11.3	11.5	11.0
Manica	11.5	9.1	7.4	4.3	6.1	7.8
Sofala	11.0	7.7	6.5	6.6	7.0	7.1
South	15.3	8.8	5.0	10.2	8.2	8.5
Inhambane	6.0	12.1	5.9	16.5	13.0	13.2
Gaza	7.8	6.9	6.7	5.6	5.1	7.6
Maputo province	30.2	12.3	4.6	13.5	3.3	8.0
Maputo city	10.3	5.9	4.6	7.0	11.4	7.6
Mozambique	12.3	9.2	6.5	7.9	8.4	8.5

Graph 2.4 Contribution of the Regions to GDP, 2006 (%)



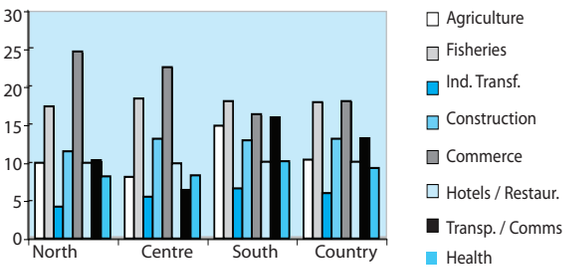
Graph 2.5 Contribution of the Provinces to GDP, 2006 (%)



Nampula in the north with 13.7 percent, Sofala and Zambézia in the centre, with about 11.1 percent and 11.6 percent respectively, and Maputo Province and City in the south, with 14.8 percent and 18.6 percent respectively, head their respective zones. The other provinces contributed between 3.4 percent (Niassa) to 6.5 percent (Tete). The contribution of each province is shown in Graph 2.5. The contribution made by each region and province to the country's economy was greatly influenced by the dynamic of certain sectors as shown in Graph 2.6.

The dynamism shown by the building industry in the northern and central regions, with growth above the national average (24.7% and 22.5%

Graph 2.6 Most Dynamic Sectors of the Economy, 2006



respectively) can be attributed to the take-off of the project to build a bridge over the Zambezi river which will provide an overland link between the north and the south, and the rehabilitation and maintenance of roads and bridges, which was reflected in growth in the transport and communications sector (although below the national average).

In the south, the most dynamic sectors in 2006 were the construction industry (16.4%), hotels and restaurants (15.9%) and agriculture (13.4%), followed by transport and communications which grew by 10.2%(which was 1% above the national average).

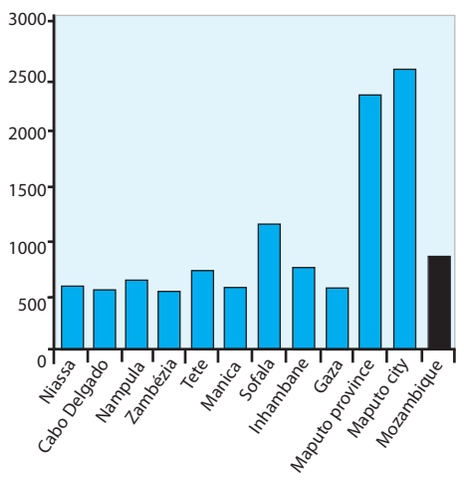
Gross Domestic Product per capita

With a GDP per capita of USD349 in 2006, Mozambique remains one of the countries with the lowest per capita income in the world.

In regional terms, Maputo city reaffirms its leadership positions shown in the previous NHDR with a per capita GDP three times higher than the national average.

The per capita GDP for Maputo city is five times the per capita GDP of Niassa, Cabo Delgado, Zambézia and Manica provinces combined, four times the real per capita GDP of Nampula, Tete and Inhambane provinces, and twice the real per capita GDP of Sofala province.

Graph 2.7 GDP per Capita 2006



Human Development in Mozambique in the period 2002 - 2007[6]

The Human Development Index (HDI) is a composite figure which measures the average achievement of a country in three basic areas of human development: a long and healthy life, as measured by life expectancy at birth; knowledge, measured by the adult literacy rate (with a weighting of two-thirds), and by the combined primary, secondary and higher education enrolment rate (with a weighting of one third); a decent living standard, measured by GDP per capita (in PPP dollars). The HDI is expressed as a figure between zero and one. A figure for the HDI near to one shows a better level of attaining human development than an HDI near to zero, The methodology for calculating the HDI is shown in Technical Note II appended to this report.

Placed in 172nd position in a list of 177 countries studied in the global HDR (UNDP 2007/08), Mozambique is regarded as one of the countries with the lowest HDI in the world (0.384). This implies that it has one of the lowest levels of human develpment. Although the national estimates for this NHDR show that the real figure is 0.082 points above the UNDP's global HDR estimate,[7] both reflect the long path that Mozambique must still travel to reduce the shortfalls of its citizens in the three basic dimensions of human development. Table 2.2 clearly shows that all the components of the HDI have, in recent years, undergone positive development, even though the variables that form the indicators used in the index are not susceptible to substantial changes over a short period of time, due to their very nature. Indeed, the evolution of the HDI bears witness, not only to the dynamics of the economy, but also to the impact of the investments made in health and education, visibly reflected in longevity, as measured by life expectancy at birth, and access to knowledge, as measured by the literacy rate and by the combined gross enrolment rate.

Led by the dynamism of an average annual economic growth rate of about 8 percent in the 2002-2007 period, expressed in substantial economic gains for a decent standard of living, and by a greater capacity to absorb pupils through the expansion of both the public and the private education networks, the HDI has risen from 0.413 in 2002 to 0.466 in 2007, which is a modest, but substantial, gain of 0.053 points.

As mentioned in the previous paragraph, the most dynamic indicators have normally been the GDP

6. The differences between the estimates for the HDI and GDI in this report and those of previous reports is due above all to alterations in the estimates of the GDP resulting from changing the base year from 1996 to 2003 and from an updating using newly available information.

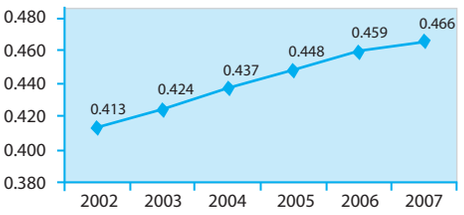
7. The difference between the estimates of the global HDR and those of the NHDR arises essentially from the former's reliance on older, secondary data (partly given the need for inter-country comparisons) and the latter's access to and use of more recent and up-to-date primary data.

Table 2.2 Human Development Index of Mozambique, 2002-2007

Basic Data	2002	2003	2004	2005	2006	2007*
Life Expectancy at Birth (years)	45.6	46.3	46.7	47.1	47.4	47.6
Adult Literacy Rate (%)	45.4	46.4	47.2	47.2	48.0	48.3
Combined Gross Enrolment Rate (%)	40.6	42.8	47.1	50.3	52.5	55.4
Real GDP per capita ($PPP)**	1537.8	1607.7	1749.8	1939.5	2127.9	2172.6
Calculation of the HDI						
Life Expectancy at Birth Index	0.343	0.355	0.362	0.368	0.373	0.377
Education Index	0.438	0.452	0.472	0.482	0.495	0.507
Adult Literacy Index	0.454	0.464	0.472	0.472	0.480	0.483
Combined Gross Enrolment Index	0.406	0.428	0.471	0.503	0.525	0.554
Real per capita GDP Index ($ PPP)	0.456	0.464	0.478	0.495	0.510	0.514
Human Development Index (HDI)	0.413	0.424	0.437	0.448	0.459	0.466

* Preliminary estimates
**Estimates based on the PPP conversion rate of the World Bank; figures for the 2007 GDP are forecasts.
Source: INE (for life expectancy, adult literacy rate and GDP, and MINEC for schools numbers 2002 and 2007)

Graph 2.8 Evaluation of the HDI, 2002-2007



index, which reflects recent economic gains, and the joint school attendance rate, which expresses the gradual, but substantial, increase in the number of places in the country's educational network.. It is estimated that over 4.6 million pupils attended EP1 and EP2 in 2007, which is an increase of about 9.5 percent when compared with 2006 (PES, 2008). As a result the gross attendance rate at these levels has risen from 83.4% in 2005 to 88.3% in 2006, for EP1, and from 6.7% in 2005 to 8.9% in 2006 for EP2. It is estimated that, thanks to the accelerated construction of schools in order to promote greater access to and better quality of education, the combined net attendance rate in these levels (EP1 and EP2) reached 94.1% in 2007, and 90.9 percent for girls (PES, 2008).

Illiteracy has also declined, from 60.5% in 1997 to 53.6% in 2003. Estimates show that the reduction has continued up to 2007 as a result of the policies to expand functional literacy programmes, adult education, and non-formal education, with a stress on women and girls, seeking gender balance. This has a positive impact on the HDI given the weight of literacy in calculating this indicator.

Gender-adjusted Development Index

The HDI, in assessing only the average achievement in three basic dimensions of human development, hides the differences in development between men and women. To reveal these difference, the Gender-adjusted Development Index (GDI), introduced in 1995, adjusts the HDI to take account of inequality in the achievements of men and women. Thus the GDI is a composite index that measures average attainment in the three basic dimensions captured in the human development index – a long and healthy life, knowledge, and a decent standard of living – adjusted to reflect the inequalities between men and women. Like the HDI, the GDI is expressed as a figure between 0 and 1. When the GDI is equal to 1, it reflects maximum attainment in the basic capacities with perfect equality between men and women (though no country has ever achieved this figure). On the other hand, a GDI approaching zero

Table 2.3 Gender-adjusted Development Index of Mozambique, 2002-2007

Basic Data	2002	2003	2004	2005	2006	2007*
Life Expectancy at Birth (years)	45.6	46.3	46.7	47.1	47.4	47.6
Women	47.5	48.2	48.6	49.0	49.3	49.6
Men	43.8	44.4	44.8	45.2	45.5	45.8
Adult Literacy Rate (%)	45.4	46.4	47.2	47.2	48.0	48.3
Women	32.0	32.0	33.8	33.8	35.5	36.1
Men	63.3	63.3	65.6	65.6	67.9	68.6
Combined Gross Enrolment Rate (%)	40.6	42.8	47.1	50.3	52.5	55.4
Women	35.4	37.9	42.1	45.5	48.1	51.0
Men	45.9	47.8	52.2	55.0	57.0	61.1
Real GDP per capita ($PPP)**	1537.8	1607.7	1749.8	1939.5	2127.9	2172.6
Women	1361.3	1424.4	1551.5	1721.1	1889.9	1907.0
Men	1728.0	1805.1	1962.8	2173.7	2382.8	2464.1
Calculation of the GDI						
Life Expectancy Index	0.343	0.355	0.362	0.368	0.373	0.377
Women	0.333	0.345	0.352	0.359	0.364	0.368
Men	0.355	0.365	0.372	0.378	0.383	0.388
Equally Distributed Life Expectancy Index	0.343	0.354	0.361	0.368	0.372	0.377
Educational Index	0.438	0.452	0.472	0.482	0.495	0.507
Women	0.331	0.340	0.365	0.377	0.397	0.411
Men	0.575	0.581	0.611	0.620	0.642	0.661
Equally Distributed Educational Index	0.412	0.421	0.450	0.461	0.483	0.498
Real adjusted per capita GDP ($PPP) Index	0.456	0.464	0.478	0.495	0.510	0.514
Women	0.436	0.443	0.458	0.475	0.491	0.492
Men	0.476	0.483	0.497	0.514	0.529	0.535
Equally Distributed Real per capita GDP Index	0.453	0.461	0.475	0.492	0.508	0.511
Gender-adjusted Development Index (GDI)	0.403	0.412	0.429	0.440	0.454	0.462

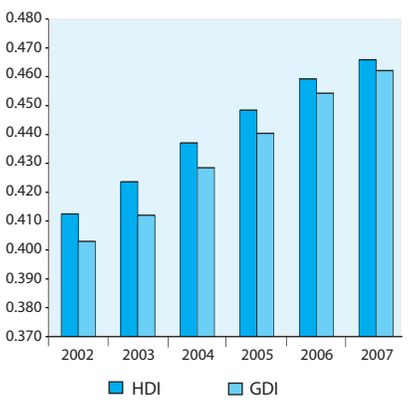
* Preliminary estimates
Source: INE (for life expectancy, adult literacy rate and GDP, and MINED/MEC for numbers of pupils 2002 and 2008)
** Estimates based on the PPP conversion rate of the World Bank; figures for the 2007 GDP are forecasts .

reflects a larger gulf between the development attainments of women and of men. The methodology used in calculating the GDI is shown in Technical Note III appended to this report.

The results, although they reveal the long path that must still be travelled to reach maximum attainment of basic capacities with perfect equality between men and women, a comparative analysis between the HDI and GDI (Graph 2.9), confirms the trend recorded in previous NHDRs of a parallel evolution between the two human development indicators, which suggests at least that the gap in the level of attainment between men and women is not getting wider.

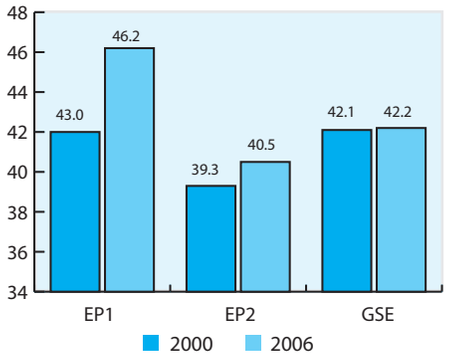
The conclusion that may be drawn from this result is that, since the disparities between men and women are not increasing, the policies intended to promote the advancement of women, particularly as regards access

Graph 2.9 Trends in the HDI and GDI, 2002-2007



to education, health and other social services, although they have not yet produced the desired effects, are making steps towards reducing the gap between the development attainments of men and women. Statistics show that the proportion of girls in EP1 rose from 43% in 2000 to 46.2% in 2006. However, and as Graph 2.10 shows, the percentage of girls in EP2 and in secondary education has been almost unchanged in seven years. Associated to this fact is the low percentage of girls who complete EP2. In 2007 this figure was 34% (28.8% in 2006) (PES, 2008).

Graph 2.10 Evolution of Proportion of Girls in Secondary Education, 2000-2006



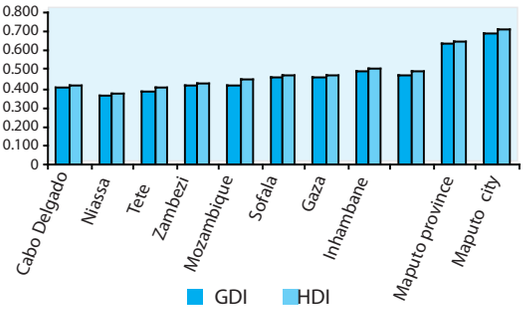
Although these results show that the MDGs target of eliminating gender disparities by 2015 is achievable for EP1, the near stagnation of this indicator in EP2 and general secondary education, worsened above all by the drop-out rate among girls at these levels. This is due to the stereotyped role reserved for girls in domestic chores, and constitutes a major challenge facing all of Mozambican society.

HDI and GDI in the Regions of Mozambique

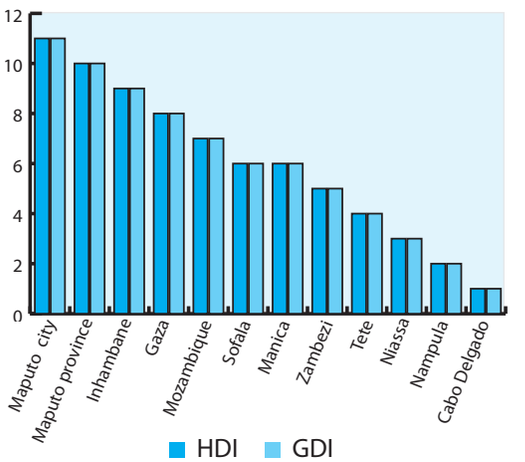
Estimates for the 2001-2006 period show that the level of human development, both national, and within the administrative regions of Mozambique continues to rise gradually, as a result of economic and social performance expressed in the positive evolution of both the HDI and the GDI.

The breakdown of the GDI by province also shows the great disparity between the provinces of the south and the remaining regions with the disparity increasing as one moves the further north. Ordering the provinces in accordance with their human development performance shows that Maputo city and Maputo province are the only provinces with an HDI that puts them in the category of medium human development (above 0.500). The provinces with the lowest HDI are in the north, notably Cabo Delgado (in last place) with an HDI of 0.060 points below the national average, and almost half the HDI of Maputo city.

Graph 2.11 Comparison between HDI and GDI by Province, average 2001-2006



Graph 2.12 Presentation of HDI and GDI by Provinces, 2006



Human Poverty Index

HPI-1 is a multi-dimensional measure of poverty, introduced in 1997, to reflect privation of the choices and opportunities that allow individuals to have a decent life. This approach, called the non-utilitarian approach, considers poverty as "a denial of the opportunities and needs for choice considered essential for human development (longevity, health, knowledge and decent living conditions)" (UNDP, 1997:15). On the other hand, the utilitarian approach is based on the level of satisfac-

tion of material goods. This assumes calculating the food poverty line which in Mozambique "is based on measuring the total value of consumption of food and non-food goods including purchases, goods produced at home and offers received" (INE, 2005:10).

The HPI-1 presented in this report follows the non-utilitarian approach to measure privations in three basic dimensions of human development in Mozambique and its regions, captured in the HDI: deprivation of a long and healthy life, deprivation of knowledge, and deprivation of a decent living standard.[8] The methodology for calculating the HPI-1 is shown in Technical Note IV appended to this report.

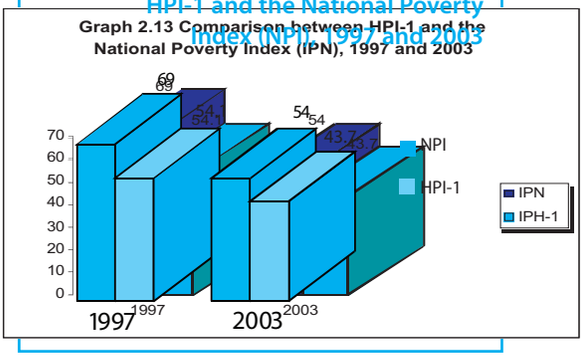
Although the results obtained by this approach are not directly comparable with those obtained in the Poverty Assessment in Mozambique, one fact worth stressing is that in both cases poverty has declined over the past 10 years (Graph 2.13).

The evolution of poverty in Mozambique bears witness not only to the dynamics of the economy, but also to the impact of the continual investment that has been made over the last 10 years in education, health and access to basic services, which has been expressed in reducing all the privations that prevent individuals from leading a decent life (Graph 2.14). In education, for example, the privation of knowledge, measured by the illiteracy rate, fell from 60.5% in 1997 to 53.6% in 2003 and is estimated to have declined to 52% in 2006. Mirroring the investments in health, particularly in preventive medicine, the likelihood of dying before the age of 40 has fallen from 22.3% in 1997 to 16.9% in 2006.

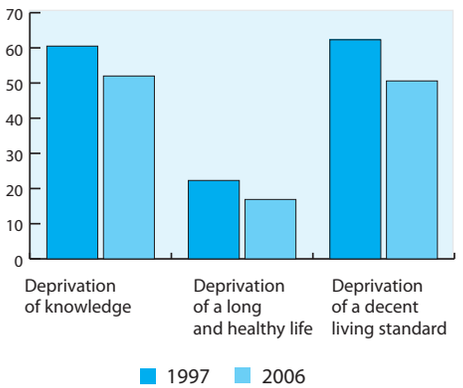
In the same period, the privation of decent living conditions for Mozambicans, measured by the proportion of the population without access to basic services (clean drinking water and health care) and by the percentage of children under the age of five with low weight for their age fell considerably – from 62.3% in 1997 to 50.6% in 2003. Estimates show that this trend has continued in the last two years, thanks to the investment in health infrastructure in almost all the provinces, and the rehabilitation and/or expansion of water supply systems both in urban/peri-urban areas, and in the countryside.

When we breakdown the HPI-1 by regions, we can note a great disparity between the administrative regions within Mozambique with poverty concentrated more in the north than in the central and southern regions. The north has an HPI-1 7.3% above the national average and 23.2% above the average HPI-1 of the south (Graph 2.15).

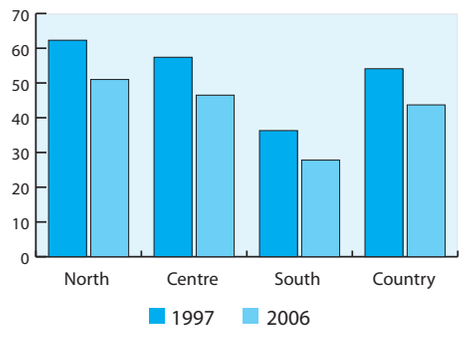
Graph 2.13 Comparison between HPI-1 and the National Poverty Index (NPI), 1997 and 2003



Graph 2.14 Poverty Reduction in the Three Basic Dimensions of the HPI, 1997 and 2006



Graph 2.15 Comparison of Human Poverty between the regions of Mozambique, 1997 - 2006



8. It is important always to bear in mind the difference in the two approaches used in calculating human poverty, since, in practical terms, the final figures calculated by the two approaches are not directly comparable, above all to avoid any misunderstanding in comparing the figures obtained in this report, with those published in the Poverty Assessment Reports in Mozambique.

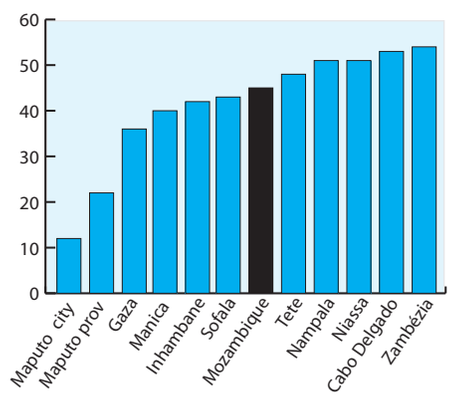
Table 2.4 Technology Achievement Index of Mozambique, 2001 - 2006

Indicators	Unit	2001	2003	2005	2006
Technology creation					
Patents granted to residents	per million inhabitants	-	-	-	-
Receipts of royalties and licence fees	USD per 1000 inhabitants	0.0	849.1	755.5	779.2
Diffusion of recent innovations					
Internet hosts	per 1000 inhabitants	0.0	0.0	0.0	0.0
Exports of medium and high technology	% of total exports	0.199	0.770	0.595	0.217
Diffusion of old innovations					
Telephones (fixed and cellular)	per 1000 inhabitants	14.8	49.4	80.8	95.9
Electricity consumption	Kwh per capita	302.8	588.9	683.4	864.3
Human skills					
Mean years of schooling in the population aged 15 and above	years	...	...	...	...
Gross tertiary science education enrolment rate (%)	%	0.248	0.311	0.431	0.488
Technology Achievement Index (TAI)		**0.079**	**0.236**	**0.248**	**0.254**

Minimum and maximum values observed, see Technical Note V
... Data not available at date of publication; - No result; 0.0 result less than half the unit used
Sources: Statistical Yearbooks (various), TDM: Annual report and accounts (various)

An arrangement of the provinces by level of human poverty (Graph 2.16), allows us to conclude that Zambézia with a HPI-1 of 53.6% in 2006 is the province with the greatest privation of opportunities and choices regarded as essential for human development, followed by Cabo Delgado (52.9%), Niassa (50.9%), Nampula (50.6%) and Tete (48.0%). The other provinces are placed above national average, estimated at 43.7% in 2006.

Graph 2.16 Breakdown of Provinces by HPI-1, 2006



Technology Achievement Index

The Technology Achievement Index (TAI) is a composite index designed to capture the performance of countries in creating and diffusing technology and in building a human skills base, in the perspective of reflecting the capacity to participate in the era of technological innovations. The index measures technological achievement in four dimensions, namely:

- Technology creation, as measured by the number of patents granted to residents per capita (to reflect the level of innovation) and by receipts of royalties and license fees from abroad per capita (to reflect the success of past innovations that remain useful, and thus still possess mercantile value);
- Diffusion of recent innovations, as measured by the number of Internet hosts per capita and the share of high- and medium-technology exports in total goods exports.;
- Diffusion of old innovations, as measured by telephones (landline and cellular) per capita and electricity consumption per capita.; and
- Human skills, as measured by mean years of schooling in the population aged 15 and above and the gross tertiary science education enrolment ratio.

The methodology for calculating the TAI is shown in Technical Note V appended to this report.

The TAI was designed to help policy makers redefine their technological strategies, based on their current position in comparison with other countries. As a result, its design reflects the objectives of the technology policies of countries regardless of the level of development.

The results, although they point to a rising trend, also reflect the long path that Mozambique still has to travel in the creation and diffusion of technologies and in building the skills of its citizens. According to the data currently available, the TAI rose from 0.079 in 2001 to 0.254 in 2006, which places Mozambique in the group of "dynamic adapters" according to the UNDP classification (2001),[9] although in 2001 the UNDP had classified it as one of "marginalized" countries, with a TAI of 0.066.

As Table 2.5 shows, most of the Mozambican population is not yet benefiting from the new or the old technologies. In quantitative terms, only 6.3% of households were using electricity as their source of energy in 2002/2003, 3.6% had a cell phone and 0.3% had a computer.

The situation is most critical if we compare the rural and urban areas. According to the results from the Household Survey undertaken between 2002 and 2003 (Graph 2.17), only 0.6% of rural households had access to electricity, compared with 21.7% of urban households. Only 0.6% of households in the countryside had a fixed or mobile phone It is thought that these indicators have improved substantially as a result of the investments made in expanding the electricity grid and mobile phone services to the districts.

Graph 2.17 Benefit of Old and New Technologies Among Households in Urban and Rural Areas, 2002/2003

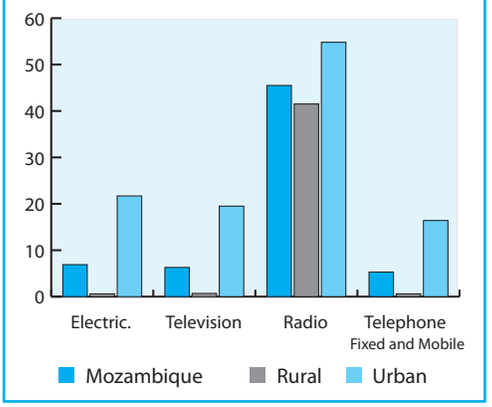


Table 2.5 Benefits from New and Old Technologies among Households by Province and Mozambique, 2002/03

Province/Regions	Electric.	Television	Radio	Fixed phone	Cell phone	Computer	Printer
North	4.3	2.8	46.1	0.7	0.7	0.1	0.2
Niassa	4.4	2.1	43.0	0.9	0.5	0.0	0.4
Cabo Delgado	3.0	2.6	43.0	0.9	0.2	0.2	0.3
Nampula	4.9	3.0	48.3	0.5	1.0	0.0	0.0
Centre	4.1	3.1	46.2	0.9	1.1	0.1	0.3
Zambézia	2.7	1.7	39.4	0.5	0.1	0.0	0.0
Tete	3.5	1.7	45.1	0.3	0.8	0.1	0.2
Manica	6.0	4.9	63.6	1.5	2.2	0.1	0.7
Sofala	6.7	7.0	52.3	2.1	3.1	0.5	0.7
South	15.6	17.0	43.3	4.6	12.1	1.1	1.1
Inhambane	3.1	3.9	32.9	0.8	0.9	0.0	0.1
Gaza	7.3	4.6	34.1	1.2	5.9	0.0	0.0
Maputo province	18.1	18.3	53.4	3.5	13.8	0.3	1.2
Maputo city	45.9	56.0	61.8	17.8	37.9	5.7	4.5
Mozambique	6.9	6.3	45.5	1.7	3.6	0.3	0.4
Rural	0.6	0.7	41.5	0.1	0.5	0.0	0.1
Urban	21.7	19.5	54.8	5.5	10.9	1.1	1.3

Source: INE, IAF 2002/03

9. UNDP (2001:47) groups countries into 4 categories: Leaders (TAI > 0.500); Potential leaders (TAI 0.350 - 0.490), Dynamic adapters (TAI 0.200 - 0.340) and Marginalised (TAI < 0.200)

Chapter 3

The Challenges of Improving Access to ICTs and E-Government

ICTS in the Context of National Development Policies

Since the early 1990s, Mozambique has become sharply aware of the driving role of Information Communication Technologies (ICTs) as instruments to support implementation of the country's development programmes and plans.

Mozambique launched its integration into the ICT era by participating in several conferences and symposia on telematics and the Information Society. At African level, Mozambique closely followed the launch of the African Initiative on the Society of Information (AISI) in 1996, and took part in other initiatives that unfolded in the African Union, the New Partnership for Africa's Development (NEPAD) and the Southern African Development Community (SADC). Table 1.1 in Chapter 1 gives a summary of the various events that have occurred throughout the world, thus providing context for the ICTs at all levels – global, regional and national.

This international and regional movement around the ICTs has helped to build the country's capacity to establish its own framework of policies and strategies in this field, which can respond to the demands of national development. Thus Mozambique's ICT Policy was approved in 1998, and the strategy for implementing it in 2000.

The government's main instrument for poverty reduction is the Action Plan for the Reduction of Absolute Poverty (PARPA). The second phase of PARPA (PARPA II), covering the period 2006-2009, contains strategic measures that are sub-divided into annual plans and targets. PARPA follows the development framework outlined in Agenda 2025 and makes operational the objectives laid down in the Government's Five Year Plan (PQG), drawn up in 2005.

The ICTs, as a sub-area of Science and Technology, are a cross-cutting matter in both PARPA II and the PQG. The government introduced the ICTs into PARPA II as an instrument for carrying out its Plan of Action. The priority objective of introducing the ICTs into PARPA II is to promote innovative forms of use in solving specific sector challenges and in encouraging cross-sector cooperation and information sharing.

Table 1.1 shows the relationship between the ICTs and the various development instruments at international, regional and national level, including the MDGs, PARPA II, the ICT Policy, the Electronic Government Strategy, and the Science, Technology and Innovation Strategy of Mozambique.

Main instruments of ICT policy and strategy

The ICT Policy, approved in 2000, defines the ICTs as an instrument for poverty reduction and for promoting development. It names as the priority areas education, human resource development, health, universal access, the ICT infrastructure, and governance. It also lays down the role of each sector of society in implementation; drawing attention to the fact that successful implementation will not be possible without the participation of all interested parties and potential beneficiaries.

The ICT Policy Implementation Strategy, approved in 2002, lays down the principles, objectives and methodology for projects in six priority areas and their budgets, mechanisms to mobilize funds, and monitoring and control mechanisms.

Mozambique's Electronic Government policy, approved in 2006, deals with the harmonisation of the various initiatives to boost ICT implementation initiatives in the public administration, as a way of making the best use of human resources. It establishes as key factors the development of human resources, regulation and the communications infrastructure, and lays down pilot projects with impact in basic areas of providing services to citizens. These include civil identification, the land register, the company register, and the participation of citizens in governance, supported by secure systems and protocols for handling electronic documents, i.e., the interchange of data, financial transactions and audits. This strategy thus contributes to attaining the objectives of the Public Sector reform which are decentralisation, improved service provision and institutional restructuring.

The Telecommunications Strategy and the Regulations for the Universal Access Service Fund were approved by the government in late 2006. Their general principle is to develop telecommunications and facilitate access to information and communication in the country.

Creating a favourable environment

The government's vision is for the constant alignment of the ICTs, in the broad sense, with national development strategies, with the main focus on the Government's Five Year Programme (PQG), the Economic and Social Plan (PES), the Action Plan for the Reduction of Absolute Poverty (PARPA) and the Public Sector Reform Programme (PRSP).

Mozambique's ICT Policy, approved in 2000, defines the ICTs as an instrument for poverty reduction and for promoting development. It declares that the priority areas are education, the development of human resources, health, universal access, the ICT infrastructure and governance. It also sets forth the role of each sector of society in implementing the policy, drawing attention to the fact that success will not be possible without the participation of all interested parties and potential beneficiaries.

The ICT Policy Implementation Strategy, approved in 2002, sets out the principles, objectives and methodologies for implementing the ICT Policy, the projects in the six priority areas and their budgets, the mechanisms for mobilizing funds, and for monitoring and evaluating implementation.

Mozambique's Electronic Government Strategy, approved in 2006, harmonises various initiatives to implement ICTs in the public administration, as a way of making the best use of existing resources. It takes as key elements the development of human resources, regulation and the communications infrastructure, and defines pilot projects with an impact on fundamental areas of services to citizens, namely civil identification, the land register, the company register and participation of citizens in governance, supported by secure protocols and systems for handling electronic documents, interchange of data, financial transactions and audits.

This strategy thus contributes to achieving the objectives of the Public Sector Reform relating to decentralisation, improved provision of services and institutional restructuring.

Despite such important advances in establishing an environment favourable to the development of ICTs in Mozambique, both in terms of policies and strategies, and in terms of the legal and regulatory framework, there is still an enormous challenge in the area of institutional capacity building. Thus building the capacity of the institutions involved in drafting policies, strategies, laws and regulations concerning ICTs should be one of the government's priorities.

With the adoption of the 1999 telecommunication law, the sector was partially liberalised. The liberalisation enabled competition in the mobile sector which until then had been a monopoly run by TDM. There are now two mobile operators in the country: mCel (Moçambique Celular), which is the brand name for Telecomunicações Móveis de Moçambique (TMM); and Vodacom Moçambique owned by Vodacom South Africa and a Mozambican company, EMOTEL, with shareholding of 85% and 10% respectively. Another Mozambican shareholder is Whatana, with 5%.

Box 3.1 Internet and telephone: Access and cost

The provision of e-mail and internet services in Mozambique was initiated by the Eduardo Mondlane University Informatics Centre (CIUEM) in 1993. In 1997, through the Leland Initiative, USAID supported the establishment of five new Internet Service Providers (ISPs), sharing a 128Kbps gateway hosted by the national telecommunications company, TDM.

Mozambique currently has a teledensity of about 0.46,[10] one of the lowest in the SADC region. In 2006, the fixed telephone network reached about 50 per cent of the country's 128 districts, and it was forecast that the remaining 64 districts would be reached in 2007 and after.

TDM's annual report of 2006[11] indicate that the available capacity of telephone lines is 127,902, but the number of subscribers has been dropping since 2000. One of the main reasons for such negative growth is the limited purchasing power of the population, especially in rural areas, together with the rapid expansion of the mobile network.

With the introduction of mobile services in November 1997, the country experienced a dramatic growth in access to telecommunication services. However these services are still limited to urban areas or along the main roads to South Africa, Swaziland and Zimbabwe, and some sections of the main roads within the country connecting the provinces.

Internet cafes were established in Maputo first and, having served for several years, are now appearing in a number of provincial capitals, despite the access fees of US$1.20 per hour and a dial-up charge of US$30/month. Several of the larger hotels in Maputo offer free Internet access to their guests.

The high subscription fees undoubtedly limit the number of e-mail subscribers. Most ISPs charge on average between US$30 and US$40 per month for a dial-up connection. Using other technologies such as leased lines (analogue), Integrated Services Digital Network (ISDN), wireless and cable TV to access the Internet becomes even more expensive.

10. Source: www.infopol.gov.mz /simposio/politica/politica.doc
11. Source: www.tdm.mz (TDM Annual Report 2004)

The company mCel was established in 1997, as result of a joint venture between TDM and Detecon GmbH (Deutsche Telepost Consulting GmbH), a subsidiary of Deutsche Telekom in Germany. In 2004 TDM bought the Detecon stake, and is now the sole owner of mCel. Vodacom was awarded the second mobile license in 2002 and started operating in December 2003.

Recent figures indicate that by last year, Vodacom already had more than one million subscribers and mCel around two million, putting the total figure of mobile subscribers in the country close to three million.

The physical infrastructure to support access to information is severely underdeveloped in Mozambique, although it is improving.

By the end of 2007, there were more than 10 operational ISPs in Mozambique, the most significant being Teledata, CIUEM, Tropicalweb, Vircon, Emil, TDM, CFMnet, TVCabo, Intra, Dataserv, SATCOM, and GSTelecom. Because Internet service provision is not subject to licensing, and requires only registration formalities, there are registered IPSsat INCM which are not providing any services. With the exception of Teledata, TDM and Virconn, none of the above-mentioned ISPs has Points of Presence (PoPs) outside Maputo. (See Table 3.1)

As in most developing countries around the world, it is very difficult to assess the number of Internet users in Mozambique. However, the total number of email subscribers is estimated at about 60,000, with more than 50 per cent of all subscribers and users in Maputo.[12] In addition, unreliable electricity, high costs and lack of skills limit the use of Internet outside of the capital, even when reliable telecommunication facilities and PoPs can be found.

Internet users have shown dramatic growth from a small base pioneered by CIUEM in 1993, as indicated in Table 3.1. Internet access in rural areas is largely non-existent. This will start being addressed through a Universal Access programme to support increased public access to basic telephony and Internet services at district level.

Infrastructure

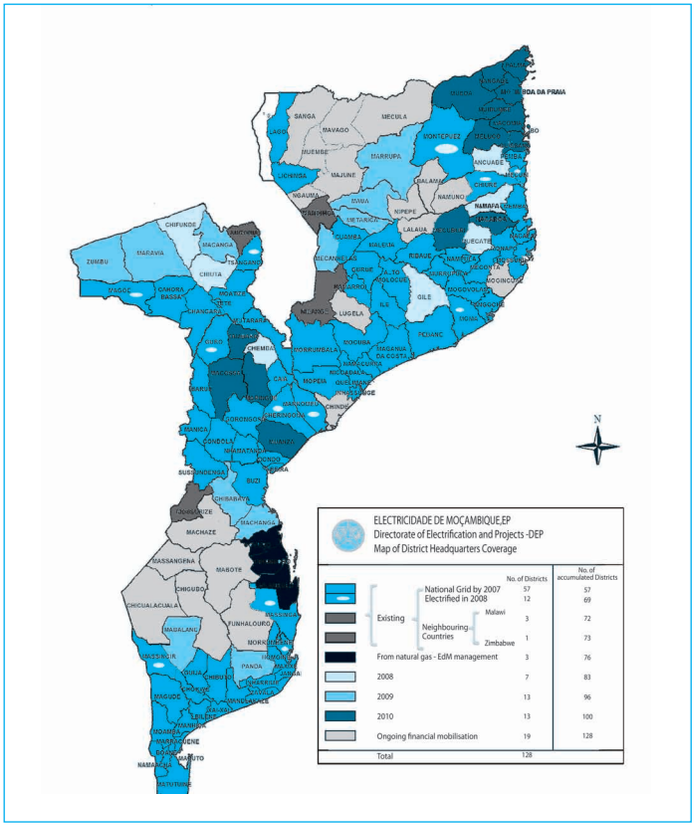
The telephone and electricity networks cover all the provincial capitals in Mozambique but still leave out a huge proportion of the population who live in the rural areas. The expansion of telecommunications is closely linked to the expansion of the electricity grid.

In terms of the electricity network, the number of district capitals covered up to 2007 was 64, out of the 128 existing, and by the end of 2008, it is envisaged that this figure will rise to 80 district capitals. The plan of the publicly owned electricity company EDM forecasts that by 2010 a total of 108 district capitals will be covered by the electricity grid, still leaving out 20 districts for which funding is still being mobilised.

Table 3.1 Availability of ICTs per 1000 Inhabitants[13]

Total Telephone Subscribers	Fixed Lines	Mobile Phones	Internet Users	Personal Computer
2005 116/1000	3.6/1000	83.5/1000	7.3 / 1000	5.9 / 1000
2006 114.6/1000	3.8/1000	116.0/1000	9.0 / 1000	6.1 / 1000

Map 3.1 Projects Underway for Electrification of District Capitals

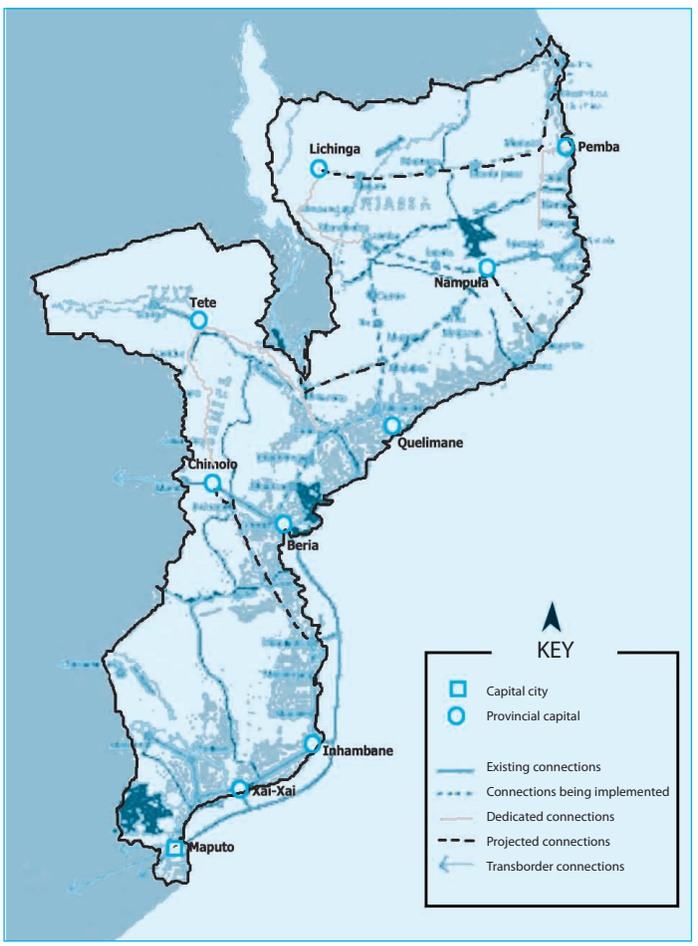


12. None of the sources could indicate with certainty the size of the existing user market but, according to the BMI-TechKnowledge Handbook 2001, estimated numbers where as high as 14,267 for 2001.
13. Sources:
    1. http://www.itu.int/ITU-D/ict/statistics
    2. http://info.worlbank.org/etools/docs/library/239731/innovationMozambiquePaperpdf

The fixed telephone network had reached about 50% of the country's districts by 2006, and it was expected that the remaining 64 districts would be reached in 2007.

The backbone of the National Transmission Network includes stretches with micro-wave, satellite and fibre-optic links. In order to increase the capacity to transmit voice, data and images nationally (broadband), the public telecommunications company, TDM, is expanding the fibre-optic links which currently cover the provincial capitals of southern and central Mozambique. By 2006, the fibre-optic cable linked the provincial capitals of southern and central Mozambique. In 2007 the stretches Beira-Muanza-Inhaminga-Caia-Nicoadala-Quelimane and Quelimane-Nicuadala-Mugeba-Alto Mulócuè-Nampula were added. In 2008, the Mocuba-Ile-Gurué-Cuamba and Nampula-Lapala-Cuamba stretches will be concluded.

