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# TAJIKISTAN

# HUMAN DEVELOPMENT REPORT

# 2001 - 2002

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## INFORMATION AND COMMUNICATIONS TECHNOLOGY FOR DEVELOPMENT

UNITED NATIONS DEVELOPMENT PROGRAMME

# 2001-2002 NHDR

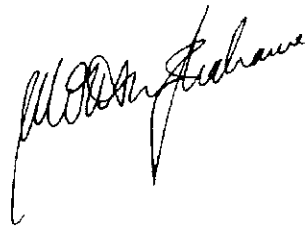
The theme of this year's National Human Development Report is Information and Communications Technology for Development. In the past ten years the world has been rapidly evolving through a series of assorted trends, some running in parellel, some diverging sharply, known as globalisation. This process is tearing down barriers that separate peoples, cultures, and economies. Tajikistan, as an open, free and democratic society with a market economy, is and must continue to be an integral part of this process.

The report draws special attention to the current state of Tajikistan's infrastructure. The extension of infrastructure, such as telephone lines, throughout Tajikistan, especially to the remote regions of the east and into impoverished rural communities, is a key goal for reducing poverty in the country and enhancing development, not merely in the realms of increased information on health, the environment, and education, but also about job opportunities. Almost three-fourths of Tajikistan's citizens reside in the countryside, where the poverty rates are among the highest. Extending telephone lines to these regions is not about mere telephones, but expanding "access" to information and opportunities.

There is much talk of the international digital divide, but the corresponding divide within Tajikistan is no less troubling, as the report highlights. This report stresses ways to overcome that divide and smooth the development process across the entire country. The equitable distribution of technology is of significance for facilitating increased social cohesion, so that all of Tajikistan's citizens benefit equally from ICT.

This report examines ICT not as an end in itself, but as a means for reducing poverty, deepening education, promoting health, creating new channels for increased democratic participation, generating economic opportunities, and carefully monitoring and managing the environment. Specific examples are highlighted throughout as to how ICT is already being used or can be used in these important areas of development, but the report is right to place education at the centre of the debate. Without education of all segments of society, not merely the young, and not merely those enrolled as students, the uses and application of ICT for development will be left unexplored, or, just as potentially damaging, leave certain parts of the population "disconnected" from the debate.

Key for guiding the analysis in this report is the Poverty Reduction Strategy Paper currently under implementation. This document establishes an ambitious agenda for the reduction of poverty by targeting a variety of sectors, like infrastructure and education, for increased development. Policy, at the national and local level, with regard to creating an enabling environment for economic and educational opportunities, expanding democratic particpation, and streamlining intergovernmental channels of communication, has a fundamental role to play for Tajikistan's equitable and sustainable development and we look forward to working with the government and civil society on addressing many of the issues contained herein for the coming year, and the years ahead.



Matthew Kahane
UNDP Resident Representative in Tajikistan

# FOREWORD

At the beginning of the 21st century, the development of information and communications technology (ICT) has constituted a promising step forward for human progress and globalisation. The unprecedented coverage the net allows has overcome a number of past impediments such as time, space and national borders, ensuring access to the world development process for all countries and peoples. Given the growing role of ICT, the 2001-2002 National Human Development Report is devoted to the theme "Information and Communications Technology for Development".

Tajikistan has made significant advances in the development process, managing in recent years to implement substantial social and economic reforms. But despite these hard-won accomplishments, the majority of the population remains poor. Therefore, Tajikistan's main priority is poverty reduction. To this end, it is hoped that the unprecedented flow of information, services, goods, people, and capital, hallmarks of globalisation, can provide new and innovative opportunities for the reduction of poverty in the country.

It is well known that social and economic development depends on many factors, such as good governance, macroeconomic stability, education, healthcare and the rule of law. Integration of ICT into Tajikistan's overall development strategy can assist in the realisation of a number of these ultimate objectives. Main benefits lie not only with the acquisition of these new technologies, but also through their targeted use for human development goals, as this report stresses.

ICT can be effectively used for expansion of education, job creation, and the social protection of the population; it can also help expand Tajikistan's human resource base, provide income generating opportunities, and participation at the national, regional, or local level, and also work to safeguard Tajikistan's precious biodiversity and environment. These, and a variety of other priorities, currently top the government's agenda.

Tajikistan welcomes all of these possibilities, and realises that an enabling environment must exist which encourages creative activity and lowers the barriers of entry for entrepreneurs. The necessary precondition for the successful achievement of these development aims is the cooperation of all actors concerned, including the public and private sectors, and civil society.

ICT diffusion in our country is currently very low. The reasons for this are no mystery. After the civil war of 1992-1997, Tajikistan began post-conflict reconstruction of its war-ravaged infrastructure and economy.

And yet, with the aim of further integration in world development processes, Tajikistan's private sector sought out opportunities to develop an ICT net within the country. This is best evinced through the establishment of such joint stock companies as Telecom Technology, Tajiktelecom, Babylon-T, and Intercom. Often, people in high-income brackets have access to ICT, while the poor (80% of the population) remain excluded from ICT and its benefits.

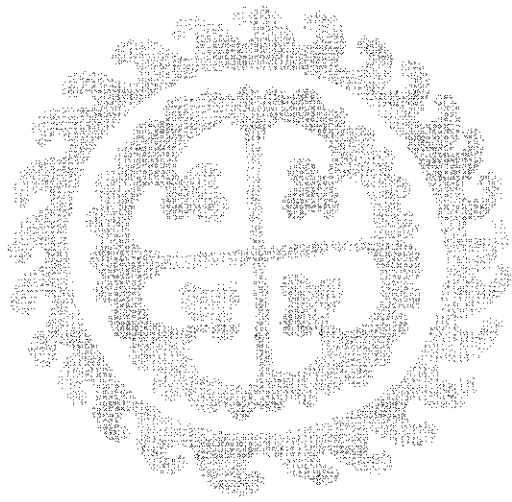
This report calls for the equal distribution of these opportunities, to give the poorest the means to lift themselves out of poverty through greater access to information

on labour markets, harvest reports, distance learning opportunities, and preventive healthcare measures.

To maximize the benefits of the high-tech era it is not enough to expand the private sector and investments, it is also necessary to implement considered public policy. The promotion of new technologies for the benefit of long-term human development must receive state support at all levels.

This Report contains a variety of useful recommendations for policy makers in all levels and branches of government. I am confident that this report will impact national policy formulation for the sake of human development.

**Talbak Nazarov**
Minister of Foreign Affairs
Republic of Tajikistan



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Photographs courtesy of V. Khabibulin, V. Khinenzon and World of Polygraphy. All children's drawing were produced for the International Day of Poverty Eradication, 17 October 2001.

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# ACRONYMS

| | |
|---|---|
| AKF | Aga Khan Foundation |
| CADA | Central Asian Development Agency |
| CD-ROM | Compact Disc - Read Only Memory |
| CIMERA | Civil Development, Media Support, Research and Analysis |
| CIS | Commonwealth of Independent States |
| DAMA | Demand Assigned Multiple Access |
| DLC | Distance Learning Centre |
| EBRD | European Bank for Reconstruction and Development |
| EWSD | Electronic Worldwide Switch Digital |
| FAO | UN Food and Agricultural Organisation |
| GBAO | Gorno-Badakhshan Autonomous Oblast |
| GDP | Gross Domestic Product |
| GDI | Gender-related Development Index |
| GIPI | Global Internet Policy Initiative |
| GIS | Geographic Information Systems |
| GSM | Global System for Mobile Communication |
| HDI | Human Development Index |
| HIV/AIDS | Human Immuno-Deficiency Virus/Acquired Immuno-Deficiency Syndrome |
| ICT | Information and Communications Technology |
| INMARSAT | International Mobile Satellite Organisation |
| INTELSAT | International Telecommunications Satellite Organisation |
| IS | Information Society |
| ISP | Internet Service Provider |
| ITC | Information Technical Centre |
| KB/Kbps | Kilobyte/kilobytes per second |
| KHO | Khatlon Oblast |
| MB/Mbps | Megabyte/megabytes per second |
| MC | Ministry of Communications |
| MLT | Mobile Line in Tajikistan |
| NGO | Non-Governmental Organisation |
| NREN | National Research Educational Network |
| OSI | Open Society Institute |
| PRSP | Poverty Reduction Strategy Paper |
| RRS | Regions of Republican Subordination |
| RT | Republic of Tajikistan |
| SO | Sughd Oblast |
| STD | Sexually Transmitted Disease |
| TACIS | Technical Assistance to the CIS |
| TADAZ | Tajik Aluminium Plant |
| TAE | Trans-Asia-Europe Fibre Optic Cable System |
| TAI | Technological Achievement Index |
| TANTIS | National Association for High Technologies and Information Systems |
| TARENA | Tajik Academic Research and Educational Networking Association |
| TJS | Tajik Somoni (national currency; 100 dirams equal 1 somoni) |
| TTU | Tajik Technical University |
| TUT | Technological University of Tajikistan |
| TVT | Tajik State Television |
| UNAIDS | Joint United Nations Programme on HIV/AIDS |
| UNDP | United Nations Development Programme |
| UNFPA | United Nations Population Fund |
| USD | United States Dollar |
| VAT | Value Added Tax |
| VSAT | Very Small Apperture Satellite Terminal |
| WB | World Bank |
| WHO | World Health Organisation |
| WWW | World Wide Web |


*The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations or UNDP concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.*

# TAJIKISTAN
# BASIC FACTS 2001

| | |
|---|---|
| Territory | 143,100 km$^2$ |
| Total population | 6,375 million |
| Capital | Dushanbe |
| Independence Day | 9 September 1991 |
| HDI ranking out of 174 countries | 112 |
| HDI | 0.679 |
| GDI | 0.664 |
| GDP per capita | USD 168.1 |
| Life expectancy | 67.6 |
| Education enrolment (%) | 61.1 |
| Currency | Somoni (USD 1 =TJS 2.76) |
| Share (%) of public budget: | |
| Health | 6.4 |
| Education | 16 |
| Social protection | 12.6 |
| Export (% of GDP) | 61.1 |
| Economic growth (%) | 10.2 |
| Consumption basket per month | TJS 22.74 (USD 9.59) |
| Average salary per month | TJS 23.50 (USD 9.91) |
| Minimum pension per month | TJS 2 |
| Employed in state sector (%) | 28.4 |
| Employed in private sector (%) | 40.7 |
| Unemployment rate (%) | 2.5 (official), 33 (WB) |
| NGOs | 1,400 |
| Number of students per teacher | 13.9 |
| Number of secondary schools | 3,649 |
| Number of people per doctor | 476 |
| Number of nurses per doctor | 2.3 |
| Contraceptive use (%) | 30 |
| Maternal mortality rate per 100,000 live births | 46.6 |
| Infant mortality rate per 1000 live births | 36.7 |
| Fertility rate | 3.7 |

*Sources: State Statistical Committee, Centre for Medical Statistics, UNDP, WB*

## EXECUTIVE SUMMARY

A discussion of ICT for human development is particularly timely given the process of globalisation that has been erasing borders and connecting citizens of all countries. It is equally important given the potential of ICT for productivity growth, deepening democracy, improving healthcare, monitoring the environment, and offering new and innovative means of education and lifelong learning: careful action in these areas holds significant possibilities for accelerating and expanding human development within the country.

There has been a vociferous debate within the development community as to the uses and abuses of new technologies for human development, and whether or not its claims to assist in development are not overstated. UNDP's 2001 Global Human Development Report tackled just these issues, and argued that, even if some of the claims associated with new technologies were overstated, the development community must explore their potential uses, and past successes, for the eradication of poverty.

Some might not think the further introduction of ICT can or should be a development goal for Tajikistan. Cellular phones and modems would appear to be meagre tools to confront poverty in the country. Yet the introduction and expansion of ICT can assist, and in some instances already has, in moving toward human development goals in a variety of innovative and sustainable ways in Tajikistan. These contributions should be investigated and analysed further.

There is a habit or reflex to state that ICT in Tajikistan is in its infancy. In many reports regarding ICT and development, it is dubbed as sufficient to merely explain the multifarious benefits to be accrued through ICT, and thus an argument is de facto made, without stating how one is to feasibly acquire ICT, and how it can be applied to the specific conditions of Tajikistan, or indeed other less developed countries. In short, the middle is missing, the bridge, from Tajikistan's present position, to the chimerical ICT city on the hill.

This report seeks to shade in and add some relief to that middle, by starting a description and analysis of what that bridge could or should look like, and what people are doing or can do to make it happen.

However, what works in one country may not apply in another. This demands a specific assessment of the situation in Tajikistan, and possible ways ICT can or has been applied in the hope of reaching one or more development goals, while remaining sensitive to not widening existing disparities.

Of paramount importance for the even development of technology across the country is greater attention to Khatlon region, Gorno-Badakhshan Autonomous Oblast, and the Regions of Republican Subordination, some of the least developed and hardest hit regions following the civil war. These regions had less infrastructure to start with in 1991, and have subsequently received less foreign investment than Sughd region and the capital Dushanbe. They suffer today from a deficit of working telephone lines, and have some of the lowest numbers of university computers, Internet cafes, and Internet users.

Universal service, for example a phone in every home, is too ambitious at present, but universal access, a phone within walking distance of every town or village, would appear to provide

a more realistic goal and could offer new opportunities where before few existed. Universal access can then be viewed as having a smoothing effect on development across the country. It is only when all profit and have a stake in the process that human development can be considered sustainable in the long-term.

Crucial for any ICT intervention is commitment and awareness. The introduction of new technologies can often be short-lived and ineffective. In Tajikistan, the network effect has not been triggered because the interventions have been isolated. Greater commitment amongst political elites and public workers, in addition to greater awareness of the benefits to be gained, is necessary.

Greater awareness amongst the population is also vitally important. Much of this technology is new and poorly understood, but this is not an argument against its use. Local communities should be involved in identifying local priorities and project implementation.

Both of these points highlight the need for a national strategy. Renewed global interest in Central Asia has followed in the wake of the terror attacks of 11 September 2001 in New York City and Washington DC; Tajikistan, along with other countries of the region, stands to benefit from increased donor engagement in its development effort. However, if this international engagement does not contribute to a nationally formulated ICT strategy, certain sectors of the economy and certain regions may be overlooked, leaving sustainability in doubt.

Such a strategy cannot be formulated in a day, or by an insulated group of experts; it must be formulated after extensive and inclusive consultations, involving all stakeholders in identifying priorities and projects, obstacles and opportunities, funding and resources. On this point, of central use for this report is the government's Poverty Reduction Strategy Paper (PRSP), which outlines the underlying causes for the persistence of poverty in the country, and the ways to reduce it. Though this strategy makes some use of the potential of ICT for improved education and healthcare, and emphasises the need to expand the country's infrastructure, it does not take into account how ICT may be applied comprehensively for human development.

Helpful for understanding the importance of a national strategy are the ideas put forward in the Digital Opportunities Initiative's Final Report, in particular the notion that a "development dynamic" can be triggered if concerted action is taken in a variety of sectors, namely infrastructure, policy, enterprise, human capacity and content and applications (See Chapter 1). Action need not occur as quickly or as deeply in all of these sectors, but there should exist an understanding as to how these dimensions interact and can spillover into one another, creating a potentially virtuous circle of development.

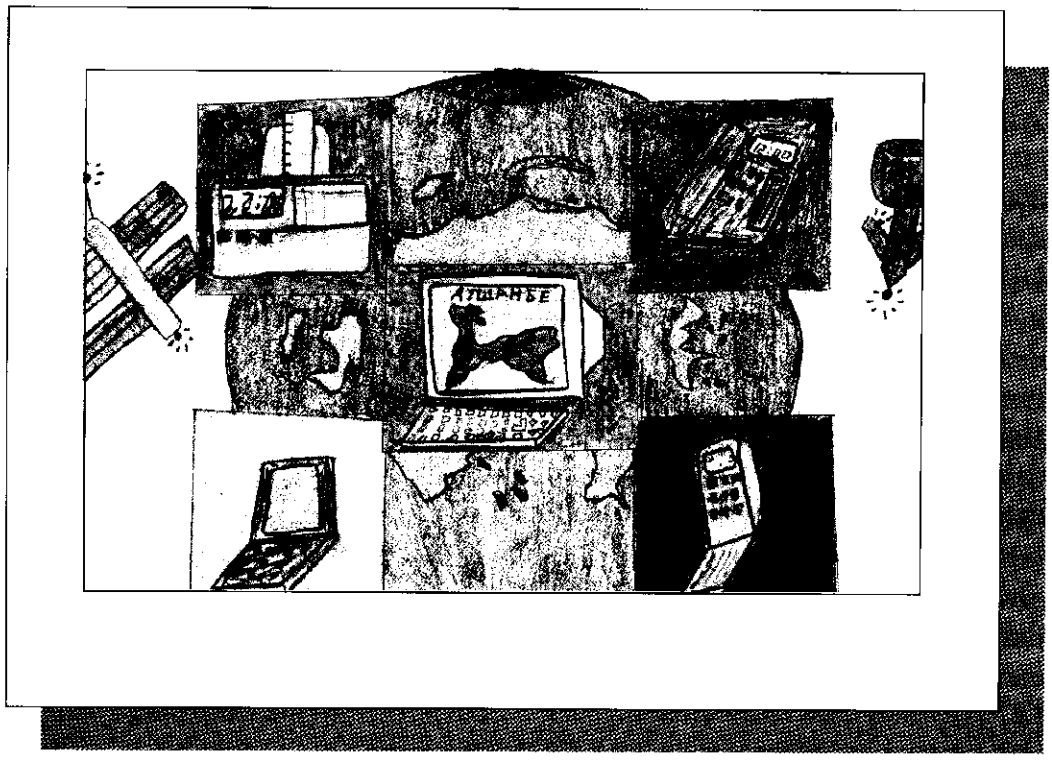
Chapter 1 will present a framework for understanding how a "development dynamic", with ICT as a tool, can be triggered by exploring the interlocking dimensions outlined above. This chapter will act as both compass and Rosetta stone: the means by which we can navigate the information in the subsequent chapters and hope to understand it.