Map 3.2 **Backbone of the National Transmission Network**



The gradual expansion of the fibre-optic network will reduce the stretches covered by satellite, and thus contribute to reducing communication costs.

The broadband infrastructure, able to transmit voice, data and images, is expected to cover all the provincial capitals by the end of 2008. But that still leaves the challenge of extending this network down to the districts where the majority of the population lives, and which are regarded as the poles for the country's development. The other major challenge is to reduce high telecommunications prices, which have been a great barrier to citizens' access to telephones, the Internet and data transmission.

Apart from the TDM infrastructure, other companies that provide telecommunications services are gradually expanding their infrastructure throughout the country. They are making a major contribution to the increase in territorial coverage, particularly the mobile phone companies.

One of the key factors for development of telecommunications, which results in an increase in the services provided to citizens and in a reduction in prices, is constant improvement in the policies and the regulatory framework in the area of telecommunications and ICTs. Significant steps have already been taken in this sector, such as the liberalisation of telecommunications so as to establish an open and competitive market, the promotion of competition in the telecommunications market, with the adoption of measures that guarantee just, sustainable and efficient competition; and the strengthening of the autonomy of the communications regulatory authority to ensure effective regulation of the sector.

The approval of the Telecommunications Strategy and the Regulation of the Universal Access Service Fund by the Council of Ministers in late 2006 should be highlighted. These are instruments that respond to the citizens' rights to access to information and communication, taking as their general principle empowering the development of the sector and facilitating access.

Despite the efforts of the government, there is a long road ahead in terms of telecommunications legislation and regulation, so that the impact of these measures results in the increased availability of ICTs to citizens.

The phenomenon of technological convergence (see Box 7.3 in Chapter 7) and the accelerated pace of ICT evolution impose on the makers of laws and policies, and on regulators in the ICT sector, a very rapid capacity of response in terms of legislation and regula-

tion. The challenges are enormous since, despite the efforts that have been made in legislation and regulation, the social costs should be avoided that may result from mistakes and/or delays in legislation/regulation, since these are determinant factors for investment in telecommunications (LecG, 2006).[14]

An important requirement for speeding up legislation/regulation is institutional capacity building. Considerable efforts in capacity building have been undertaken in the country, but a redoubling of such efforts is required, both by those who make the laws and policies on ICTs (government and parliament) and by the regulatory authority, so that the opportunities offered by these technologies in the development of our economy and the consequent improvement of social well-being are not wasted.

Thus, from the telecommunications point of view, questions such as open access to the national ICT

Box 3.2 **Digital radio and television: Challenges for Mozambique**

All nations should respond to a new technological challenge by the year 2015; this is the transition of broadcasting from analogue to digital systems. The benefits are enormous, but the financial costs implied are also important, both for the broadcasting operators and for the consumers.

A transition period for implementing digital broadcasting runs from June 2006 to June 2015, as shown in the figure below. Countries are free to decide on the start of digital implementation, but this period cannot go beyond June 2015.

Mozambique must reflect on its strategy for introducing the digital broadcasting system and take the appropriate decisions with regard to the calendar for introducing digital broadcasting, the form of operation of the multiplexers and transmitters, and ways of reducing the costs to operators and users that result from the introduction of the digital system.

With digital broadcasting, it will be possible for a station to make available new channels unavailable on FM and AM, e.g. specialist music, news, sport and comedy. Additional information can be made available such as "album art", information on songs, weather and traffic, sports results, etc., as a supplement to the programming. Thus new services can support electronic governance, electronic trade, education and health.

Compared with the analogue system, digital broadcasting offers a better quality of picture and sound (High definition - HD), and makes the best use of the radio-electric spectrum, since it allows the transmission of 7 or more programmes at the same time on a single channel, depending on the multiplex technology in use. Due to these features, digital broadcasting allows the introduction of interactivity and new services, characteristic of media convergence, which would not be possible without this optimisation. This is why new services can be introduced to support electronic governance, electronic trade, education and health.

A Regional Radio-communication Conference (RRC-06) of the International Telecommunications Union (ITU), held from 15 May to 16 June 2006, set out the digital broadcasting plan for Regions 1 and 3. Mozambique is in Region 1. The conference made technical recommendations, methodological options for planning and coordination between administrations on the use of the available broadcasting spectrum. The spectrum under consideration is in Band 174 - 230MHz and 470 - 862MHz. The basic rules on implementing digital broadcasting are contained in an agreement known as GE06.

Once digital television has been introduced, up to June 2015 it can co-exist with analogue broadcasting, and countries should put in place technical and regulatory measures to protect analogue transmissions. This protection ends in June 2015, and as from that date, broadcasting should be solely digital. The period of coexistence is known as the period of double illumination or simultaneous transmission.

Impact on operators and users

The broadcasting equipment used by radio and television operators, and the radio and television sets currently used by listeners and viewers, are not able to transmit or receive digital signals. So there is an additional cost that must be borne in the transition to digital television.

The operators will have to acquire new transmitters. The consumers can keep the receivers in use but must acquire conversion equipment to receive the digital signal and convert it into analogue before sending it to the receiver. This equipment is known as a "set-top-box" (STB). The STBs available on the market in the first half of 2008 were priced at about US$75, which is more than the statutory minimum monthly wage for Mozambican workers. It is therefore necessary for countries to adopt measures to reduce the financial weight on citizens arising from the transition from analogue to digital broadcasting.

Some countries have subsidised citizens who buy equipment ready for the digital system or lessen the cost by reducing customs duties on this type of equipment. Or they reach agreements with STB manufacturers to allow a cut in prices.

A further question posed concerning digital transmissions is the need to abandon the model of each operator assembling its own transmission network. To obtain benefits from the digital system it is highly recommended that only a few companies should exist that are dedicated exclusively to the activity of multiplexer and the transmission of programmes. The current radio and television operators would be responsible for producing content and sending it to the multiplexer and transmitter operators, who will in turn take responsibility for the local, regional or national broadcast of this content.

It is thus becoming urgent that Mozambique should take firm decisions on its strategy for introducing digital broadcasting, bearing in mind the established calendar and the objective of ensuring the right of citizens to information.

14. In: "LecG: Investment in Telecommunication Networks: A 21st Century Perspective, October/2006".

infrastructure, the integrated development of the related infrastructure (electricity, telecommunications, roads, etc.), Internet telephony, single licence for service providers, regional licence facilitating separate treatment for investment in rural areas, among others, are of crucial importance and should receive timely treatment by lawmakers and regulators, in order to reduce uncertainties and improve still further the environment for national and foreign private investment.

Access and the "digital divide"

The current inequalities in the world between the haves and the have-nots are centuries old, and over time it is tending to become worse. The statistics on poverty, on the precarious access to education, to health and to other basics, remain a global concern and reflect the unequal distribution of conditions and opportunities. The reflex of this reality in the sphere of access to ICTs gave rise to the concept of the "digital divide", expressing the impossibility of a large chunk of the world's population gaining access to and using effectively the new information communication technologies, and taking advantage of the benefits these provide.

Despite the progress made in improving access to ICTs, mainly as a result of the rapid expansion of mobile telephony, the digital divide remains one of the main challenges for the effective use of ICTs.

In an attempt to cover the various facets of the digital divide, the International Telecommunications Union (ITU) has developed four indices to measures access to and use of ICTs, whether by countries, or by individuals and households, namely the Digital Access Index (DAI),[15] the Infostate index, the Opportunity

Box 3.3 **ICTs in Mozambique and SADC**

In Mozambique, the availability of ICTs, in terms of fixed phone lines, mobile telephony, computers and Internet access, has undergone noteworthy growth, particularly in the expansion of the mobile phone network. By the first half of 2007, the penetration index of the fixed phone service in Mozambique was 0.39 telephones per 100 inhabitants. But when it comes to cell phones, the penetration index toward the end of 2006 was 12.6 telephones per 100 inhabitants, and in the first half of 2007 it reached 13.8 telephones per 100 inhabitants (INCM, 2007).[16]

But when we consider households, we find that it is still a low percentage that own radio receivers, televisions, and computers (and hence have Internet access). Data referring to 2002/2003 from the National Statistics Institute (INE) show the following coverage:

- Households with a radio set 45%
- Households with television 6.3%
- Households with cell phones 3.6%
- Households with computers 0.3%

A comparative look at other SADC states shows that Mozambique is still at a great disadvantage, according to the DAI tables published by the ITU in 2003, shown in Table 3.2.

Table 3.2 **Comparative Table of Access in the SADC Region (Digital Access Index)**

Country	Fixed Line Subscribers per 100 Inhabitants	Mobile Subscribers per 100 Inhabitants	Internet Tariffs as % of GNI	Internet Users per 100 Inhab.	Infrastructure	Capacity to Obtain	Knowledge	Quality	Use	DAI
South Africa	9.5	30.4	15.4	6.8	0,23	0.85	0.83	0.26	0.08	0.45
Botswana	8.3	24.1	10.9	2.9	0,19	0.89	0.79	0.26	0.03	0.43
Namibia	6.5	10.7	22.5	2.7	0,11	0.77	0.8	0.22	0.03	0.39
Swaziland	3.3	6.1	21	1.9	0,06	0.79	0.79	0.17	0.02	0.37
Zimbabwe	2.5	3	58.3	4.3	0,04	0.42	0.79	0.16	0.05	0.29
Lesotho	1.6	4.2	110.7	1	0,03	0	0.77	0.14	0.01	0.19
Zambia	0.8	1.3	118.7	0.5	0,01	0	0.68	0.14	0.01	0.17
Malawi	0.7	0.8	465	0.3	0,01	0	0.65	0.11	0	0.15
Tanzania	0.5	1.9	501.4	0.2	0,01	0	0.61	0.14	0	0.15
Mozambique	0.5	1.4	233.1	0.2	0,01	0	0.42	0.14	0	0.12

Note: DAI values rated in hundreds of decimal points. Economies with the same DAI value are rated in thousands of decimal points (Table based on ITU data, 2003) (http://www.itu.int/ITU-D/ict/dai/index.htmlhttp://www.itu.int/ITU-D/ict/dai/index.htm

15. Digital Access Index, established by the International Telecommunications Union. In 2003, the ITU published the DAI of 178 of the world's economies. (http:/www.itu.int/ITU-D/ict/dai/index.html)
16. Data from the Mozambique National Institute of Communications (INCM), October 2007.

Index, (ICT-OI) and the Digital Opportunity Index (DOI) (ITU, 2003).

The DAI index measures the ability of people in a given country to gain access to and use ICTs. This index covers fundamental factors that have an impact on the country's ability to accede to and use the ICTs, namely the availability of infrastructure, the cost capacity, knowledge, the quality of the infrastructure and the use of ICTs.

To minimise this shortcoming, several initiatives seeking to set up points of public and community access are taking place in Mozambique, with particular stress on communities. These community access points take several forms, such as Community Radios, Telecentres, Schools (SchoolNet), Provincial Digital Resource Centres (CPRDs) and Community Multimedia Centres (CMCs). Progress has been made in setting up these community access points, but the pace of implantation is not as fast as desired, and one of the main constraints is connectivity.

With regard to connectivity, the great challenge facing the government and the private sector is investment in research for low cost communication solutions, which can guarantee low cost connectivity in rural areas without access to telecommunications. Initiatives such as the Mozambican Information and Communication Technologies Initiative (MICTI), in partnership with the Centre for Scientific and Industrial Research (CSIR) of South Africa, researching low cost connectivity technology based on antennae made out of tins, are welcome and serve as an example of the results that can be obtained with massive investment in ICT research.

Apart from connectivity, there is also the problem of the effective use of ICTs in the daily life of communities, as a tool to improve the quality of life. Here great challenges are posed to civil society organisations which play an important role in spreading information about ICTs and their benefits among the communities, and in selecting, processing and presenting adequate contents to the communities, exploiting the combination of several ICTs, such as telephone, radio, television and the Internet, in order to make the contents reach their destination.

These actions, when properly guided, create job opportunities for women and young people, and allow improved public access to various contents in areas such as agriculture, education, health, prevention of natural disasters, among others. Support for building the capacity of these civil society organisations in the growing use of ICTs is a challenge to the government and to its bilateral and multilateral cooperation partners.

Also in the context of improving access to ICTs in rural areas, currently the Universal Access Service Fund is being implemented in Mozambique. Its regulations were approved in late 2006. Through this fund, access points to telephones and to the Internet will be set up in areas with deficient coverage. In some cases, it is envisaged that the operators involved will be subsidised by the project for the take-off of their activities.

The services available to citizens

A vast range of services useful to citizens is already available in Mozambique, as a result of the use of ICTs. The number of radio and television stations in the country has grown, transmitting a varied range of programmes related with the country's development dynamic and the daily lives of citizens. Access to telephones, the Internet and e-mail has also undergone significant improvement, notably in mobile telephones.

The expansion in networks of Automatic Teller Machines (ATMs) and increasingly competitive services introduced by electronic banking, namely banking consultations and transactions via computers and cell phones, are informative examples of the application of ICTs to make life easier for citizens. The implementation of ICT-based initiatives that provide citizens with more and better services is a challenge to the private sector.

Services to transfer money electronically, for example, have great impact on rural communities since they make it possible for Mozambicans in the diaspora to send money back to their relatives. The Post Office can also use its network to adopt initiatives of this kind, taking as its example the project on "Electronic Transfer of Money for the Southern African Region", of the Universal Postal Union.[17] Research by the World Bank found that "the international transfer of money reduced poverty by 11% in Lesotho and by 5% in Ghana."

Services for citizens available via the Internet are a reality in Mozambique, provided by the private sector and by some of the public sector. Examples worthy of note include the Eduardo Mondlane University, with publication on the Internet of information concerning the admission examination, such as the lists of registered candidates, the places, and later the results of the exams.

17. UPU Presentation to SADC Ministers, Maputo, Mozambique, June 2007

The launch of the government Portal, in the framework of electronic government, as an integrated platform offering public services to citizens, is an important starting point for electronic government. It should be noted that Mozambique leads Africa in this area. It is in 21st position, with 25 points, in the global assessment of the quality and relevance of the tools for spreading information (through the government Portal), a component of the "e-participation" initiative. The E-participation Index is a component of the E-Government Index which assesses the quality and usefulness of the information and services provided by a given country with the purpose of involving its citizens in the drafting of policies, through the use of Electronic Government programmes (UNDESA, 2005).[18]

An important step in the area of electronic Government, the main objective of which is to provide ever better services to citizens, by improving the efficiency and effectiveness of the public services provided by the state, was taken in July 2006 when the Council of Ministers approved a strategy for Electronic Government in Mozambique.

A Law on Electronic Transactions, providing a legal framework for electronic transactions in Mozambique, is being finalised. Among other matters, it deals with the registration and operation of Internet domain names, the content of information exposed electronically, consumer protection measures, and data codification and protection. These are matters of major impact in terms both of electronic government, and of electronic commerce in general.

Despite all these advances, we still have a long way to go in making available ICT-based services, such as, for example, distance learning supported by ICTs, tele-education, tele-medicine, as well as citizen participation in governance.

Important challenges in policy, legislation and regulation still need a reply. The treatment of key questions, such as data security, electronic commerce, and Open Source Software, among others, could have a major impact in increasing the use of ICTs by citizens, companies, and even the public sector, and also an impact on developing the national ICT industry.

An important challenge that should be urgently considered in the area of legislation is developing a political and legal framework in SADC, so as to eliminate costs in re-channelling calls between mobile phone networks, which allows a user to receive calls from his or her network through a another network (normally when outside the country), commonly know as "roaming".

The regional integration now under way imposes this measure in order to facilitate phone communications and business between the countries of the region, as already happens in other parts of the world, and even in West Africa, where the clients pay normal tariffs wherever they go within the region of coverage.

Content, ICT and Gender

Local content development is relatively new to Mozambique. The first significant steps were made in 1997 by CIUEM, and the official website on Mozambique (http//www.mozambique.mz) belongs to these first experiences.

CIUEM launched a new site in 2007 for support to community-based media institutions (community radio and community multimedia centres), Community Information and Communication Centre, or CAICC (www.caicc.org.mz). The site is a repository of community news and features as well as official documents with background information on various development topics, ranging from national response to HIV and AIDS to girls education. The sites also functions as a help desk on basic technical queries from community-based media houses.

Many other sites and portals now have been made by local ISPs. Most sites display commercial content, with relatively few non-profit sites available, such as on academic and research activities. In the planning phase is the Mozambique Development Gateway (MzDG), a national portal funded by World Bank, to be designed under the guidance of a steering committee involving Government, the private sector and civil society.

Meanwhile, CD-ROM production is still emerging, with very few initiatives in the area. The private company Pandora Box Lda. is worthy of mention as the pioneer of CD-ROM production in Mozambique. Pandora Box reproduces the national legislation published in the Government Gazette in searchable CD-ROM format and compiles documents from different public and private institutions for ease of use and access. (Community media content needs and production strategies are further discussed in Chapter 7.)

The involvement of women in business-related activities in Mozambique is generally low. Although the Constitution defends equal rights for men and women, most girls, especially in the countryside, do not have access to education. After independence the government has actively promoted women's empowerment, reflected today in general statistics and illiteracy levels. However, a true gender balance in political, social and economic life is still to be achieved.

18. Report from the Economic and Social Affairs Department of the United Nations (UNDESA), Global E-Government Readiness Report 2005

To illustrate, a study undertaken by CIUEM in 2002 has shown that 291 out of 882 ICT users from different schools in Mozambique are female. This case study also validates the situation found among the telecentres.[19]

Implementation of Electronic Government

The ICT Policy, approved by government in 2000, recognises the unparalleled opportunities that the effective use of information communication technologies offers for improving the operations of governments, central and local, offering citizens good quality services rapidly, placing public information in the hands of citizens, facilitating communication between them and their rulers, and making a positive contribution in education, health, the fight against corruption, attracting investments, improving the business environment and the competitive level: in short, promoting good governance.

Electronic Government is thus an opportunity to rethink the role of the government, and can become a tool for catalysing economic development and good governance.

In Mozambique, several initiatives and projects to implement computer systems are taking place in the various sectors of the public administration. It is the government's objective that setting up data networks, computer applications and databases in public institutions should take place in an articulated and coordinated fashion, in order to exploit synergies and avoid duplication of resources. It is also a government goal to guarantee the compatibility and scalability of systems installed in public institutions, which requires an integrated approach in terms of vision and the technological solutions adopted.

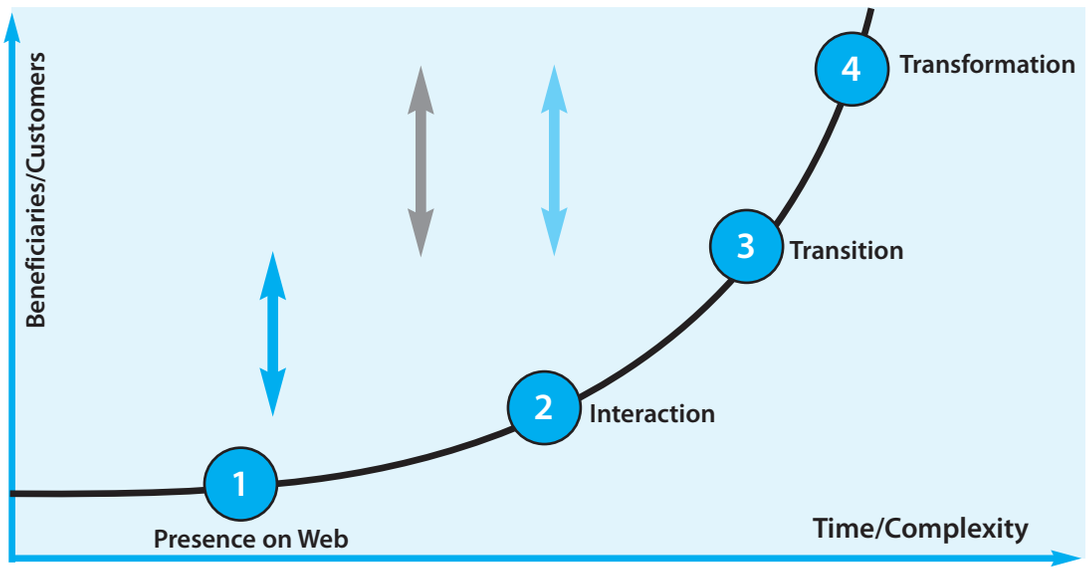
The availability, at national level, of ICTs, through the Electronic Government Strategy, helps towards achieving the objectives of the Public Sector Reform, in the framework of decentralisation, the improvement of service provision, and institutional restructuring. The development of human capacity, through

Table 3.3 Gender Distribution

Users ICT Users in visited schools		
Gender distribution	**No. of people**	**Percentage**
Male	591	62
Female	291	38
Total	**882**	**100**

Source SCAN - ICT Mozambique, 2002

Graph 3.1 Key Stages of Electronic Government



19. Mozambique Scan-ICT Final Report. Informatics Centre of the Eduardo Mondlane University (Centro de Informatica da Universidade Eduardo Mondlane) (CIUEM), 2002, Maputo, p 22.

training in computer science linked to areas of work, will raise the professionalism of the Public Sector, secure systems and protocols for handling electronic documents, the interchange of data, financial transactions and audits, will improve financial management, responsibility and the fight against corruption. Taken together, these functions will inform and strengthen policy formulation and monitoring, resulting in improved governance at all levels of government.

Implementation of the electronic Government Strategy in Mozambique is a challenge that demands redoubled efforts and significant investments, to deal with the shortage of Mozambican staff trained to support the development of ICTs, the poor coverage and capacity (bandwidth) of the existing communications infrastructure and the insufficient legislation in the ICT area.

With implementation of the Electronic Government Strategy, security and data protection rules will be established. The question of balance between data protection and the legitimate need for access to public information will, however, remain a challenge. Balanced access to data and information is one of the foundations of an informed society and of the knowledge economy.

As important partners in the national economic and social development agenda, the private sector and civil society are called upon to play a relevant role in implementing Electronic Government.

Although Mozambique is still at the initial stages of developing Electronic Government, various sectors of society are already benefiting from the facilities brought by the use of ICTs into Government-Government, Government-Civil Servant, Government-Citizen, and Government-Private Sector relations.

As for Government-Government and Government-Civil Servant relations, some examples show the steps that are being taken to improve public administration. The government's initiative to set up, in 2004, a network linking the public institutions (Government Electronic Network-GovNet), is already bearing fruit, putting into the hands of civil servants powerful tools such as e-mail, access to the Internet, to intranet and the Electronic Archives that allow greater efficiency in their activities. Implementation of the State Financial Administration System (e-SISTAFE), which also began in 2004, is a further example. It seeks to improve transparency in administrative and financial systems maintain fiscal control, and facilitate the decentralization of budgetary planning and implementation in the public sector.

As for the Government-Citizen relation, a clear example of how government services are coming closer to citizens is the development of the government's Internet Portal (www.portaldogoverno.gov.mz), launched in 2006, which is a major step forward in improving the lives of citizens. Through the government Portal, citizens may have access, through the Internet, to information on public services, with the possibility of printing out minutes and forms related to the services they wish to request.

The Government-Private Sector relationship is also gradually improving, in the area of the provision of public services, through the use of ICTs. A good example of this improvement is the empowerment of the Single Attendance Counters (BAU) with the use of ICTs, more specifically through using the BAU Portal (www.balcaounico.gov.mz). This allows users, regardless of where they are geographically, to obtain information on the activities of the various BAUs in the country.

The BAU Portal, launched in 2006, seeks to facilitate the licensing and registration of national and foreign companies, by providing information on the procedures they should follow. A further major landmark in the use of ICTs in the provision of services to the private sector is the reduction in the time taken to obtain a Company Registration Certificate, achieved by the publication of the official gazette, Boletim da República (BR), in electronic format, in the government Portal. The Public Tender Portal is being tested, which seeks to make available on-line the tenders for acquiring goods and services for the public sector.

As for improving the public administration in general, the major challenges posed are:

- integrating all the government's networks into the same common communication platform;
- the gradual reduction in the number of cash trans actions between the public sector, on the one hand, and the private sector and ordinary citizens, on the other;
- sharing, by all government systems, of basic common data on citizens, enterprises and legal entities, and the land register; and
- effective community participation in local governance.

The Electronic Government strategy has defined projects that focus their activities in these areas. They are known as Anchor Projects, and some are already under implementation.

Electronic governance

The ICTs are one of the key vehicles for Public Sector Reform, and also make a significant contribution to democratisation. As a result of the close alignment of the ICTs to PARPA II, we cite examples of how these

technologies can be and are being used as instruments to improve governance:

Citizen participation in public life is one of the key objectives of electronic governance. This component of democratisation was strengthened by the introduction of the Government Portal. From the Government Portal any citizen can send e-mails to the electronic address, webmaster@govnet.gov.mz, and pose questions concerned with governance. These questions are immediately channelled to the sector responsible for that specific area.

To this end, Focal Points have been set up in all ministries and some public institutions, which are responsible for replying to the questions posed. This initiative has already won the country 23rd place, out of the 191 member states of the United Nations, in the UN 2006 rankings in the category of "e-participation"; this means that Mozambique is the African country with the highest rate of electronic participation in governance.

Efficiency in serving the public is positively influenced by improvements in the communication between public institutions. The implementation of the Government's Electronic Network (GovNet) and the computerisation of the One-Stop Attendance Counters, currently under way ensure that a further objective of the Public Sector Reform is attained, that of making it easier for citizens to legalise and register their activities with the state.

- Decentralisation policies, particularly concerning execution of the State Budget (OE) from central level down to provincial and district level, which is guaranteed by the e-SISTAFE system, which also makes it possible to improve transparency and effi ciency in the public administration.
- Promoting the development of the provinces, through setting up Provincial Portals, loaded with a variety of information and documentation on the potential of each province, and on governance activities. The system also allows the districts to implement the system of participatory planning, which is also envisaged in the democratisation process;
- Civil society participation in monitoring implementation of PARPA II, at central, provincial and district level, is strengthened by the use of ICTs in facilitating access to information. Thus points of public and community access are being established hroughout the country, notably the Provincial Digital Resource Centres (CPRDs) and the Multimedia Community Centres (CMCs), through which the public can gain access to the government Portal and the provincial portals for consulting information and documentation about the development of the country.

Challenges for data security

No nation in the world is exempt from responsibility for electronic security. The entire world is inter-connected and interdependent through the Internet and the actions of each and every user can have an impact on the security of all the other users.

Responsibility for ensuring electronic security is a task not only for governments, but also for the companies, organizations and individuals who develop, use, manage and make available information systems. However, governments should play a leadership role in disseminating information linked to protecting critical information systems and networks, and in promoting the culture of security of information.

Mozambique is not foreign to this world-wide concern: already in the ICT Policy, approved in 2000, the question of protecting the public is dealt with as one of

Box 3.4 **Protection of the public**

The document on the ICT Policy of Mozambique sets out fundamental principles of data security and protection of the public against those who use ICTs in bad faith, including against the invasion of citizens' privacy, in the following terms.

"In order to guarantee or improve the protection of the public against the various forms of electronic abuse and crime, the Government, in collaboration with its partners, shall take, amongst others, the following policy measures:

- Guarantee the protection of personal data in the national information infrastructure;
- Adopt encrypted solutions and codes less liable to be violated;
- Fight against violations of citizens' rights and assaults against public order and socio-cultural values, especially pornography, violence and abuse against women and children through the Internet;
- Encourage and support the production and dissemination of contents that reflect the values of Mozambican society; and,
- Work with non-governmental organizations and other civil society institutions for the civil and criminal treatment of offences that may occur.

Given the seriousness of the matter, the United Nations adopted on 31 January 2003, a resolution on "Creation of a global data security culture" (Box 1.4) which seeks to make all users aware of certain basic security principles and increase the sensitivity of nations such that they may take decisive steps in promoting the global data security culture.

the areas that should deserve the attention of the state, in its capacity as guardian of the public good and guarantor of the well-being of citizens, and some measures were laid down in order to improve the security of the public. It is, however, important that Mozambique draws lessons from the experience of other countries on how to organise, so as to face, in the best possible way, this major challenge of data security.

As for the contribution of other sectors of society to data security, the absence of a culture of security in organisations in general leads people to adopt an unconcerned and naïve attitude towards questions of security. This behaviour is security vulnerability, and it is thus important, within security practices and through competent management of information systems, to guarantee the three dimensions of data security:

Confidentiality: ensure that information is accessible only to those duly authorized to gain access to it.

Integrity: safeguard the veracity and complementarity of data, as well as its processing methods.

Accessibility (availability): ensure that duly authorised persons do have access to the information, and associated equipment, whenever necessary.

Conclusions and Recommendations

Connectivity is the keyword when speaking of "digital access". Thus, from the telecommunications point of view, issues such as open access to ICT national infrastructure, as well as integrated development of various infrastructure existing in the country (electrical power, telecommunications, roads, etc.), telephones through Internet, single license for service providers, regional license offering special treatment to investment in rural areas, among others, are of crucial importance and must deserve prior treatment and positioning by lawmakers and regulators so as to reduce uncertainties and further improve the investment environment for the private sector, both national and foreign.

One of the key factors for telecommunications development, which results in the improvement of services rendered to citizens couple with price decreases, is the constant improvement of policies and the regulatory framework for telecommunications and ICTs.

The sector has made significant strides such as, for example, the liberalization of telecommunications in order to establish an open and competitive market; promotion of competition in the telecommunications market, adapting measure that ensure a just, sustainable and efficient competition; and strengthening the autonomy of the telecommunications regulatory authority so as to ensure an effective regulation of the sector.

Notwithstanding government's efforts, there is still a long way to cover in the legislation and regulation of telecommunications for the impact of these measures to be reflected in the increase of availability of ICTs to citizens.

The technical convergence phenomenon and the speedy pace of ICT evolution oblige the lawmakers, policymakers and regulators in the ICT sector to have a very fast response capacity in terms of legislation and regulation. The challenges are huge, more so because social costs which might arise from mistakes and/or delays of legislation/regulation must be avoided, since legislation/regulation constitutes a determinant investment factor in the telecommunications area.

From the point of view of governance, ICTs constitute one of the key-drivers of Public Sector Reform and contribute significantly to the process of making governance and democratisation transparent.

Among the various challenges to the full implementation of an electronic governance strategy is the implementation and systematic monitoring of e-SISTAFE in the districts and municipalities, including mechanisms for active involvement of the citizens in planning and joint monitoring of public services. This measure will increase access to information by citizens to budgeting processes and budget execution, procedures and purchasing transactions of goods and services, costs of rendering services, and users' rights.

It is important to keep in mind, through efficient mechanisms of external monitoring, that electronic governance is not limited nor is it to be confused with the mere installation of tools and electronic channels for storage of public administration documents, but rather it refers to a dynamic interaction process between government and citizens, responding to numerous requests before the municipal bodies.

Chapter 4

Access to Education Through ICTs

Introduction

Education is one of the major fundamental rights of men and women throughout the world. Education is one of the three fundamental dimensions of the human development index, covering the indicator of access to knowledge, which is measured by the adult literacy rate, together with the combined gross enrolment rate for primary, secondary and higher education. The relationship between knowledge and human development arises from the fact that knowledge makes intelligent choices possible.

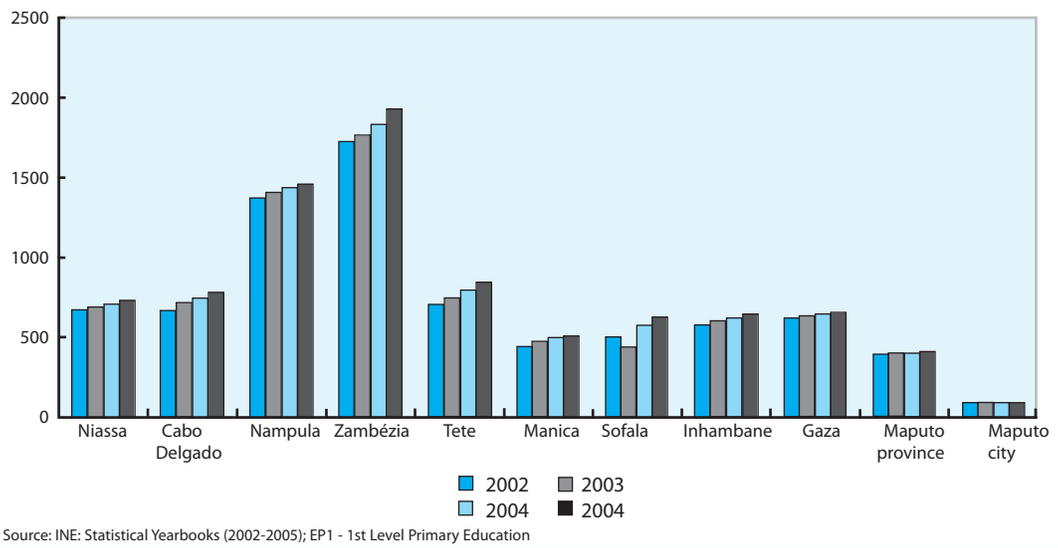
This vision, accepted by UNESCO at its creation in the mid 20th century, was reiterated at the World Education Forum of Dakar, entitled "Education for All" by our collective undertakings, also promoted by UNESCO in April 2000. The targets of the Dakar Plan of Action lay down that all children, youths and adults have the human right to benefit from an education that meets their basic learning need, i.e. an education that guarantees they can learn to know, to do, and to live together, and to be themselves.

In September 2000, the United Nations General Assembly unanimously adopted the Millennium Declaration and the Millennium Development Goals (MDGs), which recognise universal education as a right, stress its fundamental importance in human development and set 2015 as the deadline by which all boys and girls should be able to complete a full cycle of primary education.

This chapter analyses the efforts made by Mozambique to introduce ICTs into its education sector, as a powerful tool that stimulates access to knowledge. The chapter also discusses some of the obstacles and opportunities that the ICTs offer the education sector as a platform for achieving education for all by 2015, as established by the MDGs.

In Mozambique, primary education is divided into two levels. The first level lasts for five years (EP1), and is followed by two years of the second level (EP2). A complete primary education occurs when a child concludes EP2 (seventh grade) successfully.

Graph 4.1 **Evolution of the Number of EP1 Schools by Province, 2002-2005**



Source: INE: Statistical Yearbooks (2002-2005); EP1 - 1st Level Primary Education

From 2002 to 2007, Mozambique's HDI rose from 0.413 to 0.466 (UNDP, 2007/08). Although this growth was positive, to some extent due to the scale of investment made in the education sector, expressed in the rise in the literacy rate and in the combined gross enrolment rate, through the expansion of both the public and the private school network, it still remains very low on the world scale, and serves as a warning about how far the country needs to move in order to reduce the deprivations of its citizens, particularly in the area of human development.

According to the PES (2008), it is estimated that over 4.6 million pupils attended EP1 and EP2 in 2007, which is a growth of around 9.5% when compared with 2006. The net EP1 attendance rate advanced from 83.4% in 2005 to 88.3% in 2006. The rate for EP2 moved from 6.7% in 2005 to 8.8% in 2006. It is thought that the accelerated construction of schools contributed to the growth in the attendance levels.

Challenges and Opportunities of Using ICTs in Education

The need to participate in an information and knowledge society, driven by the phenomenon of globalisation, brings with it enormous challenges for the education sector, faced with the opportunity of using ICTs. These challenges should be viewed in a holistic form, and require drawing up a strategy for implementing and using the technologies in education. Although the many economic and financial reasons cannot be excluded, there has also been a lack of understanding and vision of the potential that ICTs can bring to this sector. For example, the graph below shows the evolution of the number of schools in the country. However, the planning and management of education still has no vision for including ICTs, as an alternative or complement to the classic form of offering education through building schools, or, for example, to the lack of investment in communication infrastructure.

In the information era, it is the task of Governments to ensure that access is universal, and that there is an ever greater use of ICTs, for better management of the administration at all levels. However, the use of technology, bearing in mind its potential combined with its impact in various areas, makes it indispensable to understand the complex and continual transformations in today's society so as to insert technology effectively, and envision the benefits which could derive from its use. To better understand its implications, we need to analyse the challenge of ICTs in the various aspects of the education sector.

Promoting the teaching-learning process

PARPA and Agenda 2025 include the objectives and targets of developing an information and knowledge society, taking on board the challenges of attaining the MDGs. In the sphere of education, Agenda 2025 identifies several challenges and sets forth some guidelines for state action and its scope. Thus, the document, while noting a growth in terms of access to education since the end of the war in 1992, identifies the problems of inequality in the distribution of the network, inefficiency of the system, poor quality of education, and the difficult conditions under which children learn.

The evolution of technologies, particularly in information communication, has brought a new way of taking knowledge to the masses through teaching-learning processes. Given the experiences of other countries, the role that technologies play in teaching-learning is undeniable. For example, across the globe the ICTs have allowed the development of distance learning.

Looking at our own experiences, challenges remain in using them fully in terms of technological innovation. Some of these challenges are associated with constraints in resource allocation and in implementing a strategic vision for using and taking advantage of ICTs in the education system. For example, the inclusion of a discipline on ICTs in the secondary school curriculum is intended to integrate the pupils into the information society by making it possible for them to have access to the technologies and to use them.

Also in this perspective, in 1997 MEC embarked on the SchoolNet initiative, which won major support from institutions such as TDM, TV-Cabo, IDRC, Direqlearn and Microsoft aimed at bringing computers into schools. Although it began as Internet for schools, SchoolNet soon took on another perspective as a project to give access to and allow the use of ICTs as a teaching-learning tool, through a vision of the empowerment of Mozambican pupils so that they may become participants through the effective use of technology in learning, and enjoy the advantages that these technologies offer.

Despite initiatives aimed essentially at installing a support infrastructure for access to and use of ICTs in schools, these are still a long way from attaining significant results.

The implementation of ICTs is still restricted to a small number of schools, particularly in the capital. There are sharp disparities in implementing this programme across the country. According to data obtained from the implementers,[20] greater coordina-

20. MINED (2007)

tion is needed to carry forward this initiative, insofar as that, without this initiative, the gradual movement nationally which would allow Mozambicans, particularly those of school age, to enter the so-called information and knowledge society would not be viable.

The use of technologies such as radio, television and video, and more generalised use of the Internet makes it possible to spread information and knowledge to an ever larger group of people nationally. In this context, it is not enough that educators teach children to learn. Instead, they should teach them how to look for information and treat it critically - that is, to teach the pupils to be more pro-active in learning and seeking for knowledge through the use of these technologies. Integrating the ICTs into teaching/learning procedures will make all schools true centres for sharing information and knowledge, and contribute to the creation of the information society.

Administering and managing education services

The accumulated experience in accompanying institutions shows the need for a series of changes in their organisation and operations, in order to permit access to and management of resources, in close liaison with the planning and administration of activities and services. The current situation of the administration and management of education services in Mozambique is very weak, despite reforms in the sector. For example in many schools, the registers are still drawn up by hand. The archives, the academic register, as well as all other school documents are drawn up and kept in paper filing systems. The use of ICTs could facilitate the organisation, planning and management of these activities with greater rigour, avoiding the loss of pupils' marks, damage to students' files, the issuing of forged academic certificates, etc. In other words, the technology can play an important role in management procedures, making it possible to improve performances levels in providing services of better quality.

In a more general perspective, ICTs are a very strong instrument for systematisation of school data. Currently there exist specific computer packages for the administration and management of information about education services. These packages have been developed specifically for education services. They are computer packages that can be used for the academic register, that is, administration and management of pupil enrolment, payment of fees, information on disciplines already taken during the course, the marks and much other information concerning administrative matters and the academic attainment of the pupils.

The implementation of ICTs in managing education services can help in setting up a single data base and could help overcome many of the negative consequences mentioned earlier. Thus, in the perspective of sharing a single Internet connection, reducing costs and subsequently improving sustainability, MEC has designed and developed a shared network of computers to connect the Inhambane Provincial Directorate of Education and Culture and four of the province's secondary schools. Through this project, this kind of network can easily grow speedily through linkages with other schools to this infrastructure, and later, replicating the initiative to other provinces, and thus helping manage joint activities.

ICTs in Distance Learning: Origins and Stages of Development[21]

Distance Learning (DL) is a significant example of the education potential of the ICTs, as its history and development show. DL, as a concept and practice, has gone through various stages in its history. DL has its origin in the invention of the press, which proved to be an instrument capable of putting the ideas of others into physical form, allowing those who were prepared for self-instruction to break the relationship of bond between teacher[22] and pupil which had, until then, been necessary and obligatory for anyone desiring to learn something new. The publication and free circulation of printed manuscripts, while not playing a systematized education role specifically directed at this end, allowed readers to exercise their capacity for self-instruction and self-training.

As a continual and common activity, DL began formally during the industrial revolution, when a series of correspondence courses began to be popularized, all aimed at teaching labour skills to those people who did not have the money to enter the traditional educational centres

It was due to these circumstances that distance learning was associated with a type of training aimed at the economically deprived sectors, with an informal character and, above all, dedicated to teaching skills, closer to crafts than to professional training with social prestige.

21. The international history and development of DL presented here has borrowed from the article by Jaime García Sánchez, entitled "Panorama evolutivo de la educación a distancia, published in the Revista Digital de Educación e Nuevas Tecnologias, nº 36, 2005 (http://contexto-educativo.com.ar/2005/3/nota-08.htm)
22. This fact may explain as Torres states, that, contrary "to what might be expected, the universities were ferocious enemies of the printed book, for at least the first two centuries of its existence. The logic behind this vigorous opposition was based on the following argument: books, published by printers with relative freedom, represented a challenge to the authority of the teachers since the students could go to them (the books) as a direct source of knowledge and so dispense with the indispensable advice and guidance of the teach ers". (Torres, 2001, p. 58),

The combination of printed materials and the post office laid the bases for the first distance learning experiences. The development of radio, telephones and television broadened the channels of social communication. These services which, for most people, represent the possibility of more fluid and closer communication and a new entertainment space, for DL meant the chance of new paths for its development.

Alongside radio, telephones and television, new communications machinery developed: video cassettes, tape recorders, audio reproducers and slide projectors. The second stage of DL emerged in this new context of communications infrastructure.

The DL courses on offer were developing skills other than those of crafts. Their use in basic education and above all in adult literacy, and at certain intermediate levels concerned with technical matters, brought it wide-ranging social and educational recognition.