Chapter 2 will examine the infrastructure of both old technologies (post office, telecommunications, radio and television), and their newer counterparts (computers, the Internet,

wireless communications) as they currently exist in Tajikistan.

Chapter 3 will present a "sector & strategy" approach to a variety of human development goals, investigating the uses and applications for ICT in the fields of governance, economic opportunity, education, health, and the environment. Importantly, each sector will sum up with a look at the government's current or envisioned policy response.

Chapter 4 will present a recap and culmination, wherein we will discuss lessons learnt, and attempt to gauge how close Tajikistan is to achieving the development dynamic. With the above framework in mind, and with the preceding analysis in Chapters 2 & 3 we will be in a more informed position to present recommendations for the more speedy realisation, more equitable distribution, and greater sustainability in the pursuit of Tajikistan's development goals.



## INTRODUCTION: HUMAN DEVELOPMENT AND ICT

*HUMAN DEVELOPMENT*

Human development aims at enlarging people's choices. This can be taken to cover a broad range of fields and endeavours, but generally human development aims at enabling people to live longer, healthier lives, to be educated, and to enjoy a decent standard of living. In other words, human development is about making sure people's choices are not constrained by deteriorating health, illiteracy, a lack of economic opportunity, or that the choices of this generation do not unfairly impact the choices of future generations. Human development is about making sure people have a right to choose for themselves how they want to live their own lives. It does not dictate that they should live their lives a certain way, other than to respect themselves and others, but that they should have the choice to pursue their own happiness as they define it.

*Human development is about making sure people have a right to choose for themselves how they want to live their lives*

There are many dimensions to this, but the underlying premise is freedom. It is freedom from poverty, freedom from ill health, freedom from illiteracy, but more importantly freedom for greater economic opportunities, for expanded educational opportunities, for making informed choices without discrimination or intimidation.

There are four pillars, or principles which UNDP has identified as target areas necessary for improved human development: equity, productivity, sustainability, and empowerment. These shall all be discussed in greater detail below, with regard to ICT for human development.

A tool for measuring progress toward greater human development has featured prominently in each of the previous 6 NHDRs for Tajikistan and can be once more found in this report's appendix, the Human Development Index (HDI). The HDI is a composite measurement of each individual country's progress toward improved human development, and attempts to take into account a wide range of data to assess this. Key for this calculus is reaching beyond economic figures such as year on year growth in gross domestic product and average incomes, to incorporate more aspects of human welfare than those measured in monetary terms. This is done through attempting to gauge the progress toward enlarging people's choices through, among other indicators, the human poverty index; the prospects of a long and healthy life by looking at life expectancy and access to safe drinking water; the ability to acquire knowledge by highlighting literacy and enrolment and public spending in education; to have access to the resources needed for a decent standard of living by examining the performance of a country's economy and its expenditures on health and education; preserving opportunities for future generations by examining fuel and electricity consumption and ratification of environmental treaties; protecting personal security through monitoring the number of internally displaced persons; and achieving equality for all through the gender-related development index (GDI).

Also included in this report is the Technological Achievement Index (TAI) which, though not claiming to capture the totality of technological achievement in a country, and unable to measure potential, effort and inputs, measures the creation and diffusion of technology and the building of a human skills base within a given country. The

index examines four areas: technology creation, through examining the number of patents granted, and the accumulation of royalties from patents abroad; proliferation of recent innovations, by highlighting the diffusion of the Internet and technology exports; proliferation of old innovations, through charting the diffusion of electricity and telephone lines; and finally, the human skills base is assessed through the average years of schooling, and number of students enrolled in science, mathematics and engineering.

This report attempts to give a greater qualitative, as well as quantitative picture of where human development is headed in Tajikistan, particularly with regard to ICT as a means for its more rapid achievement. Informing this approach is that development is not an outcome, but a process, not with people as a means to greater economic development, but with economic, political, social, and ecological development as means for achieving greater well being for people, the ultimate end of human development.

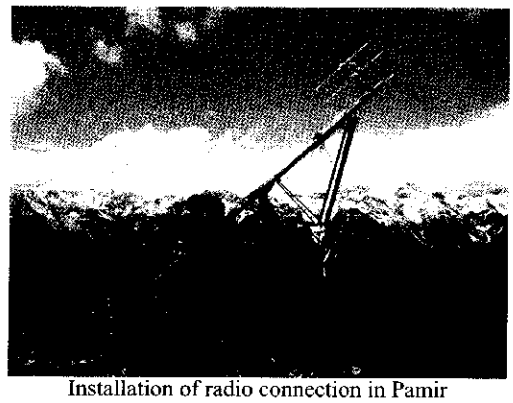
*INFORMATION AND COMMUNICATIONS TECHNOLOGY FOR HUMAN DEVELOPMENT*

Keeping in mind the four principles outlined above, what could ICT do as Tajikistan strives for greater human development? ICT can be a means for levelling differences between rich and poor, urban and rural, men and women, allowing everyone who is connected, not just to the web, but also to the national and local radio and television grids, access to a wider variety of information, news sources, and communications to friends, family, elected officials, and business partners, current or prospective. However, the centrepiece for the discussion to follow will not merely be the benefits, many of which are self-evident, but how it can be done equitably.

The gains to be earned through new technologies in the realm of productivity, while still disputed in some circles, would appear to be significant nevertheless, and could have a real impact on Tajik markets. But when we speak of productivity, we are speaking of productivity for empowerment, that benefits all levels of society, that does not degrade the environment, but that comes as a result of liberalised markets and greater choice. Thus we are not just looking for a quantitative increase in productivity, but a qualitative increase: greater choice and voice in the ways and means income generation occurs for the people of Tajikistan.

Sustainability takes us to UNDP's core philosophy: human development is not for the few, nor should it come at the expense of the many. Though most often sustainability means economic growth of the current generation should not inhibit the opportunities of future generations, the equitable distribution of ICT is yet another component of the sustainability of human development. The four dimensions of human development do not exist in isolation from one another, but can be seen as mutually reinforcing. Sustainability is about not incurring debts, whether environmentally or economically based, but can also take on a national and regional aspect: making sure technology difusion occurs as smoothly as possible, to allow for a continuous growth of human development that is not scuttled on the rocks of gross budget deficits, a polluted environment, or unequal conditions for rural or poor areas.

Empowerment is truly one of the greatest benefits to be achieved through an equitable distribution of new and old technologies across Tajikistan. ICTs can disperse knowledge cheaply, effectively, and widely. They can assist


Installation of radio connection in Pamir

substantially through empowering people to join and participate in the democratic process to a degree hitherto unseen during Tajikistan's brief history of independence through enabling citizens to assemble online, examine government laws, drafted or adopted, and also be better informed about the conditions prevailing across the country, and the actions of their democratically elected representatives. This empowerment can be reached through the expansion of choice in the sources people collect their news and information from, and in some instances, could bring a great deal more information to remote and mountainous regions where previously there was little or none.

Empowerment is also about greater job opportunities, not only knowledge of job vacancies, but also market information, about price, and what skills are in demand. This ties closely together with productivity: knowing what market prices are, and who is willing to buy, farmers can increase productivity in lucrative areas, thus reaping greater returns than they otherwise would have.

Finally, and crucially, one of the roots of greater empowerment is education. Through employing ICTs in schools nationwide, whether computers, Internet connectivity, or educational radio and television programming, ICTs can increase the quality of education, the variety of subjects taught, allow for the formulation of national curricula so that all students receive the same high level of education, and also potentially reach far more people than previously experienced.

The potential benefits of employing ICTs for greater progress in human development would appear to be substantial. The above four principles of human development, it should be noted, all culminate and point to one of the UNDP's most essential, core objectives: the eradication of poverty in Tajikistan. Through creating more and better income-generating opportunities, increasing the quantity of students enrolled and the quality of the education they receive, poverty eradication can be given a new tool, ICT.

ICTs can also play a unique role as Tajikistan strives to meet the goals outlined in the Millennium Declaration. As this report will argue, ICTs have a real contribution to make with regard to reducing poverty, empowering women, improving health and reducing maternal and infant mortality, raising awareness and preventing the further spread of HIV/AIDS, assisting in the dissemination of information on reproductive health services and, through possible distance learning, move Tajikistan closer to universal enrolment in primary school.

*THE HUMAN DEVELOPMENT SITUATION IN TAJIKISTAN*

Currently in Tajikistan, progress toward human development has been hampered by a variety of factors, many stemming from its disadvantageous starting conditions as the poorest republic of the former Soviet Union. By some estimates, GDP has dropped almost 60% from 1989 levels. As with many developing countries, the economy in Tajikistan is reliant on commodities, like cotton and

aluminium, leaving it vulnerable to fluctuations in world market prices.

However, this should be balanced with some positive aspects of the Soviet inheritance, namely near universal literacy and enrolment rates. Adult literacy has remained exceptionally high for a developing country, at 99.5%. However, the percentage of people aged 6-23 enrolled at all levels of education has been dropping, from 68.8 in 1998 to just 61.1 in 2001. It would seem likely that if nothing is done to reverse this trend the outstanding level of literacy currently existing amongst Tajikistan's population will begin to erode, perhaps quite rapidly, given the population boom the country has been experiencing since the 1980s. By some estimates, the percentage of the population under 14 is presently around 41%.

The maternal mortality rate is still exceptionally high but on average has been reduced from 87.8 per 100,000 births in 1998 to 46.6 in 2001. Public expenditures in the health sector however have risen from 6.0% of all public expenditures in 1999 to 6.4% in 2001, but still more investment will be needed to reduce these troubling figures.

GDP has been recovering slowly and rose by over 10% in 2001. In the Human Development Index of the 2002 Global Human Development Report Tajikistan ranks 112th of 174 countries.

*THE PROCESS OF NHDR PREPARATION*

The past six Tajik National Human Development Reports sought to provide timely and relevant analysis and advocacy as Tajikistan experienced and emerged from the civil war of 1992-1997, through ways to consolidate the peace process, deepen social cohesion, and ensure social protection for the most vulnerable groups. Since the conflict has ended, we now have the benefit of turning our attention to address how to achieve sustainable growth and eradicate poverty.

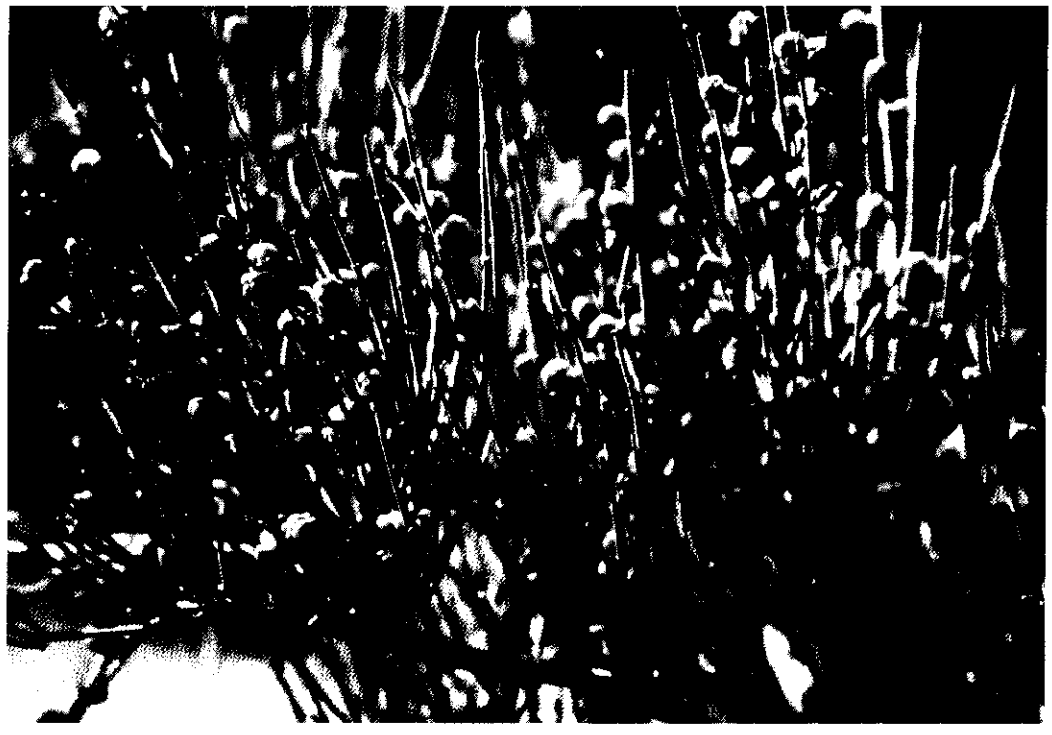
In this respect, the NHDRs in Tajikistan can be viewed as becoming more tightly focussed on certain policy advocacy issues to improve human development in the country, such as this report on information and communications technology, and the next report which will focus on water resource management.

The National Human Development Report is produced through a series of inclusive consultations aimed at building consensus among stakeholders, including representatives of the Government of Tajikistan, Parliament, academia, national NGOs, the media, the Open Society Institute, and the United Nations Development Programme.

First and foremost, it is a "nationally-owned process", which seeks to promote dialogue on relevant development issues from a variety of angles and viewpoints amongst national actors, who then prepare individual contributions for the report. This dynamic process of preparation seeks to bring together actors from a variety of fields who,

though they might have alternate approaches, share a common vision of enhanced development for the country. Complementing this aspect is the goal of building local capacities to identify and address development concerns in Tajikistan. In short, the process of preparation is just as important as the final product, the report itself.

Moreover, this process extends beyond publication, through wide and active dissemination, further policy advocacy through roundtable discussions on the issues raised in the report, and follow-up and monitoring of the concepts and recommendations outlined within the NHDR.



# CHAPTER 1

# TAJIKISTAN IN THE 21ST CENTURY

## 1.1 Globalisation

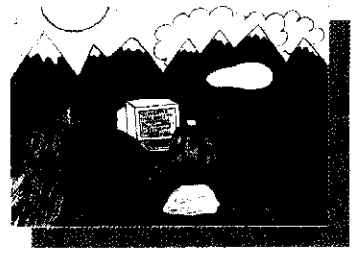
Globalisation is washing away borders. Globalisation is the process whereby geographic distance shrinks, as interdependence between nations grows. This erasure of borders can bring great economic benefits to nations, facilitating expanded trade ties through the faster, easier, and cheaper exchange of ideas, goods, capital and services. This growing integration has brought with it a significant increase in global wealth and trade.

With the end of the Cold War, optimistic proponents of the democratic peace theory, which posits that no two democracies go to war with one another, believe that as democracy spreads, as it has in the last ten years, the likelihood of war decreases.

However, the erosion of borders and the escalating integration of economies and societies also brings with it attendant dangers. Critics of globalisation deem it as nothing more than the unregulated flow of foreign capital across the world for the profit of the few. Far from globalisation being able to concert foreign capital for the benefit of national economies and investors alike, that capital can just as quickly be withdrawn, causing sharp, unpredictable shocks that can serve to accelerate financial crises. Due to this growing integration, what happens in one market has an increased likelihood of dramatically affecting neighbouring markets, if not all markets. These knock-on effects are a troubling side of globalisation, demonstrated most recently with the East Asian Crisis in 1997 and the subsequent Russian financial crisis in 1998.

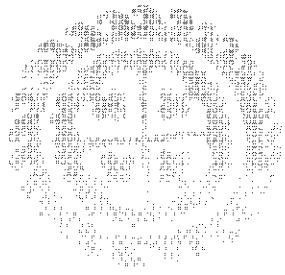
But these are by no means arguments against globalisation. They simply indicate that, as with all things, there are negative as well as positive aspects, and, furthermore, that movement and history need not be linear. It is instructive to remember that globalisation is not an entirely new phenomenon, unleashed by the end of the cold war or the "end" of history. Indeed, some have argued that this is merely a resumption, albeit with new characteristics, of a previous epoch pre-1914. Reversals are always possible, as the first great age of globalisation before the First World War has amply demonstrated. Reversals need not take the form of global cataclysms, such as a global recession or war, but can just as easily be found in the gradual accumulation of reactionary nationalist outpourings among given populations to the perceived encroachment of state sovereignty over time.

Indeed, globalisation has seen what some have called the de facto erosion of the principles enshrined in the Treaty of Westphalia of 1648, regarding the unquestioned sovereignty of the nation state and the inviolability of its borders. This can cause a critical loss of orientation and lack of certainty for all actors



*Far from globalisation being able to concert foreign capital for the benefit of national economies and investors alike, that capital can just as quickly be withdrawn*

concerned, including the state, about how the new system is evolving, and how best to manage it. After all, the free flow of capital means governments have a harder time controlling their national economies. Nevertheless, the diminished role of the state can provide new autonomy for the citizens of those same states.



Truly, globalisation is not as clear-cut as it might first appear. For example, how do we reconcile globalisation washing away borders with the fact that more borders have been demarcated in the past few years as states, both old and new, appear on the global stage? This is not merely referring to the dissolution of the Soviet Union, but also the destruction of the former Yugoslavia, and, recently, the independence of East Timor from Indonesia.

*This growing interconnectedness of economies cannot only cause widespread contagion of financial crises, but also leave those countries not connected further behind*

There is one fact that cannot be denied: globalisation, despite contrary tendencies, is happening. And it is not being directed by any one corporation, government, or group of countries. Rather it is evolving through the everyday practice of bankers, investors, consumers, politicians and citizens all over the world, with no overall grand design in mind, no steadying hand at the wheel to guide it.

In short, the question is not whether globalisation is a good or bad thing, it can be both; but how best to manage the process. How best to maximise the benefits, while minimising the costs?

1.2 Information & Communications Technologies

Information and communications technologies, whether old, such as the telephone, television and radio, or new, such as the computer, Internet, or wireless communication, are an integral facilitator of globalisation. ICTs however, are not the main agents, rather they can be viewed as accelerants, enabling the swift, cheap and easy dissemination of information across national borders. Moore's Law, which postulates that the processing power of the microchip doubles every 18 months, is ample evidence that the process is speeding up, not slowing down.

Combined with this is what has been dubbed the "network effect", that the benefits of using certain applications and products can increase exponentially as more people use those same applications and products. This can help to further understand the rapidity and depth of the changes taking place across the globe.

ICTs have also impacted globalisation in another way, with regard to human rights. Given the availability and speed of communication, domestic news can become international news with startling rapidity, leaving few governments capable of hiding famines or human rights violations.

As the advanced economies have shown, ICT can enable swift, inexpensive, and easy communication across vast distances, while also enabling sizeable gains in productivity. However, an additional concern is that this growing interconnectedness of economies cannot only cause widespread contagion of financial crises, but also leave those countries not connected further behind.

1.3 A Framework for Digital Development

Pre-1991, Tajikistan was the poorest republic of the Soviet Union. Since independence, Tajikistan has experienced, in both scope and scale, the widest violence in the former

Soviet Union, easily outstripping Georgia, Armenia and Azerbaijan, or Moldova. However, poverty in the country stands at a staggering 80% of the population. Nevertheless, ICT offers unique opportunities that, taken together with democratic and economic reforms, can improve social cohesion and reduce poverty in the country.

Because of the high poverty rate and the lack of knowledge of ICT in Tajikistan, the need for a strategic approach to ICT for development is all the more necessary to ensure that specific high priority areas are targeted, and scarce resources are not wasted. Though ICTs are no silver bullet for poverty eradication or rapid, comprehensive development, they can form a unique tool in this effort. A framework is necessary to help conceptualise how ICT might best be used to address the development challenges Tajikistan currently faces.

Through examining the interaction, complementarity and ways infrastructure, policy, enterprise, human capacity and content and application feed off of and into one other, it is hoped a more three-dimensional picture, in both breadth and depth, will emerge regarding the necessary ingredients and potential accelerants of a "development dynamic" with ICT as a tool.

1.4 Infrastructure

Infrastructure is the underlying premise. The infrastructure must be there if the development dynamic is to be triggered. Internet access in Badakhshan will have minimal impact on labour markets and economic opportunities if the roads to get people and goods to market are non-existent. Without roads, without functioning phone lines, without a communications sector that operates across the country at affordable costs for all users, the development dynamic cannot even get off the ground; in a worst case scenario, a partial rehabilitation of infrastructure may unintentionally lead to uneven development, further hampering sustainable human development efforts across the country. This calls for a holistic approach to the problem, a recognition that many facets of the economy are interdependent with one another.

It is easy and almost understandable to become overwhelmed by the sheer scale of need with regard to Tajikistan's dilapidated infrastructure: it was poorly developed in Soviet times, and was done no favours by the civil war and almost a decade of neglect. All infrastructure cannot be rehabilitated and expanded simultaneously. However, a long-term, comprehensive strategy can be composed of many steps, some of which can be reached in a relatively short period of time, producing real and tangible results in priority areas, for example, universal access to telephone lines, while working toward the larger goal of universal service. This calls for a careful, equitable approach that seeks to maximise benefits to the widest possible audience, while guarding against isolating already remote communities further.

It also means keeping a sharp eye out for a confluence of opportunities. As Charles Kenny of the World Bank in his paper "Information and Communications Technologies and Poverty" has stated, it is far cheaper to conduct technology rollout simultaneously: when laying new roads, why not raise new telephone poles at the same time; when laying water lines, why not lay wire too? If rehabilitation of post offices is a priority or at least plan, make

sure to include a public phone in each one. A public phone will be just as useful, if not more than e-mail access. After all, though few people in rural areas have access to phones, even fewer have regular access to e-mail accounts. And almost all already know how to use a public phone; the same cannot be said for e-mail, which requires some knowledge of computers, typing, and also literacy.

Rehabilitation of infrastructure can also create new and productive partnerships. This ties in with the points below regarding government policy, and privatisation. By privatising sectors of the economy, including the telecommunications sector, and by introducing competition, new partnerships can be forged for the rehabilitation of infrastructure. A market led by the private sector can also release the government from the onerous respon-sibility of expanding infrastructure, for example phone lines, by itself. Through privatisation, the government can create partners who have an inherent interest in expanding the country's infrastructure: greater expansion means more customers, which means rising revenues. However, a sharp eye must be kept out to ensure subsidised access to some of these technologies. This is just one of the areas where policy plays a crucial role.

*Turning a public monopoly into a private one should not be the aim*

1.5 Policy

Policy should be aimed at liberalising markets. This has two primary components: privatisation and competition through deregulation. Monopolies in any sector of the economy usually do not increase access, do not rapidly adopt new technologies, stifle innovation, and do not lead to lower costs for consumers. Though not always, they can often be loss-making enterprises, thus proving a financial drain on the state budget.

In the same paper, Kenny presents evidence to support the fact that, against popular notions, privatisation does not lead to mass sackings, but in fact to an increase in employment. There is also evidence to indicate that privatisation of the telecommunications sector leads to faster line rollout, in some cases a threefold increase. Privatised companies often out-perform state-owned enterprises, generating greater revenues. This can be seen as crucial: where previously state-owned enterprises needed to be subsidised, private companies can be taxed. Due to competitive pressures, and the need to capture markets, privatised companies can also become partners in rehabilitating infrastructure, as outlined above. There is also evidence to support the claim that liberalisation of the media, in particular television and radio, can lead to an increase in both the quality and range of programming offered.

Importantly, turning a public monopoly into a private one should not be the aim. The goal should be the liberalisation of markets. That means the introduction of competition and lowering of barriers to entry through the deregulation of markets. By relying on competition, it is hoped that incentives to innovate will grow, as private firms attempt to adopt new technologies, attract investment, revitalise infrastructure, and drive consumer costs down, thus putting more services at the disposal of larger swathes of the population.

The need for efficient and independent regulation is crucial to ensure that once a market is liberalised it remains liberalised. Proper deregulation will lower

barriers for entry, ensuring a competitive, transparent and fair environment for the awarding of licences. Deregulation and privatisation will also mean that prices will begin to reflect costs. However, proper regulation should guarantee that the poorest are selectively targeted and subsidised to ensure continued access. Efficient regulation would also seek to make sure that signals, both radio and television, reach all the people they are intended for. This requires considerable institutional capacity amongst regulating bodies. They must have the capacity to do their jobs, the proper training, access to the necessary resources, and a clear motivation and understanding as to what their role as regulator is and is not.

Carefully formulated, coordinated and implemented policy should aim for an equitable distribution of technology ensuring maximum coverage. This approach is even more important given Tajikistan's status as a post-conflict country. Maintaining social cohesion is crucial for the viability of the state. Equitable distribution should be seen as necessary to ensure regional disparities are not further exacerbated by the rehabilitation of infrastructure and the introduction of old and new technologies. Policy should ensure an even distribution, through, for example, offering packages of licences, coupling the most lucrative markets with some of the more expensive and remote markets, through other service requirements, and through the creation of universal access funds.

The adoption of ICT cannot be a one-off or isolated event. Rather its adoption must be a component of across the board sector reform. This is again the holistic approach. Policy, whether with regard to the government's respect toward international property rights, liberalised trade regimes, convertible currencies, the right to repatriate profits, plays a crucial role in fostering an investor friendly economic environment.

1.6 Enterprise

Enterprise is closely intertwined and builds upon infrastructure and policy. A private-led market can be a leader and partner in the rehabilitation and extension of infrastructure; and carefully crafted public policy has a key initiating and enabling role to allow the free and fair functioning of markets. The development of free enterprise is intimately linked with policy.

*Many small and medium-sized enterprises founder through an inability to obtain cheap credits through Tajikistan's underdeveloped banking sector*

The private sector is crucial for its potential to, first of all, create jobs, secondly its ability to improve infrastructure, and thirdly for its ability to fuel and accelerate economic growth. A developing private sector will improve domestic productivity, the quality and availability of goods, and potentially increase Tajikistan's global competitiveness for the long-term.

Key to development of enterprises is easy access to credit. Many small and medium-sized enterprises founder through an inability to obtain cheap credits through Tajikistan's under-developed banking sector. Property rights are crucial and can act as collateral for loans. If the policy

environment is one that encourages free enterprise and respects international patents, trademarks and other intellectual property, then those enterprises have the potential to benefit from increased foreign direct investment and trade. A predictable and stable legal framework is crucial not merely for investors, but also for entrepreneurs within the country. Additionally, contracts must be enforceable, and bankruptcy procedures clear and not prone to endless delays. No less important, tax regimes play a crucial part in fostering the private sector, providing incentives for further investment in both personnel and infrastructure.

ICT can be used by enterprises to shrink both time and space. But once again, for enterprises to fully benefit, policy is not enough; the infrastructure must be in place. To get orders from customers, to get products to clients, to receive money orders and other payments we do not need e-commerce, we only need to make sure the post functions smoothly and efficiently throughout the country.

1.7 Human Capacity

Human capacity refers to not only building awareness of ICT's use for achieving larger development goals, but also building the capacity for the population to fully utilise it. Not every economy needs to export technology to benefit from the network age. In fact, many countries that strictly export ICT encounter difficulties introducing the very same technology within their own countries. Still, skill development will be crucial in making Tajikistan globally competitive for the 21st century.

Human capacity should not merely aim at increased use, the necessary condition for increased access to be effective. It should also aim at ensuring the ability to maintain the rehabilitated as well as the new infrastructure. This will require expansion of technical capacities and knowledge throughout the regions.

To enhance the capacity of the population, it will not always be necessary to ensure universal access to the most advanced, modern computers available on the market. Often cheaper models will suffice for introducing the basics. It should also be recognised that everyone should have a chance to learn computing basics, but not everyone is going to. Computers require knowledge, and not everyone is going to want it.

Big problems do not always require big solutions. Sometimes a radio can achieve more than the most modern computer. It all depends on the user. Radio has proven to be one of the most affordable and instructive ICTs of the 20th century, and might often prove to be just as useful, if not more so, than computers and the Internet. For example, access to instructional radio programming for farm forums in Zambia assisted farmers in increasing crop yields by as much as 50%. Through these more modest ICTs, educational opportunities otherwise unavailable can be placed within the grasp of all. Radios have played educative roles from Switzerland to Sri Lanka, tackling such pressing universal social issues as drug abuse, sexually

transmitted diseases, family planning, environmental concerns, and of course local news and views.

Public policy should also aim at providing incentives to companies and enterprises to invest in their own workers through training or retraining personnel. The 2001 Global Human Development Report cites studies from industrial countires, suggesting that well-trained workers adopt new technologies at a faster rate. Training and retraining can also boost productivity. Training however is expensive; policy can play a central role here by offering tax deductions to firms for investing in training. Still, for this to be truly effective, government incentives are not enough; efficient training programmes are needed, in addition to teachers, managers, and employees, as well as employers, who understand the benefits. Policy also has a strong role to play in ensuring human capacity is inclusive of all segments of the population; that means extra effort should be placed on empowering women, youth, remote regions, and the disabled.

It should also be kept in mind that improved infrastructure, a liberalised marketplace with a flourishing free enterprise sector will all combine to provide a crucial and enticing incentive for addressing one of the threats Tajikistan has faced and could face again: the brain drain. Having all of these pieces in place will act as an incentive to retain Tajikistan's developed human capacity in Tajikistan for Tajikistan.

1.8 Content and Applications

We have already been talking about this to a certain extent throughout the above discussion: ICT, to be useful and sustainable, must have locally relevant content. Pentium IV computers are nice, but they are certainly no panacea. It should not be forgotten that the history of ICT for development, despite its relatively short span, is already littered with a number of ill-conceived failures. Many programmes expect too much too soon, call for revolution when most often evolution is more beneficial and realistic, and ultimately founder on the rocks of local communities who were not consulted and included in policy formulation and implementation.

The content and application of ICT must be comprehensible, user-friendly, clearly targeted, and succinctly explained to the intended beneficiaries. It is thus crucial to contain representatives of local administrations, communities, civil society, and NGOs that work in the regions not merely in the policy formulation stage, but also in the implementation stage, so that region specific, even village specific applications can be made in the most flexible, transparent, and swift manner possible.

*Policy also has a strong role to play in ensuring human capacity is inclusive of all segments of the population*

Special attention should also be given to the state language. This is crucial in the pickup of new technologies. For example, there are massive problems to be encountered due to the proliferation of English on the Internet. The number of sites in Tajik, a Farsi-based language, is small. The already considerable barriers of infrastructure and access should not be overcome only to rush headlong into the barrier of language compatibility. However radio and television can again be uniquely flexible in tailoring its content to local demands, capable of regional broadcasts in Tajik, Pamiri, Uzbek, and Russian. As will be outlined below, attempts are underway to create computer applications in Tajik language and standartisation of the Tajik script.

Much talk accompanies debates on globalisation concerning the perceived homogenisation of indigenous cultures into a loose, bland, monochrome "global culture" which represents no one and suppresses all. It should be recalled that the very same technologies that are cast so often as the villain and seen as encroaching upon the "cultural exceptionalism of nations" can also be used to simultaneously preserve, spread and strengthen traditional cultures. As with all technology, the World Wide Web is not good or bad in and of itself, it depends on how it is used. The crucial component of this section, content and applications, is to make sure the application of ICT contains relevant content and can be used by all citizens of Tajikistan.

*Many programmes expect too much too soon, call for revolution when most often evolution is more beneficial and realistic*

1.9 A Final Note

One further point should be made, which builds upon all five dimensions outlined above.

The most radical and dramatic solutions are oftentimes the least realistic and sustainable. Of course the goal, the eradication of poverty is ambitious and unchanging, but will likely have a long time horizon. In many instances, more modest means may achieve more sustainable outcomes.

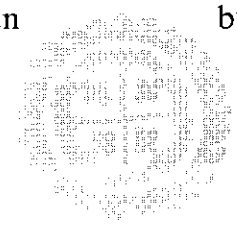
As should be clear from the above, often a radio might work just as well, and, in fact, better, for it is accessible to most regardless of education. Also, it might require less maintenance. It does not require the technical training or capacity a computer does to use. An entire classroom can listen to a radio simultaneously. And of course, a radio is far cheaper and far easier to fix than a computer. Additionally, for the price of one computer, one could buy hundreds of radios, and distribute them over a far wider geographic space than just one computer, which would most likely be stationary.

The 2001 Global Human Development Report cites an innovative example from Sri Lanka. There the Kothmale Community Radio is used as a gateway for the Internet; children and teachers request information from the radio station. The radio station then searches for this material on the Internet. Once found, the information is then broadcast to the entire community, and made available in a resource centre for all to access. This is a unique and excellent example as to how old and new technologies can interact and amplify one another, reaching a potentially far wider audience of beneficiaries with far more detailed information than if each technology were kept in isolation.

Nevertheless, the one place where radios are similar to computers is a reliance on infrastructure; just as a computer cannot hook up to the Internet without a radio or dial-up modem, so too a radio is functionally useless if no signals are broadcast. Radios need radio stations and retranslators. Furthermore, as indicated above, greater value can be added if those signals are local, in addition to national. National broadcasts can provide nationwide news and information, and also instructional programming, but local content can be more responsive, providing opportu-nities for greater feedback and interaction.