Despite its association with economic backwardness, DL came to be accepted by the traditional institutions, but not without a certain disdain, since it contradicted their order and methods. Although formally accepted by the traditional school, DL was still relegated to a second best space, located almost always in the education extension departments which were concerned with curricular matters and training close to the informal.

The development of television technology was the trigger that allowed the consolidation of DL as a model of education with broad and varied applications in all fields and levels. It was television that opened the doors for formal recognition, allowing DL to overcome its humble position in the traditional educational field and in society.

The use of satellites allowed DL to make this qualitative leap to its third stage of development, preparing the path for teleconferencing, that is, live communication in real time between the subjects of the educational act. In this way it managed to generate the necessary feedback to overcome the hitherto prevailing one-directional character of DL. With the video-conference, DL could take up educational practices that had only been developed in the traditional educational institutions, such as symposia or roundtables.

Freed from technological bonds and from ideological stigmas, DL embarked on an explosive expansion which helped it gain space on both the theoretical and practical planes. Satellite technology allowed it not only to eliminate distances but also to reformulate its practices. The use of videoconferencing generated a greater degree of interaction and flexibility, both in communication and in the quality and quantity of its educational content.

Although satellite networks allow a certain type of feedback in communication, DL could find it difficult to establish the interactive relations that characterise traditional education. Thus for distance learning, the interaction between teacher and student, between the students themselves, and the other actors in the educational process to establish educational dialogue and emotional, social and ideological bonds, remained its Achilles heel. This was the last frontier separating DL from the traditional systems where teacher and student are in the same room.

The traditional system's possibility of interaction - on which were built the relations of power characterising the system - was the final obstacle that DL had to overcome before its full acceptance as an integrated educational system

The exponential growth of the Internet allowed DL to advance to its fourth stage of development. The possibilities for communication in both directions - written, verbal or visual - which this resource allows are almost infinite. It allows the free transfer of data in audio, video, graphic and other forms which would immediately make it the adequate channel for great growth in its applications to education.

As for the possibilities that the development of the Internet has meant for educational innovation, the emergence of the virtual university should be stressed.

An educational consequence of the flexibility and freedom with which the virtual university operates is the student-centred educational stress. This is recovering the philosophy on which DL was always based, focusing "on the student, on the subject of learning, and not on satisfying targets established by others in advance, on what the student should know and the pace at which this knowledge can be attained". (Torres, 2001, pp.142)

Thus the virtual university not only shows the path to be followed by the traditional authorities in organisational and operational terms, but also innovates in the pedagogic area when it centres the curriculum on the mediation process that intervenes in learning. Currently, the traditional school is trying to take up this qualitative difference within its institutional limitations.

Apart from the changes developed by the virtual university, the global university has arisen and, with it, the university and knowledge for all, in any moment, in all places: that is, the possibility of life long learning.

Box 4.1 Distance learning in Mozambique: History and some questions[23]

For the Frente de Libertação de Moçambique (FRELIMO), democratisation of school education was one of the basic objectives of its political and cultural programme. It regarded education as a necessity for the human development of Mozambican men and women and an imperative for the creation of a just and prosperous society.

As part of the conception of the National Education System (SNE), and in order to expand it, the establishment of Distance Learning (DL) in Mozambique was proposed and approved, based on a multi-media system integrating, in the teaching-learning process, written self-teach materials with radio and, in future, television programmes. Distance Learning was recognised and made equivalent to learning in the presence of the teacher by the 1983 law on the SNE. Thus, in vision and in legislation, the country slotted into DL in the international educational context.

In 1984, a distance learning course, with the contents of 6th and 7th grades, began as a pilot project. At that time, there were many Mozambicans who had not attended this level of schooling. Primary school teachers who did not posses this level of education were chosen as the target public for this pilot experiment. This choice was based on the fact that this was a population group which, because of its teaching experience, could make a significant contribution to assessing this educational innovation. Despite the disturbed social and political environment of the time (1984-1987), the course was implemented in several districts of Maputo, Gaza, Sofala and Zambézia provinces. The course covered about 1,300 working teachers.

Each of the classes based on written material was complemented by a radio lesson broadcast by the regional stations of Radio Mozambique. Those enrolled on the course were organized into study groups to allow mutual aid, and they were also supported by their respective tutors who worked with each group once a month.

This course faced internal and external difficulties of various sorts in implementation. Despite difficult and adverse conditions, most of the students who took this first distance learning course were able to complete it successfully.

The first Mozambican experience of DL suffered a premature death. The experiment was not continued, due in large measure to the differing and conflicting points of view about the DL development strategy that should be followed. The MEC leadership chose to restrict the scope of DL intervention, limiting it to teacher training. This decision meant abandoning what was stipulated in the SNE law, namely that distance learning should be attentive to the educational needs of citizens, and should offer distance learning courses covering the various levels of education.

This decision implied that the printed self-teach materials, the radio programmes and the functioning of the network of tutors for this first experiment were not assessed. Nor was the development of new forms of using and including communication and information resources in DL courses.

After this break with the DL vision and perspectives developed in the early 1980s, in the 1990s a distance learning programme was designed aimed only at teacher training. The planning and design of this programme did not include radio, audiocassettes or videocassettes. This initiative did not take the earlier experience into account.

As in other sectors, and on other occasions, the risk was that a new programme would begin without starting from the accumulated experience in this field. New viability studies were ordered, this time resorting to international consultants, and the results did not differ significantly from the conclusions reached by the viability study held in 1981-82.

While the first experiment was basically carried out with resources from the state budget, and some specific foreign contributions, this later one implied the investment of over a million dollars, "made available" by the World Bank.

To make this teacher training operational, the Ministry of Education set up the IAP (Teacher Improvement Institute), which produced a DL course aimed at primary teachers, intended to give them basic professional training (7th grade plus 3 years training). This course began in 1996, and has so far reached about 10,000 teachers. The IAP later introduced a second course of mid-level training for teachers of basic education.

Other experiences in DL arose during the 1990s, but none with the coverage of the IAP.

In 2001, the Council of Ministers approved the Distance Learning Policy and Strategy, seeking to expand the supply of the various levels and branches of the SNE via DL, as well as to promote non-formal education activities that would meet the training needs of various productive and social sectors.

The national DL policy and strategy aimed to create a distance learning system that promotes complementarity, partnership, articulation and synergy between the various institutions interested in offering training through DL.

In 2007, as part of the implementation of the DL strategy, the National Distance Learning Institute (INED) was set up. Its task is regulation, accreditation and guaranteeing the quality of DL. It also promotes synergies and articulation between the various DL initiatives and programmes undertaken in the country.

The INED should also develop a Network of DL Provincial Centres to offer various types of support to the students enrolled in the distance courses offered by the different national institutions (public or private) that provide distance courses.

The first DL courses offered by the various interested higher education bodies[24] are now being designed. The choice of these courses took into account the priorities and needs of the education sector. Four pilot courses were identified: pre-university (11th and 12th grades), a second course that seeks to develop generic skills among students who are seeking to enter higher education or among other professions to sharpen their academic or professional performance, a third intended to train secondary education teachers with some years of experience but without any psycho-pedagogic training, and a fourth for higher training in management. These courses are still being drawn up by INDE, ISPU, UP and the UEM, respectively.

It may be considered that the DL strategy adopted in 2001, to some extent, picks up the visions and perspectives that were developed in the early 1980s. Its implementation will demand taking on board a culture that encourages the

23. For the reconstruction and reflection on DL in Mozambique I have used the article "Educação a Distância em Moçambique", by Wim Neeleman and Arnaldo Nhavoto, published by the web of the Brazilian Distance Learning Association (ABED) as well as Educação à Distância em Moçambique, a document of MINED-MESCT, which presents the DL policy and strategy in Mozambique, 2001.
24. The UP, UEM, ISP and by the MEC itself through INDE and the recently established IEDA.

Box 4.1 *continued*

development of partnerships, interaction and the sharing of human and material resources between the institutions involved in the development of the EAD.

An efficient and good quality DL system that coordinates and promotes initiatives and programmes of the various institutions interested in offering distance courses, in the various levels and spheres of education, is a powerful lever to assist the Mozambican government in its efforts to expand the educational opportunities of Mozambican citizens. DL is an important education resource for the country, and gains still further in pertinence if one recognises the huge limitations, difficult to over come in the short to medium term, that the educational system faces in using traditional means to attend to the growing and diversified demand for education.

However, and despite these visions and perspectives, today, as before, it is important to remove the risk of DL becoming restricted to a speech of convenience, made in meetings or seminars, in the attempt to give a reply - often a rhetorical reply - to the challenges posed socially in the education sector, and for which direct education does not have adequate answers.

Faced with certain practices and positions on DL, one has to ask whether there is enough political will to put DL on a footing of equality with the traditional way of offering education to citizens, to attend to their right to knowledge? And one must ask to what extent DL is considered in planning and budgeting, compared with other activities in the education sector, as a serious and viable alternative for offering quality education? DL is still seen in the final parts of official documents, without a clear definition of resources, targets, responsibilities and deadlines. The education sector faces serious problems both in terms of expansion and the diversification of educational opportunities, and of the quality of what is offered.

Given this picture, we know that information communication technologies offer real possibilities, tried successfully in many countries, as mentioned earlier. Here we still think that by constructing school buildings (on a large scale, without the capacity to maintain them), without libraries and laboratories, and with improvised or inadequately trained teachers, we will ensure good quality education for all.

With an increasing sense of frustration, one feels that we have been unable to convince those who take decisions to decide that DL should occupy the place it deserves on its own merits. The history of DL internationally proves that, while it is no panacea, it is a viable, sustainable and quality alternative for achieving the objective of democratizing access to knowledge, the goal for which many Mozambicans have fought and continue to fight.

Regardless of the limits of the communication infrastructure that supports the Internet, the channels of communication that allow interaction in education, as much or more than traditional education allows, have been broadened. Still to be overcome are physical aspects, aspects to do with the educational infrastructure, concerning the learning of specialist skills, as well as putting into practice the knowledge acquired at the level of experimentation or demonstration. In traditional education, the students can enjoy access to laboratories and workshops both for the acquisition or new or specialized skills and for proving or corroborating the knowledge or principles learned at theoretical level. So far this is relatively impossible for the distance in the virtual phase.

The emergence of the new ICTs has been expressed in the appearance of an opportunity to integrate all the media, in order to encourage distance learning. There are countless challenges and possibilities for stimulating the teaching-learning process, through a convergence of increasingly sophisticated technological resources. For example radio, connected to the Internet, can supply almost unlimited possibilities for distance learning through the broadcasting of contents for teaching-learning at an accessible cost. It is known that radio can cover almost the entire country.

MEC recognises the critical role that open and distance learning plays in expanding access to the various types and levels of education and in improving the quality of the programmes offered (MEC 2001). The job of distance learning is to shorten distances and ensure that access to the national education system is available in any part of the country. The potential deriving from the use of technologies in the sphere of distance learning will help reduce the existing gulf between the regions which have access to conditions for school attendance and those that still lack them, taking into account the financial constraints facing education and training in the presence of the teachers.

ICTs in Literacy Programmes

Data from the Ministry of Education and Culture show that currently there are two groups providing literacy programmes: the government, and non-governmental organizations (NGOs). The programmes developed by both groups have consequently increased both the number of participants and the supply of literacy units. The statistics show that, in 2002, there were 259,435 adults enrolled and, by the end of the first level, which lasts for two years, the drop out rate was 36%, while the pass rate was 76%. According to Lind & Kristensen,[25] in 2003, the number of adults in liter-

25. Lind, A. & Kristensen, V. (2004)

acy programmes was almost double the 2002 figure, and the number of literacy units was over 5,000 (Mário, 2002). Actions seeking to reduce illiteracy rates among the adult population have led institutions to adopt measures aiming to involve this group in the information and knowledge society. For example, it is in order to reduce the rate of absenteeism of many literacy students, that MEC introduced a literacy and adult education programme using radio and television technologies.[26] This would enable literacy to have a broader appeal and not be seen merely as learning how to read and write and add up. The use of ICTs should also be introduced, because, according to Voogt (2000), all citizens should be educated to live in the new society - "the Information Society".

According to the data available from the INE (2007), about 45.5% of households in Mozambique own a radio, and today there is also a great expansion of mobile phone ownership. These technologies can be used as the main instruments for transmitting the contents of the teaching-learning process as a way of empowering distance learning.

The Creation of Human Potential for the Development and Use of ICTs

The opening of political frontiers, globalisation and other factors combined can form a potential facilitator for the integration and mobility of skilled human resources. The appearance of these technologies introduced significant changes, mainly in the form of work in the various areas of knowledge, making their use at various levels an obligatory requirement that should lead to greater participation in the country's development.

ICTs also have a marked social component, because of their high potential to promote integration, to reduce distances between people, and to improve their level of information. For example, education and training should give preponderant value to building up citizens' capacities, especially by providing adolescents and young people with practical and theoretical instruments. The existence of a strategy to speed up the formation of human capital is becoming pertinent to ensure the country's development through stimulating the training of human resources, endowed with technological knowledge in line with the emerging technologies. Certainly the creation of human capital is appropriate for stimulating economic development and reducing poverty.

The education and training of women is premised in this context, given the irreplaceable role of women as mothers, leaders and educators of the new generations. In order that women discharge to the full their social and citizenry roles, they should be given permanent opportunities to access knowledge and practices so as to remain up-to-date and better prepared to support those who depend on them.

Teacher training and ICTs

One of the concerns facing the education sector is the quality of education. Discussions in an attempt to explain this phenomenon are centred on the poor training of teachers, insufficient materials, and lack of educational support, which means that most of the teachers rely on teacher-centred didactic methods, which stress repetition and memorisation. However, pupil-centred approaches encourage creative thinking and education based on skills. In this area, teacher training resorting to ICTs offers the possibility that they will master the various aspects of ICTs so as to face the challenges in the teaching-learning process. The training of teachers, and other educational staff, especially in ICTs, involves the alternative of equipping the schools, envisaging conditions for a qualitative change in the schools in terms of learning. On the one hand, in the new approaches to teaching-learning, the ICTs play an important role in training the teachers themselves, since it is through the ICTs that teachers can continue their training, update themselves on current developments and exchange experiences with other agents in their professional area. Furthermore, the ICTs, when well used, can turn teaching-learning into an interactive process (Muianga, 2003).

It is important to stress that the ICTs will only be understood and used in education, just as in other areas of knowledge, when their implementation is duly accompanied by intelligent, creative and dynamic training of teachers capable of following contemporary approaches to education. For example, a teacher with knowledge of, and access to, internet technology, can better prepare classes, expand ways of lecturing, and modify the process of assessment and of communication with the pupils and with colleagues.

In this framework, although still at an embryonic stage, the project for the Evolution of Communication and Information in Inhambane province envisages strengthening the use of ICTs in teacher training. This

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experiment, if replicated across the country, could provide teachers with tools so they can slot into the information society and respond to the demands of the new educational approach which involves mechanisms of individual and autonomous training, adapted to the needs of each teacher, but which is also cooperative, allowing the interaction of trainees among themselves and with the trainers through sharing experiences, discussion and mutual help.

Conclusions and Recommendations

One of the concerns facing the education sector is the teaching quality. Tentative discussions to justify this phenomenon centre on poor teacher training, the insufficiency of material and lack of educational support, which means that the majority of teachers resort to teaching material centred more on the teacher, thus emphasizing repetition and memorisation, rather than approaches that encourage creative thinking and teaching based on capabilities centred on the student.

Therefore, teacher training with recourse to ICTs offers the possibility of mastering various aspects in order to face the challenges of the teaching-learning processes. However, the training of teachers and of other educational agents, specially, in ICTs offers the alternative to furnishing schools, thus envisaging the creation of conditions for a qualitative change of schools in terms of learning.

On the one hand, ICTs play an important role in the new teaching-learning approaches for the teacher, since he or she uses them to work and continue to be trained and updated on the current developments, and to exchange experiences with other professional colleagues, as well as training in working processes.

On the other hand, when well used, ICTs can make teaching-learning an interactive process. Education and training of women is determinant in this context given their irreplaceable role as mothers, leaders and educators of new generations. For them to fully comply with their social role and as citizens, women must be given permanently the opportunity to access knowledge and practices so that they are updated and better prepared to support those who depend on them.

Chapter 5

Health Promotion Through the Use of ICTs

Introduction

Health is understood as "a state of complete physical and mental well-being, and not the mere absence of disease or sickness" (WHO, 1945). Furthermore, health is regarded as something that is in the collective interest and an essential condition for living in freedom.

The Millennium Declaration, adopted in 2000 by all 189 member states of the United Nations General Assembly, launched a decisive process of global cooperation for the 21st century, seeking to expand the spaces of freedom, by eradicating absolute poverty and disease, and promoting health. The Millennium Declaration gave an enormous thrust to questions of development, by identifying the central challenges faced by humanity at the threshold of the new millennium, and approving the MDGs, to be attained over a period of 25 years.

These challenges in the health area are covered by three separate Goals, namely: MDG4, MDG5 and MGD6. These goals concern reduction of child mortality, improving maternal health, and the response to HIV and AIDS, malaria and other diseases.

In the context of the MDGs, included domestically in PARPA and in the Government's Five Year Programme (NHDR 2005), the main priorities in health are to:

- reduce by 2/3 the mortality rate among children under 5 years old;
- reduce by 3/4 the maternal mortality rate;
- halt, and begin to reverse, the spread of HIV and AIDS by 2015;
- halt the spread, and begin to reverse the incidence of malaria and other diseases, by 2015.

Challenges to the Implementation of ICTs in the Health Sector

The provision of health services

Under the Mozambican government's policy and general strategy for poverty reduction, heading towards sustainable economic and social development, the Ministry of Health (MISAU) has developed a strategic plan for the sector, in which, in a transparent fashion, it shares its visions, policies and strategies in a multi-year perspective. This document expresses an approach towards the following key areas:

- The development of quality in health units, including health posts, health centres and hospitals.
- The consolidation of the major investments of post-war reconstruction in restoring and continuing to expand the health network.
- The ongoing and indispensable pledge to prioritise the poorest groups of the population, and to concentrate actions on poverty relief.
- Prioritising the expansion and quality of access to equity-based health services.
- The need to correct imbalances in the geographical distribution of public health units and other resources critical for health care provision.

There are countless spheres in which the inclusion of ICTs provides added value to the promotion of health (or eHealth: Box 4.1). According to a list of examples in the UNESCO WSIS Action Directory, these areas include:

- Promoting reliable, timely, high quality and economically accessible health care, based on effective health information systems and the promotion of continuous medical training and research facilitated through ICTs.
- Accessing the vast global knowledge about health and content resources locally relevant for strengthening research about public health and prevention programmes, and promoting the health of men and women, as well as contents on reproductive and sexual health, and sexually transmitted infections, and for diseases that are of worldwide concern, including HIV and AIDS, malaria and tuberculosis.
- Launching alerts, monitoring and controlling the spread of communicable diseases, through strengthening joint information systems.
- Promoting the development of international standards for the exchange of data on health, taking note of the necessary precautions about privacy.

- Encouraging the adoption of ICTs to expand and improve health care and information systems for remote regions and vulnerable population groups, recognizing the role of women as health providers in their own households and communities.
- Strengthening and expanding ICT-based initiatives to provide medical and humanitarian assistance in the event of disasters or emergencies.

ICT for Health systems include tools for health authorities and professionals as well as personalised health systems for patients and citizens. Examples include health information networks, electronic health records, telemedicine services, personal wearable and portable communication systems, health portals, and many other ICT-based tools assisting disease prevention, diagnosis, treatment, health monitoring and lifestyle management.

In the specific case of Mozambique, an approach to the potential that implementation of ICTs would represent for driving the public health sector immediately faces, as its first major challenge, the shortage of human resources, in terms both of their number and of their technical and professional quality, who can meet the country's demands, including for a general absorption of ICTs. With a population of about 20 million in 2007, Mozambique has only 24,000 people working in the public health service. Of these only 600 are doctors, a third of whom are foreigners. The great majority of the staff working in the sector has academic qualifications between mid-level and basic education (UNDP 2007).

A second challenge on the institutional level that demands a response for effective implementation of ICTs is the need to standardise processes for the production, circulation and spread of information, which would be undertaken on the basis of clear policies to include ICTs on the various fronts of the sector supervised by the Health Ministry (MISAU), namely: the medical and hospital area, administration, including the management of human resources, internal communication, hospital management, etc.

Given the context of the National Health Service, characterised by strong dependence on foreign aid, weak technological infrastructure, low levels of literacy, multiple and uncoordinated initiatives, particularly with external funding in the form of projects (Batley, 2002), several questions could be raised, in a discussion on the integration of ICTs in the public health sector.

For example, an important challenge for drawing up epidemiological charts is the record of events in the health units, a strategic factor in the country's epidemiological surveillance and control. This capacity is very much missing in the National Health Service because of the low level of training of health workers, the precarious nature of the infrastructure, and lack of mastery over ICTs. In this sphere, the activities of the information managers in the health units and districts is limited to collecting, aggregating and vertical dispatch of unprocessed data on epidemiological events which makes it difficult to use such information to take public health management decisions.

Furthermore, there are still, for example, communication systems (horizontal and vertical) based on meetings and seminars as the priority forms of communication, both internal and with outside partners and stakeholders, including for some interactions with the community. Communication in the health area with the community remains at the level of traditional means of spreading information, such as public meetings which fewer and fewer people attend. Without popularizing the use of alternative technological resources, such as the Internet and their convergence with traditional resources such as the radio, the possibilities of community access to health information remains, in general, sporadic, usually with exceptions during campaigns or on commemorative dates. This is essentially what characterizes the current Health Information System (SIS).

Box 5.1 What is eHealth? The example from the European Union

E-Health (also known as ICT for Health) describes the application of information communication technologies across the whole range of functions that affect the health sector, from the doctor to the hospital manager, via nurses, data processing specialists, social security administrators and, of course, the patients.

European Union research programmes have been supporting ICT for Health for the last seventeen years, co-financing research projects to the tune of Euro 500 million since the early 1990s.

An action plan adopted by the European Commission on 30 April 2004 shows how information communication technologies can be used to deliver better quality healthcare, Europe-wide. The "e-Health action plan" covers everything from electronic prescriptions and computarised health records to using new systems and services that cut down waiting times and reduce errors.

Rapid and reliable ICTs are vital to the efficiency and effectiveness of health care. For example, broadband-speed connections enable hospital consultants and general practitioners to exchange vital medical records and complex tests results before surgical operations, and doctors are increasingly using ICTs to stay in close touch with outpatients and monitor their progress at home.

eHealth offers European citizens important opportunities for improved access to better health systems. It can empower both patients and healthcare professionals. It offers governments and taxpayers a means - to cope with increasing demand on healthcare services, through substantial productivity gains. It can also help to reshape the future of healthcare delivery, making it more citizen-centred.

The question of inherited systems

Historically, the SIS was designed and operated in a typically centralised fashion, circulating information mostly from the top down. In an attempt to improve its performance, the SIS has undergone various efforts at restructuring, including the introduction of ICTs as from 1983, and the consequent development of more than ten computer applications to strengthen it. However, and as a reflex of the multiple management systems in MISAU, because of the flow of donor-financed projects, each with differing procedural requirements, the computer applications in question were basically installed as isolated projects and on mutually incompatible platforms.

As with other sectors of the state apparatus, the heath sector has tried to undertake reforms seeking to improve its performance. However, the role of the Inherited Information Systems (SIL) has not merited careful examination, resulting in the fragmentation of the National Health System as such. Inherited information Systems are generally slow, inflexible and with a high degree of uncertainty in responding to new and competitive organizational challenges, due to their age.

However, the SIL play a role that is no less important in the organisations, and so replacing them is something that deserves strategic reflection. Generally, the organisational approach of SIL is complex, and sometimes risky, due to:

- defective specification;
- unforeseeable costs for changing the rules of business; and,
- the existence of a complex installed software base (Henderson, 2000).

When an organisation wants to introduce reforms or to change the information system, it runs into problems related with the existence of a complex installed software base. This software is part of the history of the organisation and how it has operated. Abandoning it should be done gradually and when necessary. According to Henderson (2000), Inherited Information Systems are computerised systems formed by software, hardware, databases, communication networks and rules of business of the organisation.

Several authors, such as, for example, Nhampossa (2004) and Rodriguez and Ferrante (2001), suggest strategies for the transition in Inherited Information Systems, that should be followed when planning and implementing reforms or introducing ICTs into organizations in general, and into health, in particular. Literature and practice recommend that the transition of Inherited Information Systems should be done after an exhaustive assessment of the quality of the current systems and when there are significant changes in administration and in the business rules of the organization. The new information architecture cannot ignore all the organisation's inherited systems, as well as the institution's information assets. One of the first concerns of the new architecture should be how to take advantage of the systems already implemented and in current use, and to guarantee that the inherited and the new systems are interoperable.

In the specific case of the Health Ministry, where the scenario is that more than ten systems and applications exist, but do not communicate among themselves, there is practically no sharing of data/information (each system or application automatically produces data/information which are often duplicated). The systems use different criteria, without any standardization, and so they are difficult to compare in space and in time. Implementing recommendations made in the literature as a suggestion for transition from SIL meets strong resistance in MISAU, imposed by the multiplicities of priorities, interests, initiatives, systems and by the staff. There are few of the latter and some are not prepared to learn new work practices.

There is thus a need to contextualize the experiences of recommendations contained in the literature on SIL. An example of such a procedure is explicit in the document Development Programme for the Health Information System 2003-2005 (2001). This document suggests Distributed Computation, in which MISAU adopts systems independent of the operating system that is it relies on the current market. At MISAU level, standardise the software, hardware and systems, to guarantee their efficiency. Standards of the computer packages in use must be defined, prioritizing the use of stable packages. The software should be integrated to facilitate communication between modules and give a common appearance, to promote learning and use. The Hardware and Software are basic tools for the production, for example, of statistics. The growing trend in the acquisition of equipment suggests that it is necessary to consider standardising the Hardware and Software to facilitate the management of consumables and the configuration of computer resources, thus reducing maintenance costs. As for communication, part of the MISAU strategy is to create an overall virtual network through the Internet in order to guarantee access to databases of common interest to the various supervisory bodies of the National Health System.

A perspective that complements the MISAU strategy towards the SIL is proposed by the Health Information System Program (HISP) initiative, which suggests flexible health information systems based on the districts which are currently recognized as poles of development. This refers to low cost (open code) systems which envisage a bottom-up approach, accompanied by decentralisation (both of resources and of local decision–making power), empowerment of local structures (at the lowest hierarchical levels) and cultivating and promoting a culture of the use of locally relevant information and systems, for decision taking and action.

Multiple initiatives and multiple systems

The SIS is a series of tools, procedures and activities that seek to provide information so that informed decisions may be taken. In this phase, it consists of registration books and files on paper, designed to facilitate the processing of health data. The data processing tools are classified in accordance with the level of use. However, in practice the instruments have the same structure and variables, and are distinguished only by the reference code of the health unit, district or province. The SIS (including the tools and processes) was designed and implemented according to a merely hierarchical structure (from the top down), in which feedback happens sporadically and not as a routine.

Mozambique is described as possessing an SIS with a reasonable flow of information, compared with other countries in the region (Kimaro and Nhampossa, 2004).

However, the content and quality of what is reported is inconsistent with what is expected. Furthermore, the reports are summaries of activities that cannot be used to feed planning exercises or to make vertical or horizontal comparisons. Aggregate health information is reported vertically by the various hierarchical levels. This procedure hides the details specific to each health unit or management level. Under these circumstances, it is not easy to compare or contrast information obtained vertically by levels or horizontally by programmes or activities of the same level.

In the attempt to use ICTs, the Ministry of Health embarked on computerising the SIS. The purpose of this initiative is the processing by computer of the data from the national programmes (Malaria, Tuberculosis, vaccination, mother and child health, medicines and infrastructure).

In practice, the resulting computer application was only prepared to process data from two programmes, namely Vaccination and Mother and Child Health. As a result, the remaining health programmes, with technical and financial support from foreign partners, embarked on other computerization initiatives, with the purpose of enjoying the advantages of the ICTs. In the absence of a coordination and integration perspective, the Ministry of Health developed parallel computer solutions that were not prepared for sharing data. These parallel solutions generally reflected different operational policies and procedures of multiple donors. They result in making management systems complex, and the final result is inefficiency in the performance of the beneficiary, in this case, MISAU (Batley, 2002).

Factually, the various aid agencies have individual projects in different departments. This contributes to fragmentation and lack of coordination and overall control. This situation is expressed in duplication of efforts where the donors may redirect their support to the same health or administration problems, leaving the others without resources or solutions.

Francisco Songane, Health Minister from 1999 to 2004, described this fragmented structure when he remarked that MISAU was more "a ministry of projects than a Ministry of Health". This caused confusion. There were no clear guidelines for the staff. They dealt with various donors, to whom they owed obedience, competing among themselves to stay in certain projects, receiving salary differentials and increases from the different donors. The demand was in order to ensure that the few qualified technical staff served particular donors, followed their routines, and ensured that the donor money went where the donors wanted (Songane, quoted in Batley, 2002).

This fragmentation of management led to a lack of consistency and clarity about chains and levels of responsibility, and hence communication systems: it became common in the Provincial Health Directorates to identify projects by the name of the donor country, with consequences for the flow and effective management of information.

While on the one hand the multiplicity of initiatives resulting from internal or external fragmentation of systems contributes to a weak coordination of the flows of health information, the information reported is essentially for building the historical archive, and is not aimed at action. This means that a large amount of data is gathered as a matter of routine for purely bureaucratic motives-notably the fact the report must be sent, with no concern about the value of the report for taking action.

Health sector information is fragmented between the various departments, sections and programmes, where the sub-systems of epidemiology, pharmacies, human resources and finance stand out, with some divided into still smaller components.

This means there is great difficulty in acceding to the relevant data on ontological and epidemiological classifications, resources and performance. The data are frequently of poor quality, in addition to not being disaggregated by sex and/or age, when necessary.

In the attempt to improve the information system, MISAU has laid down the following objectives:

- Improve the quality and divulge the information, by producing a guide, manual and support text for the gathering, analysis, interpretation and publication of data.
- Expand the computerised instruments and databases and guarantee the availability of information.

These objectives reflect the aspirations of the Strategic Health Plan and of the Government's Five Year Programme, as regards the strengthening of the systems and of ICTs in the areas of Reproductive Health, Child Health, nutrition, malaria and epidemics. In these terms, the new ICTs are seen by MISAU and the government of Mozambique as tools with the potential to improve integration, communication and the sharing of information between the various levels or spheres of service provision.

This perspective indicates a focus on form, not on content, which could be a significant hindrance to the rapid development of an effective National Health Information System. A critical report states that, due to this experience, "the managers approach problems one by one, as they arise, and do not spend enough energy on drawing up long term visions. In addition, the memory of central planning failures remains fresh, which leads to scepticism about plans among managers (Pavignani & Durão, 1977: 11)

In short, the SIS is characterised by several conditions that contribute, first of all, to the lack of available information of adequate quality and, secondly, to constraints on its effective use. This suggests that ICTs are necessary but not sufficient to solve the challenges of the availability and use of health information. The condition of sufficiency can only be met by taking the socio-political and institutional context seriously into account.

ICTs as Drivers of Health

The picture described above contrasts with the universal trend to use ICTs as instruments that drive health. Scientific evidence shows that laboratories, science and the market are interconnected realities. Some forecasts of the Gartner Group state that by 2010, in the USA, 30% of homes will be connected only by cell phone; and by 2013, an increase of 50% in the use of software applications for health will help save an additional 20 million lives. (TELEBRASIL, April 2007).

Today, the economics of medical science has changed its reference point. A new medicine can cost 400 million dollars, and take 7-8 years to reach the market.

Supercomputers capable of handling a petaflop (1015 operations per second) are used in research in genomics and pharmogenetics. Today, it is possible to have a virtual model of the human body, visible on a screen. Sensors and actuators help the world of health, which is moved by event and symptoms. The ICT industry as drivers of health suggests the concept of connected health. The health community is extensive, and the results are better when the respective agents are connected in a network. Various technological portfolios can be activated seeking social inclusion. Among them are electronic identity cards to facilitate consultations, the use of ICTs to manage health institutions with business effectiveness, and solutions for the distance education and training of staff.

A further important role of ICTs is to serve as a source of information to a world vulnerable to epidemics. It is estimated that in 1918, 50 million people died of influenza. Data from 2006 state that AIDS has already killed 23 million and 200 million people are infected with the HIV virus. The so-called zoonoses, such as avian flu and mad cow disease threaten the world's population, today estimated to number 6.5 billion.

Analyses show that lethal viruses, identified by acronyms such as H5N1, H9N2 and BSL4, if they were to operate in a scenario of inter-personal contacts of 50%, could eliminate up to 1.5 billion (one in four) people. With only 7% of contacts, mortality falls to 200 million individuals. Mobility in such scenarios thus becomes of fundamental importance. People may be urged to reduce their mobility to the minimum necessary and to work from home, in such a scenario, the role of telecommunications and of the ICTs becomes essential.

Health is too important to be left only to doctors. This means that the ICTs are today an integral part of the health services, just as in the past rice, beans, water and soap were recognized as basic goods.

In the specific case of Mozambique, various initiatives have been designed integrating ICTs, and now undergoing full-scale development at national, provincial, district and community levels. In some cases, these were or are attempts to introduce ICTs at district level, in processing data, that is, in the gathering, aggregation, analysis, presentation, use and dispatch, horizontally and vertically, of data. MISAU, in particular, is committed to improve the SIS. This desire is expressed in the document Programme to Develop the Health Information System 2003 - 2005 (2001), which contains the guiding principles for the health services, namely, Efficiency and Equity, Flexibility and Diversification, Transparency and Accountability.

The job of the SIS is to collect and make available objective information on the provision of health services to the public, and the efficiency, effectiveness and impact of these actions. Among other areas of health service provision that have benefited from the potential of the ICTs are hospital management, telemedicine, the management of medicines, training and national, inter-provincial and international communication. Indeed, the scope of effective communication and sharing of information at levels internal and external to the National Health Service is one of the four strategic objectives of MISAU, namely:

- A more effective SIS, with quality and efficiency;
- Adequate SIS instruments available;

Box 5.2 Lubombo Spatial Development Initiative: Use of PDA in the Malaria Programme

Malaria is the main cause of mortality in Mozambique and is regarded as one of the main obstacles to development. A malaria control programme, involving the Lubombo Spatial Development Initiative (LSDI) and the Maputo Provincial Government has launched activities such as spraying houses against mosquitoes, distributing medicines and rapid malaria tests.

The main objectives of the pilot project were (1) to provide the Malaria Programme with assessment and evidential tools to take decisions that would improve planning and resource allocation (2) to assess the use of PDAs in the Malaria Control Programme as a tool to test data rapidly and allow a better definition of interventions and resources.

This initiative has been implemented in Maputo province, in the districts of Matola, Boane, Matutuine, Namaacha, Moamba, Marracuene, Manhiça and Magude. The effectiveness of any malaria control programme depends on access to reliable and timely data, something which is currently missing from the National Health Service. Information Communication Technologies (ICTs) have been used as tools to collect information on health in the communities and in the health units and to facilitate decision making.

To this end, the LSDI enjoys the support of the Canadian International Development and Research Centre (IDRC), in partnership with an organisation named SATELLIFE based in the United States (responsible for training and providing the technology). It recently introduced a mechanism for collecting data through ICTs based on the use of (1) PDAs to collect and store data, (2) GPS to collect and read geographical coordinates, and (3) cell phones for the remote dispatch of data to a central database located in the LSDI.

Findings of the external assessment

In general, members of the project were open and enthusiastic about using the technology and know the benefits that this technology can bring . The improvement most stressed is the saving of time and compliance with deadlines in sending data. They are unanimous in regarding the PDA as an appropriate technology for collecting and sending data, guaranteeing editing for correction of data, feedback, and reducing mathematical mistakes. Many said they prefer continuing to use pen and paper while they gain experience in the use of PDA and guarantee that they have in the district a copy of the information they sent.

This possibility was also reiterated because the sending of data by cell phone did not occur, obliging the dispatch of the PDA to the LSDI. Those questioned do not have access to the information after it has been sent by PDA, and so they argue it would be useful to have a back-up system that stores the data on paper.

According to those surveyed, with strengthened coordination and monitoring between the teams, and solving the question of the remote dispatch of data by cell phone, the use of the PDA is the ideal tool and brings many benefits in terms of improving the quality of the data, reducing the time spent in collecting and sending data, so that it compensates for the large investment in the technology and in staff training.

Recommendations

In this initial phase an LSDI team should travel to the districts regularly to give on-the-job training and monitor the introduction of PDA. Major difficulties exist in gaining access to the system to introduce data as well as to use it to send data - synchronisation with cell phones. Local support capacity (a help desk) should de developed to deal with the concerns of the staff in the districts in good time, to avoid them becoming demotivated.

The selection of technologies for the phase following the pilot project should consider local conditions such as the coverage of the mobile phone network, the quality of the signal and the width of the band, local supplies to guarantee the provision of post-sale maintenance services, and the skill and willingness of people to use the technologies. Since the hardware is exposed to the sun for long periods, and is handled very frequently during field activities, the specifications of the equipment to be acquired should be reviewed to avoid screen blockages and problems in synchronization.

For the following phase the use of the Garmin GPS "GPSmap 178C Sounder", given its many functions, is suggested. For the mapping component, it is recommended that a PDA application be created, which allows the user to handle some mapping software (Arcview, Mapinfo).

Source: Assessment and Monitoring Report on the Introduction of PDAS.

- Greater capacity and institutional skills in managing the SIS; and,
- Effective communication and sharing of information at levels internal and external to the SNS.

As regards hospital management, several initiatives to reorganise the area of Health Information are under way. Computerisation of the referral level has been identified as one of the priorities. Because of its complexity and its importance in Mozambican health care, Maputo Central Hospital (HCM) was chosen to start the computerisation, since it is the main referral hospital in the country. The HCM is the largest health unit in the National Health System; it is the national centre of excellence, teaching, research and reference, with 1,500 beds and over 30 blocks of buildings, covering an area of almost 170,000 sq m2. Currently all the files on the administration and care provided by the HCM are paper-based.

Typically the adoption and use of ICTS are associated with increased availability, integration, efficiency, sharing and use of information that helps improve the management of health care. Such an argument can only be sufficient if associated with social factors, cultural, political and institutional conditions that frequently hinder the rational use of information and ICTs. That is, the availability of information should be accompanied by a culture for using it, by adequate institutional bases, favourable to the flow of duly processed information.

Most of the information that is processed and published/reported by the system has minimal relevance for decision-making; most of the information used to justify the decisions is collected and interpreted after the decision has been substantially taken. Most of the information collected in response to requests for data is not taken into consideration when making the decisions for which it was requested.

The SIS computer applications focus mainly on routine information, ignoring the various other types of information required by health managers, such as those to do with infrastructure or epidemiology.

ICTs as Sources of Health Information

There is no doubt that the new ICTs are transforming the concept of "source of information". Acquiring information, knowledge and skills is becoming something that is continuous and multiple in its sources, and in its routes of access. A genuinely ceaseless flow of possible constructions of new knowledge, or reorganizing old certainties, that are transformed into new questions, that also seek out and structure other information, connected to similar ideas, in new fields of knowledge, restructuring paradigms, and imposing a different relation between the objects of study and those who intend to learn their structure and properties.

The current technological infrastructure of communication allows the connection of countless people, and their respective ideas, integrated to form a way of thinking collective, and flexible and independent, capable of broadening the capacities for thought and reflection of the individuals connected.

The use of ICTs such as e-mail, fax, computers and videoconferencing, apart from the services provided by satellites, reduces the barriers of space and time. The use of these technologies is on the increase and today it is possible to reach and/or train a highly scattered audience, using video and audio, and obtain other data.

Organisations of all sizes (from states to the smallest of companies) make increasing use of resources such as the Internet, through which they publicise their goals. People should consider computers as tools that they can use in all aspects of their lives. In particular, they need the new multimedia technologies to communicate ideas, describe objects and other information relevant to their work. This requires selecting the best resource for spreading the message, for structuring information in an orderly manner and to give information which makes it possible to produce a multidimensional document in verbal expression, without fear of speaking in public. Evidently health systems do not escape this.

Apart from being a theme in themselves, the new technologies impact upon most areas of knowledge. In health, ICTs are used as sensors to organise and process data and to make Telemedicine possible. The expression "Tele-Health" means telemedicine together with distance learning. The term "Telemedicine" refers to the use of information communication technologies to provide health services and medical information at a distance.

It is widely recognised that the World Wide Web and the Internet have been among the main reasons for a greater use of computers in health units and/or other clinical environments.

This is happening in part because the Web provides access to data and information from practically any machine, even those regarded historically as of difficult access.

The advantage of using the concept of network, an environment of uniform/standardised communication, that is, the Internet, is enormous both for the

users and the providers of health services. This finding is visible with the increase in modern health tools, characterised as telemedicine services. Telemedicine is growing and exposing its potential and products as fundamental elements for a provision of more efficient, timely and better quality health services. It should be noted that, despite the growth, the level of use of these systems is still far from the desired levels, in the case of Mozambique and of public health, in particular.

The typical questions raised are: What are the requirements for systems of telemedicine to reach higher levels of use? What is the quality of the data and/or information and its form of transmission? Is there a friendly interface? Is it easy to use and reliable? In short, how far does it meet the needs of the user, either client or provider?

In this respect, and given the context of the National Health Service (external dependence, weak technological infrastructure, low levels of literacy, disasters, endemic diseases, multiple and unconnected initiatives), several questions could be raised (during development and implementation), but some factors may only be considered and assessed when telemedicine is made available to the users. But the assessment of telemedicine systems, seeking to present their advantages and/or limitations to the users, will certainly help to improve the level of use of the systems or guide their evolution.

The radical technological developments in miniaturisation, electronic communications and multimedia confirm the promise of transforming computers into something close, genuinely personal and mobile.

The use of technology to provide access to information and to monitor, and the possibility of accessing the learning, means that it can be undertaken at any time and place. The developments in communication technology and the increase in the personal practice of this technology will allow teaching in schools, in general, and in medical faculties, in particular, to becomes integrated with what is learnt in any other place of verbal expression.

Currently, we are witnessing a technological revolution, in which rapid and sudden changes are wrought in the way in which people live, work and entertain themselves. Since it does not seem that the pace of the technological advance is going to stop, the challenge is to learn how to learn and adapt to the changes with the minimum of physical or mental effort. To achieve this, information systems and those who handle them must train people to receive them safely and adequately, and to overcome the constant changes in the new forms of work, making the acquisition of information something natural, permanent and fruitful.