Better then to have modest programmes that succeed and are sustainable, than epic programmes that fail, benefit no one, expend

scarce public resources, and in the end disenchant as many as they disconnect. Modest does not mean a lack of vision, but rather a more realistic vision and desire to effect quick, sustainable change. This approach calls for a network evolution, not revolution. Not a short, sharp shock, but an equitable distribution to ensure social protection by providing subsidised access to the poorest.

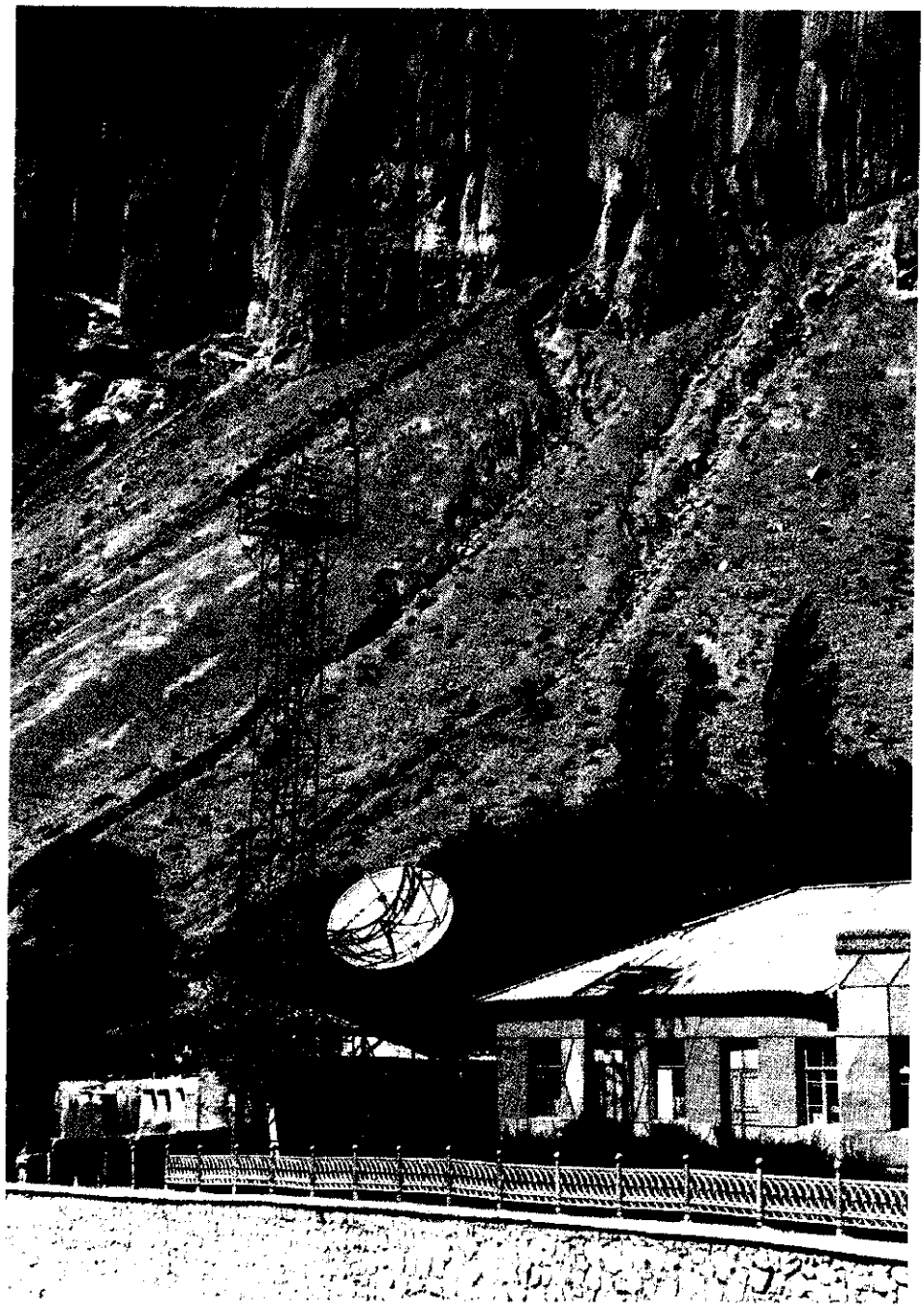


This can be done through a variety of ways as outlined by Charles Kenny in the aforementioned paper, including service requirements when licences are issued to operators, indicating that they must have a minimal level of distribution into certain regions of the country, or through the creation of universal access funds, whereby, in an open and transparent process, operators bid for access to the funds; the operator which can extend access the quickest and cheapest is awarded the contract. There are a variety of methods to build a substantial universal access fund, including charging all operators a small percentage, usually 1-2% of their revenues, which will then be deposited in the fund, through the public budget, or through funds obtained from international financial institutions or other international organisations.

Being more modest does not mean being less successful; in fact it could mean quite the opposite. It means being more realistic, and searching for "solutions that stick". A public telephone can be just as useful for empowerment as a computer in many rural localities, perhaps even more so, allowing emerging entrepreneurs to find suppliers, access market prices, and tailor his or her production according to market demands. Information is never perfect even in advanced economies, but through the use of a basic telephone, a producer will have a far better picture and understanding of the market: who wants what, how much, what they will pay for it, and when, than if the call was never made.

Finally: universal access over universal service. Universal service aims to get, for example, a phone in every home in every region of Tajikistan. Ambitious indeed. Universal access, while perhaps not as dramatic, aims to make sure a public phone is available within walking distance of every town and village nationwide. It is important to separate these two right away. Firstly, they need not be mutually exclusive. The short-term goal can be universal access, and the long-term goal universal service. It is not an either/or proposition. Secondly, any analysis must carefully consider which is more sustainable and cost-effective. Is it really realistic to talk right now about universal service, or should more time be spent trying to make universal access a reality? Which can be done in a relatively short time, a few years, throughout the country? This last question is crucial. Equitable distribution will serve to foster social cohesion as Tajikistan accelerates its economic recovery.

*Information is never perfect even in advanced economies, but through the use of a basic telephone, a producer will have a far better understanding of the market*



# CHAPTER 2

# THE CHALLENGE OF INFRASTRUCTURE

The very first dimension necessary to trigger the development dynamic is infrastructure, and with good reason. Without the phone lines, without the TV and radio stations, there is little opportunity for widespread use of ICT for Tajikistan's citizens. Computers can only do so much in remote regions if there is no sustainable connection to the Internet, if the human capacity is not present to service them, and the region is plagued by power outages, quite frequent in Tajikistan. Dilapidated infrastructure will inhibit the emergence of entrepreneurs, unable to collect and process market information, impede the education process, and will hinder the flow of information.

Tajikistan has one of the least developed telecommunications sectors in the CIS and by far the lowest penetration rate at just 3.5 mainline telephones per 100 people This figure drops to a paltry 0.6 in rural areas. There are a variety of factors limiting information availability in Tajikistan: inherited technological backwardness resulted in extremely poor starting conditions for Tajikistan. Most telecommunications equipment is obsolete. A lack of spare parts has further hindered progress. The civil war and its ensuing destruction has further impacted infrastructure negatively. Finally, a lack of finance to repair existing infrastructure and extend it has slowed the transition to and diffusion of digital opportunities. The totality of these reasons helps to lay an understanding regarding the difficulties Tajikistan will encounter, and already has, as it moves through the 21st century.

This chapter will examine the communications infrastructure, both old and new. By old we mean such things as telephones, post offices, and TV and radio stations. When we speak of new, we will highlight such emerging technologies as computers and the Internet, and satellite and wireless communication. The interaction of these two types of technologies can sometimes have strong synergistic effects, but first we must establish the landscape: what is currently available with respect to old technologies in Tajikistan?

*Tajikistan has one of the least developed telecommunications sectors in the CIS and by far the lowest penetration rate at just 3.5 mainline telephones per 100 people*

*OLD TECHNOLOGIES: SOVIET INHERITANCE & CIVIL WAR*

Across the former Soviet Union, certain industries were favored by the logic of central planning, resulting in lopsided economies, hyper-specialisation and an uneven dispersal of technology. Tajikistan is a prime example of this on a micro-scale. Certain regions in the country and sectors of the economy experienced rapid development, while others experienced more evolutionary progress, and some experienced none at all. What did Tajikistan inherit from the Soviet system, and how has this changed after ten years of independence?

## 2.1 The Post Office

One of the oldest forms of communication, the hand-written letter

**Table 2.1: Volume of postal delivery**

| Delivery of: | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| Newspapers and journals (millions) | 260.9 | 107.3 | 21.9 | 17.9 | 4.8 | 1.1 | 2.5 | 2.3 | 2.8 | 3.1 |
| Letters (millions) | 47.1 | 24.4 | 8.7 | 5.2 | 2.5 | 0.9 | 0.5 | 0.4 | 0.3 | 0.4 |
| Parcels (thousands) | 1149,0 | 424,0 | 138,0 | 40,0 | 12,2 | 6,3 | 8,1 | 3,0 | 2,0 | 2,0 |
| Wires(millions) | 2.8 | 1.8 | 1.3 | 0.8 | 0.5 | 0.3 | 0.2 | 0.18 | 0.16 | 0.16 |

*Source: State Statistical Committee*

had a place in Tajik society as one of the most trusted institutions before the outbreak of hostilities in 1992, with a hefty turnover of letters and parcels. Thanks to regular transportation and funding, letters could be delivered in a timely fashion, and postal workers were paid. In 1990, 6,500 mail workers were employed in 782 post offices; of the 6,500 workers, 2,804 were postmen delivering mail to private addresses.

Given the collapse of centralised subsidies and the ensuing civil war, the quality and volume of postal services declined dramatically. Qualified staff left the country while equipment became obsolete. Demand, unsurprisingly, also dropped during the war years. The damage resulting from the civil war to the postal service has been estimated at TJS 160,000. Thirteen departments were ruined. More than 100 communication centres suspended activities. Transportation to neighbouring countries broke down. Many letters and parcels were lost or delayed. Customer confidence in the postal service has declined accordingly. Most mail now is carried informally through friends and relatives travelling through the country. Previously, on average, one post office serviced between 4,600-5,000 people in towns, and 2,800-3,500 in rural localities. Presently, given the decline in service, it is estimated that one public mailbox exists for every 10,000 residents in Tajikistan.

The average salary of a postman was TJS 19.1 in 2001, well below the minimum consumption basket of TJS 22.74. The most reliable carrier in the country has become DHL, but this service is extremely expensive and out of reach for most Tajiks.

Because of the mountainous terrain of the country, mail is delivered daily by air to Sughd, and twice weekly by car to Khatlon and RRS. Since 1 March 2000, all outgoing and incoming correspondence travels by air through Kazakhstan, Kyrgyzstan, and Russia, spending on average 7-10 days in transit.

*OBSTACLES & OPPORTUNITIES*

There are great opportunities and prospects for a revitalised postal service in Tajikistan. The post offers a

**Table 2.2: Distribution of postal services across Tajikistan**

| Regions | Population | Departments | Centres |
|---|---|---|---|
| RT | 6,375,500 | 606 | 59 |
| KHO | 2,243,500 | 208 | 22 |
| SO | 1,930,200 | 172 | 16 |
| GBAO | 210,700 | 58 | 6 |
| RRS | 1,401,700 | 137 | 15 |
| Dushanbe | 589,400 | 31 | - |

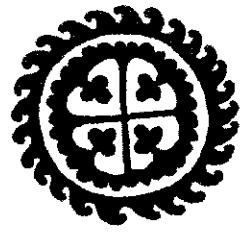
*Source: Ministry of Communications*

cheap and affordable means of communication for the poor. With regard to content and applications, it requires no new skills or adaptation. Because of Tajikistan's high literacy rates, more people can write a letter than use a computer.

But there are also serious obstacles to expanding and improving the quality of service. The tariffs the post office levies do not even begin to cover expenditures. It is a loss making enterprise, in 2000 generating TJS 549,800, while expenses topped TJS 679,400. Because wages are low, many have left the sector, or found second jobs. There is a real need to revitalise the human capacity in the sector. Productivity is low because mail is processed manually, with post offices, whether local or regional, often lacking sorting equipment. These problems cannot be forgotten, and if ignored, could become even worse.

Policy can play a crucial role here. There is no reason why rehabilitation of the postal service cannot reinvigorate the old-fashioned form of hand-delivered mail, while simultaneously offering new services in most post offices across the country, for example free public access to computers for e-mail. By offering these centres, in either post offices, schools, or libraries, equipped with just a few computers, relevance and value can be added to old institutions, and in turn, those old institutions can be transformed into potential new "hubs", offering a variety of services to isolated regions. Such an approach is ambitious, but not entirely unrealistic; it can aggregate public demand, creating many beneficiaries with just one or two lines; also it would seek to diminish the digital divide by making sure isolated and rural communities have some access, and thus have a "smoothing effect" on uneven development.

Contained in the Post Office Development Concept, currently under preparation by the General Directorate of Pochtai Tojikiston at the Ministry of Communications, is a plan for just such an idea: the opening of e-mail centres in urban and rural post offices. However, there are serious impediments to these plans. Currently, in Dushanbe, only two post offices have been opened with such e-mail centres. It is planned to expand this number and also open an Internet cafe. Unfortunately, the centres are presently under-utilised, receiving a meagre 7 to 8 clients per month, and thus generating minimal revenues. Consequently any plans geared toward expansion should have as a component the raising of awareness among the local residents regarding this new and potentially innovative service. Atop the problems of minimal coverage, and minimal awareness, is perhaps the most onerous impediment of all: cost. The cost to access computers in the post office is comparable to commercial Internet cafes. Undoubtedly the post office must generate revenues, but for the time being, to increase awareness, it might be best to offer access free of charge for the first few months, and then start gradually charging a reduced fee; if, through this method, they can attract more clients, the reduced price will be offset by more users.



*There is no reason why rehabilitation of the postal service cannot reinvigorate the old-fashioned form of hand-delivered mail, while simultaneously offering new services in most post offices across the country*

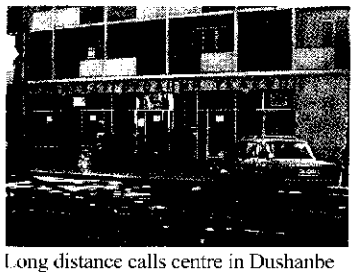
### 2.2 Telecommunications

Telephone lines have fared just as poorly as the postal service since independence, with the number of lines decreasing almost every year and in every region. In the Soviet era, phone lines were prone to disconnections, poor connections and uneven distribution. All of these trends have accelerated since independence, though there is hope,

**Table 2.3: Number of lines**

| Year | Total | GBAO | SO | KHO | RRS and Dushanbe |
|---|---|---|---|---|---|
| 1991 | 257,493 | 11,108 | 73,421 | 49,694 | 123,270 |
| 1992 | 268,063 | 11,409 | 73,602 | 48,183 | 134,869 |
| 1993 | 259,587 | 11,102 | 73,712 | 48,865 | 125,908 |
| 1994 | 262,945 | 11,225 | 74,685 | 51,225 | 125,810 |
| 1995 | 259,321 | 11,363 | 73,468 | 49,905 | 124,585 |
| 1996 | 237,859 | 10,749 | 61,990 | 47,678 | 117,442 |
| 1997 | 225,558 | 10,298 | 59,498 | 45,673 | 110,089 |
| 1998 | 221,234 | 10,265 | 59,318 | 45,490 | 106,161 |
| 1999 | 212,544 | 10,142 | 58,308 | 45,748 | 98,346 |
| 2000 | 218,516 | 10,178 | 59,331 | 45,955 | 103,052 |

*Source: State Statistical Committee*



Long distance calls centre in Dushanbe

*Access to public phones is poor. Tajikistan possesses only 196 public phones in a few major cities (0.03 per 1000 inhabitants) most of which are obsolete*

thanks to international assistance, for a turnaround in the coming years.

To a certain extent, even the figures in Table 2.3 leave much left unsaid. This graph focuses on quantity, but quality is no less important, and the quality of connectivity is low, often plagued by delayed connections and interruptions. Due to the low capacity of the prevailing analogue equipment, many long-distance calls are handled automatically through area codes, which are often unrealibale, or the call must be connected manually by an operator. Still, if one manages to get through, lines are often cut, with 145 cuts a year per 100 lines, according to WB data.

Of a total 218,516 lines, 73% are outdated. Only 7% of all lines are digital and this number is decreasing with additional analogue installation. Besides the poor infrastructure, the installed facilities are distributed inefficiently. World Bank data of 1999 indicates that currently about 27% of the lines installed are not even used, partly because subscribers have been disconnected for non-payment. The highest income-generating lines (70% of all revenues in the sector) constitute only one-fifth of all lines; these are allocated to the government, its agencies, private businesses and international organisations. According to the World Bank, the level of income-generation is on average an unsatisfactory USD 35 per functioning line, as a result of poor quality service and subsidised prices. The population pays USD 0.25 monthly, while organisations generally pay USD 1.70; still, actual costs remain considerably higher, at USD 7-8 per month.

The low cost of local calls is subsidised by the high cost of long distance calls; for one minute, a long distance call costs USD 4, resulting in low use.

Meanwhile, the waiting list has ballooned to 48,000 persons in 1999, with the average waiting time for a

**Table 2.4: Telecommunication indicators**

| | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Number of switches | 390 | 388 | 383 | 383 | 325 |
| Waiting list for service | 76,604 | 62,527 | 60,457 | 33,627 | 23,732 |
| Unmet applications | 70,765 | 53,635 | 49,143 | 19,901 | 10,269 |
| % Of main users, connected to the switch stations | 90.40 | 94.48 | 93.61 | 98.59 | 98.73 |
| % Of users, connected to digital switch | 5.53 | 4.76 | 7.72 | 7.64 | 7.43 |
| % Of main urban users | 88.16 | 87.85 | 88.83 | 86.01 | 86.90 |

*Source: Ministry of Communications*

**Table 2.5: Urban and Rural lines**

| Regions | Population, 2002 | | | Number of lines, 2000 | | | Number of lines per 100 citizens | | |
|---|---|---|---|---|---|---|---|---|---|
| | Urban | Rural | Total | Urban | Rural | Total | Urban | Rural | Total |
| Dushanbe | 589,400 | 0 | 589,400 | 72,714 | 0 | 72,714 | 14.4 | 0 | 14.4 |
| RRS | 180,600 | 1,221,100 | 1,401,700 | 24,886 | 5,452 | 30,338 | 12.9 | 0.8 | 2.3 |
| SO | 504,900 | 1,425,300 | 1,930,200 | 50,393 | 8,938 | 59,331 | 9.2 | 0.8 | 3.1 |
| GBAO | 28,000 | 182,700 | 210,700 | 4,226 | 5,952 | 10,178 | 15.7 | 3.3 | 4.9 |
| KHO | 387,600 | 1,855,900 | 2,243,500 | 37,687 | 8,268 | 45,955 | 9.3 | 0.5 | 2.1 |
| Total | 1,690,500 | 4,685,000 | 6,375,500 | 189,906 | 28,610 | 218,516 | 11.3 | 0.8 | 3.6 |
| | 26.5% | 73.5% | 100% | 85.5% | 14.5% | 100% | | | |

*Source: State Statistical Committee and the World Bank*

new line being no less than 3.6 years. Though the plight of the poor is often highlighted, private business has also been hard hit, with demand exceeding available services. The Ministry of Communications data diverges from these figures, but makes no attempt to conceal the scope of the problem.

Access to public phones, which can provide an alternative to residential phone lines in rural areas, is poor. Through their own initiative, some citizens have sought to fill this void by installing telephones in public places for local calls. The price for one call is 15 dirams, or 5 cents. This gets to the heart of the question: should the strategy be universal service or universal access? This will be discussed later with regard to policy.

One additional facet that must be highlighted is the urban/rural divide. Just as the introduction of new technologies can serve to reinforce pre-existing cleavages in society, so too can the decay of old technologies. Outlying, poor, rural areas often suffer disproportionately, while investment, if any, flows into regional capitals.

85% of all lines are allocated to urban areas, where only 26.5% of population resides. More than a third of all telephone lines are in Dushanbe, with only 9.2% of the population. Less than 1% of the population in most rural areas have access to any sort of communication, and this share is declining. Existing rural networks are unreliable and often severely damaged. In the mountainous regions of Badakhshan, facilities are even worse. Despite Tajiktelecom's efforts and a DAMA satellite network which was installed in SO, KHO, RRS and GBAO, access to information in rural areas remains limited.

*Less than 1% of the population in most rural areas have access to any sort of communication and this share is declining*

*OBSTACLES & OPPORTUNITIES*

Policy is crucial here, and can speak directly to many of the problems hindering expansion and improvement of quality in the telecom sector. The greatest obstacle in the telecom sector is the monopoly status currently

**Table 2.4: Telecommunication indicators**

| Regions | Area, Th. sq/km | % | Density sq. km | Population, | % | Phone Lines | Penetration % |
|---|---|---|---|---|---|---|---|
| RT | 143.1 | 100 | 44,5 | 6,375,500 | 100 | 218,516 | 100 |
| GBAO | 64,2 | 44,9 | 3.0 | 210,700 | 3.3 | 10,178 | 4.6 |
| KHO | 24,8 | 17.3 | 90,5 | 2,243,500 | 35.2 | 45,955 | 21.0 |
| SO | 25,4 | 17,7 | 76,0 | 1,930,200 | 30.3 | 59,331 | 27.1 |
| RRS | 28,6 | 20.0 | 49,0 | 1,401,700 | 22.0 | 29,152 | 14.7 |
| Dushanbe | 0.1 | 0.06 | 5894,0 | 589,400 | 9.2 | 73,900 | 33.8 |

*Source: State Statistical Committee*

**BOX 2.1: THE EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT**

The EBRD has actively sought to assist the process of developing Tajikistan's telecommunications sector. In 1995, the Bank provided technical cooperation to assist the government in holding an international tender to establish a joint venture company which would construct a digital overlay network (DON) using private investment. Unfortunately, due to destabilising events in Tajikistan and the Asian economic crisis, no acceptable proposals were received and the tender was formally cancelled in 1998.

Following the cancellation, the government approached the Bank in 1999 for further technical cooperation in developing a project to make investments into a fixed-line network, financed by an EBRD sovereign guaranteed loan. The Bank agreed and has provided two technical cooperation components to support this, both generously funded by the Japan-Europe Cooperation Fund: a Diagnostic and Feasibility Study conducted by Eircom International Consultancy of Ireland (233,000 Euro) and a Regulatory Development Programme carried out by Detecon of Germany (301,250 Euro).

Both technical cooperation components were successful. The Diagnostic and Feasibility Study concluded that, subject to a number of key changes and reforms, a project for financing selected development could be successful and, consequently the Tajikistan Telecommunications Project was created. Under this project, the Bank is providing a USD 13 million loan for network investments, supported by a sovereign guarantee, plus further technical cooperation to the amount of 1.1 million Euro from the Government of Japan to carry out an Institutional Development Programme. In parallel, the Government of Switzerland will provide USD 2 million to finance additional network investments under the Bank's project.

The EBRD's Board of Directors approved the Tajikistan Telecommunications project on 4 September 2001, and the legal Loan and Guarantee Agreements were signed between the government, Tajiktelecom (TT) and the Bank on 2 October 2001. A bilateral agreement was simultaneously signed between the Tajik Government and the Swiss Government.

PROJECT STRATEGY

The strategy under the Project is to replace vital but obsolescent analogue switches with new digital units. In Dushanbe, digital switches will be supported by a new digital transmission system, including microwave links, and connection to the Trans-Asia Europe (TAE) cable. Provision will also include "per-minute" call metering facilities, supporting the tariff reform programme. The realisation of these sub-projects will allow increasing the communication quality, speed and capacity of transmission. This will directly benefit all ISPs through a general strengthening of the nation's telecommunications net.

The project will be supported by improvements to the commercial and operational capacity of TT. Of particular note is the Institutional Development Programme that will target corporate management, particularly in the areas of finance and accounting, project management, strategic planning and implementation and procurement practices. It seeks to bring about further sector reforms, including development of a regulatory function and tariff reform.

Under the conditions contained in the Loan and Guarantee Agreements, the Government has undertaken a number of reforms affecting the telecommunications sector, including introducing a new telecommunications law, normalising licensing procedures, and making structural changes to the regulatory environment, including the creation of an independent regulatory body.

PROJECT INVESTMENTS

The investment programme is based on work done by the consultants, Eircom, TT and the MC, identifying a number of discrete investments that, taken together, will provide Tajiktelecom with the nucleus of a modernised telephone network. The network currently suffers from a proliferation of old technology that does not provide satisfactory quality of service, cannot support modern services required by customers, and is increasingly difficult to maintain due to a shortage of available spare parts.

TRANSITION IMPACT

The transition impact from the project derives primarily from the influence the Bank can bring to bear on the MC and TT to develop a legal and regulatory framework in the sector, as well as early preparation of TT for potential privatisation.

The sovereign loan to TT and the associated technical assistance programme will provide urgently needed financing to enable development and partial modernisation of critical infrastructure elements, thus enabling provision of improved telecommunication services.

EBRD

enjoyed by Tajiktelecom. The PRSP strictly states that the privatisation of Tajiktelecom by selling a stake to a strategic investor will occur sometime in 2003-2005. This is a crucial beginning, but a quasi-private monopoly should not be the desired end state. The benefits of liberalisation, meaning both privatisation and the introduction of competition include greater innovation, expanded access, and reduced consumer cost, to say nothing of attracting greater foreign investment. The necessary funds to modernise and expand the sector are unlikely to come through the public budget. Most investment in the 1990s was small, and sought to merely repair or replace essential parts. This is all the more reason to accelerate a liberalisation of the sector, while making sure to guarantee continued, subsidised access to Tajikistan's poorest. In fact there has already been significant foreign investment in this sector, but there is considerable room for more.

Opportunities are vast. Improved infrastructure is necessary for economic growth, and thus the reduction of poverty, however, its uneven application can cause as many problems as it solves. Importantly, the PRSP recognises how far advanced Tajikistan's urban centres are relative to its rural localities. The government's strategy envisions what appears to be a measure toward universal access, through a network of public phone lines into rural areas. This shows a sound understanding that improved infrastructure will provide better access to goods, services, jobs and information.

The law "On Telecommunications" passed on 10 May 2002, builds further on this, and asserts that, in Article 3, among the principles underlying activities in the field of telecommunications are equal access and the promotion of effective and free competition. Article 6 identifies the government as the key body charged with demonopolisation and privatisation in the sector, and, in the following article, that the Ministry of Communications will draft laws, elaborate policy, and also ensure that a competitive environment is established.

Article 16 of the law is of particular note, dealing with licences. It states that all legal and physical entities have equal rights for obtaining licences. It also states that "licences may only be refused in the result of technical restraints and due to the limited availability of frequencies or when the applicant does not have the technical or financial capacity to sustainably meet the obligations resulting from the conditions under which its activities are carried out." This is crucial for creating the intended competitive environment and must be actualised in practice. Article 24 also gives welcome assurance of confidentiality for all conversations and data transmission by law.

International Telephone Centre

### 2.3 TV & Radio

At present, there are about 35 TV and radio channels operating in Tajikistan, the vast majority of which are regional and, in principle, non-governmental.

*Importantly, the PRSP recognises how far advanced Tajikistan's urban centres are relative to its rural localities*

The legal basis of the e-media in Tajikistan is found in the Law "On TV and Radio Broadcasting", which was adopted on 14 December 1996 and amended on 30 June 1999. This gives advantage to State TV and radio by giving the State Committee for Television and Radio the competence to give licences to private TV and radio stations. In addition to a broadcasting licence, TV and radio companies also need technical permission to broadcast

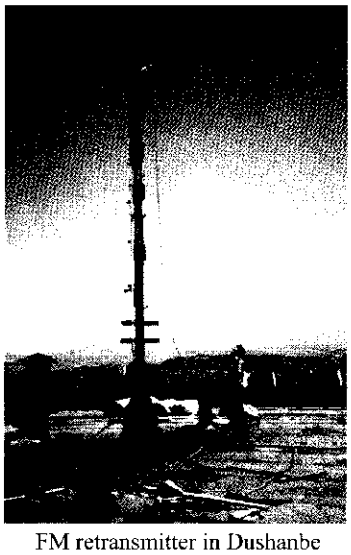
**Table 2.7 The Scope of Contraction: number of multi-program radio transmission terminals**

| Years | Total | SO | KHO | GBAO | RRS | Dushanbe |
|---|---|---|---|---|---|---|
| 1991 | 231,101 | 77,567 | 40,876 | 15,301 | 40,375 | 56,982 |
| 1992 | 228,284 | 77,567 | 39,661 | 13,699 | 40,375 | 56,982 |
| 1993 | 201,482 | 65,868 | 34,213 | 12,987 | 41,602 | 46,812 |
| 1994 | 190,459 | 62,745 | 31,515 | 13,047 | 37,081 | 46,071 |
| 1995 | 186,046 | 60,103 | 27,184 | 12,809 | 40,664 | 45,286 |
| 1996 | 138,100 | 48,868 | 25,062 | 12,380 | 35,844 | 15,946 |
| 1997 | 114,546 | 33,154 | 20,085 | 13,482 | 35,844 | 11,981 |
| 1998 | 108,954 | 35,477 | 16,045 | 12,228 | 35,844 | 9,360 |
| 1999 | 105,169 | 36,553 | 16,048 | 12,177 | 31,796 | 8,595 |
| 2000 | 101,795 | 45,547 | 16,048 | - | 31,666 | 8,534 |

*Source: Ministry of Communications*

from the State Communication Inspectorate. In practice, this can be a lengthy procedure, the outcome of which has little to do with feasibility, quality, or demand, but rather relations with local authorities.

State TV and radio take priority in using the state wire networks (Article 8), and the State holds a monopoly for international activities, i.e. re-broadcasting foreign TV and radio programmes, and buying and selling such programmes (Article 5). Article 3 lists the operational principles of TV and radio stations: objectivity of information; reliability; the right of citizens to receive information; free expression of independent views and opinions; respect towards general norms of morality; and strict observance of professional ethics. Control over ideological content or interference in the "creative work" of TV and radio, by public or private persons, is prohibited (Article 6). However, the activities of TV and radio companies can be terminated by a court, but the law does not say on what grounds. Only juridical persons in Tajikistan can found TV and radio organisations (Article 11).



FM retransmitter in Dushanbe

*NATIONAL AND METROPOLITAN E-MEDIA*

The Tajik state television channel (TVT) has a national audience of 85% of the population, according to Internews and CIMERA estimates. TVT has always been considered the main source for official state information. It broadcasts 12 hours per day. As TVT was rarely accessible in mountain villages in Badakhshan, in 1996 the Ministry of Communications established the first national satellite TV station to reach this area, though certain parts are still not covered. TVT includes a regional branch office in Khujand and uses TV organisations in all other provincial centres. The latter are small separate companies, broadcasting on the frequency of the national TVT channel, functioning de facto as provincial branches, broadcasting a mixture of TVT and local content.

The radio landscape concentrates around the Tajik State radio stations "Sadoi Dushanbe" ('Voice of Dushanbe'), Radio-i-Tajikistan, Inovechanie ('International Messages', a State channel that broadcasts news summaries in Farsi/Dari and English) and retransmission by Tajik State radio of the Russian channel "Mayak" ('Lighthouse'), and also the private Russian FM music station Russkoye Radio 2, beamed in for Russian border guards, but still accessible to large segments of the population. "Sadoi Dushanbe" is particularly popular because of its unusual approach for state media, broadcasting interactive talk-shows, debates and modern Tajik and foreign music.

**Box 2.2: E-media**

The Russian channels RTR, and until late 2001, ORT, can be seen almost across the entire country, and are re-broadcast on the basis of an intergovernmental agreement with Russia. ORT and RTR are popular and major sources of information, not only for the Russian-speaking population – which comprises ethnic Russians as well as urban Tajiks whose de facto mother tongue is Russian – but also for many provincial Tajiks who know Russian. According to a poll conducted by the NGO Sharq Research Centre in January 1999, 77% of Dushanbe's TV viewers get their news from these two channels.

On 11 October 2001, however, the Ministry of Communications had ORT switched off and the broadcasting time of RTR reduced, because officially the Russian State Broadcasting Company had not paid its USD 180,000 debt for retransmission fees. In September 2002, the Deputy Minister of Communications announced that RTR had paid its debt and brodcasting was resumed. ORT broadcasts were resumed for the month of June in 2002 as signals of the World Cup matches were beamed in to Russian troops.

The Russian military base rebroadcasts the Russian TV-6 channel for its own personnel. Uzbek State TV can be seen only in some parts of the country, such as Sughd and around Tursunzoda.

CIMERA

No non-governmental metropolitan radio stations had received licences until July 2002, when, by order of the President, Asia-Plus, which had been lingering in licensing limbo for years, received its broadcasting licence. On the 11th Anniversary of Tajikistan's imdependence, 9 September 2002, Asia-Plus finally began transmission in Dushanbe, potentially reaching up to one million people. Though currently only broadcasting 14 hours a day, there are plans in the near future to begin 24-hour broadcasts.