ICTs in Creating Value for Users of Health Services

The accessibility of the health services is a concept that includes aspects of the structure of the health services or of the facilities that strengthen the ability of people to reach a particular health professional, in terms of location, time, cost and ease of approach (UNDP 2007).

Box 5.3 Telemedicine in Mozambique: An ephemeral experience

In 1998 the first telemedicine initiative was inaugurated in Mozambique, in the form of a project. At this time, the government believed that the project would ensure the extension of healthcare to more areas and more people.

Costing 50,000 US dollars, the project consisted of a telephone connection that allowed doctors in the city of Beira to send data from various X-rays to radiologists in Maputo, where there are more technologically advanced means of diagnosis. The project operated for about a year before it collapsed, for reasons that have never been completely explained, but apparently linked to the high cost of phone calls, the insufficient availability of medical staff at both points and the absence of incentives for the radiologists involved (the care was free of charge).

In late 2002, the design of a second phase began, more ambitious in cost and in coverage. This phase, costing about 80,000 US dollars, would include the three central hospitals (Maputo, Beira and Nampula) and the Medical Faculty, containing, apart from a care component, the capacity to record images for educational purposes. A fifth partner, the Heart Institute, was also envisaged at a more advanced stage.

What is public knowledge is that this second phase never took off, despite being presented by the partners to the media. The justification of the need for a tele-radiology link lay in the fact that it facilitates the diagnosis of X-ray images, without any need for the patient to travel to Maputo for observation by specialists, with all the financial and social implications arising from this, not to mention the patient's own discomfort. Rapid diagnosis would allow treatment to begin almost immediately.

This definition of the "accessibility" of the health services, centred on the infrastructure and on the person of the health professional, is necessarily undergoing gradual change, due to the potential that telemedicine and virtual out-patient treatment represent. Historically, "accessibility" comes to be gauged in virtual terms, on the basis of the use of ICTs . They can have a remarkable impact in various spheres, such as the following:

Proximity and easy access to healthcare. Given the characteristics of Mozambique, a model that could be considered as close to the ideal would be that only a tiny percentage of users are seen in hospitals (Central, Provincial and District) and the great majority go to the Health Centres. But in practice, the basic sector only solves a tiny number of cases, and overloads the top of the pyramid. Among the difficulties that real life offers is how to place medical professionals in peri-urban and rural areas. Today's health services cannot be regarded as static entities, which wait for patients to travel to their premises.

With the possibilities offered by ICTs, the mission of health providers has switched to a new approach: that of bringing healthcare ever closer to those who have difficulties in reaching the health centres and hospitals, either through telemedicine, or through the Internet or Web. Massive use of the new ICTs, for these cases, could allow videoconferencing, Internet access and virtual out-patient treatment. TeleHealth is a fundamental factor in providing health care for the public.

Continuity and integration. Care for the patient or user of the health services can be undertaken continually and in an integrated way. For this, it is enough that there should exist a data base with all the information relevant about the patient, the diseases, and the respective conventional or traditional forms of treatment or prevention.

In these terms, partnership between the providers of conventional public health (scientific knowledge and procedures or evidence-based medicine) and the practitioners of traditional medicine (a concept that designates procedures that apply the total combination of knowledge and practice, whether explicable or not, in the diagnosis, prevention or elimination of a physical, mental or social illness, which may be based exclusively on the experience and observations of the past, transmitted orally or in writing from generation to generation, at the same time as taking into consideration the original concept of nature which includes the material world, the sociological environment, of the living or the dead, and the metaphysical forces of the universe) is very important.

Such a partnership would allow the development of knowledge and procedures for treatment and prevention that include good practices from both areas. This good or knowledge would be an indispensable resource both for providers and users of health services. Once developed, this knowledge could be very easily shared or divulged in a variety of formats, made available by the ICTs. The ICTs have the potential to facilitate public-private partnership and transparency.

Education for health, information, promotion, prevention and treatment. Through the ICTs, the patient can be informed about everything to do with his or her pathology, as well as the most effective ways of undergoing treatment, or having access to health care. The ICTs are also the most efficient means of preventing disease and promoting health. Nowadays the largest such campaigns are undeniably supported on the potential of the new ICTs.

Control of parameters and distance consultations. Information from images is used to control parameters, that is, the real state of health of patients. At the same time consultations can be made immediately, without the patient travelling to the health unit or the specialist doctor having to interrupt another activity to save a life. A simple exchange of text messages by cell phone can be important for holding consultations and/or distance treatment. Such an approach, in the specific case of Mozambique, would serve to reduce the negative effect of long waiting times, linked to the insufficient number of qualified staff (doctors, nurses or surgical technicians).

Ease in paying fees and services. Without having to visit the health unit, the payment of fees and services can be done by bank transfer, using a range of resources that not only the health service but also the banking services possess – which makes life much easier for the users.

Motivation of health providers. The ICTs can be instrumental in the effort to retain health staff in remote areas. A study made in Mozambique concluded that Internet connections played a crucial role for doctors and ensured that they stayed and did their jobs in peripheral areas. This fact is equally borne out by researchers in public health who suggest that the ICTs have the potential for strengthening national health systems in terms of the range of information contributions available to improve the quality of planning, monitoring and evaluation.

ICTs in Creating Value for Health Service Providers

Human resource management: The creation of an integrated data base including all the relevant information on the human resources of health units (health posts and centres; rural, provincial, general and central hospitals) will make it possible to handle and manage more easily aspects such as attendance, performance, career advancement etc. of all technical and administrative health staff, avoiding the voluminous and always sensitive archives kept in folders and on paper.

Economic and financial management: The series of economic and administrative actions and procedures, involving planning, analysis and control of the financial activities of the health units, seeking to maximise the economic and financial results arising from their operational activities, becomes much easier and more effective with the use of ICTs.

Cost control: Today, more than ever before, there must be cost control in health units to make it possible to analyse, at any time, the financial situation. The use of computer programmes in this context is practically indispensable.

Logistics (purchases, stocks and distribution): Logistics is the area responsible for providing resources, equipment and information, among other things, for the implementation of all activities of an organisation. Nowadays, with the wealth of information available on the Internet, this exercise becomes much easier. This is added value that can be exploited by health service providers.

Invoicing, payments and reception: Accounting data can be processed rapidly and with no complications in electronic format. In this way, the whole process of invoicing is optimised, and payments and receipts are made with much greater ease and flexibility, and the costs are much lower. Thanks to electronic transmission of data, mistakes by other handlers do not occur. Health service providers are thus freed from the dangers of mistakes from manual records.

Hygiene and safety: The concept of hygiene and safety in health is a considerable development compared with the traditional approach of working medicine. This concept is not restricted to the sphere of medical surveillance (individual health assessment examinations), and should be extended to controlling the physical and mental factors that might affect health. Thanks to technological evolution, it is becoming much easier to undertake these activities.

Conclusions and Recommendations

ICT convergence in the health-care industry introduces significant advantages for the improvement of the quality of life of users. The promotion of well-being online in primary health care is one example of how ICTs can be integrated into the health services.

Telemedicine allows for the autonomous management of health with support from specialised health providers. In telemedicine there is the integration of ICTs and health technology, telecommunications technologies and interface technology to afford sanitary care and promote the health status of the population.

With the public and patients informed, the prevention of diseases increases as does the human well-being, yet costs are reduced. The time spent at hospitals also decreases, and in contrast, economic productivity increases, resulting as a whole in a healthy society with implications in life expectancy averages.

At an institutional level, a challenge demanding the effective implementation of ICTs in the health sector is the need for the standardisation of information production, circulation and dissemination processes, based on clear policies to incorporate ICTs into the health sector's different fronts under the tutelage of MISAU, including: doctor-hospital area, administrative, management of human resources, internal communication, hospital management, etc.

These are typical areas where ICT integration has a potential for immediate impact. Potential services include the sending or receiving of facsimile messages for reference hospitals; development of informatics applications for management of information on health based in the district; hospital management at various levels, management of medicine or development of portals for storage and/or publication of information; hardware and software maintenance; and the development and implementation of informatics policies and strategies specific to health, in partnership with the private sector.

The encouragement of public-private partnerships envisaged by both the ICT Policy and the MDGs must be actively addressed in order to contribute to the generalised introduction and expansion of ICTs in society. Private companies in the ICT field can give training to public institutions personnel, in general, at relatively cheaper prices if there are memoranda of understanding and collaboration.

Chapter 6

Guaranteeing Environmental Sustainability Through the Use of ICTs

Introduction

The contemporary world faces several threats to the environment, and at the same time levels of human poverty persist, mainly in the developing countries. Air pollution, thanks to atmospheric circulation and to the persistence of some pollutants in the atmosphere for long periods, which is one of today's most complex challenges, sparking off efforts internationally, and within individual countries, to mitigate its effects.

Climate change is a threat to life on earth, and its impact is already being felt. For example, the average temperature of the African continent increased by between 0.25°C and 0.5°C during the 20th century. Current studies show that this rise will continue throughout the 21st century, unless practical measures are taken to bring it under control.

Environmental Science Published for Everybody Round the Earth (ESPERE Association) states that the greater frequency of droughts, floods and other extreme events, arising from global warming, will have a negative impact on access to food and water, on public health, and on infrastructure, slowing down Africa's pace of development. This document also shows that the effects of climate change will lead to natural disasters such as floods, due to the rise in average sea level, and the reduced flows of rivers, which will make irrigation difficult, and lower the reserves of water for consumption in the northern and southern regions of Africa, with a consequent loss of harvests, thus compromising improvements in the human development indicators of African countries.[27]

Alongside these phenomena, the world is experiencing a far-reaching revolution in ICT. Based on the use of ICT, the distance between counties has shrunk, and it is possible to follow almost instantaneously what is happening in any corner of the world. With these tools, combined with the Geographical Information System (GIS) of a given country, it is possible, through satellites, to map the water and forest resources among others, and proceed to their rational management.

Mozambique is not foreign to the development of the ICTs. Resolution 28/2000 of the Council of Ministers approved the ICT Policy and the strategy for implementation. One of the areas stressed in this policy is the environment. Thus the ICTs are seen as a new instrument in confronting the environmental challenges that the country faces, and are thus an opportunity to be exploited.

Millennium Development Goal No. 7 (Ensure environmental sustainability) has as its targets:

- Integrate the principles of sustainable development into country policies and programmes;
- Reverse loss of environmental resources;
- Reduce by half the proportion of people without sustainable access to safe drinking water; and
- Achieve significant improvement in the lives of at least 100 million slum dwellers, by 2020.[28]

It is thought that the ICTs, as a cross-cutting area, can contribute through their various spheres of application to achieving this and the other MDGs. The scope of these targets, and consequently of MDG 7, pose a major challenge to the entire world, and particularly developing countries, in that the impacts of climate changes are increasing, and the weakness of their economies makes it difficult to adapt to these changes.

National Preparedness to Respond to Environmental Problems

The frequency of environmental disasters in Mozambique demands that measures be taken to mitigate them, both by the government of Mozambique (GoM), and by civil society. Public awareness about the rational use of resources in order to preserve them is extremely important in this.

27. Veja como estamos a alterar o clima? Camila Schreiner (2004) – CICERO (Centre for international Climate and Environment Research – Oslo) Norway. Available at www.atmosphere.mpg.de
28. Government of Mozambique and UNDP. 2005. Report on the Millenium Development Goals. Maputo.

There are inter-sector initiatives on the part of government institutions, pulled together by the Ministry for the Coordination of Environmental Action (MICOA) and of civil society, to mitigate environmental problems, and to make society aware of environmental problems

Each of these sectors has contributed within its own attributes and powers. MICOA is responsible for inter-sector coordination, based on the strategies drawn up, which deal with the preservation of biodiversity, preventing and fighting against uncontrolled bush fires, preventing and fighting against soil erosion, the need for national capacity - building for self-assessment of overall environmental management, the fight against drought and desertification, among others.

In the political sphere, the country regards the environmental problematic as a matter which should form part of the strategies of the various sectors. In the light of the Action Plan for the Reduction of Absolute Poverty (PARPA) 2006 - 2009, several environmental initiatives are being undertaken by public institutions and civil society, taking as their priorities:

- Sanitation;
- Territorial arrangement;
- Prevention of soil degradation;
- Management of natural resources, including controlling bush fires;
- Legal and institutional aspects, that is, environmental education, compliance with the legislation, and institutional capacity - building;
- Reducing air, water and soil pollution; and
- Preventing and reducing the effects of natural disasters.[29]

The environmental policy laid down by the government of Mozambique includes strategic objectives, that take into account

- environmental management as an essential factor for poverty eradication,
- participatory community management of the environment, and
- a regional and global perspective on environmental problems.[30]

Under the environmental policy, activities are undertaken that seek to safeguard the environment, both in the major cities and in the rural areas.

However, there are several other sector programmes, policies and strategies approved by the GoM. Among these, there stand out the Forestry and Wildlife Development Policy and Strategy (1997), the National Land Policy and National Implementation Strategy (1995), the National Disaster Management Policy, and the National Biodiversity Strategy, among others, which, in one way or another, deal with questions concerning the protection and management of the environment in general, including the marine and coastal environments.

Mozambique has a National Disaster Management Institute (INGC), which is a public institution, subordinate to the Ministry of State Administration (MAE), which coordinates activities to prevent disasters, provide relief for disaster victims, and rehabilitate the affected infrastructure.

In handling natural disasters, the National Meteorology Institute (INAM), a body subordinate to the Transport Ministry, plays a key role, thanks to the information it provides about the weather, allowing grater and better knowledge of the climate, given that the country is subject to greater variations in climate.

However, several challenges arise in implementing the environmental policy, which requires taking measures to strengthen it. Such challenges are, to some extent, linked to the lack of available information. Measures to make people aware of how to use natural resources sustainably require that they know about alternative ways of using such resources, which take into account the need to preserve them. Sanitation measures will be effective as from the moment that information reaches the majority of the people.

Warnings about natural disasters will also be efficient, if the information reaches people in real time, mainly those who live in vulnerable places. The problem of water shortages could be minimised, when new sources of ground water are discovered, and this information is publicized, including techniques for access to these sources, as well as techniques for using rain water.

Thus ICTs play a fundamental role in improving the implementation of strategies and policies intended to guarantee environmental sustainability, since they are tools capable of generating and divulging information relevant to this area.

The Role of ICTs in Promoting Environmental Sustainability

The Government of Mozambique (GoM) considers that the ICTs are a strategic and facilitating cross-cutting area which could stimulate the country's scientific and technological research.[31] Since they have a

29. GoM. 2006. Plano de Acção para a Redução da Pobreza Absoluta (2006 – 2009). Maputo
30. National Human Development Report (UNDP) 2005.
31. GoM. 2006. Science, Technology and Innovation Strategy of Mozambique. Maputo.

cross-cutting nature, the ICTs are taken into account in the activities of several sectors, and their contribution is viewed in accordance with the objectives of each institution. The applications of the ICTs in processes and activities that safeguard natural resources means that they become tools to support achievement of MDG 7, and also to improve the HDI.

In the management of environmental resources, the ICTs play a major role in the following aspects:

- In environmental education, in order to conserve and protect the environment;
- In divulging knowledge for the management of natural resources;
- In the use of information systems for preventing, issuing warnings on, and accompanying natural and environmental disasters, as well as planning and inspecting the use of water and environmental resources.

The role of ICTs in environmental education

Environmental education is today recognised as an instrument of environmental management, and at the same time part of an overall and permanent education, which takes as its guideline environmental protection and the achievement of sustainable development.

The Stockholm Conference on the Environment, in 1972, was a landmark in the approach to environmental education. Twenty years later, the Earth Summit, held in Rio de Janeiro (1992), which took as its theme "Environment and Development", stressed the need for environmental education and education for sustainability.

According to PARPA, environmental education allows the public to become aware of the consequences of human interaction with the environment. It can thus take measures to improve it, through identifying alternative sources of income generation for the poorest households. This can help to alleviate the pressure of poverty on the environment.

Environmental education seeks to reach all citizens, through a permanent participatory educational process to make citizens aware of the need to view environmental problems in an increasingly pro-active manner.

The main objectives of environmental education are:

- To give people an overall understanding of the environment and an overall recognition of its importance;
- To value the environment from the ethical, economic and aesthetic viewpoints, encouraging attitudes of responsibility and solidarity; and
- To strengthen behaviour that helps citizens to take effective action to conserve and transform the environment.[32]

In Mozambique, several institutions have undertaken environmental education activities, and have contributed to changing public mentality about how to treat the environment, for example, awareness raising activities on the need to preserve marine and forest species have reduced the demand for using such species in adornments.

To reduce the impact of floods, the INGC and civil society organisations have waged education campaigns about advisable places for building homes and cultivating fields that are not vulnerable to flooding.

The contents of environmental education are based on sector policies for the preservation of the environment, as well as for controlling and preventing natural disasters. The ICTs are used, in this case, to design procedures and disseminate information intended to reach the entire population, both urban and rural.

The procedures include:

- Lectures with the aim of spreading good practices in the urban and rural environment, contributing to the conservation of resources. This includes information on the danger of uncontrolled bush fires, deforestation and indiscriminate hunting, and techniques for collecting and conserving rainwater;
- Documentary films on successful environmental conservation activities. This seeks to provide information on the importance of mangrove forests, coastal protection and basic sanitation measures, as well as warning people to deposit rubbish in appropriate places;
- Spreading information through the Internet, radio and television on sustainable methods of interacting with the environment;
- Interaction with peasants, encouraging them to adopt environmentally friendly cultivation techniques.

In rural areas the environmental education programmes should be empowered through the use of ICTs, but because of their poor coverage of the country, these activities have been less than what was desired. However, the main constraint which to some extent leads environmental education activities to fail, is the lack of a clear policy which would hold responsible the various institutions which play a direct or indirect role in environmental protection.

32. **De Jesus, Octávio Manuel. 2004. Educación Ambiental** – *Política y Estrategia.*

Box 6.1 **The role of ICTs in promoting environmental governance**

Concept of environmental governance

Environmental governance may be defined as the series of mechanisms and procedures that ensure the adoption of harmonised concepts and practices in planning, regulation, implementation and control of environmental management activities. Environmental governance is exercised, with the due specificities, at global, regional, national and local level.

International environmental governance

The Stockholm Conference referred to above was an important landmark in environmental governance, since it stressed the need for a systematic and wide-ranging approach as the condition for the survival of the planet and all forms of life. On this basis the United Nations Environment Programme (UNEP) was set up, as the highest mechanism of global environmental governance, responsible for coordinating the global environmental agenda and reporting to the United Nations General Assembly.

To put the environmental agenda into operation, several subsidiary bodies and implementation mechanisms were set up. The Multilateral Environmental Agreements (MEAs) provide the framework for environmental conventions and their respective protocols. Of particular interest for developing counties are the conventions on conservation of biodiversity, on drought and desertification, and on climate change, since they are directly linked with the base of renewable natural resources, vital for the subsistence of the majority of the population. Mozambique, in particular, is very susceptible to the impact of extreme events related to climate change because of its geographical location and level of social and economic development.

National and local environmental governance

National and local environmental governance is, in general, guaranteed by the government agencies set up for this purpose. The institutional model varies from country to country. Mozambique has a Ministry for Coordination of Environmental Action, which stresses the cross-cutting, multi-sector and multi-disciplinary nature of environmental questions. The country has an Environment Law, which is the framework for sector legislation oriented towards the sustainable use of natural resources and conservation of the environment. At local level, the provincial, district and municipal governments have specific powers in the environmental area.

At national and international level, there are bodies that exercise a determinant influence on the environmental agenda. This is the case with research institutions, non-governmental organisations, and community-based organisations, that handle and process information they use to educate and raise the awareness of the public.

The challenges of environmental governance

Through the MEAs, targets and undertakings are defined that should be respected by all nations. The notion of MEAs requires difficult negotiations, based on scientific knowledge, development needs and perspectives, which are not accessible to most African countries, given their lack of financial resources, knowledge and skills. Thus, although they contain areas of ecological value that are of global interest, and although they have contributed least to environmental decline, African nations, and particularly their poorest strata, draw little benefit from their wealth, and suffer most from the negative effects of human activities, including climate change.

This picture is made worse by the fact that the industrialised countries tend to finance activities that seem appropriate to them, when they want, and under the conditions they are interested in imposing on developing countries. Thus humanity faces the challenge of ensuring sustainable environmental governance based on harmonising the understanding and agenda of the various blocks of nations, and between rich and poor.

The role of ICTs in environmental governance

The ICTs play a role of great importance in environmental governance, as a mechanism for harmonising global, regional, national, local and even individual interests. Indeed, they can contribute through:

- Education and awareness, so that the global agenda is known to all, and internationally accepted environmental values are adopted, including the precautionary principle, the principle that the polluter pays. and the principles of shared benefits, differential responsibility and prior consent, based on informed opinion, for the good of regional and international peace and stability.
- Harmonisation of the global, national and local environmental agendas, so as to ensure that the regional and global programmes are based on the perceptions and needs of states
- Making sustainable environmental governance operational, based on wide-ranging and participatory planning, facilitated by the capacity that the ICTs offer for obtaining, processing and storing data that is relevant for planning, circulation of information, and feedback.
- Empowering communities by providing them with access to information on:
  - Adoption of international decisions on the value of indigenous knowledge and culture, and the fight against racism and other forms of segregation;
  - Experiences of other countries concerning criteria and mechanisms for access to and sharing of benefits;
  - Lessons learnt in other countries, which can be used to form the informed opinion used in environmental impact assessment;

- Necessary knowledge, rights and forms of participating in monitoring projects implemented on their territory;
- Legislation and defence mechanisms against expropriation of land and other forms of exclusion from development.

Disseminating Knowledge Through ICTs

Knowledge of sustainable methods of interacting with the environment is a lever for improving the interaction between the public and the environment, and to make viable activities intended to reduce the impact of global warming on the environment and the inadequate use of environmental resources.

Such information is of great importance because it allows the public to become aware of existing resources, methods of interaction regarded as sustainable, and procedures for conserving resources.

MICOA, through the Sustainable Development Centres (CDS), has obtained information and made it available, through the use of ICTs, which helps the public face the environmental question with greater rigour. For example, the Coastal Areas CDS has provided information on marine species at risk of extinction, the importance of mangroves and corals and the need to protect them, which to some extent changes the behaviour of the people towards such resources.

In agriculture, the extension services undertaken by the Ministry of Agriculture (MINAG) have had an impact on improving food security, since they advise peasants on adopting drought-resistant crops, such as cassava, on sustainable cultivation methods, such as crop rotation, cleaning rather than burning areas for cultivation, among other activities. But information is not always accepted by the public, in both urban and rural areas.

It is difficult to change mentalities, faced with sociocultural habits, such as the use of firewood and charcoal as fuel, the exploitation of forest species for medicinal purposes, bush fires for agricultural ends, and this is a challenge for the preservation of the environment.

Box 6.2 The role of ICTs in preventing and controlling pollution

Environmental pollution is the emission of solid, liquid and gas wastes in amounts larger than the capacity of the receiving environment to absorb them, thus resulting in changing environmental quality and fitness. Pollution interferes in the environmental balance, and in the life of plants and animals, including people.

As for the nature of pollutants, the following groups are considered: nutrients, petroleum hydrocarbons, heavy metals, radioactive materials, and persistent organic pollutants. Based on the sources, industrial and agricultural pollutants, and municipal effluents stand out.

Given its importance for sustainable development, including the quality of the environment, health, the satisfaction of the basic needs of the public and the rational use of economic development opportunities, pollution has received the attention of local and national governmental authorities. Among the latter, the role of the Ministries of Agriculture, Health and the Environment stand out. Internationally, this includes the United Nations agencies, namely UNEP, FAO, WHO, OIM, as well as NGOs.

Pollution in the Mozambican context

The idea persists that pollution is a problem of developed countries. This is false because:

- There are many pollutants that occur as the direct products or by-products of human activities in industry, agriculture, services and even domestic activities.
- Pollutants are highly mobile because of theirphysical and chemical properties (dissolution, vaporisation) and the dynamic of globalisation, associated not only with productive activities but also with the diversification and speed of means of transport and the development of tourism.

Pollution the silent killer

Although it causes serious impacts, when compared with other expressions of environmental degradation (such as deforestation and erosion), pollution has the characteristic that it can often go unnoticed, given its insidious nature. Indeed, even when expressed as smoke pouring from chimneys, or the dumping of solid waste, or spills of damaging liquids, the impacts of pollution tend to be sub-chronic to chronic, so that its effects are not recognised immediately. This leads to underestimating the problem, particularly in developing countries.

The Mozambican population is potentially exposed to pollution arising from:

- Use of pesticides in combating mosquitoes and other vectors of disease;
- Mismanagement of municipal sewers, and industrial solid waste and effluent, contaminating the soil, surface water and the water table;
- Improper use and storage of pesticides intended for agriculture;
- Extractive activities, including mining and oil exploration;
- Leaks associated with the supplying and operations of fuel companies;
- Mobility of particles generated in other countries and carried by the air or by the waters of international rivers (agriculture, mines, municipal and industrial effluents);
- Circulation of a large number of old and badly maintained vehicles, often in narrow streets that limit the self-purifying effect of air circulation;
- Use of biomass in closed environments, mainly affecting women and children in poor households;
- Obsolete industrial units that emit vapours, gases and dust.

One of the main factors behind the degradation of Mozambique's forests is the exploitation of forest resources to obtain firewood, charcoal and wood. Lack of access to appropriate agricultural technologies is behind uncontrolled bush fires, which have major implications for the destruction of forests. According to the 2007 report of the Global Canopy Programme (GCP), deforestation in the tropics and uncontrolled bush fires are the second largest source of carbon dioxide emissions into the atmosphere.[33]

Under its ICT Policy, the Government of Mozambique has made efforts at regional level to take the greatest advantage of the opportunities that ICTs offer for creating a modern Geographical Information System (GIS) and for geoprocessing of data. This will make it possible to obtain in due time, and with greater precision, information on the state of the weather, and forecast natural disasters, improving the quality of information made available to the public.

Use of climate information systems for environmental management

In Mozambique, processes to minimise the effects of global warming are increasingly efficient because of the use of prevention and alert systems, and the follow-up made through ICTs.

Satellite images, combined with GIS techniques, have been used by INAM to detect and monitor phenomena that can lead to natural disasters. This helps in taking decisions and adopting appropriate measures to reduce the impact of such events in due time.

Information systems have made it possible to map areas frequently hit by cyclones, and vulnerable to drought and floods, and to publicise information on these disasters, serving as a basis for decisions to evacuate and resettle people. For example, the production, in 2000, of thematic maps by the National Cartography and Remote Sensing Centre (CENACARTA), a body subordinate to MINAG, pointed the exact location and extent of the zones affected by the floods that occurred that year, facilitated the resettlement of the population, the selection of new areas of expansion, the rehabilitation of the infrastructure that were destroyed, and assessment of the environmental damage. This covered the south and centre of the country, in the Limpopo, Incomati, Maputo, Save, Pungwe and Buzi river basins.

Weather forecasts are made by INAM and broadcast by Mozambican radio and television stations. Meteorological information is also broadcast by the community radios. INAM collaborates with various national institutions and NGOs. Recently a new cyclone alert system was developed, resulting from a partnership between INAM and the INGC, and involving some NGOS, in order to improve this system and ensure that a larger number of people have access to the warnings, can easily understand them, and will thus take precautionary measures in due time.

To ensure that the information reaches the most remote areas, the INGC has made available crank radios, mainly in areas regarded as at risk, which makes it possible to spread the information provided by INAM on the state of the weather. Thus the public becomes increasingly aware of how to deal with natural phenomena.

In rural areas, awareness is easily raised through information that involves local practices and knowledge. People accept information better, when its content derives from local knowledge, because this is transmitted from generation to generation, and tested in daily life. For example, to forecast floods, the common local knowledge in some parts of central Mozambique, warns to:

- Determine convenient places to build houses or open fields that are at a distance from river banks;
- Pay attention to the signs of nature, such as dark grey clouds, bands of swallows, the chattering of some typical birds of the region, which are the prelude to rain;
- Note large amounts of branches, tree trunks, roots and plants in the rivers, which show that the river has burst its banks upstream, and are thus a warning of impending floods.

The creation of databases on this and other knowledge can help store and spread information that involves local knowledge which can be exploited by the local population to reduce to some extent their vulnerability to natural disasters.

Information on the river basins vulnerable to flooding, with severe social and economic impacts, such as the Limpopo, Incomati and Save (in the south of the country), and the Buzi, Púnguè, Zambeze and Licungo (in the central provinces) has also been spread through radio and television and extension programmes in these places. But it is recognized that the people living in these basins do not always accept this information. However, it helps to reduce the impact of flooding to some extent.

Currently, with a vast range of technologies and modelling and scientific analysis capacities available at national and regional level, particularly the ICTs,

33. The GCP is an alliance of 37 scientific institutions from 19 contries.

most environmental problems have been detected and forecast in good time. The impact of these problems, mainly for human life, has been increasingly minimised, because of preventive interventions by the various sectors, including civil society.

In recent years, the information made available through the ICTs has helped to minimise the effects of natural disasters, such as the destruction of homes, fields and schools, which to some extent compromises the development of Mozambique's HDI. To choose sites for building new schools and hospitals in rural areas, the projects carried out by the institutions in charge take into consideration information on places at risk, and vulnerable to the occurrence of natural disasters, where it is not advisable that schools and health units be built.

Risk management is a multi-disciplinary activity which includes thematic and applied research, the inclusion and installation of existing new technologies, the provision of services useful to citizens, and the need to consider adequately aspects of risk perception and communication.

Currently, with a vast range of technologies and modelling and scientific analysis capacities available at national and regional level, particularly the ICTs (for example, satellite observations of the earth), most environmental problems have been detected and forecast in good time. The impact of these problems, mainly for human life, has been increasingly minimised, because of preventive interventions by the various sectors, including civil society.

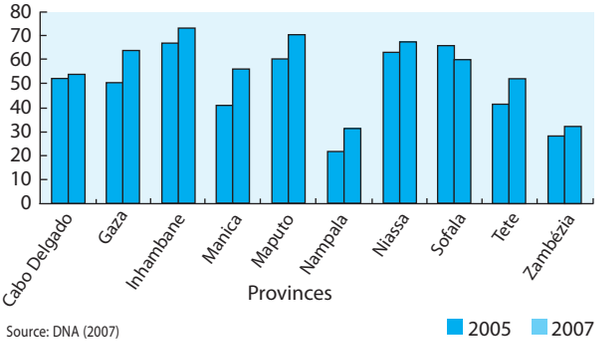
Sustainable access to safe drinking water

Reduce by half the proportion of people without sustainable access to safe drinking water, states Target 10 of MDG 7. However, millions of people living in poverty, mainly in developing countries, still face problems of access to sources of safe water.

Water is a natural resource, vital for the survival of people and of all other living species. They cannot survive without this precious liquid which is a fundamental condition for their existence. Of all the water on the planet, only 0.01% is in the form of fresh water ready to be used by people.

In Mozambique, the coverage of water supply to meet the basic needs of the public and for productive use is insufficient, due to climatic variations, hydrogeological characteristics, and the fact that the country receives rainfall on average for only 3 or 4 months a year.

Graph 6.1 **Rate of Coverage by Rural Water Sources, 2005-2007**



Source: DNA (2007)

Access to drinking water and to basic sanitation is a fundamental requirement for improving citizens' quality of life. It makes it possible to reduce the incidence of diseases such as cholera and malaria, which are the major causes of hospitalization and deaths in Mozambique in recent years.

The scope of the MDGs is, to some extent, related to sustainable access to drinking water and sanitation. Measures that seek to eradicate absolute poverty and hunger, to reduce mortality among children under five years old, to improve maternal health, to fight HIV and AIDS, malaria and other diseases, require the creation of basic sanitation conditions and improved access to clean drinking water.

The coverage of safe drinking water in the country is less than desired. The rate of coverage in the rural areas of four Mozambican provinces (Nampula, Zambezia, Manica and Tete) in 2005 was lower than 50%. The lowest rate was in Nampula, where only 22% of people had access to clean drinking water, although there was a slight improvement when compared with 2003, when the figure was 19.6%.

The highest rates of safe drinking water coverage were found in Inhambane and Sofala, with 67.1% and 65.9%, respectively.

Between 2005 and 2007, the coverage rate in sources of clean drinking water in rural areas rose in five of Mozambique's provinces, namely Nampula, Inhambane, Niassa, Zambézia and Maputo. The Provinces of Inhambane, Maputo and Niassa registered the highest coverage growth rates of 73.5%, 70.7% and 67.7%, respectively. Graph 6.1 shows the data for this variable in 2005 and 2007.

In urban areas, the water coverage rate in 2005 was around 40%, a high figure when compared with

34. National Human Development Report 2005.

Box 6.3 **Management of water resources**

The fact that human society demands large amounts of water for its activities means that water is becoming an increasingly scarce resource. This scarcity is made worse by pollution and contamination of water. So when conflicts begin to arise between cities and nations over water use, the result will be to put constraints on socio-economic development.

The development of any country is based on the availability of good quality water, and the ability to conserve and protect water resources.

Mozambique's water resources consist of surface water (rivers, lakes, lagoons) covering an area of 13,000 sqkm, and groundwater. The latter are aquifers consisting mostly of mineral and thermal waters.

All of Mozambique's main rivers, the Zambezi, Pungwe, Save, Limpopo, Incomati and Umbeluzi, with the exception of the Rovuma, rise in upstream countries. This means that the country is very vulnerable in terms of the availability of water, both directly for human use and for the environmental needs of natural ecosystems, particularly in estuarine areas.

According to the National Water Board, the government has long been concerned at this dependence on other countries for water, and has signed several agreements, namely:

- In 1964, the Portuguese and South African governments signed an agreement of principle for the better joint use of international rivers by both countries.
- In 1967, Swaziland also signed the same agreement with Portugal and South Africa.
- In 2002, the Standing Tripartite Committee between the Republic of Mozambique, the Republic of South Africa and the Kingdom of Swaziland signed the INCOMAPUTO agreement on shared waters to govern the use of two of their shared rivers (the Incomati and the Maputo).

The dams in countries through which the rivers pass create some problems in Mozambique, as in the case of the Zambezi river, which passes through the Kariba dam, in Zambia and Zimbabwe, and through the Cahora Bassa dam in Mozambique which was built in the 1970s for hydroelectric purposes. The Umbelúzi river passes through the Minjoli dam in Swaziland and the Pequenos Libombos dam in Mozambique, which was built to supply drinking water to Maputo city.

The management of water resources in Mozambique was undertaken at local level (river, lake, lagoon); and by sector (to solve problems of fisheries, water, electricity generation) in response to crises (that is, management was only undertaken where there were crises).

With the approval of Law 16/91 (the Water Law), which rests on the principle of Integrated and Deconcentrated Management of Water Resources, and of Decree 26/91, which set up the five Regional Water Boards (ARA-South, ARA-Centre, ARA-Zambezi, ARA-Centre North and ARA-North), the Mozambican government took an important step forward in this sector. Currently the first three ARAs have been established, and the last two are being implanted.

With the ARAs set up, the scenario for water resource management has changed. They show that to minimize impacts, management should be undertaken at ecosystem (river basin) level – undertaking integrated management (trying to deal with several problems at the same time), and also with a predictive function (forecasting problems and impacts), setting up databases and monitoring the river basin.

The agreements the government signs with upstream countries should be accompanied with systemic monitoring, and the establishment of functional basin commissions with the upstream countries so that they can jointly manage the basin, since this is a physical unit with demarcated boundaries. It is a hydrologically integrated system, with interactive components and sub-systems and would provide a systemic vision for the integrated management of water resources.

Currently, management is based on direct reading of the levels of rivers, or of rain gauges, since there are no data in real time. Generally in the rainy season the readers of the scales on the rivers are concerned with looking after their fields, and often the data they present in this period are false. That is, the entries in the recording notebooks are made in the fields. The data are sent to the ARAs by radio from the District Administrations, but these institutions close at 15:30, so after this time no communication is possible.

Experiences from several countries show that ICTs play a preponderant role in water resource management, in the cases of modelling management in river basins, Development of Models for Charging for water use, Studies of Transposition of Basins; Information systems for Basin Management, Application of Cellular models from flow to flood simulation; models for operating reservoirs; development of new formulations and simulations of problems related with flows with the surface free, transport and dispersion of effluents, propagation of flood peaks, ruptures of dams, flood plains and propagation of large scale waves.

Thus for efficient management of the basis, the country needs to obtain hydrometric data in real time, in the priority networks.

the coverage rate of 2000.[34] But the coverage rates recorded in both rural and urban areas are far from reaching the target laid down for 2015. Likewise, the poor water coverage could also compromise achieving the other MDGs.

To give impetus to programmes seeking to increase clean drinking water coverage, the ICTs play a significant role. They allow exact knowledge of the existing water resources in a given region. Through computerized monitoring, combined with GIS and databases, they can measure the water quality and detect polluted areas. Through satellites, it is also possible to locate new water sources and open boreholes in order to ensure access to improved water sources for more people.

Regional efforts have been made to minimise the problem of the shortage of drinking water in SADC member states, since SADC has a significant water resource potential (large rivers and lakes). These efforts are tending to create a platform allowing the integrated management of these resources. In this framework, ICTs are seen as management instruments that offer mechanisms facilitating decision taking, and are also related with other management instruments.

The SADC-HYCOS (Hydrological Cycle Observing System) regional network, managed by the National Water Board (DNA), was set up in 1994, as a component of WHYCOS (World Hydrological Cycle Observing System). It has been a reference point for the management and spread of information on the hydrological situation in the region. It has also supported the development of capacities at national and international level to cooperate and collaborate efficiently in the sphere of SADC policies, in monitoring and managing water resources.

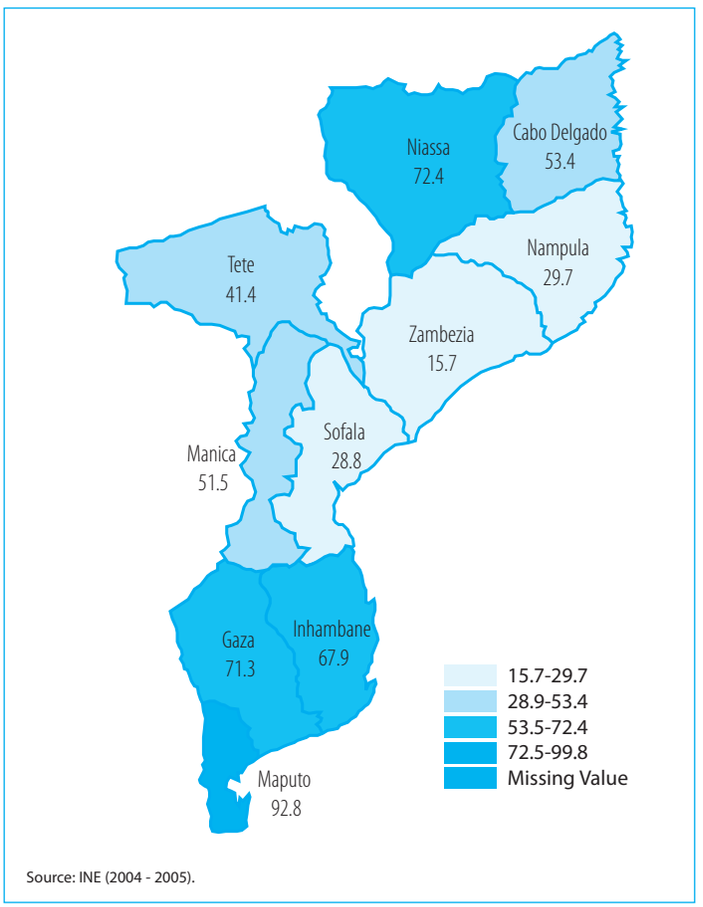
Sustainable access to sanitation

Sanitation, as a series of measures, seeks to preserve or modify environmental conditions in order to prevent diseases and promote health. Impoverished communities often regard management of sanitation as an unacceptable extra burden, which leads them to neglect essential sanitary practices. This leads to cumulative severe impacts, in the form of diseases (often fatal to children), heaps of garbage, proliferation of insects and environmental degradation.

In Mozambique, the sanitation problem is felt not only in the major cities but also in the districts. Apart from the accumulation of rubbish and its precarious management, because of the defective handling of wastewater and the obstruction of drainage channels, there are also urban inundations during the rainy season, culminating in large pools that block some access roads. The increase in population density in the large cities is blamed for saturating their structures, which were built for a small number of inhabitants. The lack of capacity on the part of the institutions that should collect waste, clean the water tubes and drainage channels, is also blamed as one of the factors worsening the state of sanitation.

Among other purposes, sanitation seeks to control and prevent disease in order to improve the quality of life of the public, raise the productivity of individuals in society and facilitate economic activity. According to the UNICEF Report *Progress for Children: Water, Sanitation and the MDGs,* published in the second half of 2006, unsafe drinking water, inadequate availability of water for hygiene,

Map 6.1 **Safe Sanitation Coverage, 2005**



Source: INE (2004 - 2005).

and lack of access to sanitation, contribute together, globally, to about 88% of deaths from diarrhoeal diseases, or more than 1.5 million of the 1.9 million children under the age of five who die due to diarrhoea every year. This is 18% of all deaths among under-fives, and means that over 5,000 children die every day because of diarrhoeal diseases.

A further problem is poor collaboration by the public in adopting basic sanitation measures, despite radio or television campaigns advising them. One notes this, for example, in the failure to comply with the timetable set for depositing rubbish, and the failure to use public rubbish containers correctly. There is also a poor understanding of the consequences of dumping rubbish outside the places indicated for this purpose. Obstruction of the drainage channels is also caused by the accumulation of garbage that people dump in roads or other improper places.

The GoM recognises the importance of sanitation for public welfare. One of the objectives of the Access to Water Sanitation and Housing component in the PQG (2005 - 2009) is to ensure the sustainability of water supply and sanitation systems, as well as to increase sanitation coverage, in both urban and rural areas.

An analysis of rates of safe sanitation coverage shows that four provinces (Nampula, Zambezia, Sofala and Tete) have rates below 50%. Zambezia is in the most critical condition with a rate of only 15.7%. Maputo province has the highest percentage of people covered by safe sanitation, 92.8%

Through ICTs, municipal bodies, some of the media and other institutions have made efforts to make citizens aware of the need to improve sanitation. However, it is accepted that information should also be given about the advantages that sanitation activities can bring to communities, which could probably lead to private initiatives to contribute to improvements. For example, sewer repair initiatives held to reduce expenses in treating the water supply, and cut the incidence of diseases caused by human contact with waste. This measure will also check beach pollution.