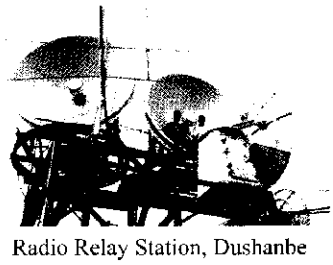
*REGIONAL & LOCAL E-MEDIA*

Thirty local and regional TV and radio channels are broadcasting in different districts of the country, but none have national reach. All regional e-media in Tajikistan are TV channels, except for Tiraz Khujand, a non-governmental regional radio station. Their average broadcast time is 6 hours per day. Like in other Central Asia republics such as Kazakhstan and Kyrgyzstan, regional TV is becoming an ever more important information channel in the provinces, since printed media rarely appears due to geographic isolation and the high cost of transport. Many rural households still own a radio or TV from the Soviet era. As such, and because the population of Tajikistan is predominantly rural, local media have a large potential role in conflict prevention efforts, advocacy campaigns and strengthening administrative decentralisation and local governance.

*OBSTACLES & OPPORTUNITIES*

An impediment to growth for the independent media is financial. There are no state subsidies for local TV stations, the advertising market is small to non-existent, fees for the use of frequencies are steep and media outlets are unable to pay their journalists more than around USD 20 a month. Short announcements, congratulations (birthdays, official and religious holidays, and so forth) and ads (though rare) constitute the main source of income for local TV stations. In Sughd, an advertising spot costs up to USD 10 for each broadcast, while in Khatlon the rate is no higher than USD 2 to 4.

Another source of income is provided by "latent advertising", whereby TV stations produce and broadcast 10 to 15 minute films which positively present an enterprise, collective farm or politician. Although the Law on



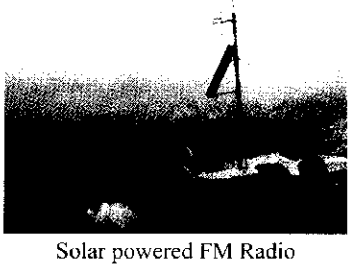
Radio Relay Station, Dushanbe

*On the 11th Anniversary of Tajikistan's independence, 9 September 2002, Asia-Plus finally began transmission in Dushanbe, potentially reaching up to one million people*

**BOX 2.3: LANGUAGE IN THE E-MEDIA**

The vast majority of TV and radio programmes broadcast in Tajik, the state language and native tongue of the majority of the population, especially in the provinces. Although the Language Law of 22 July 1989 determined Tajik as the state language, (the first law in Soviet Central Asia to give the language of the titular ethnic group such status) it does not contain any obligations or quotas regarding the use of Tajik in the e-media. On the other hand, the law does says that juridical persons (de facto including e-media outlets) are to use Tajik as their official language of communication. In areas with a large concentration of ethnic minorities (i.e. especially Russians and other Russian-speakers in Dushanbe, Khujand and Chkalovsk, and Uzbeks in Sughd, Tursunzoda and south of Kurgan-Tyube) however, the language in question can be used. TVT broadcasts primarily in Tajik, but its daily "Ahbor" news bulletin is also re-broadcasted daily in Russian and once a week in Uzbek. TV stations that broadcast a substantial percentage of their programmes in Russian and/or Uzbek are Poitakht in Dushanbe and Gulakhandoz in the Jabar Rasul district, a predominantly ethnic Uzbek district near Khujand. TV Regar and TV TADAZ in Tursunzoda (a district whose population is almost two-thirds ethnic Uzbek and also has a substantial number of Slavs and other Russian-speakers due to the TADAZ aluminium factory) broadcast their news and music shows in Uzbek and Russian. In Badakhshan, a region where besides Tajik about half a dozen local languages are spoken, the local TVT branch (TV Badakhshan) broadcasts in Tajik. On-site interviews are sometimes conducted in local languages, whose numbers of speakers vary from only 40,000 (Shugni-Roshani) to less than 1,000 (Iskashimi). In 1996 national satellite TV stations were installed to retransmit Tajik State TV, but field observations indicated that certain areas had not been covered for about seven years, especially in Murgab, though there was occassional access to Russian channels like ORT and RTR.

CIMERA



Solar powered FM Radio

TV and Radio Broadcasting prohibits control over the content of programmes, wealthy people holding prominent positions in their region usually sponsor local or regional stations. Two key characteristics of the media are that it be free, to cover what they want how they want, and financially independent. Media throughout the former Soviet Union and Central and Eastern Europe are striving to attain these two objectives to offer the citizens of their country a high quality, more timely, and more accurate product.

Over-regulation is another impediment to growth. There is a pressing need for deregulation in the sector. Policy can provide a useful instrument in this respect, allowing the private market for television, radio and advertising to flourish.

A further obstacle is the uneven distribution of television and radio around the country. The majority (65%) of local TV-stations can be found in Sughd province. Unsurprisingly, Sughd also has the greatest diversity. In Khujand, four stations are on the air: the local branch of TVT and three private stations, of which the most popular is SM-1 (which broadcasts an average of 10 hours per day). According to

**Table 2.8**

| Province or city | Number of local TV channels | Location and remarks |
|---|---|---|
| Dushanbe | 4 | Dushanbe (4) |
| Sughd | 18 | Anis; Asht; Chkalovsk; Matcha; Naw; Gulakandoz; Isfara; Jabbar Rasul disctrict (1 each); Kanibadam (2); Khujand (4); Penjikent (2); Uratepe; the Vorukh enclave (1 each). |
| Regions of Republican Subordination | 2 | Tursunzoda (2) |
| Khatlon | 3 | Kulyab; Kurgan-Tyube; Vose (1 each) |
| Badakhshan | 1 | Khorog (1) |
| Total | 28 | |

*Source: Internews, NANSMIT*

analysts and local journalists, the relatively diverse e-media presence in the north is due to the following factors:

- apart from a separatist coup attempt in late 1998, Sughd was largely spared the civil war;
- historically, the province, which holds one-third of the population but brings in three-quarters of the country's GDP, has always been more developed and better connected with regional centres like Tashkent, Uzbekistan.

This is especially obvious in comparison with the near non-existence of any kind of media in Badakhshan and the Regions of Republican Subordination, although local information agencies in these areas are trying to increase their coverage in the national media and eventually plan, funding permitting, to set up local TV or radio stations there.

However the potential opportunities are huge. The PRSP rightly identifies TV and radio as being one of the most affordable and accessible forms of information for people throughout the country, but this potential is hindered for the above reasons. There are too few private stations, but these could offer real opportunities for the government, the first of which being taxation of revenues generated through the selling of commercial air-time. Expanding the tax base is one of the key macroeconomic objectives of the government. In turn, independent media outlets would prove a boon for the nascent advertising industry in the country, to say nothing of the journalists and technicians who would be directly employed by the stations. This increased professionalism in both sectors should be seen as crucial if Tajikistan and its companies are to compete in the global marketplace. A free and independent media is also recognised as one of the defining characteristics of democracy. The fostering of an environment that allows for the emergence of independent voices will undoubtedly lead to an increase in Tajikistan's prestige abroad. The media market is similar in many respects to other markets: by reducing barriers to entry, quality and choice can increase.


Radio communication in Pamir

*The PRSP rightly identifies TV and radio as being one of the most affordable and accessible forms of information for people throughout the country*

The PRSP clearly states as a goal for sector development the "liberalisation and promotion of a competitive environment for TV and radio channels," especially with regard to independent FM stations. Additionally, even private radio and TV stations can address important social issues, and should thus be viewed, at times, as partners for the government,

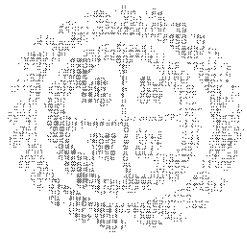
**BOX 2.4: SATELLITE TV**

A relatively new phenomenon is the spread of satellite TV in Tajikistan. Although not as widespread yet as in Turkey or Morocco for example, satellite dishes have become a familiar sight in Dushanbe and, to a lesser extent Khujand. Sat TV has also become the main way to continue watching channels like ORT and RTR. A handful of companies now sell antennas and provide installation services for up to 270 channels – with Russian, Iranian, Arabic and Italian TV channels particularly well-represented along with world news stations like BBC and Euronews in Russian. Since getting sat TV means an investment of about USD 250 to 450, thirty to fifty times the average monthly income, this form of information diffusion is only accessible to a very small percentage of the population.

The diffusion of this technology is not a problem in and of itself. But it is likely that the divides between urban and rural, rich and poor, could begin to diverge more if something is not done to increase rural communities' access, not to satellite, but to phones, post offices, and local or regional e-media. A policy or strategy is necessary to ensure that the hallmark of the Soviet era, uneven development, does not become the defining characteristic of the Network Age.

CIMERA

providing an important educative tool and resource for raising the awareness of the population about problems that concern all the citizens of Tajikistan. This feeds into what could become a larger goal: programmes originating from multiple sources with nationwide availability, can also assist in raising awareness of the common concerns the entire country faces, and could play a large role in forging an even stronger national identity among Tajikistan's citizens.



*The Internet is a global form of communication, decentralised, inexpensive, and uniquely controlled by the user*

*NEW TECHNOLOGIES: TAJIKISTAN ENTERS THE INFORMATION AGE*

New technologies have had a relatively short period to be introduced into Tajikistan, though they hold the possibility of large gains in productivity, information dissemination, empowerment and other benefits to be outlined in the following chapter. The civil war consumed most of the 1990s, stifling innovation, destroying infrastructure, provoking an exodus of qualified specialists, and holding out little hope for foreign investment. However since the peace of 1997, there is new hope that the proliferation of these technologies will accelerate, but careful policy has a critical role to play in their smooth distribution. These technologies have already begun cropping up in Tajikistan's major cities, though they have yet to make a real impact in rural localities. There are no reliable figures on the number of computers in the country, however, the number of computers in the education system is somewhat easier to gauge and will be discussed below. What and where have these new technologies been introduced, and with what results?

**2.4 The Internet**

The Internet possesses a variety of unique characteristics: it is a global form of communication, decentralised, inexpensive, and uniquely controlled by the user. However, all of this must be qualified when applied to Tajikistan.

The Internet's global aspect means that some countries are advancing, leaving others further behind. Indeed, it is decentralised, but for countries with rudimentary infrastructure, the Internet is often overly centralised in important urban areas, with little spillover to regional localities. It is inexpensive, yes, but connection rates in developing countries can consume staggering amounts of monthly incomes in comparison to the West (according to the 2001 Global Human Development Report, connection charges as a percent of monthly income in the US is just 1.2% versus Bangladesh at 191%). The Internet is indeed controlled by the user, but the capacity to use the machines must first be developed in Tajikistan before the benefits of self-empowerment can ever occur.

Currently, according to GIPI data, there are 4 First Level ISPs in Tajikistan, with an additional e-mail provider, the Central Asian Development Agency (CADA). With only around 5000 Internet subscribers enjoying regular access, Tajikistan has one of the lowest penetration rates in the world. E-mail services are available in universities and some international and local NGOs, sponsored by UNDP, CADA, OSI, the Eurasia Foundation and IREX, which has four centres in Dushanbe, Khujand and Kurgan-Tyube with more than 300 users. However the wider population in urban centres, to say nothing of rural districts, has severely restricted access. This low rate can be explained by poor infrastructure, lack of awareness and, most importantly, prohibitive costs.

Tajiktelecom was connected to the net through X25 Global One in 1998. This net allowed for e-banking transactions in the National Bank of Tajikistan and credit cards in Agroinvestbank. Tajiktelecom has been an ISP since 2000, and has been the main provider for the state since 2001. Tajiktelecom, with the participation of foreign firms, put into operation the first Electronic Worldwide Switch Digital (EWSD). In addition to this, 3 digital switches with a capacity of 18,000 lines were installed, and a digital satellite tract for 30 channels through Germany was established, allowing for an improvement in long distance communication and Internet access. Tajiktelecom also plans to connect Khujand, Kurgan-Tyube, Kulyab and Khorog to the net via satellite, thus integrating all major regional centres.

Because few subscribe to ISP services (more of which below), all ISPs have opened Internet cafes, to offer greater access, and also generate revenue. Tajiktelecom is no different, with one Internet cafe opened with five computers.

Telecom Technology was the first to offer Internet access in Tajikistan on 28 December 1998. A private company, it provides Internet access and e-mail, in addition to IP-telephony, web design, as well as retail computers and office equipment. First established in 1994, Telecom Technology, http://www.tajnet.com, is one of the leading providers of Internet services in Tajikistan, currently serving 80% of all Internet subscribers. Its clients are mainly international organisations, commercial businesses, universities, and individuals. But it also, along with Tajiktelecom, provides for the public sector, including the Office of the President, Parliament, various Ministries, Embassies, and banks.

Installation of retransmitter in Pamir

Formed in February 2000, Babylon-T is another private ISP, (http://www.tojikiston.com). Babylon-T provides Internet and e-mail services, web design, and free support to the Private School for ICT for computer literacy. Babylon-T advocates wireless access to the Internet for regional providers, corporate clients and end-users through ADSL (Assynchronous Digital Subscribers Line) and PNA (Private Net Access). Babylon-T has also established wireless communication between Kurgan-Tyube and Dushanbe. The ISP has direct channels and agreements with a number of other major Tajik ISPs, and also has two independent satellite channel with Russia (1.2 Mbps) and Europe (512 Kbps). Babylon-T has affiliations in Kurgan-Tyube, and recently in Khujand. In 2003 it plans to open similar affiliations in Khorog and Kulyab. Furthermore, Babylon-T has begun to export new technologies to Afghanistan, including connection to the Internet.

Founded in 1998, Intercom, (http://www.tjinter.com), offers Internet access and e-mail services, and was the first to offer use of the IP-phone, a far cheaper alterative to land based phones, in Tajikistan. For example, a call to Moscow on an IP-phone costs

**Table 2.9: First Level ISPs**

| ISP | Coverage | Expansion Plans | IP-telephone |
|---|---|---|---|
| Telecom Technology | Dushanbe, SO | KHO, GBAO | March 2001 |
| Babylon-T | Dushanbe, Kurgan-Tyube, SO | Kulyab, Khorog | October 2001 |
| Intercom | Dushanbe, Kurgan-Tyube | Radio-Ethernet, Khujand | March 2000 |
| Tajiktelecom | Dushanbe | KHO, SO, GBAO | |

**BOX 2.5: TELECOM TECHNOLOGY**

Since 1994, forty corporate nets were created in banks, ministries, committees, and universities with the help of Telecom Technology. In 1994–1995, Telecom Technology installed the biggest local industrial computing net in Tajiktextile, connecting about 160 personal computers through a corporate net for data collection and processing. In April 1999, Telecom Technology assisted in connecting all universities in Dushanbe to the Internet, providing 60 hours of free Internet access per month for students and faculty. Last year, thanks to the efforts of Telecom Technology, more than 20,000 students and teachers benefited from these services. To facilitate the integration of Tajikistan into the global net, on 10 July 2000, the company created the portal "Tajikistan", at http://tajikistan.tajnet.com. This is a portal to a number of sites with information on the population, religion, geography, climate, and culture of the country. The site also includes current news from agencies like Khovar, the state information agency, and Asia-Plus. By 20 August 2001 the site had received 120,000 hits from users around the world. In October 2000, a satellite VSAT-station was set up in Khujand, ensuring Internet access to SO. In its plan for 2000-2010, Telecom Technology envisions the creation of satellite VSAT-stations in GBAO and KHO oblast centres, ensuring Internet and IP-telephone access to both southern and eastern Tajikistan. In the summer of 2002, Telecom Technology signed a loan agreement with the International Finance Corporation. This money will be used to further expand access, reduce customer costs, and modernise facilities, including both Internet centres and satellite communications stations.

20 dirams per minute, or almost 5 times less than the average 96 dirams via a regular phone. Intercom is the biggest operator of IP telephones and has the largest number of long distance calls centres. In 2000, Intercom introduced wireless Internet connection via radio modem.

As aforementioned, CADA, though not providing Internet access, is a significant provider of e-mail, has been offering this since mid-1995. Access to e-mail was provided not only by line, but also in public centres (PC) free of charge with the support of the OSI. These centres also provide access to e-mail by fixed lines to educational and public institutions; in this capacity, CADA, with the financial support of the Eurasian Foundation, provided 60 modems to these various institutions. Additionally, CADA provides e-mail services to international and private organisations on a commercial basis. At their expense, CADA is running free e-mail services to students and scholars.