As for garbage removal, it is important that there should be permanent information on its benefits for cities and communities. Collection by the relevant authorities must be regular and at short intervals. Collection at night has proved efficient, but there is also a need for daytime rubbish collection, which obviously requires an increase in material and human resources.

Main Challenges

Achieving the MDGs requires increased government intervention in the areas outlined in environmental policy. The application of the directives from the various protocols has been reflected in policies carried out by the government to reverse the effects of climate change.

However, publicizing the legislation and implementing policies to preserve the environment is a matter of urgency and imposes challenges to the ICTs. These tools play a fundamental role in obtaining and processing data on environmental resources; in spreading information on sustainable environmental practices; and improving planning methods, readiness, mitigation and response to natural disasters, and thus should be made use of. However, they have not always had the necessary effectiveness.

It has not been easy to obtain and compile databases on the natural resources existing in Mozambique, and thus undertaken rational management of them. Likewise the lack of a general or integrated legal framework, that defines the areas and types of intervention for each body, reduces the effectiveness of the various interventions.

As for spreading information, the ICT infrastructure does not cover the entire country, and there are difficulties in making full use of these tools, particularly in rural areas.

A further factor blocking the efficient use of ICTs is the high rate of illiteracy, which ensures that many people, particularly in the countryside, depend only on information given by radio stations.

Access to information, in itself, is not a great challenge, but good quality and proper structure of the information is indispensable, if people are to understand the dangers that their activities pose to the environment. The understanding of information varies according to how well educated the public is. There should therefore be discrimination in the information aimed at particular target groups. In rural areas, it would be necessary to empower the local media, which is easily understood, or better still, that the information should be based on local knowledge.

Conclusions and Recommendations

ICT use has in a significant way contributed to the preservation and improvement of natural resources management processes. The impact of natural disasters throughout the Mozambican territory has been gradually mitigated in recent years thanks to technological resources and means which allow for a timely forecasting of phenomena such as cyclones,

droughts and floods, making available precise information on their magnitude and possible effects.

This makes it possible to make decisions and implement measures aimed at avoiding major human and costly material damage, which reduce the HDI.

The use of these tools has, to some extent, helped preserve natural resources and improve their management. In recent years, the impact of natural disasters has been lessened, since it is now possible to forecast these phenomena, and make available in good time information on the scale and possible effects, so that measures may be taken to avoid heavy human and material losses.

The use of paper has been increasingly reduced, although the country is still not making full use of the potential that the ICTs offer. Bearing in mind the impact that the community centres and other facilities presented in chapter 7 of this report have on the districts where they are installed, one glimpse a possibility of improving access to information on the protection of environmental resources and promoting educational activities beneficial to the environment.

Initiatives in defence of the environment should not be viewed as the exclusive responsibility of local governments. It is understood that these should take a major responsibility, both for protecting the quality of water, and for making available relevant information that helps prevent and/or lessen the effect of natural disasters, so as to support implementation of policies carried out by the central authorities. These should be accepted by all, regardless of where they may be. For example:

- In their houses, people should be able to monitor domestic consumption of water and reduce unnecessary use of this precious liquid.
- In schools, training centres and higher education institutions, the teachers should be able to encourage the use of ICTs to research on modern methods of saving water, making use of rainwater, and easy methods of recycling paper that can be adopted at community level.
- In sectors such as industry and agriculture, more rigorous studies should be made of modern production processes that do not involve wasting water and the use of equipment and inputs that do not damage the environment. These studies should be spread through ICTs to ensure their rapid adoption.

Chapter 7

Using ICTs for Community Development

Introduction

Eradicating extreme poverty and hunger is the first MDG. It calls for the reduction by half, by 2015, of the percentage of people living on less than a dollar a day and a reduction by half of the proportion of people suffering from hunger. The use of ICTs in the various sectors of activity is a reality in the world, including Mozambique. The Mozambican government tries to make use of the potential of ICTs to develop national capacity to solve the country's basic problems, by reducing levels of poverty and promoting development. This concern can be seen in several instruments under implementation, notably: the National ICT Policy and the strategy for implementing it, PARPA I and II, and the Mozambican Science, Technology and Innovation Strategy.

In most countries, there has always been a visible difference in provision of and access to ICTs between those living in urban and in rural areas. Thus in the 1990s, there arose a notable international surge of enthusiasm for promoting and using ICTs to empower local communities to:

- improve their formal and informal education;
- promote job opportunities;
- encourage productive activities;
- ensure greater participation in society;
- increase social integration at local and world level; and
- increase wealth and rural development.

In the case of Mozambique, the government strategies envisage setting up infrastructure for community access to ICTs. Various governmental and non-governmental organisations are implementing components of the National ICT Policy, seeking to narrow the digital divide. This is the context for the establishment in Mozambique of Telecentres, Community Radios, Community Multimedia Centres (CMC), Mobile Units, Digital Agencies, Provincial Digital Resource Centres (CPRD), cellular phones and others. Their implantation also results from contributions by various national and international partners.

Box 7.1 Mission of ICT initiatives for community development

- Contribute to universal access to ICTs;
- Contribute to expanding access to information;
- Promote circulation of information to and from the rural areas; and,
- Contribute to sustainable and balanced development between rural and urban areas and between the different regions of the country.

ICTs for community development seek above all to reduce inequality in access to and use of ICTs, opening paths to innovation and development at all levels. The implantation of ICTs for development takes place under the universal access programme that envisages the right of citizens to enjoy access to information and to knowledge, through (ICT Policy, 2000):

- Promotion of universal access;
- Creation of a universal service fund to which telecommunications operators and private and public service providers contribute;
- Incentives for telecommunication service providers in poor areas;
- Encouraging access to the Internet and other new services;
- Supporting creation of a national network of ICT public access points, within a reasonable distance of home and at prices within the reach of low income people;
- Exempting computer and communications equipment intended for universal access from import taxes;
- Reduced phone charges in favour of extending the network to a larger number of users;
- A single tariff for calls to ISPs from any part of the country, equal to the cost of a local phone call;
- A community tariff for the electricity and telecommunications services provided to the universal access points;
- Exploring other modern technologies more appropriate to the country's situation.

The present chapter deals with the use of ICTs for community development. This is necessarily a cross-cutting theme, since ICTs for community development support activities in various rural productive or service areas. The implementation of ICTs for community development involves the creation of at least one ICT access point in each district, now that the districts are regarded as poles of development. The implementation of ICTs for community development basically includes access to information, the production and dissemination of local information, as a tool for good governance and social inclusion. This broadens the horizons of ICT users and empowers human development.

Contribution of ICTs to Community Development

There is a broad recognition of ICTs as cross-cutting tools that drive development in various areas (MCT, 2006). The contribution of ICTs to development can be seen in the importance that information plays for the development of communities in various areas. ICTs, when correctly put at the disposal of communities, allow changes through:

Social inclusion. Communities, even in remote areas, interact with other communities, empowering their socialization. Through the use of cell phones, e-mail and the Internet, communities communicate with their relatives and friends and develop new relationships. Communities send and receive messages on family and community events through the community radios. The community use of ICTs for socialization is shown in the studies held by Mozambique's Telecentres and CMCs, as well as by the experiences of Brazil (Santana, 2006) and in a study on South Africa and Nigeria (Akinsola et al, 2005).

Sharing knowledge. Citizens from different places in Mozambique and abroad develop skills and various experiences. Though the use of cell phones, computers, CD-Roms, the Internet, e-mail and community radio, the communities swap among themselves accumulated experiences and skills developed in how to carry out particular activities. Thus the users of ICTs become endowed with the skills to undertake activities that might permit the creation of wealth and well-being.

Access to better health practices. ICT initiatives for community development have served as centres of diffusion that, through various resources, help the public understand better practices of prevention, symptomology, health care and the treatment of diseases, thus improving their performance in their professional and/or productive activities. In Telecentres and CMCs information is produced that is spread through posters, community radios, brochures with contents on vaccination campaigns, raising awareness for preventing and fighting diseases such as malaria, HIV and AIDS and cholera. These actions lead to improved quality of life.

Box 7.2 Experiences of setting up telecentres and community radios

The studies assessing the Telecentres and the CMCs held in 2005 and 2006 noted the following.

The users of the Telecentres and CMCs recognise the importance of these ICT access points, for they say "we are better informed".

The peasants' associations in Manica, Gondola, Sussundenga and Chokwe were unanimous in saying they had benefited from useful information on how to produce and conserve crops, but they would like to obtain more information on the best markets for their produce, and places to acquire seeds, pesticides and other goods.

Manica: "The Telecentre has trained about 27 local pupils at basic level. It works with groups of farmers in market research for placing their products and to find places to acquire seeds. One of the fruits of partnership was the supply of goods by the farmers to Shoprite in Beira" (Manager of the Manica Telecentre).

Sussundenga: "There's a very strong link between the community radio and the Telecentre. Most of the information transmitted on the radio is obtained and prepared at the Telecentre" (Manager of the Sussundenga Telecentre).

Chokwe: "The communication assistants, together with the District ORAM motivator, have been collaborating with the peasants and local associations, and a magazine is now under preparation" (Manager of the Chókwè Telecentre).

Metoro: "Setting up a computer room is important for the school and the district since it helps in the pupils' assimilation of the material and in the teaching-learning process" (Director of the Metoro EPC).

Pemba: "The quality of the lessons has improved because the teachers now use digital material from the CDs. Last year there was a 99% pass rate. The digital material corresponds to the current curriculum" (IMAP Educational Director).

Pemba: "Distance learning will shortly start in 17 districts with 40 students in each district and knowledge of how to use a computer will make a contribution" (IMAP Director).

Improved education. Bearing in mind that the schools and public libraries hold a limited number of titles, the CD-ROMs and the Internet available in rural areas have filled the vacuum. In teaching-learning activities, teachers and pupils at various levels use the Internet and the CD-ROMs to access and share contents, to share best practices and methods of teaching-learning, the development of discussion forums, distance learning, etc.

Teachers at schools near the Telecentres, CMCs and Digital Agencies have surfed the Internet for information to enrich their lessons including illustrative images, examples and demonstrations. The students have consulted contents of various disciplines to consolidate the materials taught and to undertake research. Students have also played the games available on the CD-ROMs and on the Internet, thus improving their capacity for logical thought and their school performance.

The use of CD-ROMs in the Telecentres and CMCs have shown multiple advantages, notably: the capacity to store a relatively large amount of information; the disks are easy to transport, cheap and easily updated; their use allows interaction, as an extremely strong and sharable educational instrument.

Access to better agricultural and livestock practices. Peasants, farmers and breeders, individually, or organised in associations, have access, through the community radios, Telecentres and CMCs, to a broader range of better agricultural and livestock production techniques, dealing with pests and diseases, food preservation techniques, access to factors that assist in setting prices and access to international and other markets. At the Telecentres and CMCs, systematised information is gathered on how to produce particular crops or animals, how to conserve surplus crops, etc. This information is divulged in the association and in the community in general through the community radio. The community radios are also used in campaigns to vaccinate animals and fight against pests.

Cultural and social development. Strengthening Mozambican culture and identity through virtual interchange between local communities of different districts and with world communities through use of ICTs. Through the Internet, cell phones and e-mail, local communities have swapped information portraying the cultural and social aspects of their lives. The cultural mosaic of local communities is also divulged by the community radios. Among the various actions that allow cultural interchange between communities, the National Community Radio Forum (FORCOM) stands out. However, a study made in South African communities by Ngcobo and Herselmen (2007) draws special attention to the need to combine traditional and modern technologies since this would allow the preservation of culture while at the same time encouraging tolerant and sustainable changes.

Environmental management. In this area, rural communities have access to information on preserving the environment, the rational use of natural resources, the prevention of destructive natural phenomena, etc.

Public utility information. Through community radios and cell phones, people living in rural areas have access to meteorological information (weather, wind, rain, drought, sun, humidity, etc.), exchange rate information, information on access to micro-credit to develop small businesses, etc., which are instruments that allow them to better plan their activities. Community radios are also used to divulge information about lost children, deaths, festivities, and other events. Communities have made heavy use of ICTs, particularly the Internet, to look for job opportunities.

Economic development. Through access to entrepreneurial and management techniques and practices, local formal and informal economic agents have developed their activities by resorting to various services in the Telecentres, CMCs and community radios, notably; taking photocopies, typing documents, divulging and promoting their products and services. The presence of various ICT - related services in the different regions of the country reduces the distances local people have to travel, thus minimising their costs. The cell phone has played a noteworthy role as an instrument supporting the development of both formal and informal economic activities. The cell phone creates in individuals the capacity and the power to act. It is the means of communication most used by the communities due to its easy access and because it is relatively cheap.

Governance. Access to and sharing in mechanisms for the better functioning of the government and governance, both through making legislation and other legal instruments available, and through requesting and satisfying public services for citizens, including accountability. Government institutions and local communities can view various documents such as regulations, laws, and policies, through using the Internet and CD-ROMs available at the community centres with access to ICTs.

Communication. When phenomena occur in remote places, local communities, through cell phones, play the active role of supplying the information promptly to the media. Journalists on the com-

munity radios exchange information among themselves by using e-mail and the Internet.

Access to miscellaneous information. The ICTs also allow communities and civil society organisations access to information for the development of industrial, commercial and leisure activities.

The combination of these aspects in a coordinated fashion can strengthen the contribution of ICTs to community development and to their active participation in society. But, in order to take advantage of ICTs for community development, certain challenges must be considered.

Phases of Implementation

The implementation of ICTs for community development is being undertaken following two basic phases; namely, access and use. The phase of establishing conditions to allow access is underway through the installation of electricity and telephone lines, at least to district level, and the installation of various ICT access points. Also in this phase ICT training programmes are underway, carried out by various governmental and non-governmental bodies.

Special mention should be made of the programmes undertaken by UTICT, including access to training in the CPRDs, design of the curriculum in ICT for development, and establishment of a training support portal. These actions result from the government's efforts and from the strong support of international partners and civil society.

The "use" phase, though to some extent parallel, is more incipient, characterised by producing and improving the content of information of interest to the community, which serves for developing and improving mastery over ICT capacities by the users.

Telecentres and Multimedia Community Centres

The universal access programme advocates that the state recognise and protect the right of citizens to access to information and knowledge expressed through the ICTs. The state thus intervenes in order to guarantee enjoyment of this right, and appeals to the various sectors in favour of this project (ICT Policy, 2000). In this framework, the ICT initiatives under implementation include those that count on the direct participation of the community in their management and use, such as the CMCs and community radios, and those intended to meet the needs of the communities but which belong to the public or private sector, such as the CPRDs and digital agencies.

The first experience of implementing community ICTs in Mozambique took place in 1999, with the installation of two pilot Telecentres by the Eduardo Mondlane University Computer Centre (CIUEM). This gave the rural communities access to basic ICT services such as telephones, fax, computers, Internet, e-mail, photocopying and other associated services.

The lessons drawn from implementing the pilot Telecentres led to the installation of further Telecentres across the country, as from 2001. The Telecentres were set up with the aim of providing low cost ICT access points for rural, and mostly poor, communities. Thus communities in remote areas came to possess another means of access to various information.

With computers available and in some cases also Internet access, in the telecentres, there arose the need to link the capacities of radio with those of the computer, and the concept of the Multimedia Community Centre (CMC) was launched. Using computers, CD-ROMs, the Internet and e-mail, local, national and international information, educational materials, games, entertainment and material of public interest is taken. It is compiled and translated into local languages for later broadcast over the local community radio. The local information produced by the CMC journalists is transmitted in the country and abroad via the Internet. The community radios have brought a new dynamic to local people because of their access to various information of community interest, mostly presented in local languages, as well as in Portuguese.

Community radios

In Africa, particularly in Mozambique, the circulation of newspapers and magazines, and access to television is still mostly limited to urban areas (FORCOM, 2006). Mozambique is still at a stage where most people live in the countryside in extreme poverty, and are in no condition to buy newspapers regularly or to own a television. Furthermore, most of the Mozambican population is illiterate (CAICC, 2007), (FORCOM, 2006).

In rural areas, there persist other constraints – newspapers do not reach there, and there is no electricity, which limits access to television. This means that in rural areas, access to information through the various media remains very low. Even with access, the information cannot be made use of due to limitations in reading and in understanding Portuguese. After the approval of the Press Law in 1991, several community media initiatives were launched, including the

community radios (CAICC, 2006), (UNESCO, 2000). There is not yet a clear definition of the concept of Community Radio, but in Mozambique there are three aspects to such radios: they are non-profit-making; they are owned and controlled by the community; community participation.

The establishment of community radios in Mozambique has been undertaken with the participation of local communities in the management, production and broadcasting of information of community interest. The principle of the community radios is to involve the local communities themselves in producing information in their own interest, using the local languages, which allows the information to reach more people without having to pay. Most of the Mozambican population remains poor, but each household makes an effort to own a radio, and thus a variety of information reaches the local communities.

Provincial digital resource centres and ICT mobile units

With the aim of supplying ICT training and services (courses in using computers, the Internet, e-mail, computer maintenance, etc) at provincial level, in 2003, the Technical Unit for Implementing the ICT Policy (UTICT) began to set up the Provincial Digital Resource Centres (CPRDs). These concentrate ICT resources, supply technical support and training, and undertake actions for the effective use of ICTs for the development of the respective provinces. The CPRDs are stimulating the creation and development of national and regional networks that can support the various public, private, civic and community organisations in undertaking their activities autonomously, by making available adequate sector applications, so as to permit local, and hence national, development (UTICT, 2007).

Since Mozambique is a vast country still characterised by limitations in access to electricity and telephones, and a shortage of staff and local technical capacity to establish and maintain the ICT infrastructure, this means that some of the population has no access to ICT services. In order to provide remote areas (lacking in the above-mentioned basic infrastructure) with ICT services, a pilot mobile ICT access unit has been set up, managed by Inhambane CPRD. This is used mainly for rural areas as a point of public access for use of computers, the Internet, e-mail and others. The mobile unit consists of a vehicle with a container transformed into a training room, equipped with computers linked to the Internet, via satellite.

Digital agencies and cell phones

In supplying access points to the Internet and e-mail, Digital Agencies were set up in some district capitals for community access to the Internet. They were established based on the infrastructure already installed by Telecomunicações de Moçambique (TDM) following the expansion of the services that fixed telephony supports. The Digital Agencies provide Internet access on a commercial basis.

The cell phone is one of the main instruments for communication in Mozambique and in Africa. The rapid expansion of mobile telephone services in Mozambique is due to the poor capacity of the fixed phone network and the territorial extent of the country. Mobile telephony thus plays an extremely important role for communication among the rural population who have no alternative. Table 7.1 shows the main ICT initiatives in Mozambique.

Table 7.1 ICT Community Access Initiatives

	Telecentres	Community Radios	CMCs	CPRDs	Mobile Units	Digital Agencies
Niassa	-	9	2	-	-	
C. Delgado	-	4	1	1	-	
Nampula	-	6	6	1	-	
Zambézia	-	6	2	1	-	
Tete	-	3	2	1	-	
Manica	2	3	2	-	-	
Sofala	-	4	1	1	-	
Inhambane	1	3	1	1	1	
Gaza	-	3	1	1	-	
Maputo prov.	1	5	3	-	-	
Country	3	46	21	7	1	

Main Challenges

For the effective use of ICTs to contribute to community development, some challenges must be taken into consideration. Some experiences in setting up community ICTs in Mozambique show that communities are receptive to some technologies, notably to cell phones. This receptiveness results from recognition of the results that derive from using them as a means of communication. The same recognition is clear in the case of radio, unlike the use of computers, the Internet and CD Roms where, in many cases, there are so far no concrete results to justify investing the scarce resources of the poor.

Box 7.3 Convergence in community ICT initiatives

Technological convergence is already taking place in Mozambique at various levels, including in community ICT initiatives. However, at community level it is also useful to look at convergence from another angle, using the dictionary definitions of "collaboration", "cooperation" or "place of meeting" to see how the various institutions, enterprises and bodies can "converge" their activities to the benefit of the communities they seek to serve.

In particular, the Community Multimedia Centres (CMCs) build on previous experiences with community radios and telecentres. The basic concept is to take advantage of synergies between the old and new information and communication technologies, using them to establish a multi-directional information chain that links, for example, the most distant radio listener at one end to the capacities of the Internet at the other. The listener can receive information in his or her own language, and can contribute to the local radio programmes, while information produced in the CMC can be disseminated nationally and internationally via Internet and materials drawn from the Internet and other external sources can enrich the radio.

The community journalists and CMC collaborators thus act as an interface, or hub, for the various components of the chain.

Although small and based in rural areas, the CMCs rely technologically on advanced digital technologies, ranging from studio equipment, sound editing and programme production to accessing information in online or offline formats, providing computer training courses, scanning photos and print and graphic production. Where there is a mobile phone network it is the preferred instrument for radio phone-ins and debates. Computers are used for showing films, looking up information in CD-Rom encyclopedias, storing digital images and local information, designing wedding invitations and many other work, study and leisure-related activities. Where there is broadband connectivity, Radio Mozambique's national news programmes can be captured and re-broadcast on the community radio. New IT software facilitates local language use and translations, computer use for literacy, content designed for women and other innovations. Free or open source software guarantees independence and reduces costs.

These facilities, and the whole information chain, are open to the public, to national or local government bodies, institutions, associations, etc to be used to inform, educate, communicate, debate, facilitate services, build local capacities. This is where collaboration and cooperation must play a vital role, ensuring that the CMCs' multifaceted technological capacities are used efficiently and effectively as tools for socioeconomic and democratic development, and that investments and human resources are rationalised.

Another vital component of convergence and collaboration is the principle of sharing infrastructure, at least at district level. Reliable and low-cost energy and Internet connectivity are the Achilles heels of CMCs and similar initiatives. If infrastructure can be shared in an open access system between companies, government sectors, community ICT initiatives, schools, etc, and if information can flow freely along the channels created, then the goal of equality in access to and use of services and information systems will become achievable.

Constraints

While government policies are in place for extending community ICT access, the free flow of information, the use of ICTs to reduce the gap between government and citizen and improve services, the need for infrastructure strategies, etc, technology is in constant advance and neither community or government needs, nor private sector operators, can be expected to wait for long years of debate or piloting before using the latest capacities.

This could give rise to the danger of fragmentation and duplication of resources instead of convergence, for example: costly parallel connectivity infrastructures for delivery to local government, to a school, to a private company and to a CMC; multiple resource centres containing similar information; multiple content providers covering one sector of need thoroughly but leaving a large gap in another, instead of coordinating plans and topics; scarce human resources being scattered; etc.

At the other extreme, one of the strengths of ICTs, enhanced by technological convergence, is the pluralism of use and non-hierarchical approach they enable, and attempts to over-coordinate or centralise would also be stifling to initiative and development.

Digital technologies will progressively replace analogue systems, just as computers are replacing typewriters, the fax replaced the telex and will soon be replaced in its turn, and diskettes have already almost vanished in favour of flash drives. But it must be remembered that on the one hand many of Mozambique's districts still lack basic infrastructure conditions for productive use of ICTs, while on the other investments in community or other initiatives at district level cannot expect to be upgraded regularly in the light of the instant obsolescence of the commercial strategies of software or hardware producers. However exciting the opportunities opened up by convergence, strategic choices must consider durability, robustness, maintenance and cost as key factors in investment, and avoid opening up a new information divide between rural haves and have-nots by exclusive use of digital information channels.

In most countries the introduction of broadband has been accompanied by a development discourse about how the benefits of connectivity will be extended to the most far-flung corners and reach the poorest of the poor, but this is not necessarily the case. A recent study in South Africa found that, although the number of broadband users was increasing exponentially, the overall number of Internet users was not growing. In other words existing Internet users, mostly in the urban areas, were upgrading their systems to broadband, but the expected reaching out was not taking place. Perhaps this is not so surprising when considering that progress towards universal access in most African countries, whether through public monopoly or market (often ending up as private monopolies) strategies, has been extremely slow.

Raising awareness on the importance of ICTs

Due to the technological character of the ICTs, their presence can intimidate people, even those who have some capacity to use them. This attitude may take the form of resistance to change in relation to the ICT environment at all levels. Thus actions for a better understanding of the importance of knowledge of the appropriate technology and how to use it to solve concrete problems is a challenge. At the highest level of governance there must be sufficient motivation to promote and support community ICT initiatives for development, through setting forth policies and legislation. A further challenge is addressed to the mid-level of governance, since this should have mastery over the potential of ICTs. Only in this way will they be able to promote and identify the real local needs that seek the implementation of new community ICT initiatives.

The various civil society organizations play the role of facilitators in formulating community ICT initiatives, since they mobilize resources, support implementation, and serve as a link between the local communities and the government machinery. Hence this group should be aware of the importance of ICTs for development in order to better motivate the rural communities benefiting from ICT initiatives.

A further major challenge is raising the awareness of the private sector and motivating it to invest in community ICTs, since the private sector is one of the key actors for the successful implementation and sustainable exploitation of community ICTs. A no less importance challenge is raising the awareness of the beneficiary communities of the importance of ICTs for their daily activities. That is, the public should clearly understand how important the ICTs are for their daily lives.

Particular attention should be paid to the mid-level of governance, to the private sector and to the local communities through developing increased motivation about the benefits of using ICTs, which are still latent. Understanding, at all levels, of the importance of ICTs for development is a factor of extreme importance for the success of community initiatives.

Access and barriers to ICTs

Poor communities, particularly in rural areas, face limitations in access to basic ICTs, caused by the following barriers.

Electricity and telecommunications infrastructure. This is one of the main barriers faced by people living in remote rural areas, which are characterised by a scattered population, long distances between houses, and low population density. These factors, linked to the feeble purchasing power of local communities, means there is little commercial incentive for investing in expanding the electricity and telecommunications infrastructure. It is imperative to continue expanding the electricity and telecommunications networks down to district, administrative post and locality level, since there are still many regions without electricity and with no fixed or mobile phone coverage.

In some rural regions that do have electricity and telecommunications services, usage has not been effective due to poor quality and constant breakdowns in the supply of electric current and communication signals. The costs of electricity and of telecommunications remain very high for rural communities.

A further barrier is the shortage of skilled human resources to manage the existing infrastructure in rural areas. Thus incentives are needed to recruit staff who can guarantee the full operation of these infrastructures at district, locality and village level.

Physical barriers to access and participation. So far community ICT access points are mostly located in district capitals. Thus community ICT initiatives are essentially limited to those population settlements in the vicinity of the district capitals. In some cases, with the exception of mobile phones, the people living in remote areas are not active players in the use of the available ICTs due to the great distances they must travel to reach the nearest point of access to computers and Internet.

The location of the premises where the community ICT initiatives operate in some cases inhibits access and use by the real beneficiaries. Thus the identification of an appropriate location is a challenge, requiring the involvement of the community itself in the preparation phase that will lead to establishing the ICT initiative.

Economic capacity. Taking into account the reality in which most of the rural Mozambican population lives, the prices charged (although they are subsidised in some cases) for access to community ICTs are beyond the capacity of local communities to pay. It is to be expected that needy communities prioritise their scarce financial resources to satisfy their basic needs, rather than channelling them to access and use of ICTs. This refers to the situation of households with no income or who live on the minimum wage which does not even cover a basic basket of goods. The use of radios and mobile phones even by the rural population can be seen as recognition of how

Box 7.4 Women and the use of ICTs

In research undertaken in 2006 on "Women and the use of ICTs", it was found that women mostly make use of cell phones and community radios. Computers and the Internet are not much used for lack of the capacity to pay, lack of time because they have to seek sustenance for their families, and lack of schooling. They use the Internet and cell phones to look for jobs. Women particularly use cell phones to coordinate their work and social activities, mainly to stimulate their business and to deal with family matters, etc.

The study showed that literate women and those who hold leadership positions are those who use computers effectively and understand their importance. It concluded that activities to raise the female literacy rate are needed.

important communication is for their development. To increase the use of mobile phones and of access to and use of computers and the Internet, rural people need some minimum economic power that can be obtained by stepping up the activities underway to generate employment and self-employment.

Educational level. Illiteracy is a significant barrier, not only in Mozambique but in many developing countries. The assessments made of the community ICT initiatives show that the main users possess at least basic education. This implies that illiterate communities still have some limitations in understanding the importance of the direct or indirect use of computers, the Internet and CD ROMs for improving the quality of their daily activities, although there is a clear understanding of the importance of mobile phones

The eradication of illiteracy remains one of the great challenges for education in Mozambique and is thus a determining factor for the other challenges discussed in this chapter.

Socio-cultural factors. This barrier may be regarded as reflecting the social hierarchy typical of African societies. In general, local communities exclude themselves from participating in community ICT activities when they think that such activities are not for them but for trained people who occupy positions or hold responsibilities in society.

The experience of rural communities is characterised by oral contacts among themselves and handling concrete objects of the real world. Thus, the passage into the virtual environment of the ICTs is a barrier that should be noted. There should be active involvement by the local communities themselves in implementing the ICTs, accompanied by acts to explain and demonstrate the results of various experiences in the use of ICTs for development.

Gender inequality. Gender inequality in access to ICTs is visible, not only in Mozambique but throughout the world, in both developed and developing countries (UNDP, 2001). Most users of the community ICT services are men. Particularly in Mozambique, this trend is linked, on the one hand, to cultural factors that favour boys rather than girls in access to education, and, on the other, to the privilege that men enjoy in access to various resources and opportunities. Studies in some African countries show that the main users of computers and the Internet are men – 86% in Ethiopia, 83% in Senegal and 64% in Zambia (UNDP, 2001)

Gender equity in access to ICTs will only be possible with joint efforts that motivate girls to attend school and to stay there.

Sustainability: In Content, Technical, Social and Financial

Content

In Africa, there are several ICT initiatives for development that fail because they do not provide relevant and useful information for their target group. This challenge is shown by a study demonstrating that in Africa, with the exception of South Africa, only 0.02% of Internet content is produced locally (UNDP, 2001). Local communities are aware of the information they need to develop their activities and so their involvement is fundamental.

From the studies assessing the use of community ICTs in Mozambique, in general the local people state that their priority contents concern education, health, local and national news, moral education, etc. Production of these contents is under way at the Telecentres, Community Radios and CMCs. It is up to the various governmental bodies and to civil society to join efforts to step up the production of local, national and international contents adapted to local reality. Like the community radios, it is thought that the question of content should precede implementation, by promoting debates with the local communities to identify content that will meet their real needs, and that respect linguistic, cultural and social factors. The contents would thus help in the identification of appropriate supporting ICTs.

Since most ICT community initiatives result from NGO support and envisage a specific period for their implementation, their sustainability, once the financing phase is over, is rather fragile. The question of sustainability can be seen from various perspectives – financial, technical and social.

Technical sustainability

In preparing community ICT initiatives, it is important to choose equipment and software in line with local reality, otherwise it may be impossible to use or maintain locally. One question that may be posed is "can we send the old computer that we no longer need to a district or locality?" Obviously the answer is "not necessarily", because it could become simply an instrument that worsens the poverty of the communities. For instance, the computer could be so slow that Internet access becomes extremely expensive. The ideal is to make a careful analysis to identify the ICT with technical specifications adequate to the real needs and, preferably, with local technical support. In the sphere of implementing the Telecentres, CMCs and Community Radios, some lessons were drawn in creating local capacity through training young people and local volunteers in the use of computers, exploitation of the Internet, production and presentation of radio programmes and other ICT-linked services, and the results are contributing to technical sustainability. The CPRDs should play a fundamental role for the technical sustainability of the ICTs installed in districts and localities.

Social sustainability

Regardless of the financial and technical constraints that community ICT initiatives face, as long as they faithfully serve the poor communities, they would be complying with one of their main objec-

Table 7.2 Comparison of the Provision of ICTs for Community Development

Comparison factor	South Africa	Nigeria	Mozambique
Model of provision	Educational/community projects	Private initiative/ community Internet cafe	Educational/community projects
Objective of provision	Facilitate development, create human capacity and economic development	Business (profits)	Education, facilitate development, create human capacity and economic development
Government policy	Adequate support, funding, coordination through a service agency.	Deregulated telecommunications without any community programme implemented	Regulated telecommunications. Policies defined but not yet implemented
Infrastructure/ Technology	Radio, Telephone, Satellite	Telephone, Satellite	Radio, Telephone, Satellite
Management	Community	Private	Community
Services	Information, communication, provision of government services, job creation, community development	Information, communication, job opportunities.	Information, communication, job creation, community development.
Funding	Government, telecommunications operators, NGOs, international organisations, ICT industries	Personal savings, bank loans	NGOs, international organisations
Sustainability	Difficult to sustain	Sustainable	Sustainability difficult

(Source: IJEDICT, 2005, Estudos de avaliação de Telecentros e CMCs em Moçambique)

tives. This means that during implementation of community ICTs, ways should be found to achieve financial and technical sustainability without damaging the social objective for which they were established. Thus various efforts are being launched such as, for example, free attendance at user courses for the children of members of peasants associations that collaborate with the Telecentres and CMCs.

Financial sustainability

Bearing in mind that community ICT initiatives are intended for people in rural areas with low purchasing power, their sustainability depends on implementing development policies. The main target group of community ICTs is poor, and unable to pay for the services, which implies that either the communities abstain from the services because the prices are prohibitive or they use the services because the prices are low. In both cases, profitability will be low. Bearing in mind that the purpose of the community initiatives is to benefit poor people, it is thought that the second option is acceptable. It is up to the government to play its role, and the body managing the initiative should identify other complementary services to generate income that contributes to sustainability.

In establishing Telecentres, community radios and CMCs in Mozambique, management strategies were experimented with, that produced encouraging results, through partnerships with institutions and NGOS already established locally and which are undertaking activities with the local communities. Table 6.2 presents a comparative analysis of the provision of ICTs for development in Mozambique, Nigeria and South Africa.

Coordination and Management

In implementing community ICTs, coordination allows the rational use of scarce resources. The ICT community programmes are being undertaken by several organisations and, in some cases, in an isolated fashion. As a result, one notes:

Risk of duplication and absence of ICTs in some areas expressed by the establishment in the same places of several ICT initiatives with the same goals. Furthermore, some areas are excluded from ICT initiatives, even when they have telecommunications infrastructure and electricity, just as in the regions where there is duplication.

Synergies between different initiatives There are positive results from collaboration between the various initiatives. As in the case of the network of Telecentres and CMCs and the community radio network. These initiatives collaborate among themselves and with the educational workshops and the Schoolnets. It is desirable that there should be collaboration between all currents of implementing community ICTs, namely: CMCs, Community Radios, Telecentres, Schoolnets, Educational Workshops, Digital Agencies and CPRDs.

To this end, local communities must be involved in the entire process, from the moment of design, to planning, implementation and then operation and management. Taking local specificities into account, adequate management models should be developed. The involvement of the local community in managing the ICTs aimed at it is crucial for obtaining better, particularly social, results, to ensure active and objective use of the ICTs by the local communities, they should feel owners of the initiative. Thus actions should be undertaken so that the communities take on ownership, contrary to the current trend where the communities recognize the implementing agency as the legitimate owner of the initiative. The existence of an institution that can coordinate all community ICT initiatives would allow equitable and balanced distribution of the existing scarce resources.

Conclusions and Recommendations

Technological convergence is already producing important benefits to ICT community initiatives, such as the CMCs. However, the maximization of their value demands a collaborative convergence of users of available technology in the CMCs. Thus, the following recommendations are considered:

- MDGs sectoral strategies must include ICT use for the dissemination of messages, information on education tools through community access points, along with their use for improvement of their services and systems;
- Interests of the poor and marginalised must be defended during debates on technological policies, strategies and decisions, and civil society must be pro-active in this regard;
- Public policy considerations must give priority to ICT use for the promotion of development in rural areas; and,
- Open access and universal access principles must be placed as a condition of licensing, approval or investment in systems at district level.

Chapter 8

Partnerships for Development Using ICTs

Introduction

ICTs can and should be powerful tools for speeding up the efforts to attain the MDGs, through fighting poverty, hunger, disease, illiteracy, environmental decline and gender inequality. The MDGs recognise the role of ICTs as a catalyst and agent of change through the sharing of knowledge, facilitation of transparency and the formation of associations, stimulating economic growth and supporting competitiveness.

The Mozambique ICT Policy (2000) includes a clear strategic objective concerning this matter, in advocating that the state should facilitate conditions to set up "a universal access fund to which the operators and public and private providers of telecommunications services contribute."

According to MDG 8, partnerships have a prominent role in increasing teledensity, the number of computers, the number of Internet Service Providers (ISPs), and developing human capacity in ICTs to lead Mozambique towards a knowledge society. The ICTs have a role here in facilitating the internal democracy of civil society, stimulating broader consultation, promoting the display of different points of view, and developing the capacity of people to understand each other. For the success of this vision, a more dynamic partnership is indispensable, which constructively promotes interaction between governments, civil society and other development stakeholders.

There is a need to improve and harmonise the collection and dissemination of information that is clear in the various networks of interchange, such as the Programme Aid Partners (PAPs),[35] the Poverty Observatory, the Mozambican Debt Group (GMD) and other fora in which the inclusion of the ICT is a challenge because of their use as a tool to encourage and strengthen the development of national, regional and global partnerships for the sustainable economic development of Mozambique.

The spirit of development of these partnerships should be guided by the need to produce wealth, access to more information and markets, a better business environment, good governance, access to technical and financial assistance, as well as planning, implementing and monitoring these various processes.

This chapter will deal with the role of ICTs in encouraging and managing these partnerships and the role of the partnerships in developing the ICTs in Mozambique.

Box 8.1 List of indicators related to ICTs

In order to monitor the attainment of this goal, two of the indicators are related to ICTs, specifically and solely with infrastructure:

- Telephone lines (fixed and mobile) per 1000 inhabitants, and,
- Number of computers per 1000 inhabitants.

Other indicators not solely based on infrastructure are included so as to measure digital inclusion, such as:

- Number of people trained in ICTs;
- Number of people employed in the ICT sector;
- Number of local companies registered which have ICTs as the focus of their business;
- Number of IP domains and addresses registered;
- Number of ISPs per 1000 inhabitants;
- Number of Internet users per 1000 inhabitants;
- Number of web pages in the main local languages;
- Number of radio/TV stations per 1000 inhabitants;
- Regulatory policies for the ICT sector;
- ICT-related patents registered;
- Number of software licences registered; and
- Number of institutions (e.g. schools, hospitals, local governments, banks, universities, libraries, etc) with Internet connections.

Promotion of Partnerships for Development

The stage of development of the ICTs in the world, and particularly in Mozambique, obliges us to revisit some key development aspects achieved in including ICTs in a broad manner on national development agendas. This analysis considers the ICTs both as a sector and as a facilitating tool.

35. Formed by the following members: Germany, African Development Bank, World Bank, Belgium, Canada, European Commission, Denmark, Spain, Finland, France, Holland, Ireland, Italy, Norway, Portugal, Sweden, Switzerland and the United Kingdom. Austria joined the partners during the Joint Review. These partners (PAPs) support the budget and have signed a Memorandum of Understanding with the Government. The observers include the United States, the International Monetary Fund, Japan and the UNDP.

To achieve development more rapidly, there is a need to continue to build the capacity of the various beneficiaries of the ICTs, and facilitate Mozambicans' access to knowledge such that they may be the main protagonists in development. The Internet has been a tool widely used in the interchange between national and international organisations, for trade, research, and education. This technology has been used in the remote trade (over the Internet) of goods and services, but with many limitations, since electronic transactions are not yet legal in the country. Something that occurs more frequently is the use of the Internet to promote various goods and services.

The international initiatives undertaken by PEOPLink[36] allow Mozambican artisans to resort to a platform for electronic trade, so that they can show and promote their products and make contacts for later sales. A further constraint on this initiative is that internet access is only possible in some parts of Mozambique. Thus the artisans have used national and international middlemen in this business who resell their goods, and this has implications in increasing the final sale price.

The other area in which the Internet is widely used is in the promotion of research and education. The internet has been used on a large scale in Mozambican research and education bodies to interconnect with other, similar national and international bodies to improve scientific research and to develop partnerships to implement innovative projects. Communication between universities and research institutes allows Mozambican universities access to the multi-disciplinary knowledge, ideas and innovations in institutions located in developed countries. A practice also noted in this collaboration is access to technical assistance, sharing of public knowledge, and the joint publication of research reports.

Mozambique has also heavily stressed, in its policies and strategies, the need to acquire knowledge about the ICTs. The Secondary Education Strategy envisages the introduction of ICTs in the curricula for secondary education and for technical and professional education, and access to computers, the Internet and free e-mail in the schools as a way of developing basic skills/capacities about ICTs. The project "Um Olhar de Esperança" ("A Look of Hope") is a partnership for the education area between the Mozambican government and the business sector. It is an example of a partnership which seeks not only the construction, rehabilitation and equipping of schools throughout the country, but particularly the introduction of ICTs in educational establishments.

The government believes that the ICTs, as a facilitating element, can impress a greater dynamic on administrative acts, and offer efficient methods to facilitate and speed up changes and to attain the targets of national programmes. To this end, the government has developed e-SISTAFE, a financial management system – expenditure and income – in public institutions, and introduced the Local Initiative Investment Budget in 2006 which is regarded as a highly positive step. According to the Budgetary Implementation Report for 2006, this initiative has reached a high level of execution.

The percentage of the State Budget as a whole transferred to the districts and municipalities grew from 5% to 9% between 2005 and 2006, and now exceeds the target agreed for the districts under the 2007 Performance Assessment Framework (QAD). The Joint Review, a participatory mechanism,[37] assessed the performance of the GdM and the PAP throughout 2006 based on the agreed QAD, and drew key lessons that should have an impact on performance in 2007 and on the planning and budgeting process for 2008.

The review took as its basis the plans and reports of the Government, including PARPA II, the 2006 Economic and Social Plan, the State Budget, the government report on the Implementation of the Budget and the PES, sector reports, syntheses of the Poverty Observatory meetings, the civil society Annual Poverty Report, and an independent report on the performance of the PAP.

The advantage of the diffusion of the ICTs (as part of Electronic Government) as a mechanism to promote the removal of red tape from public organisations is often mentioned. The ICTs increase the efficiency of these organisations, by helping simplify administrative processes and reducing the costs associated with them. They also contribute to a more flexible relationship with citizens, companies and other social agents and thus make possible the revival of democratic systems, by encouraging the exercise of citizenship rights and civic participation (for example, by making suggestions and complaints on-line and participating in discussion forums).

The assessment of the ICT as a sector looks at aspects of the expansion of the telecommunications

36. For more details, visit the website http://peoplink.org/EN/aboutus.html, viewed on19 March 2008.
37. Formed by 29 working groups, distributed by four thematic pillars, cross-cutting questions and the assessment of the PAP, constituted by representatives of the government, the PAP, other donors and civil society.

and Internet network in fibre-optic links to inter-connect all the districts (the poles of national development, strategically identified as such in the government's five year programme) by 2008, which is to be undertaken by Telecomunicações de Moçambique. This is an opportunity for telephone, radio and television operators to develop partnerships to use this installed infrastructure, saving on the investment costs to expand their services throughout the country, since there will be no need for each of them to implement their own infrastructure.

The other initiative is regional and will make it possible to connect Mozambique with the world through a fibre-optic cable, the EASSy Submarine Cable System. The objective of EASSy is to reduce dramatically the costs of international connections by establishing an undersea cable connecting 9,000 kms and 23 African countries along the Indian Ocean coast, from Djibouti to Durban in South Africa. This cable will in turn be inter-connected with other submarine systems connecting the African member countries to a further 56 counties throughout the world. Furthermore, it is intended to extend this fibre-optic connection to the countries of the interior (e.g., Zambia, Zimbabwe, Uganda, etc.), through the coastal countries.

Currently the costs of Internet access in Mozambique are high when compared with other countries in the region. The Eduardo Mondlane University, in partnership with other national ISPs, has established an Internet Exchange Point (IXP) which facilitates the flow of local (national) information on the Internet without needing to use international gateways. This initiative shows that by working in partnership the ISPs can reduce the costs of operation and make communications within the country speedier. The funds saved can be used to expand their service provision networks and bring further benefits to Mozambicans.

The other dimension of these partnership initiatives is awakening the awareness of communities about the benefits of ICTs. The first initiatives implemented in Mozambique were the establishment of two pilot Telecentres in Manhiça and Namaacha (see Chapter 7) and the introduction of ICTs in secondary schools (Schoolnet, see Chapter 4). These programmes have also contributed to the development of the ICT regulatory environment, such as the ICT Policy and its Implementation Strategy.

ICTs in the Framework of Developing Partnerships

The government, on its own, cannot guarantee that the ICTs play a significant role in development. Efforts to disseminate and appropriate technology are generally carried out by individuals, civil society, academic and research institutions, and the private sector, because they have the due knowledge and resources to ensure success in implementation. While the public sector, in partnership with the private sector, invests in the less

Box 8.2 Examples of some ICT partnerships for development

The Schoolnet project has the goal of making pupils computer literate, and to introduce the Internet into secondary schools, in order to integrate ICTs into education, and turn the schools into centres for sharing information/knowledge, and to promote access to and use of the Internet and e-mail. In the initial years, with the support of the World Bank and of the International Development Research Centre (IDRC), it was able to benefit 13 secondary schools in all the country's provincial capitals. In 2002, the project was moved to the Ministry of Education. Recent efforts have allowed the adoption of ICTs in the secondary education curriculum and the attraction of more partners from the private sector and civil society to provide Internet access (the case of TV Cabo), and computers (the case of the project "A Look of Hope").

The **Telecentres Project** was designed to provide community access to the Internet and to telephones, and training and use of computers in small rural communities. One of the objectives was to develop a business model that includes financial sustainability, even though this is an initiative with social goals. With the entry of other partners, besides the IDRC, such as UNESCO, the Kellogg Foundation, the Community Development Foundation (FDC), and Microsoft, it was possible to extend the network to a further 22 districts and also set up appended community radios in all these centres, currently called Multimedia Community Centres.

The **Sustainable Development Network (SDNP**), financed by the United Nations programme established in 1996, and the Leland Initiative. Africa Global Information Infrastructure Gateway financed by USAID and established in 1997, has contributed to the introduction of the Internet in Mozambique through building the capacity of ISPs and universities, improving their infrastructure, and training their technical staff. The initiative has also financed implementation of some VSATs in Mozambique and the creation of poles for Internet access in Beira and Nampula allowing the expansion of the Internet network, the production of web pages, the sharing of content and information on agricultural markets.

In 1997, a programme "Acacia in Africa" was launched, and in 2003 the programme Connectivity for Africa was launched, both financed by the International Development Research Centre (IDRC) of Canada, with the objective of making citizens aware of the Internet and ICTs for development. This financed some community projects such as the ICT debate forum, the development of local contents, and respective publication on-line by the Women's Forum and by the Christian Council of Mozambique, the use of ICTs in the management of natural resources, the national survey on ICT capacity in the public and business sector, and the development of an institute to upgrade the skills of Mozambicans in ICTs and business. According to the evaluation made of this programme by external assessors, they were categorical in stating that there is a high level of ownership of these projects.

expressive markets and encourages competition, through the creation of partnership opportunities and the creation of new markets, civil society should work in close collaboration with the communities to strengthen ICT-related initiatives and their respective integration in the development process.

The dissemination of ICTs in civil society and in the public administration seeks to include Mozambicans in the digital world, to expand the transparency of government and donor actions, and reduce the cost of public procedures, in order to increase interaction with the private sector, broadening the opportunities to negotiate its products and services with the government.

Government: Policy maker and provider of infrastructure and human resources

The development of the ICTs in Mozambique and their role in expanding the competitiveness of the national economy is only possible based on collaborative actions, and these must take place in a favourable environment. The general framework of legislation on ICT in Mozambique includes:

- The ICT Policy approved in 2000, the Implementation Strategy for that policy approved in 2002 with the mission of creating a legal and business environment favourable to the production and dissemination of ICTs, which turns Mozambique into an active and competitive partner in the world economy, and into a producer rather than a mere consumer of ICTs;
- The Electronic Government Strategy approved in 2006 to improve governance and increase efficiency and effectiveness in the public and private sectors;
- The Telecommunications Law passed in 2004 which limits the monopoly on the fixed network until December 2007 and stresses the principles of universal access;
- The Universal Access Policy and Strategy;
- The Law on Electronic Transactions which was submitted for approval in 2007;
- The Science, Technology and Innovation Policy, which recognises the crucial need to integrate ICTs in all sectors as a facilitating tool that will strengthen capacity, innovation and the entrepreneurial spirit, improve corporate governance, and increase the efficiency of the public sector.

This general framework allows improvement in the provision of public services and interaction of the private sector and civil society with the government. The use of ICTs to increase collaboration and facilitate procedures is one of the objectives of decentralising the state administrative machinery, accelerating change and meeting the targets of national programmes. Some examples implemented in this area are e-SISTAFE, a financial management system – expenditure and income – in public institutions, and the Local Initiative Investment Budget introduced in 2006, under the management of the districts. These are regarded as very positive steps which allow the entry of other partners as development actors.

In order to facilitate the import of computer equipment and the development of the computer park, the government passed legislation reducing customs duties to 7.5% on the import of computers and software, and intends to reduce duties to 0% on the import of components in order to encourage a computer assembly industry. The ICTs can facilitate the introduction of outsourcing, a practice of partnership whereby the public sector can gain by allowing some areas to be implemented by the private sector. This practice also favours Public-Private-Partnerships (PPP), where each party can identify its role as a producer, a supplier or a user.

A robust communications infrastructure could facilitate to a great extent the unleashing of these partnerships, given the existence of an interconnection facility. There is a severe shortage of staff trained in ICTs. On average, in recent years, the universities have been graduating about 100 computer technicians a year, a number which is far too small to implement all the various computer projects. Here it is the government, once again, which bears the responsibility for ensuring training in the areas of science, technology and engineering.

Civil society: Users and financers of ICTs

The involvement of NGOs, development agencies and civil society in general is fundamental for creating an equitable information society, based on sustainable economic and social development. According to the studies undertaken, these organisations have been among the main actors in disseminating the new technologies. Most of the ICT projects for development, are financed or implemented by these organizations. Examples of these initiatives are the community access points - for example, the telecentres that guarantee public access to the Internet, or the Internet Cafés, which can be the vehicle for establishing Internet POPs in all districts, and the introduction of the Internet in secondary schools. In general, civil society has special competence and capacity to connect communities to the benefits brought by the ICTs.

Some risks identified in these partnerships are concerned with how they are initiated. The organisations that head most of them are not Mozambican,

and they also want their own interests satisfied during implementation. This has led to a feeble sense of ownership of the initiatives by communities, which makes their sustainability difficult. This is partly because there is little transfer of technology and knowledge or weak involvement of local technicians and staff in implementing and managing the initiative.

In some cases reconditioned equipment, or equipment no longer used in the west, is used in these initiatives. Shortly afterwards, the equipment is out of order or obsolete. This leads to high future costs for the country, because this is rubbish that is difficult to handle, and requires the hiring of specialists to deal with it. These partnerships mostly result from global initiatives, or initiatives originating from outside Mozambique, which often bring a challenge or barrier in the shape of the official language of communication between partners or in the software applications used. Rarely are they in Portuguese, and much of the knowledge produced, including reports, is published solely in languages other than Portuguese. So that they can benefit a larger number of Mozambicans they have to be translated into Portuguese, and a fund allocated to cover the costs of translation, which makes the collaboration more expensive.

ICTs have been a facilitating tool in implementing the activities of society in establishing a new platform and vision, as an open, multicultural and participatory space, in which programmes will unfold to raise awareness about the foreign debt, poverty, education and health, and to divulge legislation, accompanied by training and technical assistance to promote citizenship action using participatory and social advocacy tools to improve governance in Mozambique, with the participation of civil society. The availability of ICTs in the community centres is an opportunity for partnership which can help to train technicians in the civil service, and individuals in general in the districts, without the need to travel to the provincial capitals.

Private sector: Complement to public resources and technical capacity in ICT

The involvement of the private sector is fundamental in the industrialisation of the ICTs, in order to guarantee the solid and sustainable development of infrastructures, content and applications at costs accessible to Mozambicans. The private sector can be involved in practical partnerships for the development of innovative applications, and can play a role in a broader political and social context, for example, by helping Mozambique develop ICTs, ICT markets and human resource capacity in ICT.

According to the strategy document for the implementation of universal access, the national telecommunications market in 2004 was estimated at 215 million dollars, and the future growth indices are

Box 8.3 Role of ICTs in the management of the Programme Aid Partnership

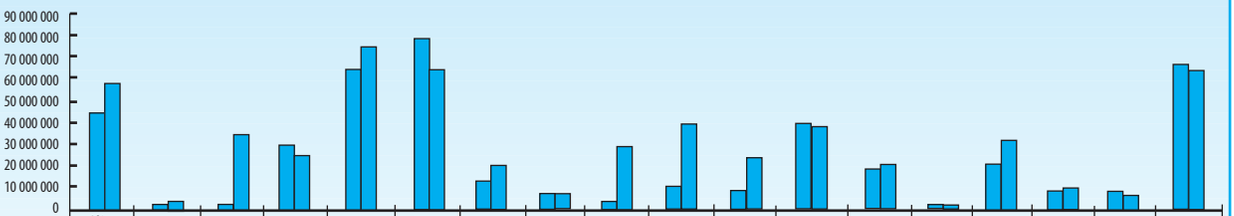
The objective of the Programme Aid Partners (PAPs) is to contribute to reducing poverty in all its forms, by supporting the evolution, implementation and monitoring of PARPA through:

- establishing a partnership based on frank and open dialogue about the content and progress of Mozambique's poverty reduction strategy; and
- granting funding to the public sector for poverty reduction, with a clear and transparent link to performance, so as to improve the effectiveness of aid and the country's sense of ownership of the development process.

In implementing this initiative, ICTs facilitate the distance discussion of programme aid, and the creation of databases (eg the ODAMoz) and the respective areas of intervention, as well as in the planning and monitoring of processes, guaranteeing good linkages between the dialogue and monitoring of the PAP and the Poverty Observatory.

Below is an assessment of Official Development Aid for 2005 and 2006 using the systems of state procurement.

ODA to GoM using Public Procurement Systems (data in US$)



	African Development Bank	Belgium	Canada	Denmark	DFID	European Union	Finland	France	Germany	Ireland	Italy	Netherlands	Norway	Portugal	Spain	Sweden	Switzerland	World Bank
in 2005	44 584 500	2 514 149	3 024 606	28 440 799	65 251 592	78 881 449	12 350 760	7 228 180	4 399 762	3 997 296	8 461 362	39 815 333	17 954 503	1 479 491	8 510 535	20 917 678	8 460 418	66 500 000
in 2006	58 772 400	3 771 224	34 196 569	24 906 735	74 156 363	64 538 225	20 601 291	6 514 402	29 792 675	38 202 506	23 022 884	39 355 495	20 516 614	1 494 383	9 313 607	32 388 664	7 125 435	63 990 000

projected at a minimum of 10% a year, with 15% more likely. Liberalisation of the communications sector can help expand the market and the communications industry for the entire country.

The strategy adopted is that implementation of the universal access policy in Mozambique will be led by the private sector, and oriented towards the market. It is an initiative to expand the terrestrial telephony infrastructure, public access and private services to all districts, localities and villages that currently have no access. The participation of the Mozambican private sector in the recent public tender for implementing telephone and Internet services in four districts in Zambezia and Nampula provinces was outstanding. The Universal Access Service fund, managed by the Mozambique National Communications Institute (INCM), is the result of contributions from the main telecommunications operators, of 2% of their gross income, in order to expand public access to the telephone service throughout the country.

Private sector participation and the current stage of ICTs has allowed the establishment of a highly computerized banking system in the country, aligned with the best in the world. In 2006, according to the 2007 Joint Review Report, the number of bank branches reached 231, of which 53.3% are located in Maputo City and Province, compared with the 219 branches that existed in 2005. In 2006 a further five micro-credit operators and two micro banks were authorised. The low level of bank deposits in our economy, particularly in the districts, remains a great concern. Of the 128 districts in the country, only 28 have bank branches, due to the high operational costs involved (transport, security and communications).

Digital Exclusion *versus* Inclusion: Building an Information Society

The ICTs facilitate the free circulation of information and ideas, leading to the creation of completely new forms of social and economic interaction and new communities in a cyberspace without borders. These technologies make it possible for people to accede to information and knowledge almost instantaneously, in any part of the world.

The formulation of strategies for greater participation by communities and by associations should inform and guide the agenda of governance, because only by stimulating competitiveness in these segments as well can Mozambique achieve the successes it seeks. It is through this prism that the efforts for decentralisation and for greater empowerment of the communities should be viewed, as well as stimulating greater participation by these and other development stakeholders. The consolidation of regional and international partnerships should be directed towards this strengthening.

Digital exclusion is one on of the greatest barriers. It has created a disparity of knowledge and access to information between the cities and the rural areas. An information society, without (digital) exclusion, is characterised by the existence of a large number of networks of economic and social interchanges of individuals and communities with the capacity to link a variety of groups, allowing them access to and exchange of information and knowledge that are crucial to their socio-economic development. Education is a key element in building this society based on information, knowledge and learning. The introduction of ICTs in the schools will allow the development of a culture of e-learning in schools which ensures the use of ICTs in teaching and learning in the curricula, and professional development of teachers.

The appropriation of these technologies, both by the public administration and by citizens or companies has happened in a cross-cutting way. Society indicates a lack of maturity in exploiting the potential inherent to the use of these technologies. The tendency to appropriate the ICTs has been characterised by making use of the simplest advantages, those most easy to make operational (and the least demanding is terms of the skills needed to exploit them and the credibility and confidence they involve) and which will obviously not be those that are expressed in the most relevant improvements to citizens' standards of living and the strengthening of business competitiveness.

The ICT Policy Technical Unit (UTICT) has developed an information technology observatory which needs to be updated, encouraging partnerships for collecting data with national institutions, such as the Mozambique National Communications Institute, the National Statistics Institute, the fixed and mobile phone operators, the ISPs, the software production and computer equipment resale companies, and the NGOs that have implemented ICT projects for development.

Conclusions and Recommendations

The world is experiencing an informatics revolution that has changed the facet of human life in an extraordinary way, from education, economy and entertainment. Equally, the potential for ICTs to process, store, refine and disseminate data, information and knowledge in diverse forms throughout disperse geographical limits has transformed the way governments, the public and private sectors operate throughout the world.

ICTs today assume the same prominence as do water and electricity and, consequently, have become a main factor for the socio-economic development of nations. ICTs have altered the principles of dissemination and control of information. The appearance and convergence of ICTs has become the centre of global socio-economic transformations. In the context of a long historic vision, technological advancement has been instrumental in raising living standards and, by inference, for the reduction of global poverty.

Mozambique has made significant strides towards its full integration into the Information Society and the global economy based on work in virtual networks and knowledge activities.

Aware of the strategic importance of ICTs in the fight against absolute poverty and towards development, the Mozambican government has since the year 2000 (when the ICT Policy was approved) up to now, started various initiatives to raise awareness and the interest of the public and the private sector, as well as through direct support to activities to implement ICTs in the various economic and social sectors.

The government has adopted a significant legal and political package of measures aimed at promoting the full integration of ICTs as crosscutting tools with a high potential to galvanise human development. However, there is still a long way to go towards a greater exploitation of the ICT potential aimed at reducing the current absolute poverty indices in the country, through the promotion of better access to education and to other public services such as health; significant increases in the levels of agricultural production and productivity; sustainable management of the environment and natural resources; and prevention and efficient management of cyclical natural disasters that Mozambique suffers annually, among other activities.

Amongst some of the targets that the country needs to attain in order to achieve a bigger and more efficient diffusion of ICTs and their use, are the increase of Internet penetration; the substantial addition of national content on Internet; the expansion of basic competence on the use of information technology; the availability and expansion of online services and better interactivity with citizens by the public administration, among others.

This report notes that one of the most important barriers to be removed by the ICT Policy is the expansion of communications infrastructure to the country's most remote areas, thus reducing the high cost of connectivity, there remain barriers in access to ICTs for the majority of the population with low income. Such a goal can be achieved with greater speed through the creative establishment of partnerships between the public and private sectors.

Regarding telephones, worthy of consideration is that the expansion of access to rural areas can be stimulated through the inclusion of certain obligations and targets by the involved companies, as part of the conditions and obligations for licensing. Such obligations should include the guarantee of rigorous observation of the proposed tariffs within the allowed limits in the rural areas as pre-determined by the INCM, as a way to stimulate the expansion of universal services throughout the country.

The improvement and innovation of mobile network services to enable voice access, data and Internet remains an important challenge, considering that each mast covers a 30 km radius, would enable the country to reach higher levels of tele-density and Internet use. This objective can be realized by stimulating partnerships between research institutions and individual innovators aiming at the provision of local sustainable solutions on the one hand, and on the other, between mobile phone service providers to secure the full provision of infrastructure.

Internet use is undoubtedly the development spoke of the information society and its dissemination decisively conditions the method and speed of diffusion and social ownership of ICTs, and thus the increase in the quality of life of citizens as well as the competitiveness of the local economy.

In order to stress Mozambique's development vision, the ownership of ICT knowledge and promotion of natural science, engineering and new technologies teaching becomes indispensable. Education is the key element in the building of this society based on information and knowledge, which can be elevated in the rural areas with the introduction of e-learning for the mass Training of Trainers (teachers) and professionals in various areas.

However, ICTs alone cannot be seen as a panacea, that is, as a solution for all the problems of development. While acknowledging their extraordinary potential in enabling access and sharing of in-depth information, breaking the traditional barriers to give voice to the remote population, and to supply valuable information that strengthens economic, health and educational activities, ICTs can only acquire relevance and impact when integrated with enlightened strategies of national development, sensitive to the global nature of the contemporary society challenges.

Technical Notes

Technical Note I

Methodology for Disaggregating the National GDP by Provinces and Regions

One of the innovations of Mozambique's National Human Development Reports (NHDR) is the presentation of the Human Development Index (HDI) disaggregated by provinces and regions. A fundamental step for this innovation is the desegregation of the Gross Domestic Product (GDP) by provinces and regions at both current prices and constant prices.

This technical note describes in terms of national accounts the methodology used to break down the Gross Value Added (GVA) from 2000 to 2006 by provinces and regions and how this indicator is adjusted to arrive at the concept of the GDP. The material takes up and updates the methodologies for disaggregating the national GVA by provinces and regions described in the previous NHDRs.

Principles and Methods of Regionalisation

This section explores the general principles used in disaggregating the GDP produced by the INE's Department of National Accounts by provinces and regions. Thus we start by defining the concept of Regional Accounts and regional territory, and then establish rules for the provincial/regional breakdown of the GDP.

In an initial approach, the regional/provincial accounts consist of the regionalised registration of operations concerning the flow of goods and services between the residents of a region/province, and make possible the construction of a series of macro-economic indicators that facilitate comparisons of structure and evolving analyses of different regions. Thus each region is treated as a specific economic entity.

However, this undertaking runs into some serious conceptual obstacles, particularly the fact that the regional territory is not a "closed area" from the point of view of its economy; that is, the complete description of the economy of each region/province cannot be obtained with the same depth or breadth as a national economy, given the multiplicity of statistical restrictions on deeper knowledge of regional or provincial activities.

Like the national accounts, the regional accounts are governed by the principle of residency, according to which each economic or productive unit is allocated to a particular economic territory in relation to which it has a centre of economic interest. Thus the application of the principle of residency, as a general principle, in the regional/provincial accounts by area of activity means that the Gross Value Added should be allocated where the production unit resides. In the case of households, since they are single-region institutional units, it is considered that their centre of economic interest is in the region where the majority of their activities take place, which corresponds to the region where they live, but not necessarily the region where they work.

Delimiting the regional economy rests on the functional perspective, that is, the technical economic unit of reference is the establishment whose activity in the region where it is located it is intended to capture. Since the establishment is the unit which best represents regional activity, it is also here that one finds the greatest constraints on constructing an accounting system identical to that used for the national accounts, since the establishment, unlike the company, does not possess legal status, and has no autonomous accounting. This fact makes it difficult to individualise an important part of the flows supporting the production of regional accounts (IGBE, 1999).

Methods of Regionalisation

The regionalisation of operations varies since it is determined by the type of data available, and on the organisation of the National Statistical System itself. According to IBG (1999) and Eurostat (1995), in general there are three methods of regionalisation:

The Ascending Method, which presupposes the co llection and treatment of the elementary statistical units, taking into consideration local level units of economic activity (establishments) and institutional units (households and public administrations) and gradually adding them together until reaching the desired regional level.

This method, although it ensures the use of statistical data strictly linked to the variables that it is intended to measure at regional level, does not guarantee a priori consistency with national figures.

The Descending Method consists of desegregation of the national product on the basis of a regional indicator resulting in the use of apportioning units, i.e. it functions by reference to a regional indicator that is as close as possible to the variable to be estimated. The method is called descending because the aggregate is allotted to a region and a year on the basis of a local or regional unit of economic activity. However, the notion of unit of local economic activity, in most cases, continues to require an accurate regional allocation. For example, the Gross Value Added of rail transport can be allocated to regions according to the number of passengers and aggregate tonnage transported. This method has advantages over the previous one because of guarantees that the national figures and the regional figures are consistent, since the latter result from a division of the national total based on a distribution key - but it has disadvantages in that the regional valuations do not always result from data directly linked to the variables to be measured and the basic units in question. But this disadvantage can be less serious if the distribution indicator is correlated with the operation in question.

The Mixed Method, which consists in using simultaneously the ascending and descending methods, since the ascending method is rarely found in its pure form. There are always gaps in the data which have to be filled by using the descending approach. Similarly many descending methods frequently include data from exhaustive sources, as do ascending estimates. Thus mixed methods are the norm, and their degree of reliability depends above all on the available statistical sources.

In this work, priority has been given to the descending method, where the main regional aggregate is a replica of the following aggregates in the national accounts: Production, Gross Value Added and the Gross Domestic Product (GDP), in the perspective that the resulting estimates reflect the National Accounts produced by the National Statistics Institute (INE).

One advantage of this method is the numerical coherence between the national accounts and the regional ones, i.e. it guarantees that the national figures and the regional figures are consistent, knowing that the latter result from a division of the national total based on a distribution key. This method is cheaper to develop in that its uses existing data, and does not require new exhaustive records. It is the method most recommended in situations where there is no information from the units of local economic activity.

Sources of Data

To regionalise most of the operations, priority was given to the sources and statistical indicators from the provinces/regions, while simultaneously verifying whether they admit the possibility of certain operations being multi-regional. In cases where the quality of the data was mediocre or unsatisfactory, or because it simply did not exist and hence for a particular operation it was not possible to use sources or indicators based on place of residence, the regional allocation of production was undertaken on the basis of estimates and approximations resting on empirical knowledge of the reality of the provinces.

Thus for the operations of allocating production and Gross Value Added where adjustments were made to reach the concept of regional/provincial GDP, the main statistical sources were the balance sheets for 143 products drawn up by the INE's Department of National Accounts, the State Budget, the Provincial Statistical Yearbooks, the data from the Early Warning System, the data from surveys and censuses (IAF, QUIBB, CAP, TIA, IAF, RGPH, INFOR, IFTRAB etc.) accompanied by estimates and approximations resting on empirical knowledge of the reality of the provinces.

Thus, for agricultural products, the annual data from the Early Warning System was used, which provides estimates of production and cultivated area by province for seven major crops (unhusked rice, maize, sorghum, beans, fresh cassava, groundnuts and millet). It is estimated that, taken together, these crops account for about 75% of agricultural production (IAF96). Apart from the data from the Early Warning System, the provincial yearbooks have information on other crops. For the remaining agricultural produce, for which there is no detailed provincial/regional information, the authors took the population growth rate, on the assumption that, when the market is saturated and there is no possibility of exports, production becomes stabilised at the size of the market, and its growth, in the case of perishable products, in the absence of other distorting factors, approaches the population growth rate.

For livestock produce, the data from the Agricultural and Livestock Census held by the INE in 1999- 2000 was used. This information is updated by using data on livestock inventories by province, and by category and species, providing data on cattle, goats, pigs and other species.

For the fisheries, mining and commercial services sectors, the allocation of production to provinces was based on the number of people employed in the respective economic activity, in accordance with the results from IAF 2002/03 and the projections from the 1997 Population Census.

For the industry and construction sectors, the allocation was based not only on the number of people employed in the respective economic activity, but also on estimates and approximations resting on empirical knowledge of the reality of the provinces. For example, allocation of production in the construction sector paid a great deal of attention to Maputo, Inhambane and Nampula provinces which in the last four years have benefited from large investments in manufacturing industry and in mining respectively.

For electricity, both the amount generated and the amount invoiced by provinces, and included in the EDM annual reports, were used. The application of the principle of residence, according to which production of Gross Value Added should be allocated where the unit of production is resident, allowed the production of HCB to be entirely allocated to Tete province. From the production point of view, for piped water services, the reference data come from the water companies in each province. This information was complemented by the IAF data registering expenditure on water that is not piped. This value is updated annually by the population growth rate, on the assumption that the service bears a direct relation to the number of people who need these services.

For most activities in the tertiary sector (trade, banking and insurance and real estate services), although they have a huge weight in the national economy[38], they are the least known part of the regional estimates. In many countries, the methodology used for estimating even the national Gross Value Added of this sector is not very good. In this work, recognizing the poor quality of the data for this sector, the allocation of operations was based on the number of people employed in the service sector.

For restaurants and hotels, production was allocated according to the guest-nights in hotel establishments, as registered in the provincial yearbooks. This criterion is more consistent with that used by the INE's Department of National Accounts in calculating quantitative indices for the sector.

The distribution of production in the transport and communications sector was based on an index combining statistics of the number of vehicles, cargo handled in the ports, passengers transported, and telephone coverage.

Finally, for the public administration and defence services, and for health and education services, the authors used the expenditure in the State Budget, and number of health staff and school attendance respectively.

Disaggregation/Regionalisation of Operations

To allocate production to provinces, the reference point taken was the balance sheets for each year drawn up by the INE's Department of National Accounts for each of the 143 products, on the assumption that the sum of the production of all of the provinces should be approximately equal to the value of production on the balance sheets

As the main rule, the regional data with provincial detail is used to estimate the relative participation of each region in the national sum by areas and by variables. This establishes a key of distribution by province. However, it is not possible for all areas to obtain regional information for all variables. Hence alternative methods are used so as to obtain better estimates for the variable in question. This implies, in practice, that the same regional distribution can be applied both for production and for value in the various fields of activity at the most detailed level. Thus the technical coefficient of intermediate consumption is assumed, that is, the ratio between production and intermediate consumption is the same in all regions. This hypothesis, although difficult to confirm, cannot be avoided as a result of the methodology used in this study.

Adjustment of the Provincial Values

From the conceptual point of view, it was not possible to establish an objective criterion for a provincial allocation of customs duties and services of indirectly measured financial intermediation (SIFIM). Arising from the difficulties in obtaining indicators to share out the customs duties and SIFIM by provinces, the distribution was done proportionately to each province. This adjustment made it possible to reach the concept of the GDP.

Quality and Precision of the Estimates

The precision and quality of the estimates presented here depend on the type of methodology applied, but above all on the quality of the data, a factor which is beyond our control, and necessarily involves improving the provincial statistical information. In general, the regional/provincial data are less exact than the national data, because they are based on smaller samples, and on databases of inferior quality.

38. As a whole, the tertiary sector accounted for 48% of the GDP in 2004.

The national economy has a strong identity: the national frontiers are fixed and cross-border flows (of people, goods, services and financial assets) are habitually measured, or are even regulated. The regional economy is much more open: the regional/provincial boundaries vary from time to time, and the flows between regions/provinces are so common that they are rarely regulated or measured. Even so, based on the available data and the criteria we have defined, it has been possible to present an estimate that we believe reflects what is really happening in the Mozambican economy.

Conclusions

In this work, the Descending Method has been used to disaggregate the 2000-2006 GDP by provinces and regions. For sources of data, the authors used the balance sheets, the Provincial Statistical Yearbooks, data from the Early Warning System, as well as the data from surveys and censuses (IAF, QUIBB, CAP, TIA, IAF, RGPH, INFOR, IFTRAB etc.), accompanied by estimates and approximations based on empirical knowledge of the reality of the provinces to disaggregate production and Gross Value Added by provinces/region, and produce estimates of the GDP from the perspective that the resulting estimates would mirror the national accounts compiled and published by the INE.

Based on these assumptions, first distribution keys were constructed based on the balance sheets of the national accounts formed by a sample of 143 products. Based on the distribution keys, proportional allocation of the national sums was made for each field of activity and by provinces/regions. Arising from the difficulties of obtaining indicators for sharing out customs duties and SIFIM by provinces, the national values of these operations were allocated proportionately to the Gross Value Added of each province. This adjustment made it possible to reach the concept of the Gross Domestic Product of the province or region.

The precision and quality of the estimates presented here depend on the type of methodology applied, but above all on the quality of the data, a factor which is beyond our control, and necessarily involves improving the provincial statistical information. Even so, based on the available data and the criteria we have defined, it has been possible to present an estimate that we believe reflects what is really happening in the Mozambican economy.

Technical Note II

Calculating the Human Development Index (HDI)

The HDI is based on three indicators: longevity, as measured by life expectancy at birth; educational attainment, as measured by a combination of adult literacy (two-thirds weight) and the combined gross primary, secondary, and tertiary enrolment rate (one third weight); and standard of living, as measured by real per capita GDP (in PPP $).

To calculate the HDI, the parameters used are derived strictly from the methodology of the Global Human Development Reports, which fix for each of the indicators of the HDI, the following minimum and maximum values:

- Life expectancy at birth: 25 years and 85 years;
- Adult literacy: 0% and 100%;
- Combined gross enrolment rate: 0% and 100%;
- Real per capita GDP (PPP $): $100 and $40,000.

Thus, the results obtained are comparable with the indicators of other countries and to the figures published in the GHDRs, diverging only in the sources of the data used. However, since it makes no sense to use a real per capita GDP in PPP dollars to compare the level of human development between regions within Mozambique, the minimum and maximum values of the GHDRs were converted into Meticais based on the PPP dollar conversion rate, and then applying a deflator allowing comparisons between years along a series under analysis.

Based on these fixed minimum and maximum values, the indices for life expectancy and educational attainments were calculated according to the following general formula:

$$\text{Index} = \frac{\text{Actual } x_i \text{ value} - \text{minimum } x_i \text{ value}}{\text{Maximum } x_i \text{ value} - \text{minimum } x_i \text{ value}}$$

Taking as an example Mozambique's life expectancy at birth (45.0 years), the adult literacy rate (43.3) and the combined gross primary, secondary and tertiary enrolment rate (38.5), all for the year 2001, then the life expectancy index (ILE) and the educational attainment index (IEA) for this year would be:

$$I_{EV} = \frac{45.0 - 25}{85 - 25} = 0.333 \qquad I_{NE} = \frac{2 * \frac{43.3}{100} + \frac{38.5}{100}}{3} = 0.417$$

Constructing the income index (Iy) is a little more complex, and it is not the aim of this technical note to present the details of how it is built. But we can summarise the construction of the income index by using the following formula:

$$I_y = \frac{Log(y_{observado}) - Log(y_{min\ imo})}{Log(y_{max\ imo}) - Log(y_{min\ imo})}$$

Taking as an example the real per capita GDP in PPC dollars of 2001 (1,471.8), we can calculate the corresponding index in the following way:

$$I_y = \frac{Log(1471.8) - Log(100)}{Log(40000) - Log(100)} = 0.449$$

Once the indices for life expectancy, educational attainment and income have been obtained, the HDI is calculated as a simple average of the three indices.

$$HDI = \frac{0.333 + 0.417 + 0.412}{3} = 0.400$$

Technical Note III

Calculating the Gender-adjusted Development Index (GDI)

Calculating the GDI is based on the same variables as the HDI, with the difference that the GDI adjusts the average achievement in life expectancy, educational attainment and income in accordance with the disparity in achievement between women and men. In other words, the GDI is the HDI adjusted to take account of sexual inequality.

In this study the weighting formula was set at _=2, taken from UNDP (2004) which expresses a moderate aversion to inequality[39]. As in the HDI, in constructing the GDI the following maximum and minimum values were established, taken from the GHDRs:

Life expectancy at birth: Maximum 82.5 and 87.5 years for men and women respectively. Minimum 22.5 and 27.5 years for men and women respectively. The difference reflects the fact that women tend to live longer than men, given the same care (medical care, nutrition etc.).

The same maximum and minimum values as used in calculating the HDI were maintained for the Adult Literacy Rate, the Combined Gross Enrolment Rate, and real per capita GDP, as well as the formula for calculating the individual indices. However, to allow comparability of the administrative regions within Mozambique, the minimum and maximum values were converted into nominal meticais, based on the PPC conversion rate, and then applying a deflator that allows comparability between years along a series under analysis.

The equally distributed life expectancy index is given by:

{Female population share x (Female life expectancy index)(1-_) + male population share x (Male life expectancy index)(1-_)}(1-_)

Likewise, ***the equally distributed educational index is given by:***

{Female population share x (educational attainment index)(1-_) + male population share x (educational attainment index)(1-_)}(1-_)

Income Calculation

Values of real per capita GDP (PPP US$) for women and for men, in an ideal situation, are calculated, following UNDP (2004:264) recommendations, from the female share (Sf) and male share of earned income, using the ration between female non-agricultural wages (Wf) and male non-agricultural wages (wm) and the percentage shares of women (eaf) and men (eam) in the economically active population. Formally:

$$\textit{Female share of the wage bill} = \frac{(W_f / W_m) * ea_f}{(W_f / W_m) * ea_f + ea_m}$$

Assuming that the female share of earned income is exactly equal to the female share of the wage bill:

$$S_f = \frac{(W_f / W_m) * ea_f}{(W_f / W_m) * ea_f + ea_m}$$

When data on the wage ratio are not available, as is the case in Mozambique, the same document suggests an estimate of 75%, the weighted average of the wage ratios for countries with wage data out of the series of countries included in the study, of which Mozambique was part. This value means that, on average, the wages of women are 25% lower than those of men.

It is then assumed that the total GDP (PPP US$) of a country (Y) is divided between men and women in accordance with the female share of earned income. Formally,

Total GDP (PPC US$) going to women = Sf xY

Total GDP (PPP US$) going to men = Yx (1 - Sf)

The per capita GDP (in PPP US$) of (yf) and of men (ym) is obtained by division by the female and male population of the country.

The adjusted income both for women W(yf) and for men W(ym) is dealt with in the same way as in the construction of the HDI:

$$W(y_m) = \frac{Log(y_m) - Log(y_{min\ imum})}{Log(y_{max\ imum}) - Log(y_{min\ imum})}$$

&

$$W(y_f) = \frac{Log(y_f) - Log(y_{min\ imun})}{Log(y_{max\ imum}) - Log(y_{min\ imum})}$$

39. Expresses a moderate degree of inequality aversion and is calculated as a constant average of the male and female values.

The equally distributed income index is given by:

{Female population share x [W(yf)](1-_) + Male population share x [W(ym)](1-_)}(1-_) .

Technical Note IV

Calculating the Human Poverty Index (HPI-1)

HDI-1 measures deprivations in the three basic dimensions of human development captured in the HDI:

Vulnerability to death at a relatively early age, as measured by the probability at birth of not living to age 40.

Exclusion from the world of reading and communications, as measured by the adult illiteracy rate.

Lack of access to overall economic provisioning, as measured by the unweighted average of three indicators, the percentage of the population without sustainable access to an improved water source, the percentage of the population without access to health services, and the percentage of children under weight for age;

Once the indicators of deprivation are obtained, the HPI-1 is calculated through the following formula:

$$IPH - 1 = \left[\frac{1}{3}\left(P_1^{\alpha} + P_2^{\alpha} + P_3^{\alpha}\right)\right]^{\frac{1}{3}}$$

Where:

P1 = Probability at birth of not surviving to age 40 (times 100)

P2 = Adult illiteracy rate

P3 = Unweighted average of population without sustainable access to an improved water source and to health services, and the percentage of children under weight for age.

± = 3, the figure used to give an additional, but not excessive, weight to the areas of most acute deprivation.

Technical Note V

Calculating the Technology Achievement Index (TAI)

The Technology Achievement Index (TAI) is a composite index designed to capture the performance of countries in technological creation and diffusion, and in the construction of basic human capacities. The index measures achievement in four dimensions:

- Technology creation, measured by the number of patents granted toresidents per capita and by receipts of royalties and license fees from abroad per capita.
- Diffusion of recent innovations, measured by the number of Internet hosts per capita and the share of high-technology and medium-technology exports in total goods exports.
- Diffusion of old innovations, measured by telephones (mainline and cellular) per capita and electricity consumption per capita.
- Human skills, measured by the mean years of schooling in the population aged 15 and older, and the gross tertiary science enrolment ratio.

For each of the indicators in these dimensions, the observed minimum and maximum values are:

Indicator	Maximum value observed	Minimum value observed
Patents granted to residents (per million inhabitants)	994.0	0
Royalties and licence fees received (USD per 1,000 people)	272.6	0
Internet providers (per 1,000 people)	232.4	0
Exports of high and medium technology (as a percentage of total commodity exports)	80.8	0
Telephones (mainline and cellular), per 1,000 people	901.0	1
Consumption of electricity (KWH per capita)	6969.0	22
Average years of schooling (among population aged 15 and above)	12.0	0.8
Gross tertiary science enrolment ratio (%)	27.4	0.1

The performance for each indicator is expressed as a figure between 0 and 1 by applying the following formula:

$$\text{Index} = \frac{\text{Actual value - minimum value observed}}{\text{Maximum value observed - minimum value observed}} \quad (1)$$

The index for each dimension is calculated as a simple average of the indicators for that dimension. In turn, the HAI is a simple average of the indices of the four dimensions.