Just a final word can be said about a number of other registered ISPs, among them ComCiTel in Dushanbe (2001), Comintel in Dushanbe (2001), "Tirozi Jahon" (2001), and "Muminobod" both in Khujand (2001). ComCiTel carries out only banking transactions, while Comintel is registered but does not function. "Tirozi Jahon" is a radio broadcast company and though it has an ISP licence, it does not yet offer Internet services. "Muminobod" provides only e-mail services. A number of these

**Table 2.10: Telecom Technology Internet cafe distribution***

| Locations | Number of cafes | Number of computers | Number of users | Charge per hour |
|---|---|---|---|---|
| Dushanbe | 3 | 20 (15+3+2) | n/a | 5 somoni |
| Khujand | 3 | 12 (4+4+4) | n/a | n/a |
| Chkalovsk | n/a | n/a | n/a | n/a |
| Kayrakum | n/a | n/a | n/a | n/a |
| Istravshan | n/a | n/a | n/a | n/a |
| Kanibadam | n/a | n/a | n/a | n/a |
| Hissar | n/a | n/a | n/a | n/a |
| Total | n/a | n/a | n/a | n/a |

**Telecom Technology plans to open later cafes in TursunZoda, Kurgan-Tyube and Khorog*

Source: Telecom Technology Quam

**Table 2.11: Babylon-T Internet cafes and IP phone**

| Locations | Number of cafes | Number of computers | Number of users per day | Charge per hour (all day rates) |
|---|---|---|---|---|
| Dushanbe | 35 (of which 20 are 24 hours) | 70 in total, ranging from 2-10 in each cafe | 30 per day in central cafés | 5-6 somoni |
| Kurgan-Tyube | 2 | 3 | 5-10 | 5 somoni |
| Chkalovsk | 1 | 10 | 30 | 6 somoni |
| Khujand | 2 | 12 | 40 | 4.5 somoni |
| Leninskiy region | 1 | 2* | 10 | 5 somoni |
| Hissar | 3 | 3 | 5 | 5 somoni |
| Total | 44 | 96 | n/a | 5.1 somoni average |

**Currently IP-Phone services are offered but 8 computers will be installed shortly.*

firms have obtained a licence but do not operate primarily because they are involved in other services, for example "Tirozi Jahon" in Khujand; additionally, many have underestimated the logistical and financial resources necessary to maintain ISP activities. The licences indicate that ISP activity must begin within 3 months upon issuance of the licence, but many have been able to obtain extensions as they try to establish themselves in the marketplace and expand services offered.

TARENA received an ISP license on 24 January 2002 as well as a license to establish a corporate academic net in Dushanbe. But it is not yet an ISP due to delays in the delivery of earth satellite equipment.

*ISP INTERACTION*

In Tajikistan there are what can be called First Level ISPs and Second Level ISPs. The First Level consists of the main providers listed above, who have access to satellite channels. These are of course of crucial importance, but there are certain drawbacks to being a First Level ISP that must be highlighted. First of all, expense. According to GIPI estimates, it costs around USD 90,000 to fully licence and operate a First Level ISP. This cost is exorbitant for most entrepreneurs without access to foreign investment or domestic credit. Secondly, there is a very limited market of subscribers, and these are mainly confined to major urban centres, such as Khujand and Dushanbe. The fees these subscribers pay cannot begin to cover the First Level ISPs' costs. Technical support and customer care take up large portions of a First Level ISP's time and expense because the technology is so new.

There is also a rather lengthy licensing process that acts as a disincentive for easy entry. Atop these already burdensome conditions, the generally poor state of the country's telephone

**Table 2.12: Intercom cafes**

| Locations | Number of cafes | Number of computers | Number of users per day | Charge per hour |
|---|---|---|---|---|
| Dushanbe | 3 (of which 1 is 24 hours) | 16 (12+2+2) | 30-50 | 5.40 somoni during the day;<br>3 somoni in evening;<br>1.8 somoni at night. |
| Kurgan-Tyube | 1 | 3 | n/a | 12 drams per minute |
| Total | 4 | 19 | n/a | |

*Source: Intercom*

**Table 2.13: CADA Centers**

| Location of Centers | # Of workstations | Registered users | Average # of active users |
|---|---|---|---|
| Kurgan-Tyube | 5 | 1200 | 600 |
| Kulyab | 10 | 2000 | 900 |
| Khorog | 7 | 1500 | 600 |
| Khujand | 10 | 3000 | 1500 |
| Istravshan | 2 | 200 | 120 |
| Panjekent | 4 | 200 | n/a |
| Dushanbe | 20 | 3720 | 1000 |

*Source: GIPI*

lines speaks against an exponential increase in the number of First Level ISPs in Tajikistan in the near term.

However, an area of growth and expansion exists on the so-called Second Level. Second Level ISPs obtain, or rent, satellite channels from the First Level to provide Internet connections and e-mail services on their own premises, mainly through Internet cafes. They do not have the costly or time consuming need to offer technical support to subscribers scattered across Tajikistan's major cities. All access is conducted on-site. Secondly, according to GIPI it only costs around USD 10,000-12,000 to establish a Second Level ISP. Though they are confined to their own premises, within those premises they can provide more services for the generation of revenues than can the ordinary First Level ISP subscription services, to whit, doubling as cafes.

It is unclear though, whether Second Level ISPs are a permanent or a temporary solution in Tajikistan. After all, in this constellation, one need only shut down the few existing First Level ISPs, and both First and Second Levels would be effectively cut off; and in turn, if the First Level wanted to eliminate competition, they could merely cut off the Second Level. However, it is a timely stop-gap measure, offering

**BOX 2.6: OPEN SOURCE SOFTWARE**

Open Source Software is actively being used across Tajikistan. Debian GNU/Linux, Red Hat Linux, SuSe Linux and KDE and Slackware Linex are becoming standard operating systems in a number of public e-mail facilities, CADA, and almost all ISPs inTajikistan. What exactly is it, and what are its benefits and drawbacks?

Open Source Software presents a unique opportunity for the free distribution and modification of computer software. OSS provides the source codes, or machine language, the computer reads. These are usually closely guarded secrets of large software manufacturers. Because the source codes are provided, the software can be tailored for specific needs. The only caveat is that all modifications must be made freely available, just as the original software was. Examples of OSS include the Apache web server software as opposed to more expensive Netscape or Microsoft versions, or the Linux desktop operating system as opposed to Microsoft's Windows.

Because Linux is open source, the applications that run on it are also OSS, and thus often freely available for download. Other benefits include a number of developers continuously working on debugging the software, thus making it subject to constant revision and improvement; it also allows individuals, governments and businesses alike to overcome costly systems' upgrades; it enables greater local control of content and can increases self-reliance. However, at present it is not as user-friendly or easy to install, configure and operate as, for example, Windows. Costs can also acrrue due to a resulting need for expertise or consultation. Additionally, there are some hardware compatibility problems with Linux. If the human capacity can be developed, OSS presents real opportunities for countries such as Tajikistan trying to bring computers, and the operating systems to use them, into the country widely and cheaply.

**Table 2.14: Second Level ISP cafes as of July 2002**

| Organisations | Location | # of workstations | Average # of users per day |
|---|---|---|---|
| Cobweb | Dushanbe | 3 | 25 |
| High Technology Network | Dushanbe | 3 | 30 |
| Business Centre "Millennium" | Khujand | 2 | 20 |

*Sources: Cobweb, High Technology Network, Millennium*

Internet and e-mail access to many in Tajikistan's cities who either do not have computers, or have computers but cannot afford the cost of First Level subscription services.

Additionally, it makes rational sense for First Level ISPs to cooperate with Second Level ISPs, for they both work together in developing the market. The First Level can also generate more profits through renting their lines to the Second Level without having to invest in more personnel and premises. And there is no reason in the future why Second Level ISPs, after building a reputation and proving their own profitability, might not then be able to take the next step to become full-fledged First Level ISPs themselves. Key to ensuring the growth of both levels would be a simplification of the registration process. More First Level ISPs will act to drive down costs and expand basic services, while also offering improved services, such as greater privacy and security.

There are also a number of opportunities to be seized if the First Level experiences growth. These First Level ISPs, along with the government, have an obvious interest in strengthening the existing infrastructure in the country. The First Level could prove to be an invaluable partner, and also a source for foreign investment in the near future.

## 2.5 Cellular Phones

Cell phones are at present well out of the reach of the vast majority of the population, whether rural or urban, due to the prohibitive cost, though it should be noted that prices have been dropping of late. According to the Minsistry of Communications, currently there are 3,505 mobile phone users, and 400 users of paging services.

*More First Level ISPs will act to drive down costs and expand basic services*

The first provider of cellular phones, Tajik Tel, a private company, started offering analogue services in Dushanbe in 1996. In May 2001, cellular communication was expanded to the Hissar Valley and Kurgan-Tyube. Overall, the quality of mobile service is high, with 85% of all calls connected successfully. However, the use of different standards, analogue and digital, does not allow for roaming.

**Table 2.15: The number of ISPs, a comparative perspective**

| Country | # of ISPs | Population (in millions) | As a % of the population |
|---|---|---|---|
| Armenia | 9 | 3,200,000 | 1.56 |
| Azerbaijan | 15 | 8,000,000 | 0.5 |
| Georgia | 14 | 5,000,000 | 1 |
| Kyrgyz Republic | 12 | 4,500,000 | 1.11 |
| Russia | 1500 | 145,470,197 | 5.50 |
| Tajikistan | 4 (8)* | 6,375,500 | 0.03 |
| Ukraine | 300 | 48,000,000 | 3.13 |
| Uzbekistan | 59 | 25,000,000 | 0.48 |

**Four "First Level" ISPs, 1 e-mail provider, CADA, and three "Second Level" ISPs. Source:GIPI*

TT Mobile, also called MLT (Mobile Line in Tajikistan), was launched on 27 December 2001, as a joint venture between Russia's North-West GSM and Tajiktelecom. It offers high quality digital connections and a wide range of additional services, including text messaging, in Kulyab, Hissar, Khujand, Shahrinav, Tursunzoda, Dushanbe and Kurgan-Tyube. In March 2002, TT Mobile reduced its tariffs to an initial connection cost of USD 50, and USD 0.18 for incoming calls and 0.26 for outgoing calls per minute. Due to a lack of qualified personnel, experts from other countries have been invited to start further cell phone operations, while locals maintain technical services.

Another operator is Indigo Tajikistan, established in October 2001, and founded by the US-based MCT corporation and the Aga Khan Fund for Economic Development. Based on Ericsson technology, Indigo's GSM network offers coverage over Dushanbe, Hissar and Tursunzoda. Plans are underway to extend this network to Kurgan-Tyube, Kulyab, Khorog, and also to hook up with its sister company Somoncom in Sughd, which began offering cellular digital services in Khujand in May 2000. Indigo expects to have a digital connection between Khujand and Dushanbe soon, and automatic roaming in 2002.

Additionally, since September 2002, Babylon Mobile Company also started to offer cellular digital services in Dushanbe and Khujand.

### 2.6 Satellite Communication

Since 1977, the Tajik-British joint stock company, Zenith, has been providing satellite communication to businessmen and foreign organisations. It offers several types of personal satellite telephones, based on the Inmarsat satellite system, allowing interested clients to install large satellite earth stations. Zenith offers reliable, portable mobile phones, operating on batteries or electrically, which can bypass the local telephone net.

The mobile phone system itself costs USD 3,000, the fixed device USD 3,600.

**Table 2.16: Regional Distribution of ISPs***

| Region | Population | E-mail/ISP | Number of ISPs/E-mail providers |
|---|---|---|---|
| Sughd | 1,930,200 | First Level: Babylon-T, TajikTelecom<br>Second Level: Business Centre "Millennium"<br>E-mail: CADA | 5 |
| Gorno-Badakhshan | 210,700 | CADA | 1 |
| Khatlon | 2,243,500 | Babylon-T, CADA, Intercom | 3 |
| Dushanbe | 589,400 | First level ISP: Babylon-T, Intercom, Telecom Technology, TajikTelecom<br>Second Level ISP: High Technology Network, CobWeb<br>E-mail: CADA | 7 |
| RRS | 1,401,700 | Babylon-T | 1 |

**Please refer to Table 4.3 for the distribution of computers in Tajik universities* *Source: GIPI*

The cost of using these mobile phones is on average USD 2.50 per minute, higher than the cost of a landline connection (USD 1.80 per minute). The estimated number of clients is about 100. Zenith can also provide earth stations from Intelsat, offering a wider range of services in addition to voice communication, including data and video transmission. During the last 2 years, such earth stations were installed for private and public clients in Tajikistan, Turkmenistan and Uzbekistan.

The Ministry of Communications hopes that such firms as Global Star, Iridium and Thuraya, popular on the global market, can be introduced in Tajikistan. Although these services could be the most reliable option for Tajikistan, it cannot be considered seriously, given the cost.

*OBSTACLES & OPPORTUNITIES: THE DIGITAL DIVIDE*

The most significant obstacle is the poverty of the population. The technology could be offered, but the population cannot afford it. Also at present, the human capacity does not exist to properly employ it. Furthermore, the infrastructure is not in place to provide sustainable, reliable connections to outlying regions. The most troubling result of this dispersion of new technologies is popularly known as the Digital Divide.

The gulf is massive between Tajikistan and the west, but it is no less troubling within the CIS itself. To a certain extent, this is to be expected, given the wealth of national resources in other countries, and the fact that Tajikistan was mired in civil war for half of its first decade of independence. Still, Tajikistan need not get caught up in a race to compete with its neighbours. In fact this would probably have ruinous consequences for the country as a whole, for the digital gulf is just as severe within Tajikistan. Any attempt to "storm" into the network age, would, most likely, leave some regions behind, and cast the hope of an equitable distribution of technology to the winds.

Most ISPs operate in regional centres, particularly Khujand and Dushanbe. These centres contain a far greater concentration of computers in universities, Internet cafes, and Second Level ISPs. This is not troubling in and of itself, some centres will advance more quickly than others; but the fear is that if something is not done soon to bring wider services and access to other areas, like Khatlon, Rasht and Gorno-Badakhshan, regional inequalities could grow. To diminish the divide it is not necessary to provide universal service to these technologies, but universal access should be a goal, enabling the smooth distribution of opportunities across Tajikistan. Key for the dissemination of these technologies in Khatlon, the Regions of Republican Subordination and Badakhshan could be the experience gained, and still evolving in the north and the capital.

*If something is not done soon to bring wider services and access to other areas, like Khatlon, Gharm, and Badakhshan regional inequalities could grow*

The PRSP clearly recognises that vulnerable segments of society must be protected, and that one of the surest means of reducing poverty in the country is through providing regular services to them, such as energy, transport, communications and information. As should be clear, there are many more types of new technologies, but their use across Tajikistan is relatively limited when compared to old technologies. However, that does not mean that they are without value, though their price is at present high.

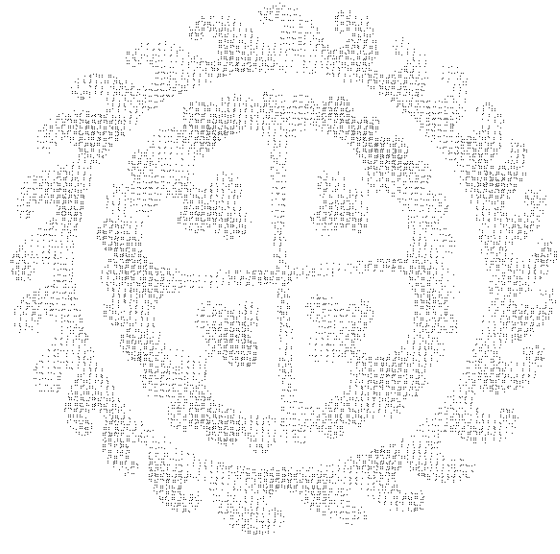
In particular, a major obstacle for ISPs is licensing. Obtaining a licence is a complex, time-consuming process. To get a licence, a would-be ISP must submit the following to the State Inspectorate of Communication: a letter, with a checklist of all attached documents; a copy of the registration certificate; a copy of the charter; a copy of the founders' agreement; an explanatory note with technical specifications of the equipment; feasibility indicators, such as income, expenditure, time for returns; and, if applicable, agreement of the owner for rental or use of the equipment.

Policy can work to reduce barriers for entry, and encourage ISPs to extend their services to remote regions, even if that means giving them tax breaks for doing so. As mentioned earlier, only when the sector exists in a predictable regulatory environment and competition is introduced, will prices decrease and foreign investment flow into the country. Regarding restrictions on the importation of computer hardware or software, there is currently a 20% VAT, but this applies to all imports. It would however not be entirely inappropriate to waive this for the importation of computer hardware and software, especially if it for hospitals and schools.

**BOX 2.7**

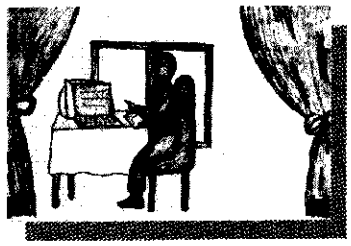
*"The big problem, the solution of which meets the demands of the present time, is the creation of computer centres in cities and regions, rural jamoats and rural towns. In this regard, the local bodies of executive power, Ministry of Education and other structures should take required measures."*

President Emomali Rakhmonov, Speech before the Majlisi Oli, 22 April 2002



# CHAPTER 3

# ICT FOR DEVELOPMENT



In fact, we have not finished discussing infrastructure. The last chapter only dealt with the information and telecommunications infrastructure, both old and new. Infrastructure encompasses far more than phone lines, and must be expanded to incorporate schools, hospitals, and the legal and institutional infrastructure.

This chapter will look at the tangible and potential usages and applications of ICT as a tool to achieve development goals. It will walk us through a variety of different sectors and the strategy adopted, beginning with the use of ICT for good governance. Then we will examine how ICT can be used to enhance economic opportunities inTajikistan. Acting as the pivot or axis of the entire chapter will be the third section, education. Education will tie together the discussion of all sectors, as lifelong learning and retraining will form a crucial element for the population to instrumentalise ICT for their own ends. Finally, we shall examine both health and the environment, and how ICT can or already is being applied to improve the quality of life of Tajikistan's citizens.