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Statistical Annex

Quadro 54
Table 54

Órfãos Originados pelo SIDA ou Não, por Regiões, Moçambique, 1990-2010
Total AIDS and non AIDS Related Orphans, by Region, Mozambique, 1990-2010

Descricao/Description	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Norte/North																					
Orfãos Maternos/Maternal Orphans	157,226	161,785	166,685	171,905	177,453	183,329	189,569	196,206	203,324	210,981	219,280	227,815	236,073	244,160	252,225	260,372	269,462	280,538	293,489	308,073	323,959
SIDA/AIDS	121	224	383	611	954	1,448	2,169	3,150	4,510	6,351	8,816	12,114	16,439	22,025	29,151	38,065	48,880	61,806	76,723	93,371	111,380
Nao SIDA/Non-AIDS	157,105	161,561	166,302	171,294	176,499	181,881	187,400	193,056	198,814	204,630	210,464	215,701	219,634	222,135	223,074	222,307	220,582	218,732	216,766	214,702	212,579
Orfãos Paternos/Paternal Orphans	252,457	257,423	262,571	268,276	274,446	280,965	287,851	295,081	302,591	310,345	318,377	325,872	332,108	337,470	342,325	346,839	352,207	359,729	369,144	380,131	392,267
SIDA/AIDS	735	1,002	1,320	1,688	2,206	2,885	3,762	4,934	6,468	8,463	11,044	14,374	18,626	24,036	30,848	39,198	49,162	60,833	74,037	88,486	103,820
Nao SIDA/Non-AIDS	251,722	256,421	261,251	266,588	272,240	278,080	284,089	290,147	296,123	301,882	307,333	311,498	313,482	313,434	311,477	307,641	303,045	298,896	295,107	291,645	288,447
Orfãos de Ambos /Orphans	43,556	44,386	45,272	46,306	47,504	48,882	50,400	52,090	53,939	56,772	60,045	63,544	67,079	70,724	74,624	78,778	83,194	88,661	95,114	102,465	110,559
SIDA/AIDS	133	197	282	392	551	770	1,073	1,484	2,040	3,721	6,233	9,111	12,462	16,374	20,978	26,304	32,391	39,434	47,387	56,172	65,656
Nao SIDA/Non-AIDS	43,423	44,189	44,990	45,914	46,953	48,112	49,327	50,606	51,899	53,051	53,812	54,433	54,617	54,350	53,646	52,474	50,803	49,227	47,727	46,293	44,903
Total de Orfãos/ Total Orphans	**366,127**	**374,822**	**383,984**	**393,875**	**404,395**	**415,412**	**427,019**	**439,198**	**451,975**	**464,554**	**477,612**	**490,143**	**501,102**	**510,905**	**519,926**	**528,433**	**538,476**	**551,606**	**567,518**	**585,739**	**605,668**
Centro/Centre																					
Orfãos Maternos/Maternal Orphans	207,371	212,556	218,423	225,156	233,030	242,402	253,670	267,156	283,098	301,684	322,859	346,086	370,500	395,394	420,013	443,498	465,746	486,942	506,621	524,464	540,281
SIDA/AIDS	591	1205	2265	3988	6685	10755	16615	24626	35106	48330	64323	82985	103918	126551	150223	174177	197848	220869	242763	263162	281798
Nao SIDA/Non-AIDS	206780	211351	216158	221168	226345	231647	237055	242530	247992	253354	258536	263101	266582	268843	269790	269321	267898	266073	263858	261302	258483
Orfãos Paternos/Paternal Orphans	333,861	337,493	341,456	346,153	352,183	359,988	369,735	381,686	395,856	412,398	431,192	451,217	471,462	491,308	510,229	527,619	543,788	559,235	573,678	586,828	598,583
SIDA/AIDS	2984	4498	6570	9437	13381	18700	25661	34431	45051	57596	71966	87907	105118	123213	141824	160510	179026	197218	214811	231528	247180
Nao SIDA/Non-AIDS	330877	332995	334886	336716	338802	341288	344074	347255	350805	354802	359226	363310	366344	368095	368405	367109	364762	362017	358867	355300	351403
Orfãos de Ambos /Orphans	74,499	75,176	76,029	77,242	81,340	87,279	94,470	103,124	113,286	124,688	136,929	150,480	165,178	180,666	196,435	211,924	226,760	241,241	255,018	267,683	278,981
SIDA/AIDS	739	1214	1927	2988	6806	12272	18915	26904	36274	47033	59147	72806	87880	104059	120890	137842	154610	171055	186821	201521	214873
Nao SIDA/Non-AIDS	73760	73962	74102	74254	74534	75007	75555	76220	77012	77655	77782	77674	77298	76607	75545	74082	72150	70186	68197	66162	64108
Total de Orfãos/ Total Orphans	**466733**	**474874**	**483849**	**494067**	**503873**	**515111**	**528934**	**545718**	**565667**	**589394**	**617123**	**646823**	**676785**	**706035**	**733808**	**759193**	**782774**	**804936**	**825282**	**843609**	**859884**
Sul/South																					
Orfãos Maternos/Maternal Orphans	144,184	141,662	139,318	137,164	135,226	133,623	132,426	131,730	131,684	132,442	134,162	136,992	141,015	146,247	152,620	159,932	168,158	177,212	186,746	196,315	205,471
SIDA/AIDS	132	284	553	989	1649	2621	4006	5933	8558	12063	16637	22466	29690	38364	48460	59809	72194	85329	98817	112216	125090
Nao SIDA/Non-AIDS	144052	141378	138765	136175	133577	131002	128420	125797	123126	120379	117525	114526	111325	107883	104160	100123	95964	91883	87929	84099	80381
Orfãos Paternos/Paternal Orphans	247,832	244,599	241,492	238,452	235,504	232,653	229,900	227,336	225,158	223,683	223,187	223,723	225,275	227,825	231,178	235,067	239,474	244,405	249,498	254,428	258,931
SIDA/AIDS	697	1062	1572	2268	3214	4485	6167	8359	11184	14791	19324	24893	31570	39347	48122	57712	67889	78410	88965	99260	109034
Nao SIDA/Non-AIDS	247135	243537	239920	236184	232290	228168	223733	218977	213974	208892	203863	198830	193705	188478	183056	177355	171585	165995	160533	155168	149897
Orfãos de Ambos /Orphans	72,253	67,270	62,742	58,724	55,288	52,504	51,346	51,251	51,690	52,774	54,473	55,717	57,635	60,240	63,475	67,209	71,306	75,830	80,544	85,197	89,498
SIDA/AIDS	200	325	511	778	1152	1668	3411	5790	8433	11429	14912	18712	23067	28013	33531	39520	45883	52525	59218	65714	71736
Nao SIDA/Non-AIDS	72053	66945	62231	57946	54136	50836	47935	45461	43257	41345	39561	37005	34568	32227	29944	27689	25423	23305	21326	19483	17762
Total de Orfãos/ Total Orphans	**319763**	**318991**	**318068**	**316891**	**315442**	**313772**	**310981**	**307815**	**305152**	**303351**	**302876**	**304999**	**308656**	**313833**	**320323**	**327790**	**336327**	**345788**	**355700**	**365546**	**374904**
Mocambique/Mozambique																					
Orfãos Maternos/Maternal Orphans	508,781	516,003	524,426	534,225	545,709	559,354	575,665	595,092	618,106	645,107	676,301	710,893	747,588	785,801	824,858	863,802	903,366	944,692	986,856	1,028,852	1,069,711
SIDA/AIDS	844	1,713	3,201	5,588	9,288	14,824	22,790	33,709	48,174	66,744	89,776	117,565	150,047	186,940	227,834	272,051	318,922	368,004	418,303	468,749	518,268
Nao SIDA/Non-AIDS	507,937	514,290	521,225	528,637	536,421	544,530	552,875	561,383	569,932	578,363	586,525	593,328	597,541	598,861	597,024	591,751	584,444	576,688	568,553	560,103	551,443
Orfãos Paternos/Paternal Orphans	834,150	839,515	845,519	852,881	862,133	873,606	887,486	904,103	923,605	946,426	972,756	1,000,812	1,028,845	1,056,603	1,083,732	1,109,525	1,135,469	1,163,369	1,192,320	1,221,387	1,249,781
SIDA/AIDS	4,416	6,562	9,462	13,393	18,801	26,070	35,590	47,724	62,703	80,850	102,334	127,174	155,314	186,596	220,794	257,420	296,077	336,461	377,813	419,274	460,034
Nao SIDA/Non-AIDS	829,734	832,953	836,057	839,488	843,332	847,536	851,896	856,379	860,902	865,576	870,422	873,638	873,531	870,007	862,938	852,105	839,392	826,908	814,507	802,113	789,747
Orfãos de Ambos /Orphans	190,308	186,832	184,043	182,272	184,132	188,665	196,216	206,465	218,915	234,234	251,447	269,741	289,892	311,630	334,534	357,911	381,260	405,732	430,676	455,345	479,038
SIDA/AIDS	1,072	1,736	2,720	4,158	8,509	14,710	23,399	34,178	46,747	62,183	80,292	100,629	123,409	148,446	175,399	203,666	232,884	263,014	293,426	323,407	352,265
Nao SIDA/Non-AIDS	189,236	185,096	181,323	178,114	175,623	173,955	172,817	172,287	172,168	172,051	171,155	169,112	166,483	163,184	159,135	154,245	148,376	142,718	137,250	131,938	126,773
Total de Orfãos/ Total Orphans	**1,152,623**	**1,168,687**	**1,185,901**	**1,204,833**	**1,223,710**	**1,244,295**	**1,266,934**	**1,292,731**	**1,322,794**	**1,357,299**	**1,397,611**	**1,441,965**	**1,486,543**	**1,530,773**	**1,574,057**	**1,615,416**	**1,657,577**	**1,702,330**	**1,748,500**	**1,794,894**	**1,840,456**

Fonte/Source: INE/MISAU, 2004

Quadro 53
Table 53

Esperança de Vida à Nascença, por Sexos Segundo Regiões e Províncias, Moçambique 2002-2007
Life Expectancy at Birth by Sex, and by Regions and Provinces, Mozambique 2002-2007

Região/Província Regions/Provinces	Esperança de Vida à Nascença/ Life Expectancy at Birth																	
	2002			2003			2004			2005			2006			2007		
	Total	Mulheres/ Women	Homens/ Men	Homens/ Men	Mulheres/ Women	Homens/ Men	Total	Mulheres/ Women	Homens/ Men	Total	Mulheres/ Women	Homens/ Men	Total	Mulheres/ Women	Homens/ Men	Total	Mulheres/ Women	Homens/ Men
Norte/North	**42.5**	**43.7**	**41.4**	**41.4**	**44.1**	**41.8**	**43.4**	**44.7**	**42.3**	**44.0**	**45.2**	**42.8**	**44.1**	**45.4**	**43.0**	**44.3**	**45.5**	**43.2**
Niassa	44.0	45.1	42.8	42.8	45.5	43.2	44.7	45.9	43.6	45.1	46.3	43.9	45.32	46.51	44.17	45.5	46.7	44.4
Cabo Delgado	41.1	42.8	39.4	39.4	43.2	39.8	41.9	43.7	40.2	42.4	44.2	40.6	42.41	44.21	40.68	42.5	44.3	40.8
Nampula	42.5	43.1	41.9	41.9	43.7	42.5	43.7	44.4	43.1	44.4	45.1	43.8	44.71	45.35	44.09	45.0	45.6	44.4
Centro/Centre	**44.8**	**46.5**	**43.2**	**43.2**	**47.2**	**43.8**	**45.8**	**47.5**	**44.1**	**46.1**	**47.8**	**44.4**	**46.4**	**48.1**	**44.7**	**46.7**	**48.5**	**45.0**
Zambézia	45.7	46.9	44.5	44.5	49.0	46.4	48.2	49.5	46.9	48.6	50.0	47.4	49.04	50.35	47.78	49.5	50.8	48.2
Tete	44.1	45.6	42.7	42.7	45.7	42.8	44.3	45.7	42.9	44.3	45.8	42.9	44.47	45.94	43.07	44.7	46.1	43.3
Manica	45.5	47.7	43.4	43.4	48.1	43.7	46.2	48.4	44.0	46.5	48.7	44.3	46.82	49.05	44.68	47.2	49.4	45.0
Sofala	43.8	45.8	42.0	42.0	46.1	42.3	44.5	46.5	42.6	44.8	46.8	42.9	45.17	47.17	43.25	45.6	47.6	43.6
Sul/South	**52.1**	**55.8**	**48.5**	**48.5**	**56.1**	**48.7**	**52.6**	**56.4**	**48.9**	**52.8**	**56.6**	**49.2**	**53.1**	**56.9**	**49.4**	**53.3**	**57.1**	**49.7**
Inhambane	**48.6**	52.4	44.9	44.9	52.8	45.2	49.3	53.2	45.5	49.6	53.5	45.8	49.9	53.85	46.11	50.2	54.2	46.4
Gaza	**48.0**	52.3	43.9	43.9	52.6	44.2	48.7	53.0	44.5	49.0	53.4	44.8	49.3	53.68	45.09	49.6	54.0	45.4
Maputo prov./prov.	**53.1**	56.4	49.8	49.8	56.8	50.1	53.7	57.2	50.4	54.0	57.5	50.7	54.34	57.8	51.01	54.6	58.1	51.3
Maputo cidade/city	**58.6**	62.0	55.3	55.3	62.1	55.3	58.6	62.1	55.3	58.6	62.1	55.3	58.8	62.2	55.5	58.8	62.3	55.6
Moçambique/Mozambique	**45.6**	**47.5**	**43.8**	**43.8**	**48.2**	**44.4**	**46.7**	**48.6**	**44.8**	**47.1**	**49.0**	**45.2**	**47.4**	**49.3**	**45.5**	**47.6**	**49.6**	**45.8**

Fonte/Source: INE, 2004, Projecções da Populacao Total 1997-2020 e por Area de Residencia 1997-2015 (Actualizacao); QUIBB 2000-01; IAF 2002-03

Quadro 52
Table 52

Componentes do Crescimento Populacional por Regiões e Províncias, 2001 - 2005
Components of Population Growth by Region and Provinces, 2001 - 2005

Região/Província Regions/Provinces	Resumo das Taxas Vitais/Summary of the Vital Rates															
	2002				2003				2004				2005			
	TBM/GDR	TBN/GBR	TC/GR	TGF/TFR	TBM/GDR	TBN/GBR	TC/GR	TGF/TFR	TBM/GDR	TBN/GBR	TC/GR	TGF/TFR	TBM/GDR	TBN/GBR	TC/GR	TGF/TFR
Norte/North	**20.2**	**44.1**	**2.3**	**6.2**	**19.8**	**44.0**	**2.3**	**6.2**	**19.3**	**43.7**	**2.4**	**6.2**	**18.9**	**43.5**	**2.4**	**6.1**
Niassa	19.2	46.9	2.7	6.8	18.9	46.9	2.7	6.8	18.4	**46.4**	2.7	6.7	18.0	46.1	2.7	6.7
Cabo Delgado	21.3	41.7	2.0	5.6	21.0	41.6	2.0	5.6	20.6	**41.3**	2.0	5.6	20.2	40.9	2.0	5.5
Nampula	20.1	43.8	2.3	6.2	19.6	43.6	2.3	6.2	19.0	**43.5**	2.4	6.2	18.5	43.4	2.4	6.2
Centro/Centre	**18.4**	**44.4**	**2.6**	**6.0**	**17.8**	**43.8**	**2.6**	**6.0**	**17.4**	**43.3**	**2.6**	**5.9**	**17.1**	**42.9**	**2.6**	**5.8**
Zambézia	17.3	41.4	2.3	5.5	15.6	39.8	2.3	5.3	15.1	**39.0**	2.3	5.2	14.7	38.4	2.3	5.1
Tete	19.4	46.7	2.6	6.7	19.2	46.6	2.6	6.7	19.0	**46.2**	2.6	6.6	18.9	45.9	2.6	6.6
Manica	17.9	46.6	3.0	6.3	17.6	46.5	3.0	6.3	17.2	**45.9**	3.0	6.2	16.9	45.4	3.0	6.1
Sofala	19.0	42.7	2.3	5.6	18.7	42.4	2.3	5.6	18.4	**42.1**	2.3	5.5	18.0	41.9	2.3	5.5
Sul/South	**13.9**	**36.3**	**2.4**	**4.4**	**13.6**	**35.8**	**2.4**	**4.3**	**13.4**	**35.4**	**2.3**	**4.2**	**13.1**	**35.1**	**2.3**	**4.2**
Inhambane	17.1	40.5	2.2	5.0	16.7	40.1	2.2	4.9	16.2	**39.7**	2.2	4.8	15.8	39.3	2.2	4.8
Gaza	17.1	39.9	2.0	5.0	16.7	40.0	2.1	5.0	16.4	**39.7**	2.1	4.9	16.0	39.4	2.1	4.9
Maputo prov./prov.	12.8	34.8	2.9	4.2	12.5	34.2	2.8	4.1	12.3	**33.7**	2.7	4.0	12.0	33.1	2.7	3.9
Maputo cidade/city	8.5	29.9	2.5	3.4	8.4	28.7	2.4	3.2	8.5	**28.6**	2.3	3.2	8.5	28.5	2.3	3.1
Moçambique/Mozambique	**17.8**	**41.8**	**2.4**	**5.5**	**17.2**	**41.3**	**2.4**	**5.5**	**16.8**	**40.9**	**2.4**	**5.4**	**16.4**	**40.5**	**2.4**	**5.4**

Fonte/Source: INE, 2004, Projecções da Populacao Total 1997-2020 e por Area de Residencia 1997-2015 (Actualizacao); QUIBB 2000-01, IAF 2002/03

Quadro 51.2
Table 51.2

População Total e por Sexo Segundo Regiões e Províncias, Moçambique 2005 - 2007 (Habitantes)
Total Population by Gender, Provinces and Regions, Mozambique 2005 - 2007 (Inhabitants)

Região/Província Regions/Provinces	2005			2006			2007		
	Total	Homens/Men	Mulheres/ Women	Total	Homens/Men	Mulheres/ Women	Total	Homens/Men	Mulheres/ Women
Norte/North	**6,292,500**	**3,106,005**	**3,186,495**	**6,444,421**	**3,182,355**	**3,262,066**	**6,887,568**	**3,530,607**	**3,530,607**
Niassa	999,332	491,232	508,100	1,027,037	505,179	521,858	1,178,117	604,349	604,349
Cabo Delgado	1,617,165	784,628	832,537	1,650,270	801,040	849,230	1,632,809	849,574	849,574
Nampula	3,676,003	1,830,145	1,845,858	3,767,114	1,876,136	1,890,978	4,076,642	2,076,684	2,076,684
Centro/Centre	**8,179,896**	**3,977,345**	**4,202,551**	**8,382,512**	**4,079,153**	**4,303,359**	**8,798,283**	**4,575,207**	**4,575,207**
Zambézia	3,710,011	1,808,955	1,901,056	3,794,509	1,851,617	1,942,892	3,892,854	2,030,763	2,030,763
Tete	1,511,832	733,630	778,202	1,551,949	754,107	797,842	1,832,339	947,028	947,028
Manica	1,320,232	637,583	682,649	1,359,923	657,489	702,434	1,418,927	744,670	744,670
Sofala	1,637,821	797,177	840,644	1,676,131	815,940	860,191	1,654,163	852,746	852,746
Sul/South	**4,947,640**	**2,285,075**	**2,662,565**	**5,061,768**	**2,341,523**	**2,720,245**	**4,844,863**	**2,637,765**	**2,637,765**
Inhambane	1,381,023	615,097	765,926	1,412,349	630,577	781,772	1,267,035	707,192	707,192
Gaza	1,304,798	575,906	728,892	1,333,106	590,231	742,875	1,219,013	677,147	677,147
Maputo prov./prov.	1,044,946	496,354	548,592	1,072,086	509,625	562,461	1,259,713	686,118	686,118
Maputo cidade/city	1,216,873	597,718	619,155	1,244,227	611,090	633,137	1,099,102	567,308	567,308
Moçambique/Mozambique	**19,420,036**	**9,368,425**	**10,051,611**	**19,888,701**	**9,603,031**	**10,285,670**	**20,530,714**	**10,743,579**	**10,743,579**

Fonte/Source: INE, (2004) Projecções da Populacao Total 1997-2020 e por Area de Residencia 1997-2015 (Actualizacao)
INE, (2004) Projecções da Populacao Total 1997-2020 e por Area de Residencia 1997-2015 (Actualizacao); * Resultados preliminares do RGPH 2007

Quadro 51.1
Table 51.1

População total e por sexo segundo regiões e províncias, Moçambique 2002 - 2004 (Habitantes)
Total Population by Gender, Provinces and Regions, Mozambique 2002 - 2004 (Inhabitants)

Região/Província Regions/Provinces	2002			2003			2004		
	Total	Homens/Men	Mulheres/ Women	Total	Homens/Men	Mulheres/ Women	Total	Homens/Men	Mulheres/ Women
Norte/North	5,866,769	2,892,893	2,973,876	6,003,460	2,961,186	3,042,274	6,145,323	3,032,205	3,113,118
Niassa	920,957	451,879	469,078	946,231	464,554	481,677	972,391	477,690	494,701
Cabo Delgado	1,521,755	737,488	784,267	1,552,733	752,766	799,967	1,584,584	768,505	816,079
Nampula	3,424,057	1,703,526	1,720,531	3,504,496	1,743,866	1,760,630	3,588,348	1,786,010	1,802,338
Centro/Centre	7,597,029	3,685,098	3,911,931	7,786,775	3,780,141	4,006,634	7,981,365	3,877,707	4,103,658
Zambézia	3,464,805	1,685,488	1,779,317	3,544,853	1,725,748	1,819,105	3,626,739	1,766,978	1,859,761
Tete	1,397,136	675,077	722,059	1,434,431	694,117	740,314	1,472,728	713,668	759,060
Manica	1,205,901	580,249	625,652	1,243,124	598,916	644,208	1,281,317	618,069	663,248
Sofala	1,529,187	744,284	784,903	1,564,367	761,360	803,007	1,600,581	778,992	821,589
Sul/South	4,613,772	2,120,029	2,493,743	4,723,591	2,174,312	2,549,279	4,834,815	2,229,293	2,605,522
Inhambane	1,291,300	571,104	720,196	1,320,453	585,340	735,113	1,350,372	600,010	750,362
Gaza	1,225,127	535,542	689,585	1,250,665	548,493	702,172	1,277,307	561,990	715,317
Maputo prov./prov.	962,363	455,963	506,400	989,987	469,476	520,511	1,017,542	482,953	534,589
Maputo cidade/city	1,134,982	557,420	577,562	1,162,486	571,003	591,483	1,189,594	584,340	605,254
Moçambique/Mozambique	17,653,239	8,486,603	9,166,636	18,077,570	8,698,020	9,379,550	18,961,503	9,139,205	9,822,298

Fonte/Source: INE, 2004, Projecções da Populacao Total 1997-2020 e por Area de Residencia 1997-2015 (Actualizacao)

Quadro 50.2
Estrutura da Distribuição do OE incluindo em Percentagem do PIB, Moçambique, 2005 - 2006
Table 50.2
Structure of State Budget Expenditure Distribution including as Percentage of GDP, Mozambique, 2005 - 2006

Região/Província Regions/Provinces	Despesas do Orçamento do Estado 2005 (em 106 MT/ State Budget Expenditure 2005 (in 106 MT)			Despesas do Orçamento Geral do Estado (Estrutura %) 2005/ State Budget (OGE) Expenditure (Structure %) 2005			Despesas do Orçamento do Estado (en Percentagem do PIB) 2005/ State Budget Expenditure (as Percentage of GDP) 2005			Despesas do Orçamento do Estado 2006 (em 106 MT/ State Budget Expenditure 2006 (in 106 MT)			Despesas do Orçamento Geral do Estado (Estrutura %) 2006/ State Budget (OGE) Expenditure (Structure %) 2006			Despesas do Orçamento do Estado (em Percentagem do PIB) 2006/ State Budget Expenditure (as Percentage of GDP) 2006		
	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total
Norte/North	**2958.9**	**453.4**	**3412.3**	**14.2**	**2.8**	**9.2**	**8.9**	**1.4**	**10.2**	**3358.2**	**372.6**	**3730.8**	**22.0**	**3.8**	**14.9**	**12.0**	**1.3**	**13.3**
Niassa	607.3	130.2	737.5	2.9	0.8	2.0	11.9	2.6	14.5	806.9	135.4	942.3	5.3	1.4	3.8	19.0	3.2	22.2
Cabo Delgado	1009.4	118.1	1127.5	4.8	0.7	3.1	13.5	1.6	15.0	1072.7	75.4	1148.2	7.0	0.8	4.6	16.9	1.2	18.1
Nampula	1342.2	205.1	1547.3	6.4	1.3	4.2	6.5	1.0	7.5	1478.6	161.8	1640.4	9.7	1.7	6.5	8.5	0.9	9.4
Centro/Centre	**3596.7**	**510.0**	**4106.6**	**17.2**	**3.2**	**11.1**	**7.0**	**1.0**	**8.0**	**4325.8**	**746.4**	**5072.2**	**28.4**	**7.6**	**20.3**	**10.0**	**1.7**	**11.7**
Zambézia	995.9	108.5	1104.4	4.8	0.7	3.0	5.6	0.6	6.2	1172.7	173.2	1345.9	7.7	1.8	5.4	8.0	1.2	9.1
Tete	829.8	99.6	929.4	4.0	0.6	2.5	8.7	1.0	9.7	975.2	216.2	1191.4	6.4	2.2	4.8	12.2	2.7	14.9
Manica	748.4	89.6	838.0	3.6	0.6	2.3	10.7	1.3	12.0	850.6	109.9	960.5	5.6	1.1	3.8	14.1	1.8	16.0
Sofala	1022.6	212.3	1234.9	4.9	1.3	3.3	6.0	1.2	7.2	1327.4	247.1	1574.4	8.7	2.5	6.3	9.0	1.7	10.7
Sul/South	**3022.1**	**397.1**	**3419.2**	**14.5**	**2.5**	**9.3**	**4.5**	**0.6**	**5.1**	**3384.4**	**353.3**	**3737.7**	**22.2**	**3.6**	**14.9**	**5.9**	**0.6**	**6.5**
Inhambane	726.4	99.1	825.5	3.5	0.6	2.2	7.9	1.1	9.0	812.4	95.3	907.6	5.3	1.0	3.6	11.2	1.3	12.5
Gaza	704.4	121.5	825.9	3.4	0.8	2.2	10.3	1.8	12.0	816.9	91.1	908.0	5.4	0.9	3.6	13.8	1.5	15.3
Maputo prov./prov.	751.1	108.7	859.8	3.6	0.7	2.3	3.4	0.5	3.8	739.3	76.2	815.5	4.8	0.8	3.3	3.7	0.4	4.0
Maputo cidade/city	840.2	67.8	908.0	4.0	0.4	2.5	2.9	0.2	3.2	1015.8	90.7	1106.6	6.7	0.9	4.4	4.3	0.4	4.7
Sub-Total	**9,578**	**1,360.4**	**10938.1**	**45.9**	**8.5**	**29.6**				**11068.4**	**1,472.4**	**12540.7**	**72.6**	**15.0**	**50.1**			
Âmbito Central	11277	14726	26002.2	54.1	91.5	70.4				19058.2	19045.6	38103.8	124.9	194.6	152.1			
Moçambique/Mozambique	**20854.3**	**16086.0**	**36940.3**	**100.0**	**100.0**	**100.0**	**13.7**	**10.6**	**24.3**	**30127**	**20517.9**	**50644.5**	**197.5**	**209.6**	**202.2**	**23.4**	**15.9**	**39.4**

Fonte/Source: MPF, Conta Geral do Estado (2005); MPF, Execução do Orçamento (2006);

Quadro 50.1
Table 50.1

Estrutura da Distribuição do OE incluindo em Percentagem do PIB, Moçambique, 2003 - 2004
Structure of State Budget Expenditure Distribution including as Percentage of GDP, Mozambique, 2003 - 2004

Região/Província Regions/Provinces	Despesas do Orçamento do Estado 2003 (em 106 MT/ State Budget Expenditure 2003 (in 106 MT)			Despesas do Orçamento Geral do Estado (Estrutura %) 2003/ State Budget (OGE) Expenditure (Structure %) 2003			Despesas do Orçamento do Estado (en Percentagem do PIB) 2003/ State Budget Expenditure (a Percentage of GDP) 2003			Despesas do Orçamento d Estado 2003 (em 106 MT/ State Budget Expenditure 2003 (in 106 MT			Despesas do Orçamento Geral do Estado (Estrutura %) 2004/ State Budget (OGE) Expenditure (Structure %) 2004			Despesas do Orçamento do Estado (em Percentagem do PIB) 2004/ State Budget Expenditure (as Percentage of GDP) 2004		
	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total	Corrente/ Recurrent	Investimento/ Capital	Total
Norte/North	**1828.2**	**288.8**	**2116.9**	**12.0**	**3.0**	**8.5**	**7.5**	**1.2**	**8.7**	**2280.8**	**684.4**	**2965.2**	**12.0**	**5.2**	**9.2**	**8.1**	**2.4**	**10.6**
Niassa	432.7	85.9	518.6	2.8	0.9	2.1	12.9	2.6	15.5	511.6	192.2	703.8	2.7	1.5	2.2	12.1	4.5	16.6
Cabo Delgado	568.8	73.5	642.4	3.7	0.8	2.6	10.4	1.3	11.8	749.7	252.3	1002.0	4.0	1.9	3.1	11.8	4.0	15.8
Nampula	826.6	129.3	955.9	5.4	1.3	3.8	5.4	0.8	6.2	1019.5	239.9	1259.4	5.4	1.8	3.9	5.8	1.4	7.2
Centro/Centre	**2591.1**	**536.7**	**3127.8**	**17.0**	**5.5**	**12.5**	**6.8**	**1.4**	**8.2**	**2945.4**	**1056.6**	**4001.9**	**15.6**	**8.0**	**12.5**	**6.8**	**2.4**	**9.2**
Zambézia	710.1	132.5	842.6	4.7	1.4	3.4	5.3	1.0	6.3	832.4	381.7	1214.1	4.4	2.9	3.8	5.7	2.6	8.3
Tete	572.4	118.9	691.2	3.8	1.2	2.8	8.6	1.8	10.4	703.9	217.0	920.9	3.7	1.7	2.9	8.8	2.7	11.5
Manica	529.4	76.5	605.9	3.5	0.8	2.4	9.9	1.4	11.4	604.7	168.3	773.0	3.2	1.3	2.4	10.0	2.8	12.8
Sofala	779.2	208.8	988.0	5.1	2.1	3.9	6.1	1.6	7.7	804.3	289.6	1093.9	4.2	2.2	3.4	5.5	2.0	7.4
Sul/South	**2033.3**	**285.1**	**2318.4**	**13.3**	**2.9**	**9.3**	**4.2**	**0.6**	**4.8**	**2362.0**	**589.0**	**2951.0**	**12.5**	**4.5**	**9.2**	**4.1**	**1.0**	**5.2**
Inhambane	498.9	115.4	614.3	3.3	1.2	2.5	8.6	2.0	10.6	586.8	269.9	856.7	3.1	2.1	2.7	8.1	3.7	11.8
Gaza	483.3	70.7	554.0	3.2	0.7	2.2	9.3	1.4	10.7	550.4	121.0	671.4	2.9	0.9	2.1	9.3	2.0	11.3
Maputo prov./prov.	469.8	58.7	528.5	3.1	0.6	2.1	2.8	0.4	3.2	535.0	135.5	670.5	2.8	1.0	2.1	2.6	0.7	3.3
Maputo cidade/city	581.4	40.2	621.6	3.8	0.4	2.5	2.8	0.2	2.9	689.7	62.6	752.3	3.6	0.5	2.3	2.9	0.3	3.2
Sub-Total	6,452	1,110.6	7563.1	42.3	11.3	30.2				7,588	2,330.0	9918.1	40.1	17.7	30.9			
Âmbito Central	8803	8678	17481.1	57.7	88.7	69.8				11346.1	10821	22167.2	59.9	82.3	69.1			
Moçambique/Mozambique	**15255.7**	**9788.4**	**25044.1**	**100.0**	**100.0**	**100.0**	**13.7**	**8.8**	**22.6**	**18934.2**	**13151.1**	**32085.3**	**100.0**	**100.0**	**100.0**	**14.7**	**10.2**	**24.9**

Fonte/Source: MPF, Conta Geral do Estado (2003) e (2004)

Quadro 49
Table 49

Evolução do Número de Escolas, Professores e a Relação Aluno/Professor no ESG, por Provincias, 2002-2005
Evolution of the Number of Schools, Teachers and the Ratio of Pupils/Teachers (ESG) by Province, 2002-2005

Região/Província Regions/Provinces	Número de Escolas /Number of Schools				Número de Professores / Number of Teachers				Relação Aluno/Professor/Ratio of Pupils/Teachers			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
Norte/North	**31**	**31**	**35**	**43**	**657**	**813**	**1018**	**1086**	**37.6**	**37.5**	**37.0**	**43.8**
Niassa	5	5	5	6	105	142	159	162	44.9	41.3	40.5	46.4
Cabo Delgado	9	9	11	14	210	244	306	326	31.5	32.9	34.5	42.7
Nampula	17	17	19	23	342	427	553	598	36.2	38.4	36.2	42.3
Centro/Centre	**56**	**57**	**67**	**70**	**1130**	**1293**	**1820**	**2044**	**36.9**	**38.9**	**34.7**	**39.8**
Zambézia	18	18	22	22	392	368	644	671	38.7	49.2	34.4	43.8
Tete	15	16	15	15	228	294	366	392	36.4	32.8	31.4	35.9
Manica	11	11	16	17	243	321	384	504	36.2	34.9	37.1	37.4
Sofala	12	12	14	16	267	310	426	477	36.1	38.7	35.7	42.0
Sul/South	**57**	**66**	**68**	**78**	**1704**	**2006**	**2393**	**2735**	**37.2**	**39.2**	**38.5**	**38.8**
Inhambane	16	16	16	17	366	420	486	578	36.5	40.1	42.0	42.9
Gaza	13	14	14	17	259	336	367	482	36.5	33.5	35.2	34.0
Maputo prov./prov.	12	14	16	19	408	401	487	642	33.9	44.6	42.7	39.4
Maputo cidade/city	16	22	22	25	671	849	1053	1033	41.8	38.8	34.1	39.0
Moçambique/Mozambique	**144**	**154**	**170**	**191**	**3491**	**4112**	**5231**	**5865**	**37.3**	**38.9**	**36.4**	**40.2**

Fonte/Source: INE:Anuarios Estatisticos (2002-2005); ESG - Ensino Secundario Geral (1o e 2o Ciclo)

Quadro 48
Table 48

Evolução do Número de Escolas, Professores e a Relação Aluno/Professor no EP2, por Provincias, 2002-2005
Evolution of the Number of Schools, Teachers and the Ratio of Pupils/Teachers (EP1) by Province

Região/Província Regions/Provinces	Número de Escolas /Number of Schools				Número de Professores / Number of Teachers				Relação Aluno/Professor/Ratio of Pupils/Teachers			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
Norte/North	**206**	**245**	**301**	**367**	**1848**	**2381**	**2701**	**2978**	**36.4**	**33.9**	**35.9**	**38.2**
Niassa	38	45.0	57	**73**	**429**	**588**	628	662	31.9	28.8	32.1	33.6
Cabo Delgado	57	82.0	108	**136**	**402**	**550**	644	710	38.3	36.3	37.6	43.4
Nampula	111	118.0	136	**158**	**1017**	**1243**	1429	1606	38.9	36.6	37.9	37.7
Centro/Centre	**304**	**352**	**429**	**509**	**2531**	**3065**	**3719**	**3866**	**38.8**	**37.6**	**37.6**	**42.0**
Zambézia	128	138.0	154	**186**	**858**	**978**	1200	1284	41.3	43.0	41.2	45.0
Tete	53	64.0	83	**105**	**517**	**625**	767	853	34.4	33.0	35.1	36.9
Manica	60	77.0	97	**116**	**522**	**715**	853	900	40.3	35.6	36.0	37.7
Sofala	63	73.0	95	**102**	**634**	**747**	899	829	39.1	38.7	38.0	48.2
Sul/South	**313**	**353**	**386**	**444**	**3055**	**3629**	**4086**	**4167**	**44.4**	**42.1**	**41.5**	**42.3**
Inhambane	81	90.0	106	**126**	**653**	**786**	974	1032	49.5	47.9	44.8	45.5
Gaza	110	120.0	130	**142**	**718**	**841**	964	1016	42.6	41.3	40.0	39.7
Maputo prov./prov.	72	88.0	93	**115**	**812**	**985**	1092	1096	39.1	37.8	38.4	39.7
Maputo cidade/city	50	55.0	57	**61**	**872**	**1017**	1056	1023	46.5	41.5	42.9	44.4
Moçambique/Mozambique	**823**	**950**	**1116**	**1320**	**1565**	**9075**	**10506**	**11011**	**76.3**	**38.7**	**39.0**	**41.1**

Fonte/Source: INE:Anuarios Estatisticos (2002-2005); EP2 - Ensino Primario 2o Grau

Quadro 47
Table 47

Evolução do Número de Escolas, Professores e a Relação Aluno/Professor no EP1, por Provincias, 2002-2005
Evolution of the Number of Schools, Teachers and the Ratio of Pupils/Teachers (EP1) by Province, 2002-2005

Região/Província Regions/Provinces	Número de Escolas / Number of Schools				Número de Professores / Number of Teachers				Relação Aluno/Professor/Ratio of Pupils/Teachers			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
Norte/North	**2717**	**2813**	**2889**	**2974**	**11334**	**12928**	**14344**	**13862**	**66.3**	**62.7**	**60.7**	**71.4**
Niassa	671	693	708	729	2535	2920	3641	2944	52.3	49.6	44.0	61.3
Cabo Delgado	671	716	750	785	2657	2991	3392	3428	76.9	75.2	71.4	77.2
Nampula	1375	1404	1431	1460	6142	7017	7311	7490	69.6	63.4	66.7	75.6
Centro/Centre	**3379**	**3425**	**3711**	**3908**	**14825**	**16300**	**17860**	**17707**	**72.0**	**71.2**	**72.3**	**81.2**
Zambézia	1723	1764	1833	1926	6093	6227	6706	6738	86.2	91.5	94.0	103.0
Tete	708	745	798	842	3500	3879	4201	4116	53.7	55.5	59.9	69.9
Manica	445	478	499	514	2709	3230	3693	3779	68.1	62.5	60.6	65.5
Sofala	503	438	581	626	2523	2964	3260	3074	79.9	75.2	74.5	86.3
Sul/South	**1692**	**1739**	**1773**	**1814**	**12589**	**13609**	**14432**	**14318**	**62.0**	**59.0**	**58.1**	**62.2**
Inhambane	580	605	623	647	3367	3694	4079	3995	65.4	61.6	59.3	66.0
Gaza	625	635	647	656	3506	3916	4169	4225	61.9	57.2	56.0	59.6
Maputo prov./prov.	395	402	406	414	3144	3332	3463	3561	58.5	56.8	56.6	58.6
Maputo cidade/city	92	97	97	97	2572	2667	2721	2537	62.1	60.5	60.4	64.7
Moçambique/Mozambique	**7788**	**8077**	**8373**	**8696**	**38749**	**42837**	**46636**	**45887**	**58.2**	**66.0**	**65.9**	**74.0**

Fonte/Source: INE:Anuarios Estatisticos (2002-2005); EP1 - Ensino Primario 1o Grau

Quadro 46
Table 46

Evolução das Taxas de Escolarização do ESG2 por Província e Sexo, Ensino Público e Privado, 2005-2006
Evolution of School Attendance (ESG2) by Province and Sex, Public and Private Education, 2005-2006

Região/Província Regions/Provinces	2003			2004			2005			2006		
	H M/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women
Norte/North	**2.0**	**2.8**	**1.1**	**2.8**	**4.0**	**1.5**	**0.2**	**0.2**	**0.2**	**0.3**	**0.3**	**0.2**
Niassa	2.6	3.9	1.3	3.6	5.4	1.7	0.2	0.3	0.2	0.4	0.5	0.2
Cabo Delgado	1.5	2.2	0.9	2.4	3.5	1.3	0.1	0.1	0.1	0.2	0.2	0.1
Nampula	1.7	2.3	1.2	2.3	3.0	1.6	0.2	0.3	0.2	0.3	0.3	0.3
Centro/Centre	**3.4**	**4.4**	**2.3**	**4.4**	**5.7**	**3.1**	**0.5**	**0.6**	**0.5**	**0.7**	**0.7**	**0.6**
Zambézia	1.9	2.5	1.3	2.5	3.3	1.6	0.2	0.3	0.2	0.3	0.4	0.3
Tete	1.9	2.6	1.3	2.4	3.1	1.8	0.4	0.4	0.3	0.5	0.5	0.5
Manica	3.4	4.9	2.1	3.9	5.4	2.5	0.5	0.7	0.3	0.6	0.7	0.5
Sofala	6.2	7.7	4.7	8.8	11.0	6.6	1.1	1.2	1.0	1.2	1.2	1.2
Sul/South	**8.1**	**8.5**	**7.7**	**10.6**	**11.0**	**10.2**	**1.4**	**1.3**	**1.5**	**2.2**	**2.0**	**2.3**
Inhambane	4.6	6.0	3.1	6.6	8.1	5.2	0.6	0.7	0.5	1.0	1.1	0.8
Gaza	2.3	2.8	1.8	3.9	4.0	3.8	0.3	0.4	0.3	0.6	0.5	0.6
Maputo prov./prov.	5.1	5.8	4.4	6.3	7.1	5.5	1.0	1.0	1.0	1.4	1.5	1.3
Maputo cidade/city	20.4	19.3	21.6	25.5	24.7	26.2	3.7	3.2	4.3	5.7	4.8	6.6
Moçambique/Mozambique	**3.7**	**4.4**	**3.0**	**4.8**	**5.7**	**3.9**	**0.6**	**0.6**	**0.6**	**0.8**	**0.8**	**0.8**

Fonte/Source: Ministerio da Educação e Cultura;
H - Homens; M - Mulheres; ESG2 - Ensino Secundário do 2º Ciclo

Quadro 45
Table 45

Evolução das Taxas de Escolarização do ESG1 por Província e Sexo, Ensino Público e Privado, 2003-2006
Evolution of School Attendance (ESG1) by Province,and Sex, Public and Private Education

Região/Província Regions/Provinces	2003			2004			2005			2006		
	H M/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women
Norte/North	**11.8**	**16.3**	**7.3**	**14.2**	**19.0**	**9.4**	**1.6**	**1.9**	**1.3**	**2.6**	**3.0**	**2.1**
Niassa	12.9	18.4	7.3	16.4	22.3	10.5	1.9	2.3	1.6	3.4	4.1	2.8
Cabo Delgado	13.3	18.5	8.3	15.4	20.6	10.3	1.3	1.6	0.9	1.9	2.2	1.6
Nampula	9.2	12.2	6.1	10.7	14.3	7.2	1.7	1.9	1.5	2.3	2.6	2.0
Centro/Centre	**15.4**	**19.9**	**10.9**	**18.1**	**23.0**	**13.3**	**3.7**	**4.3**	**3.1**	**5.1**	**5.8**	**4.4**
Zambézia	10.0	13.4	6.5	12.0	16.1	7.9	2.0	2.6	1.5	3.1	4.0	2.2
Tete	11.2	13.9	8.5	15.6	19.3	12.0	3.1	3.3	2.8	5.1	5.6	4.5
Manica	17.8	24.2	11.6	19.5	26.0	13.2	4.1	4.9	3.3	5.2	5.9	4.5
Sofala	22.6	28.3	16.9	25.3	30.7	20.0	5.6	6.5	4.8	6.9	7.5	6.3
Sul/South	**34.2**	**32.6**	**35.7**	**40.1**	**37.7**	**42.4**	**9.4**	**8.6**	**10.1**	**13.4**	**12.1**	**14.7**
Inhambane	22.6	24.8	20.5	28.4	30.2	26.6	4.9	5.1	4.8	7.8	7.8	7.7
Gaza	16.8	16.1	17.6	24.8	23.1	26.4	4.2	3.8	4.6	7.4	6.4	8.2
Maputo prov./prov.	36.8	36.0	37.7	40.9	38.7	42.9	9.8	9.1	10.6	13.7	12.1	15.3
Maputo cidade/city	60.4	53.5	67.2	66.3	58.8	73.6	18.5	16.4	20.6	24.6	21.9	27.3
Moçambique/Mozambique	**17.0**	**19.8**	**14.2**	**20.0**	**23.0**	**17.0**	**3.9**	**4.1**	**3.8**	**5.6**	**5.8**	**5.4**

Fonte/Source: Ministerio da Educação e Cultura
H - Homens; M - Mulheres; ESG1 - Ensino Secundário do 1º Ciclo

Quadro 44
Table 44

Evolução da Taxa Bruta de Escolarização do EP2 por Província e Sexo, Ensino Público e Privado, 2003-2006
Evolution of Gross School Attendance (EP2) by Province and Sex, Public and Private Education, 2003-2006

Região/Província Regions/Provinces	2003			2004			2005			2006		
	H M/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women
Norte/North	**26.4**	**35.9**	**16.9**	**31.7**	**42.2**	**21.3**	**37.1**	**48.7**	**25.6**	**42.1**	**52.8**	**31.5**
Niassa	31.5	42.6	20.2	37.2	49.2	25.1	41.2	53.9	28.6	42.8	52.3	33.5
Cabo Delgado	24.9	33.3	16.7	31.0	40.9	21.3	39.8	51.7	28.1	47.2	59.4	35.4
Nampula	22.7	31.7	13.7	27.0	36.5	17.5	30.4	40.5	20.2	36.2	46.8	25.6
Centro/Centre	**31.7**	**41.6**	**22.0**	**37.6**	**48.8**	**26.6**	**42.8**	**54.5**	**31.3**	**48.5**	**59.7**	**37.3**
Zambézia	22.8	31.6	13.9	25.6	35.0	16.2	28.5	38.6	18.3	32.1	42.0	22.2
Tete	25.3	32.2	18.4	32.2	40.7	23.7	38.2	47.4	29.0	44.7	53.9	35.5
Manica	38.6	51.7	26.1	46.8	61.9	32.3	52.0	66.8	37.6	59.3	73.4	45.4
Sofala	40.2	50.9	29.5	45.9	57.7	34.2	52.7	65.3	40.1	57.9	69.5	46.1
Sul/South	**72.6**	**73.7**	**71.4**	**82.5**	**82.1**	**82.8**	**86.6**	**85.5**	**87.7**	**88.6**	**86.0**	**91.2**
Inhambane	57.0	62.4	51.8	66.9	72.3	61.7	73.2	77.7	68.6	74.4	76.6	72.3
Gaza	54.3	55.2	53.3	61.4	62.2	60.7	65.3	65.1	65.4	65.2	64.3	66.1
Maputo prov./prov.	76.4	77.4	75.4	87.8	85.6	89.9	91.8	89.9	93.6	96.8	93.8	99.7
Maputo cidade/city	102.6	99.8	105.2	113.7	108.4	119.0	116.2	109.2	123.2	117.8	109.4	126.5
Moçambique/Mozambique	**36.9**	**44.4**	**29.6**	**42.7**	**50.7**	**34.8**	**47.0**	**55.5**	**38.5**	**51.4**	**59.4**	**43.4**

Fonte/Source: Ministerio da Educação e Cultura
H - Homens; M - Mulheres; EP2 - Ensino Primário do 2º Grau

Quadro 43
Table 43

Evolução da Taxa Líquida de Escolarização do EP2 por Província e Sexo, Ensino Público e Privado, 2003-2006
Evolution of Net School Attendance (EP2) by Province and Sex, Public and Private Education, 2003-2006

Região/Província Regions/Provinces	2003			2004			2005			2006		
	H M/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women
Norte/North	**2.1**	**2.5**	**1.6**	**2.8**	**3.3**	**2.2**	**3.5**	**4.1**	**2.9**	**5.1**	**5.7**	**4.5**
Niassa	2.9	3.6	2.3	4.2	5.2	3.2	4.6	5.4	3.8	6.9	7.3	6.4
Cabo Delgado	1.2	1.6	0.9	1.7	2.0	1.3	2.7	3.1	2.2	4.2	4.8	3.6
Nampula	2.0	2.5	1.6	2.4	2.9	1.9	3.2	3.8	2.6	4.3	5.0	3.6
Centro/Centre	**4.5**	**5.5**	**3.6**	**5.8**	**6.8**	**4.8**	**7.4**	**8.4**	**6.5**	**9.5**	**10.5**	**8.5**
Zambézia	2.9	4.0	1.7	3.1	4.3	1.9	3.8	5.1	2.5	5.1	6.6	3.6
Tete	4.1	4.8	3.4	5.9	6.6	5.3	7.4	8.0	6.8	10.0	10.6	9.4
Manica	4.7	5.8	3.6	5.7	6.7	4.7	7.9	8.9	6.8	8.9	9.6	8.2
Sofala	6.4	7.3	5.5	8.5	9.6	7.3	10.7	11.5	9.9	14.0	15.2	12.9
Sul/South	**9.6**	**8.8**	**10.5**	**12.2**	**10.8**	**13.7**	**13.5**	**11.9**	**15.1**	**17.9**	**15.4**	**20.4**
Inhambane	5.8	5.9	5.7	7.1	7.1	7.2	7.8	7.4	8.1	10.8	9.9	11.6
Gaza	5.2	4.6	5.7	6.5	5.5	7.6	7.3	6.2	8.5	9.2	7.6	10.7
Maputo prov./prov.	8.8	7.7	9.9	13.5	11.4	15.5	14.4	12.6	16.3	20.2	17.6	22.8
Maputo cidade/city	18.8	16.9	20.7	21.8	19.2	24.5	24.6	21.5	27.7	31.4	26.5	36.4
Moçambique/Mozambique	**4.5**	**4.9**	**4.1**	**5.6**	**5.9**	**5.2**	**6.7**	**7.0**	**6.3**	**8.9**	**9.1**	**8.6**

Fonte/Source: Ministerio da Educação e Cultura
H - Homens; M - Mulheres; EP2 - Ensino Primário do 2º Grau

Quadro 42
Table 42

Evolução da Taxa Bruta de Escolarização do EP1 por Província e Sexo, Ensino Público e Privado, 2003-2006
Evolution of Gross Attendance (EP1) by Province and Sex, Public and Private Education, 2003-2006

Região/Província Regions/Provinces	2003			2004			2005			2006		
	H M/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Men	HM/ Men Women	Home/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women
Norte/North	**104.7**	**117.4**	**92.1**	**114.7**	**126.8**	**102.7**	**127.9**	**139.4**	**116.4**	**134.0**	**144.2**	**123.8**
Niassa	111.2	123.9	98.5	122.8	135.1	110.5	135.0	145.4	124.6	140.0	148.6	131.3
Cabo Delgado	112.3	126.9	98.0	121.7	135.8	107.7	132.1	145.2	119.1	137.1	149.1	125.1
Nampula	90.7	101.5	79.7	99.8	109.6	89.7	116.7	127.7	105.4	125.0	134.8	114.9
Centro/Centre	**108.5**	**121.7**	**95.2**	**119.9**	**132.2**	**107.5**	**130.7**	**141.9**	**119.4**	**136.1**	**145.9**	**126.3**
Zambézia	106.6	120.7	92.4	117.1	130.1	103.9	128.3	140.9	115.6	138.5	150.2	126.6
Tete	102.6	112.4	92.9	118.1	127.3	108.7	132.0	140.3	123.6	138.8	145.5	132.0
Manica	119.3	134.1	104.8	129.8	143.5	116.4	139.2	151.0	127.6	142.7	152.6	133.0
Sofala	105.3	119.8	90.7	114.6	127.8	101.1	123.2	135.4	110.7	124.5	135.2	113.7
Sul/South	**144.1**	**145.1**	**143.1**	**144.3**	**144.6**	**143.9**	**149.9**	**150.1**	**149.8**	**145.4**	**145.7**	**145.2**
Inhambane	132.5	135.4	129.6	133.5	135.2	131.9	137.5	138.5	136.5	133.1	134.1	132.1
Gaza	134.8	137.2	132.5	137.7	139.1	136.2	143.7	144.2	143.1	139.3	139.7	139.0
Maputo prov./prov.	157.1	157.5	156.7	156.8	157.2	156.4	159.3	158.9	159.7	154.6	154.4	154.8
Maputo cidade/city	151.8	150.3	153.5	149.1	146.9	151.3	159.3	158.9	159.7	154.6	154.4	154.8
Moçambique/Mozambique	**112.7**	**122.9**	**102.4**	**121.2**	**130.5**	**111.8**	**131.3**	**140.1**	**122.5**	**135.3**	**143.0**	**127.5**

Fonte/Source: Ministerio da Educação e Cultura
H - Homens; M - Mulheres; EP1 - Ensino Primário do 1º Grau

Quadro 41
Table 41

Evolução da Taxa Líquida de Escolarização do EP1 por Província e Sexo, Ensino Público e Privado, 2003-2006
Evolution of Net School Attendance (EP1) by Province and Sex, Public and Private Education (2003-2006)

Região/Província Regions/Provinces	2003			2004			2005			2006		
	H M/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women	HM/ Men Women	Homen/ Men	Mulheres/ Women
Norte/North	**64.5**	**68.3**	**60.8**	**71.2**	**74.7**	**67.8**	**80.1**	**81.0**	**79.2**	**82.1**	**82.8**	**81.4**
Niassa	72.3	76.7	68.0	81.2	85.4	77.1	90.8	93.5	88.1	96.7	98.9	94.5
Cabo Delgado	68.3	73.1	63.6	73.3	77.9	68.8	79.4	79.4	79.4	79.4	79.4	79.4
Nampula	52.9	55.0	50.8	59.1	60.7	57.5	70.2	70.2	70.2	70.2	70.2	70.2
Centro/Centre	**68.0**	**73.0**	**63.0**	**75.2**	**79.5**	**70.9**	**83.5**	**87.3**	**79.7**	**89.4**	**92.8**	**86.1**
Zambézia	68.4	74.1	62.7	75.5	80.3	70.7	83.2	88.2	78.1	91.5	96.2	86.8
Tete	68.2	71.8	64.6	79.0	81.9	76.0	89.8	92.0	87.7	97.7	99.4	96.1
Manica	69.1	74.2	64.2	75.1	79.4	70.9	83.9	87.4	80.5	88.5	91.4	85.6
Sofala	66.4	72.1	60.7	71.2	76.2	66.0	77.2	81.6	72.7	80.1	84.3	75.8
Sul/South	**87.5**	**85.8**	**89.3**	**90.8**	**88.7**	**92.9**	**94.4**	**91.9**	**97.0**	**92.8**	**90.5**	**95.2**
Inhambane	77.6	76.9	78.3	81.4	80.1	82.6	86.5	84.4	88.6	84.9	83.3	86.5
Gaza	77.5	76.4	78.6	82.7	81.2	84.2	89.3	87.1	91.6	89.5	87.6	91.3
Maputo prov./prov.	95.5	93.5	97.4	99.3	97.3	101.3	105.4	102.8	108.0	104.8	102.2	107.5
Maputo cidade/city	99.5	96.4	102.8	99.9	96.2	103.7	96.6	93.5	99.8	92.1	88.8	95.6
Moçambique/Mozambique	**69.4**	**72.4**	**66.4**	**75.6**	**78.0**	**73.2**	**83.4**	**85.6**	**81.2**	**88.3**	**90.3**	**86.3**

Fonte/Source: Ministerio da Educação e Cultura

H - Homens; M - Mulheres; EP1 - Ensino Primário do 1º Grau

Quadro 40
Table 40

Defusão das TIC entre os Agregados Familiares, por Provincia e Moçambique 2002/03 (%)
Distribution of ICTs among Aggregate Households, by Province and Mozambique 2002/03 (%)

Região/Província Regions/Provinces	Tipo de TIC / Type of ICT								
	Aparelhagem/ Hi-Fi System	Televisor/ Television	Radio/ Radio	Ventoinha/ Fan	Caixa Telefone/ Telephone Box	Telef. Celular/ Mobile Phone	Computador / Computer	Impressora/ Printer	Total
Norte/North	**3.4**	**2.8**	**46.1**	**2.8**	**0.7**	**0.7**	**0.1**	**0.2**	**56.8**
Niassa	3.1	2.1	43.0	1.4	0.9	0.5	0.0	0.4	51.4
Cabo Delgado	2.4	2.6	43.0	1.8	0.9	0.2	0.2	0.3	51.4
Nampula	3.9	3.0	48.3	3.6	0.5	1.0	0.0	0.0	60.3
Centro/Centre	**7.2**	**3.1**	**46.2**	**2.5**	**0.9**	**1.1**	**0.1**	**0.3**	**61.4**
Zambézia	1.5	1.7	39.4	1.9	0.5	0.1	0.0	0.0	45.1
Tete	2.7	1.7	45.1	1.9	0.3	0.8	0.1	0.2	52.8
Manica	10.2	4.9	63.6	3.1	1.5	2.2	0.1	0.7	86.3
Sofala	25.4	7.0	52.3	4.6	2.1	3.1	0.5	0.7	95.7
Sul/South	**22.4**	**17.0**	**43.3**	**11.4**	**4.6**	**12.1**	**1.1**	**1.1**	**113.0**
Inhambane	14.6	3.9	32.9	2.8	0.8	0.9	0.0	0.1	56.0
Gaza	28.0	4.6	34.1	5.5	1.2	5.9	0.0	0.0	79.3
Maputo prov./prov.	17.5	18.3	53.4	11.6	3.5	13.8	0.3	1.2	119.6
Maputo cidade/city	33.7	56.0	61.8	34.5	17.8	37.9	5.7	4.5	251.9
Moçambique/Mozambique	**9.5**	**6.3**	**45.5**	**4.7**	**1.7**	**3.6**	**0.3**	**0.4**	**72.0**
Rural/Rural	5.3	0.7	41.5	0.5	0.1	0.5	0.0	0.1	48.7
Urbano/Urban	19.3	19.5	54.8	14.6	5.5	10.9	1.1	1.3	127.0

Fonte/Source: INE, IAF 2002/03

Quadro 38
Table 38

Agregados Familiares por Tipo de Bem Duravel, por Provincia e Mocambique 2000/01 (%)
Household Aggregates by Type of Durable Goods, by Province and Mozambique

Região/Província Regions/Provinces	Tipo de Bem / Type of Goods						
	Máquina de/ Machine		Congelador/Deep Freezer	Televisor/Television	Radio/Radio	Relogio ou relogio de paredes/ Watch or Clock	Fogão Moderno/ Modern stove
	Ferro/Iron	Costrura/Sewing					
Norte/North	**1.7**	**3.0**	**1.0**	**1.5**	**43.6**	**26.7**	**0.6**
Niassa	1.9	3.7	0.7	1.0	39.1	28.7	0.3
Cabo Delgado	0.9	2.4	0.6	0.9	42.3	24.3	0.4
Nampula	2.3	2.9	1.8	2.6	49.3	27.1	1.2
Centro/Centre	**1.7**	**3.5**	**1.7**	**2.1**	**49.5**	**33.2**	**1.4**
Zambézia	0.6	3.0	0.4	0.6	48.9	32.7	0.0
Tete	2.6	2.3	2.4	1.9	41.1	26.3	1.8
Manica	1.8	4.2	1.8	2.8	53.7	38.4	0.9
Sofala	2.1	4.3	2.1	3.3	54.2	35.4	2.7
Sul/South	**16.4**	**10.3**	**15.1**	**18.7**	**57.5**	**59.2**	**26.8**
Inhambane	1.3	9.0	1.7	1.7	41.6	39.1	4.1
Gaza	4.1	9.6	4.1	2.6	43.6	48.3	8.6
Maputo prov./prov.	12.6	4.8	11.4	16.9	64.1	65.8	35.6
Maputo cidade/city	47.4	17.9	43.4	53.6	80.7	83.5	59.0
Moçambique/Mozambique	**4.5**	**4.7**	**4.0**	**5.1**	**49.5**	**36.5**	**6.6**
Rural/Rural	0.3	3.3	0.5	0.3	43.6	27.3	1.4
Urbano/Urban	15.7	8.4	13.6	18.0	65.3	61.2	20.6

Fonte/Source: INE, QUIBB 2000/01

Quadro 39

Agregados Familiares por Tipo de Bem Duravel, por Provincia e Mocambique 2002/03 (%)

Região/Província Regions/Provinces	Tipo de Bem / Type of Goods						
	Máquina de/ Machine		Congelador/Deep Freezer	Casa Propria/ House ownership	Radio/Radio	Relogio/ Watches, clocks	Fogão Moderno/ Modern stove
	Ferro/Iron	Costrura/Sewing					
Norte/North	**2.3**	**2.2**	**1.8**	**91.4**	**46.1**	**21.4**	**1.4**
Niassa	2.4	2.0	1.0	92.6	43.0	23.6	1.3
Cabo Delgado	2.1	2.6	2.1	89.4	43.0	26.2	1.9
Nampula	2.3	2.0	1.8	92.2	48.3	18.4	1.1
Centro/Centre	**2.6**	**2.3**	**1.8**	**91.5**	**46.2**	**25.7**	**2.1**
Zambézia	2.0	1.8	0.9	94.4	39.4	21.7	0.4
Tete	2.1	1.0	1.5	93.5	45.1	13.1	1.4
Manica	3.0	4.7	3.1	89.5	63.6	36.0	2.5
Sofala	4.6	3.3	3.2	83.2	52.3	42.5	6.3
Sul/South	**13.2**	**6.7**	**10.4**	**90.2**	**43.3**	**50.8**	**12.9**
Inhambane	2.0	3.4	2.1	96.1	32.9	38.0	1.8
Gaza	6.0	8.1	4.9	93.1	34.1	44.9	3.3
Maputo prov./prov.	13.0	5.1	10.6	89.1	53.4	53.3	13.4
Maputo cidade/city	43.2	12.2	32.6	77.4	61.8	78.2	44.7
Moçambique/Mozambique	**5.0**	**3.3**	**3.9**	**91.2**	**45.5**	**30.1**	**4.3**
Rural/Rural	0.4	2.1	0.3	94.8	41.5	21.4	0.3
Urbano/Urban	15.0	6.0	12.2	82.7	54.8	50.6	13.8

Fonte/Source: INE, IAF 2002/03

Quadro 36
Table 36

Agregados Familiares por Tipo de Energia Usada, por Provincia e Mocambique 2000/01 (%)
Household Aggregates by Type of Energy Used, by Province and Mozambique, 2000/01 (%)

Região/Província Regions/Provinces	Tipo de Energia / Type of Energy						
	Electr.	Petrol/Gas	Vela/Candles	Bateria/Batteries	Lenha/Firewood	Outro/ Other	Total
Norte/North							
Niassa	3.6	49.4	0.8	0.1	32.6	13.5	100.0
Cabo Delgado	1.4	48.7	0.3	0.0	49.6	0.0	100.0
Nampula	4.0	59.6	0.0	0.0	32.6	3.7	100.0
Centro/Centre							
Zambézia	1.0	17.4	0.5	0.0	63.9	17.1	100.0
Tete	3.1	46.7	0.9	0.3	48.4	0.6	100.0
Manica	2.6	66.5	0.5	0.0	30.5	0.0	100.0
Sofala	4.4	62.5	0.9	0.0	32.1	0.1	100.0
Sul/South							
Inhambane	1.6	75.7	5.4	0.1	17.0	0.1	100.0
Gaza	3.7	73.8	7.9	0.0	13.9	0.7	100.0
Maputo prov./prov.	16.3	75.0	5.7	0.0	3.0	0.1	100.0
Maputo cidade/city	51.0	35.5	12.6	0.3	0.3	0.3	100.0
Moçambique/Mozambique	**5.7**	**52.2**	**2.2**	**0.0**	**35.1**	**4.7**	**100.0**
Rural/Rural	0.4	46.4	1.2	0.0	46.2	5.7	100.0
Urbano/Urban	20.1	68.0	4.7	0.1	5.1	2.0	100.0

Fonte/Source: INE, QUIBB 2000/01

Quadro 37
Table 37

Agregados Familiares por Tipo de Energia Usada, por Provincia e Mocambique 2002/03 (%)
Household Aggregates by Type of Energy Used, per Province and Mozambique 2002/03 (%)

Região/Província Regions/Provinces	Tipo de Energia / Type of Energy						
	Electr.	Petrol/Gas	Vela/Candles	Bateria/Batteries	Lenha/Firewood	Outro/ Other	Total
Norte/North	**4.3**	**52.6**	**0.6**	**0.0**	**40.6**	**1.9**	**100.0**
Niassa	4.4	59.2	1.6	0.0	30.1	4.7	100.0
Cabo Delgado	3.0	40.4	0.0	0.0	56.5	0.1	100.0
Nampula	4.9	57.1	0.7	0.0	35.1	2.2	100.0
Centro/Centre	**4.1**	**46.8**	**1.1**	**0.0**	**37.9**	**10.1**	**100.0**
Zambézia	2.7	44.4	0.6	0.0	34.1	18.2	100.0
Tete	3.5	41.3	1.9	0.0	48.5	4.9	100.0
Manica	6.0	50.6	1.2	0.3	41.7	0.3	100.0
Sofala	6.7	56.1	1.5	0.0	33.8	1.9	100.0
Sul/South	**15.6**	**67.6**	**8.7**	**0.1**	**7.7**	**0.3**	**100.0**
Inhambane	3.1	77.9	3.2	0.2	15.3	0.2	100.0
Gaza	7.3	73.8	11.4	0.0	6.9	0.5	100.0
Maputo prov./prov.	18.1	69.3	8.1	0.1	4.1	0.3	100.0
Maputo cidade/city	45.9	38.9	14.8	0.1	0.1	0.1	100.0
Moçambique/Mozambique	**6.9**	**53.8**	**2.7**	**0.0**	**31.7**	**4.8**	**100.0**
Rural/Rural	0.6	48.5	1.4	0.0	43.0	6.4	100.0
Urbano/Urban	21.7	66.4	5.8	0.0	5.0	1.1	100.0

Fonte/Source: INE, IAF 2002/03

Quadro 35
Table 35

Indicadores das TIC - Moçambique 2001 - 2006
ITC Indicators - Mozambique 2001 - 2006

Descrição / Description	2001	2002	2003	2004	2005	2006
Agregados familiares com posse de alguns produtos das TIC (%) / Household aggregates in possesson of some ICT products						
Radios / Radios	49.5	45.5	45.5	...	...	...
TV / Television	5.1	6.3	6.3	...	...	...
Telefones / Telephones	...	5.3	5.3	...	...	...
Linhas de rede instaladas (unidade) / Installed network lines (unit)	21429	12144	9876	8582	12453	...
Total de acessos RDIS / RDIS total access	369	484	723	902	1083	...
Acesso básico / Basic access	346	450	641	803	959	...
Acesso primário / Primary access	23	34	82	99	124	...
Total de linhas equivalentes (unidade) / Total of equivalent lines (unit)	90870	85659	81318	74252	75373	...
Capacidade de rede exterior (pares) / Capacity of external network (pairs)						
Rede primária / Primary network	150129	151510	154489	155089	174323	...
Rede secundária / Secondary network	198259	199309	200309	200639	203219	...
Capacidade instalada em comutação (linhas) / Installed capacity in computation (lines)	127902	138482	133587	131967	134774	...
Capacidade de rede nacional de interligação (circuitos) / Capacity of the national network for inter-connectivity (circuits)	27150	29070	969	1748	2135	...
Taxa de digitação em comunicação telefonica (%) / Rate of digitization of telephone communication	100	100	100	100	100	...
Taxa de digitação em transmissão (%) / Rate of digitisation of transmissions	98	98	98	98	98	...
Teledensidade (por 100 habitantes) / Teledensity (per 100 inhabitants	0.51	0.46	0.42	0.37	0.36	...
Produção de energia (MWH) / Production of energy (MWH)	5345.8	11459	10902.4	11705.7	13272.5	17190.7
Trafego telefónico nacional - Rede fixa (103 impulsos) / National telephone traffic - Fixed line	776180	611314	589521	311828	243906	...
Trafego telefónico internacional - Rede fixa (103 minutos) / International telephone traffic - Fixed line	21997	22954	22357	18868	16344	...
Total de linhas de rede ligadas ao assinante (unidade)/ Total network lines assigned to subscribors (unit)	89488	83739	77576	69676	65992	70313
Cellphone subscribers (unit)	...	...	...	...	1503943	1837195
Tempo médio de espera de Instalação (mês) / Average waiting time for installation (months)	13	13	10	9	4	...
Avarias participadas por 100 pp´s (unidade) / Average number per 100 people (unit)	80	70	65	66	52	...
Avarias reparadas em < 72 horas (%) / Average repairs in <72 hrs	92	93	93	93	94	...
Reclamações de facturação por 1000 LDR´s (unidade)/ Reported faults per 1000 LDRs (unit)	161	140	146	84	99	...
Reclamações resolvidas em < 30 dias (%) / Faults resolved in < 30 days	65	82	67	66	82	...
Telefones publicos assistidos (unidade) / Public telephones repaired (unit)	1826	2460	4903	5671	4999	...
Telefones publicos de cartão (unidade) / Public telephones mapped (unit)	1279	1581	1419	1371	1288	...
Total de cartões móveis celulares activos (unidade) / Total of mobile phones active cards (unit)	152652	254759	...	...	...	...
Parque telex (unidade) / Telex infrastructure (unit)	237	36	...	...	...	...
Circuitos alugados para uso privado / Hired circuits for private use	968	1158	1082	1304	1441	
Proveedores de internet ligados ao servidor das TDM / Internet providers liked to TDM server	7	7	7	7	7	7
Tarifas telefónicas / Telephone tariffs						
Instalação (Mt) / Installation	485.6	485.6	485.6	485.6	485.6	485.6
Assinatura mensal (Mt) / Monthly subscription	171.4	224.6	224.6	224.6	224.6	224.6
Conversações nacionais (Mt) / National calls	1.6	2.1	2.1	2.1	2.1	2.1
Procura total (unidade) / Total demand (unit)	111912	96397	85405	76407	74206	...
Satisfação da procura (%) / Demand satisfied	67	70	61	59	57	...
Lista de espera (unidade) / Waiting list (unit)	22424	12658	7829	6731	4471	...

Fonte / Source: TDM: Relatorio de Contas 2004 e 2005; QUIBB 2000/01; IAF 2002/03; Balanco do PES 2006 (para o numero de subscritores de telefone fixo e movel dos anos 2005 e 2006) / (for the number of fixed line subscribers in the years 2005 and 2006);
Legenda: ... Dados não disponíveis à data de publicação; LRD= Linhas de rede; RDIS = Rede Digital de Integração de Serviços
Key: Non-available data at publishing date: LRD=Network lines, RDIS = Digital Network of Integrated Services Digital Network

Quadro 34
Table 34

Produto Interno Bruto (PIB) por Ramos e por Provincias - Estrutura percentual (%), 2006
Gross Domestic Product by Industries and by Provinces - Percentage Strucuture (%), 2006

Preços Correntes/ Current Prices	Niassa	Cabo Delgado	Nampula	Zambezia	Tete	Manica	Sofala	I'bane	Gaza	Maputo Prov.	Maputo Cid./ City	Total
PIB/ GDP	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Valor Acrescentado por Ramos de Actividade/ Value Added by Industry	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**	**94.2**
Agricultura, Pecuaria e Silvicultura/ Agriculture, Livestock and Forestry	33.0	41.3	32.2	51.2	19.0	33.2	16.0	40.7	32.9	6.0	0.1	22.7
Pescas/ Fisheries	2.6	4.1	3.1	3.6	2.2	0.6	1.2	2.5	3.1	0.2	0.3	1.8
Indústria Mineira/ Mining	0.2	0.3	0.4	0.3	2.7	0.4	0.7	3.6	2.3	0.5	0.4	0.8
Indústria Manufactureira/ Manufacturing Industry	7.9	9.0	8.4	8.1	2.4	13.5	16.9	3.2	9.3	39.5	13.9	14.6
Electricidade e Agua/ Electricity and Water	4.2	4.6	3.8	4.6	45.1	4.3	2.1	3.1	4.1	1.0	0.9	5.4
Construção/ Construction	6.5	1.0	1.5	0.5	0.6	3.4	1.2	5.0	3.4	11.6	1.8	3.4
Comércio/ Commerce	7.7	8.5	9.5	8.3	4.6	9.5	9.4	9.5	10.4	9.5	14.5	9.9
Servicos de Reparação/ Maintenance Services	0.1	0.1	0.6	0.0	0.1	0.1	1.0	0.0	0.1	0.4	0.4	0.4
Restaurantes e Hotéis/ Restaurants and Hotels	2.9	1.1	0.5	0.9	1.0	0.7	0.8	1.9	2.0	0.3	4.0	1.5
Transportes e Comunicações/ Transport and Communications	4.8	3.3	10.0	2.1	2.8	3.8	20.4	5.2	3.1	9.4	16.7	9.6
Serviços Financeiros e Seguros/ Financial and Insurance Services	3.6	3.7	5.9	1.5	0.8	2.4	6.7	2.1	1.7	1.3	15.1	5.5
Serviços Imobiliários, Alugueres e Prestados a Empresas/ Real Estate, Renting and Business Activities	3.2	3.4	5.2	2.1	2.1	6.6	9.2	5.7	6.5	9.3	18.2	8.2
Serviços de Admnistração Pública e Defesa/ Public Administration and Defence Services	7.9	5.3	5.1	1.8	3.6	4.5	3.1	3.3	4.1	1.8	3.9	3.6
Serviços de Educação/ Education Services	5.9	5.6	4.5	6.3	4.8	6.2	2.7	4.7	6.1	1.6	1.3	3.7
Serviços de Saúde/ Health Services	2.2	1.6	1.4	1.3	1.1	2.1	1.0	1.6	2.3	0.6	0.6	1.2
Outros serviços/ Other services	1.5	1.4	2.1	1.7	1.4	2.8	2.0	2.0	2.7	1.1	2.0	1.8
Ajustes pelos Direitos Alfandegários/ Ajustment for Import Taxes	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Ajustes pelo SIFIM/ Adjustments for FISIM	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2

Fonte/ Source: Informação preparada para o presente relatorio/ Data prepared for this report

Quadro 33
Table 33

Produto Interno Bruto (PIB) por Ramos e por Provincias - Estrutura percentual (%), 2005
Gross Domestic Product by Industries and by Provinces - Percentage Strucuture (%), 2005

Preços Correntes/ Current Prices	Niassa	Cabo Delgado	Nampula	Zambezia	Tete	Manica	Sofala	I'bane	Gaza	Maputo Prov.	Maputo Cid./ City	Total
PIB/ GDP	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Valor Acrescentado por Ramos de Actividade/ Value Added by Industry	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**	**93.8**
Agricultura, Pecuaria e Silvicultura/ Agriculture, Livestock and Forestry	34.6	40.0	32.3	51.5	18.9	33.6	15.9	39.1	33.1	5.7	0.1	22.5
Pescas/ Fisheries	2.5	3.9	2.8	3.2	2.1	0.6	1.1	2.4	2.8	0.2	0.3	1.7
Indústria Mineira/ Mining	0.2	0.3	0.4	0.3	2.9	0.4	0.7	3.8	2.4	0.5	0.4	0.9
Indústria Manufactureira/ Manufacturing Industry	7.9	9.2	8.9	8.2	2.4	13.6	17.0	3.5	9.4	39.6	14.1	14.8
Electricidade e Agua/ Electricity and Water	4.2	4.7	3.7	4.4	44.8	4.2	2.1	3.2	4.0	1.0	0.9	5.3
Construção/ Construction	5.6	0.9	1.3	0.5	0.5	3.0	1.0	4.6	3.0	11.0	1.6	3.1
Comércio/ Commerce	7.7	8.6	9.4	8.1	4.5	9.3	9.2	9.8	10.2	9.3	14.3	9.8
Servicos de Reparação/ Maintenance Services	0.1	0.1	0.6	0.0	0.1	0.1	1.0	0.0	0.1	0.4	0.4	0.4
Restaurantes e Hotéis/ Restaurants and Hotels	2.4	1.7	0.4	0.8	1.2	0.8	0.8	1.9	2.0	0.3	3.7	1.5
Transportes e Comunicações/ Transport and Communications	4.7	3.4	10.0	2.1	2.9	3.8	20.0	4.9	3.2	9.4	16.2	9.5
Serviços Financeiros e Seguros/ Financial and Insurance Services	3.6	3.8	5.8	1.5	0.8	2.3	6.5	2.1	1.7	1.2	14.5	5.3
Serviços Imobiliários, Alugueres e Prestados a Empresas/ Real Estate, Renting and Business Activities	3.5	3.7	5.6	2.2	2.3	7.0	9.8	6.4	6.8	9.9	19.3	8.8
Serviços de Admnistração Pública e Defesa/ Public Administration and Defence Services	7.3	5.1	4.6	2.2	3.5	4.4	3.0	3.3	3.9	1.8	4.1	3.6
Serviços de Educação/ Education Services	5.7	5.5	4.1	5.7	4.5	5.7	2.6	4.8	5.9	1.6	1.2	3.5
Serviços de Saúde/ Health Services	2.1	1.6	1.4	1.3	1.2	2.0	1.0	1.7	2.4	0.6	0.6	1.2
Outros serviços/ Other services	1.6	1.5	2.2	1.7	1.5	2.9	2.1	2.2	2.8	1.2	2.1	1.9
Ajustes pelos Direitos Alfandegários/ Ajustment for Import Taxes	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Ajustes pelo SIFIM/ Adjustments for FISIM	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7

Fonte/ Source: Informação preparada para o presente relatorio/ Data prepared for this report

Quadro 32.B373
Table 32.

Produto Interno Bruto (PIB) por Ramos e por Provincias - Estrutura percentual (%), 2004
Gross Domestic Product by Industries and by Provinces - Percentage estrucuture (%), 2004

Preços Correntes/ Current Prices	Niassa	Cabo Delgado	Nampula	Zambezia	Tete	Manica	Sofala	I'bane	Gaza	Maputo Prov.	Maputo Cid./ City	Total
PIB/ GDP	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Valor Acrescentado por Ramos de Actividade/ Value Added by Industry	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**	**93.5**
Agricultura, Pecuaria e Silvicultura/ Agriculture, Livestock and Forestry	35.7	40.6	32.4	52.5	19.5	34.8	16.5	38.6	34.0	5.6	0.1	22.8
Pescas/ Fisheries	2.7	4.2	3.1	3.5	2.3	0.6	1.1	2.7	3.0	0.2	0.3	1.8
Indústria Mineira/ Mining	0.2	0.3	0.5	0.3	3.2	0.5	0.8	4.3	2.5	0.5	0.4	0.9
Indústria Manufactureira/ Manufacturing Industry	7.9	9.2	9.1	8.8	2.6	14.1	17.9	4.0	9.9	40.4	15.5	15.7
Electricidade e Agua/ Electricity and Water	3.9	4.3	3.5	4.2	42.5	3.8	2.0	3.1	3.6	0.9	0.8	4.9
Construção/ Construction	5.6	0.9	1.4	0.3	0.4	2.0	0.8	3.2	2.2	11.5	1.3	3.0
Comércio/ Commerce	7.5	8.3	9.1	7.9	4.5	8.8	8.8	9.9	9.6	8.6	14.2	9.5
Servicos de Reparação/ Maintenance Services	0.2	0.1	0.6	0.0	0.1	0.1	1.0	0.0	0.1	0.4	0.4	0.4
Restaurantes e Hotéis/ Restaurants and Hotels	1.9	2.1	0.3	0.7	1.3	0.9	0.8	1.7	1.8	0.2	3.6	1.4
Transportes e Comunicações/ Transport and Communications	4.7	3.2	11.5	2.1	3.0	3.8	19.6	4.3	3.4	9.1	16.0	9.5
Serviços Financeiros e Seguros/ Financial and Insurance Services	2.7	2.8	4.3	1.1	0.6	1.6	4.8	1.6	1.2	0.9	10.7	3.9
Serviços Imobiliários, Alugueres e Prestados a Empresas/ Real Estate, Renting and Business Activities	3.9	4.0	6.0	2.4	2.5	7.4	10.5	7.2	6.9	10.1	21.1	9.4
Serviços de Admnistração Pública e Defesa/ Public Administration and Defence Services	7.2	5.2	4.2	0.9	4.0	4.8	3.5	3.7	4.3	1.8	4.8	3.6
Serviços de Educação/ Education Services	5.6	5.2	3.8	5.5	4.3	5.4	2.5	4.8	5.7	1.6	1.4	3.4
Serviços de Saúde/ Health Services	2.2	1.6	1.4	1.4	1.3	1.8	1.0	1.9	2.5	0.5	0.6	1.2
Outros serviços/ Other services	1.8	1.6	2.4	1.7	1.5	3.0	2.2	2.5	2.9	1.2	2.3	2.0
Ajustes pelos Direitos Alfandegários/ Ajustment for Import Taxes	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
Ajustes pelo SIFIM/ Adjustments for FISIM	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8

Fonte/ Source: Informação preparada para o presente relatorio/ Data prepared for this report

Quadro 31
Table 31

Produto Interno Bruto (PIB) por Ramos e por Provincias - Estrutura percentual (%), 2003
Gross Domestic Product by Industries and by Provinces - Percentage Strucuture (%), 2003

Preços Correntes/ Current Prices	Niassa	Cabo Delgado	Nampula	Zambezia	Tete	Manica	Sofala	I'bane	Gaza	Maputo Prov.	Maputo Cid./ City	Total
PIB/ GDP	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Valor Acrescentado por Ramos de Actividade/ Value Added by Industry	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**	**93.0**
Agricultura, Pecuaria e Silvicultura/ Agriculture, Livestock and Forestry	39.7	42.1	32.8	52.5	20.7	35.3	16.9	34.9	35.1	6.2	0.1	23.4
Pescas/ Fisheries	3.1	4.5	3.2	3.5	2.5	0.6	1.2	3.2	3.1	0.3	0.3	1.9
Indústria Mineira/ Mining	0.2	0.3	0.5	0.3	2.1	0.6	0.5	0.7	1.5	0.6	0.3	0.6
Indústria Manufactureira/ Manufacturing Industry	8.3	8.8	8.4	8.2	2.6	12.7	16.9	4.0	8.9	40.5	14.7	15.0
Electricidade e Agua/ Electricity and Water	4.0	4.0	3.1	3.6	40.3	3.4	2.0	3.1	3.3	0.8	0.8	4.6
Construção/ Construction	1.3	1.9	2.9	0.7	0.8	4.3	1.7	6.2	4.8	8.8	2.7	3.4
Comércio/ Commerce	8.1	8.2	8.8	7.5	4.6	8.4	8.8	10.8	9.5	9.0	14.1	9.5
Servicos de Reparação/ Maintenance Services	0.2	0.0	0.7	0.1	0.1	0.2	1.1	0.1	0.1	0.4	0.5	0.4
Restaurantes e Hotéis/ Restaurants and Hotels	0.7	0.9	0.5	0.7	1.9	0.9	1.3	2.4	0.8	0.1	3.9	1.5
Transportes e Comunicações/ Transport and Communications	4.7	2.6	11.1	2.0	3.2	3.7	19.2	4.5	3.0	9.2	15.8	9.4
Serviços Financeiros e Seguros/ Financial and Insurance Services	2.5	2.4	3.6	0.9	0.5	1.4	4.1	1.5	1.0	0.8	9.1	3.3
Serviços Imobiliários, Alugueres e Prestados a Empresas/ Real Estate, Renting and Business Activities	4.3	4.1	5.9	2.3	2.7	7.2	10.6	7.9	6.9	10.8	21.4	9.6
Serviços de Admnistração Pública e Defesa/ Public Administration and Defence Services	5.9	4.8	4.1	2.5	3.8	4.5	3.4	3.7	4.0	2.0	4.8	3.7
Serviços de Educação/ Education Services	5.9	5.0	3.5	5.0	4.0	4.9	2.3	5.2	5.6	1.6	1.3	3.3
Serviços de Saúde/ Health Services	2.2	1.5	1.3	1.4	1.4	1.7	1.0	2.0	2.3	0.6	0.7	1.2
Outros serviços/ Other services	2.1	1.7	2.5	1.7	1.7	3.1	2.3	2.8	3.0	1.3	2.4	2.1
Ajustes pelos Direitos Alfandegários/ Ajustment for Import Taxes	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Ajustes pelo SIFIM/ Adjustments for FISIM	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6

Fonte/ Source: Informação preparada para o presente relatorio/ Data prepared for this report

Quadro 30
Table 30

Produto Interno Bruto (PIB) por Ramos e por Provincias - Estrutura percentual (%), 2002
Gross Domestic Product by Industries and by Provinces - Percentage Strucuture (%), 2002

Preços Correntes/ Current Prices	Niassa	Cabo Delgado	Nampula	Zambezia	Tete	Manica	Sofala	I'bane	Gaza	Maputo Prov.	Maputo Cid./ City	Total
PIB/ GDP	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Valor Acrescentado por Ramos de Actividade/ Value Added by Industry	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**	**92.4**
Agricultura, Pecuaria e Silvicultura/ Agriculture, Livestock and Forestry	40.3	43.1	33.3	53.4	20.9	35.9	17.2	37.0	36.1	6.2	0.1	23.7
Pescas/ Fisheries	3.1	4.5	3.2	3.4	2.5	0.6	1.2	3.1	3.1	0.3	0.3	1.9
Indústria Mineira/ Mining	0.2	0.3	0.5	0.3	2.0	0.6	0.4	0.6	1.4	0.5	0.2	0.5
Indústria Manufactureira/ Manufacturing Industry	6.6	7.1	7.7	7.4	2.4	11.8	15.4	3.7	8.4	36.4	13.3	13.6
Electricidade e Agua/ Electricity and Water	3.9	4.0	3.1	3.5	39.8	3.3	1.9	3.0	3.2	0.8	0.7	4.4
Construção/ Construction	0.9	1.4	2.0	0.5	0.6	2.9	1.1	4.9	3.3	12.2	1.8	3.3
Comércio/ Commerce	8.1	8.5	9.0	7.5	4.7	8.4	8.8	10.7	9.5	8.8	13.9	9.5
Servicos de Reparação/ Maintenance Services	0.2	0.0	0.8	0.1	0.1	0.2	1.1	0.1	0.2	0.4	0.5	0.4
Restaurantes e Hotéis/ Restaurants and Hotels	0.9	0.7	0.5	0.6	2.3	1.0	1.0	1.8	0.8	0.1	4.2	1.5
Transportes e Comunicações/ Transport and Communications	4.9	2.9	11.9	2.0	3.3	4.0	19.8	4.0	3.3	9.2	16.2	9.7
Serviços Financeiros e Seguros/ Financial and Insurance Services	2.4	2.4	3.6	0.8	0.5	1.3	3.9	1.4	1.0	0.7	8.6	3.2
Serviços Imobiliários, Alugueres e Prestados a Empresas/ Real Estate, Renting and Business Activities	4.6	4.5	6.4	2.5	2.9	7.7	11.2	8.3	6.9	11.1	22.2	10.1
Serviços de Admnistração Pública e Defesa/ Public Administration and Defence Services	5.8	4.6	2.9	2.6	3.7	4.9	3.7	3.7	4.2	2.0	5.7	3.8
Serviços de Educação/ Education Services	5.7	4.9	3.7	4.9	3.8	4.7	2.2	5.2	5.6	1.6	1.3	3.2
Serviços de Saúde/ Health Services	2.1	1.7	1.2	1.3	1.4	1.9	1.0	2.1	2.3	0.6	0.7	1.2
Outros serviços/ Other services	2.7	1.9	2.7	1.6	1.6	3.2	2.4	2.9	3.2	1.4	2.4	2.2
Ajustes pelos Direitos Alfandegários/ Ajustment for Import Taxes	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Ajustes pelo SIFIM/ Adjustments for FISIM	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7

Fonte/ Source: Informação preparada para o presente relatorio/ Data prepared for this report