## 3.1 ICT for Governance

Tajikistan became an independent nation for the first time on 9 September 1991. This transition brought with it many opportunities and attendant difficulties. The political transition from the Soviet system to democracy, and economic transition from plan to market, was delayed throughout the 1990s, as was the state-building process, due to the ruinous civil war of 1992-1997. But since the peace, members of the opposition have joined the government, and Tajikistan held its first legislative elections in early 2000. It is now time to build on these steps, and examine the role ICT can play for improving governmental capacity, the quality and responsiveness of its services, as well as the reach and accessibility of those services, while at the same time contributing to greater empowerment and participation of the population.

*ICTs can improve internal management and coordination, provide faster and more accurate information, allowing governmental actors to make better decisions during the process of policy formulation*

*INSTITUTIONAL INFRASTRUCTURE & ADMINISTRATION*

Governments are always large, often unwieldy creatures. ICT is dynamic and rapidly evolving. How can ICT improve governance? ICT can improve internal management and coordination. It can also provide better, faster and more accurate information, allowing governmental actors to make better decisions regarding economic and social conditions in the country. By creating local intranets within government bodies and then connecting these to a larger governmental network, information can be processed and passed along far more rapidly than if hard copies or voice communication were used. This can ease and improve the process of internal management.

In 1996, a network was created within the Office of the President. Thanks to this network, some 1200 normative acts were prepared electronically within one year. But this progress has been isolated. Because other areas have not been as swift to adopt new technologies, paper must still be used for printing, and distribution must still take place through the post office. This takes us to the heart of the problem of infrastructure: an across the board, holistic approach is needed if the total benefits of using ICT are to be gained. If this is to happen, a common automated system for document preparation must be in place to facilitate the free and easy flow of information from the Presidential administration to the ministries, state committees, and local governing bodies.

A 1997 resolution, "On installing a unified automated system of document preparation in the government" seeks to address this need, the creation of a corporate network in the government. Furthermore, a Presidential decree of 16 September 1999, "On measures to ensure access to the global information network", established an Information Technical Centre in the Office of the President. Staffed by seven, the Centre is charged with creating a website, establishing a corporate network, and generating e-documents and providing ISP services for the government. The Press Centre of the President of Tajikistan, the Tajik State Information Agency, Khovar, in tandem with the Committee for TV and Broadcasting have been charged with preparing official information on the social, political and economic situation in the country. The Information Technical Centre will then deploy it on the Internet. The progress of this Centre could be accelerated by an increase in financial resources and training to strengthen its human resources.

The benefits are great. A networked government can use ICT to assist in financial planning, budget preparation, debt management, improved monitoring of government performance, connect governmental actors at all levels, and will in the long run cut costs and time. The electronic filing of taxes in Chile has also demonstrated that speed and efficiency can increase, while reducing costs, resulting in a win-win scenario for government and citizen alike. For any of this to happen though, institutions must change their way of thinking. Clear and articulate explanations of the gains to be accrued through ICT must be made to government bodies, and state actors with a strong commitment to its implementation must be identified.

In addition to a lack of interest or knowledge, such initiatives can also fall prey to a lack of financing and poor design. If public money is to be invested in retraining public employees in computer applications to make them operationally effective, they must be user-friendly, practical, replicable, and must follow a clearly formulated e-governance strategy. Without the human capacity in place the development dynamic cannot be triggered.

Pilot projects are useful for identifying problems, finding solutions, and raising awareness. E-readiness assessments can pinpoint the greatest weaknesses, in institutions, laws, human capacity and technology, and the means for their improvement. The key is to avoid projects that do not take into consideration local conditions. This strikes to the core of

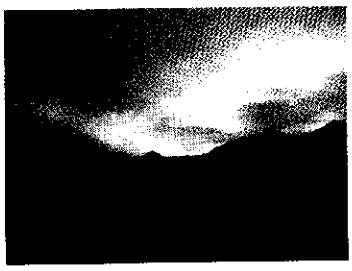
the content and applications dimension of the development dynamic and the sustainability of human development. If the formulated strategy does not take into consideration country specific concerns and problems, in short, if it is not relevant, it will most likely fail rather than succeed.

But for any of this to become a reality, the legal infrastructure must already be in place.

*LEGAL INFRASTRUCTURE*

The Law "On Informatisation" passed in August 2001, seeks to bring some clarity to these rapidly evolving technologies, and recognises the proprietary nature of all data and the validity of e-signatures in Articles 6-7 and 14 respectively. This law seeks to regulate legal relations in the use of documented information, and aims to meet the demands of users for information and integration into the global information net. Article 30 of Tajikistan's Constitution ensures the right of citizens to information, but this law additionally introduces such concepts as an owner and user of information resources and their rights, and also defines public information resources as a publically owned resource of Tajikistan, protected by law. Also passed in August 2001, the government resolution, "On creating a national network of data transmission and access to the global information network" concerns measures to bring into being access to the global information net. Tajiktelecom is charged with creating a national net for data transfer, which will then be connected to the corporate net of the government, according to the above-cited resolution of 1997.

The 2001 resolution attempts to ensure the protection of information resources, but bars information which seeks to incite violence or cruelty or discrimination based on race, nationality, social status or religion.



This resolution also charges the Ministry of Security and Chief Board of State Secrets to prepare a National Concept of Information Security and measures for the protection of information, and an embargo on banned information. The Foreign Ministry is charged with reviewing international regulations to ensure the resolution is in full compliance with international law.

Additionally, passed in May 2002, the law "On electronic documents" for the first time defines the notion of e-documents and their certification.

There have been some moves in recent months in Tajikistan to lay the foundation of a legal infrastructure for the use of e-documents and e-signatures in governmental communications. This can bring with it a variety of far-reaching benefits. E-documents mean e-circulation, a far cheaper and more efficient means of communication than those previously employed. This will spare the government current administrative overhead costs expended on stamps and signatures, paper, files, and cabinets. Converting these things to an accepted electronic standard will save both time and money, allowing for an increase in quality and responsiveness.

*THE CASE OF GRAFT*

ICTs allow for innovative solutions to widespread problems, including the careful monitoring of officials for reducing opportunities to extract rents through public positions. World experience has shown that officials can be bypassed electronically.

*Using ICT to improve the quality of government services must always remain a complement, not a substitute, for existing services*

In Seoul, South Korea, the local government initiated a new system called OPEN (Online Procedures ENhancement) for permit and licence applications. Combining careful widespread public awareness with larger objectives such as public administration reform, have helped make the electronic processing of applications a far more transparent and accountable process, enabling citizens to monitor their application's progress in real time, and avoid completely the often tedious and time-consuming need to queue.

Another initiative was taken in Andhra Pradesh, India, to reform the process of registering deeds and stamp duties; from a variety of lengthy steps and 15 days to process, the procedure, now conducted on networked computers, was narrowed to 2 hours. Andhra Pradesh has also computerised the process of issuing caste certificates, essential for obtaining government services, from as long as a month to only ten minutes. As can be expected, the opportunities for graft narrow as the amount of processing time is reduced, and citizens are given a higher quality of public service.

It is important to remember though that computers often "do not know." They know only the information put into them by people. If the people inserting the information are not monitored, opportunities for graft are only confined to a smaller group. Still, such procedures for licences and permits can speed up the process, reduce costs, and reduce opportunities for corruption. Richard Heeks of the Institute for Development Policy & Management at the University of Manchester, in his paper, "Understanding e-Governance for Development", has called this a "disintermediating effect", reducing the opportunities for corruption amongst public officials. However, such policy must be carefully formulated. ICT should complement current government initiatives in the field. If they occur in isolation from wider, more across the board public administration reform, the initiatives can fragment, fail, or produce negligible results. If anti-corruption

**BOX 3.1: LIVE TELECONFERENCE**

On 8 December 2001, a televised direct hotline conference took place with participation from the Minister and Deputy Minister of Communications, Deputy Head of the Committee for Radio and TV and senior officials. These officials answered questions and concerns of citizens in real time. This was the first interactive communications initiative of its kind. Most questions related to the poor facilities and high tariffs of long distance calls. Many young people also asked about the future prospects for expanding ICT access. The call-in was extremely successful; this kind of 2-way communication enhances awareness on both sides, amongst officials and the public they serve. Particularly, citizens gained an increased awareness of the state of communications infrastructure, latest developments, information regarding newly adopted legislation, and a chance to voice their concerns over the high cost of long distance calls.

This kind of interaction is crucial, when the two, government and citizen, discuss, interact, and hear one another's views and concerns. Only through this kind of productive "give and take" can the government fulfil its role as the elected representatives of the people. It should be hoped that in the not too distant future, on-line chats, where citizens place questions to key, high-level government officials in real time, could occur, with maximum coverage by the press. It is not simply about Tajikistan's citizens voicing their concerns, but it should also be viewed as a tool the government can use to better understand the needs and concerns of the citizens they govern. In that respect, it is a crucial feedback mechanism, enabling the government to improve the quality and responsiveness of the services they provide.

**Ministry of Communications**

measures are to be sustainable, ICT should be one tool among many.

In a broader context, using ICT to improve the quality of government services must always remain a complement, not a substitute, for existing services. Otherwise, those without access to new technologies will be potentially cut off. Furthermore, those who have access yet do not know how to use it will also be cut off. This brings us to the flip side of the coin; governance not only involves the governing bodies, but, more importantly, the governed.

*AN INCREASE IN DEMOCRACY*

By opening channels to citizens across the country, participation and empowerment can grow. Through new and multiple flows of information, citizens are in a better position to make considered choices, not only with regard to consumer products, but also with regard to government representation. To this end, ICTs were used in 1999 in South Africa to register voters, and also to ensure the vote counting procedure was transparent.

Not only can ICT, whether the Internet, TV or radio increase opportunities for participation, they can also increase the quality, responsiveness and accessibility of national and local government to citizens' concerns. E-services in South Korea have eliminated some of the opportunities for graft, and also brought the government to every computer terminal in the country. This will reduce the costs of lengthy and expensive trips to regional, or national government bodies for citizens.

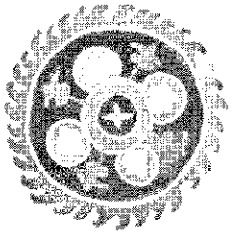
The dissemination of e-documents and laws allows for better information and coordination in the government and swift and cheap dispersal of such information to the citizens of the country. This will lead to informed citizens, productive debates, and increased awareness. For example, the Ugandan Parliament has created an e-library where bills can be accessed and read, and budgets and expenditures tracked. This is not only available to parliamentarians, but to citizens and NGOs alike, resulting in increased transparency and a demystification of the legislative process.

Additionally, electronic forums, debates, and bulletin board systems can be another tool for citizens to assemble over vast distances, and bring their concerns, both of a national and local character, to the government. This is particularly relevant to Tajikistan, which, through poor infrastructure, geography and inclement weather, has a number of isolated regions.

*POLICY RESPONSE*

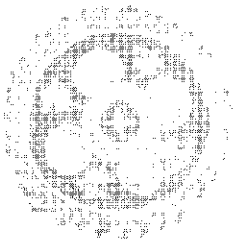
The government's PRSP has a significant role to play here. Improving the quality of public administration is clearly a priority for the government and a means for reducing poverty in the country. This means not only reducing corruption, but also increasing the productivity of its workers. Additionally, the PRSP targets improving the tax administration and debt management and greater oversight of the public budget; as outlined above, ICT can assist in reaching these goals, as well as improving coordination and communication and avoiding duplication among public bodies.

Transparency is viewed as key for public administration reform. The PRSP directly calls for more televised debates and question sessions among



*Not only can ICT, whether the Internet, TV or radio increase opportunities for participation, they can also increase the responsiveness of national and local government to citizens' concerns*

senior government officials. Other ICTs, such as computers, can increase the accountability of public sector workers by enhancing monitoring and also publishing and disseminating information of violations or infractions. Greater transparency is a measure the PRSP recognises will have no defined timeframe, but will be a permanent feature of policy. The PRSP also specifically states that the mass media has a vital role to play in highlighting indiscretions by public officials. Furthermore, the paper discusses the creation of confidential phones for employees or citizens to voice complaints.



*Phones, faxes, the Internet, and e-mail can all assist in the most fundamental relationship in the market: connecting producers with consumers*

Four planes of the development dynamic have been crucial to this discussion. Infrastructure: nothing will happen without it. Policy: public administration reform is a goal, and ICT can help. Human capacity: officials must understand and be able to use these applications, just as citizens must have access and training. And of course content and applications: the use of ICT must have relevance, solve common and identified problems, and must be available not only in Russian, but also Tajik, if it is to be used by all, especially those in rural communities.

But can enterprise, the free market, the fifth and final dimension of the development dynamic, assist in furthering these ends?

### 3.2 ICT for Economic Opportunities

Phones, faxes, the Internet, and e-mail can all assist in the most fundamental relationship in the market: connecting producers with consumers, and suppliers with producers.

Producers need information; it helps them to make decisions, and enables learning. ICT, from phones to the Internet, can help to establish what the environment is, who wants what, where, how much, and at what price. Producers cannot spend time travelling and assessing each market. This must be done through more efficient channels. Government policy is crucial in this respect: does the regulatory environment allow for the free and easy flow of information? Monopolies tend to stifle innovation, are unable to increase access, do not adopt new technology, and do not result in lower prices for consumers. Liberalisation of markets is key to empowernment and expansion of economic opportunities of the population.

By creating a competitive environment, prices can be driven down, and availability increased. This is not only referring to the need to privatise the telecoms sector, but privatise management in other sectors. If

**BOX 3.2: THE NATIONAL DEVELOPMENT GATEWAY PROJECT**

Supported by the World Bank, a National Development Gateway was created (www.tajik-gateway.org), providing a virtual portal allowing the world to come to Tajikistan and Tajikistan to come to the world. The Gateway contains a variety of useful information regarding Tajikistan's economic reform plan, programmes on privatisation, laws and regularly updated news. The Gateway can be seen as a development tool, improving education access by permitting e-conferencing and virtual discussion, and informing the donor community regarding drought mitigation and humanitarian relief needs. With regard to investment opportunities, the Gateway contains a variety of information on mineral and energy resources, and will help to considerably raise the profile of industrial producers, transport agencies, and tourist facilities. The investments attracted can assist in expanding the labour market, improving education access, and fostering closer ties with foreign partners.

Association of Operators

properly executed, the end result of this can be increased jobs, increased consumer choice, and, because of increased competition and a predictable and stable regulatory environment, increased investment.

Information helps producers assess demand, but it also helps them with regard to financing. Information can be used by banks to analyse credit-worthiness of the poorest, and expand access to financial intermediaries. Furthermore, information will better enable employers and employees to decide which skills are most desirable, and also the means to improve the efficiency and reduce costs of their operations.

Education and economic opportunity are intimately linked. Improved education can expand choices and allow for innovation. This is not merely relevant to big business, but also to micro-level entrepreneurs and farmers.

Not all countries export technology, and not all countries need to. Tajikistan is not Costa Rica, a country which, thanks to an Intel production plant, has in recent years become a major exporter of ICT. Many countries that export technology have difficulty disseminating that same technology within their own societies. Tajikistan has neither the infrastructure, the investment nor the human capacity to consider this a viable option. Rather, Tajikistan's economy is primarily agriculturally based, and deserves particularly close scrutiny.

*THE RURAL DIMENSION*

Following up on work initiated by TACIS, and with funding from the SDC and support from the Ministry of Agriculture, FAO has initiated a weekly radio programme broadcast on state-run Tajik Radio, *Dehkon ba Dehkon (Farmer to Farmer).* Throughout project implementation, focus group discussions were conducted to better identify the concerns, priorities and needs of the rural population. The topics covered have been wide-ranging and seek to address some of the major concerns farmers encounter, such as farmers' rights, protecting crops and livestock from pests and disease, how to obtain credit, and taxation.

There have been limits to the project, foremost among them the lack of a developed professional media, which is flexible and responsive to listener concerns. Journalists still exercise significant self-censorship, knowing that they take a very considerable personal risk if they broadcast sensitive information or take a critical position

**BOX 3.3: VOCATIONAL TRAINING TO SUPPORT DEMOBOLISATION AND EMPLOYMENT PROGRAMME IN TAJIKISTAN**

In partnership with the Ministry of Labour and Social Protection, UNTOP and ILO, UNDP has executed a project directed at the reintegration of former combatants and servicemen through vocational training for available and potential employment. The Modular Centre of Employable Skills was established in 2002, and 240 former combatants have received vocational training. All training courses include computer literacy training and are focussed on the following areas: auto-mechanics, farming, repair of electrical and household appliances, computer operators and menders, and computer literate bookkeepers. The Modular Centre will continue to provide short-term vocational training for unemployed and vulnerable groups.

UNDP

toward government policy. A number of topics have also been deemed too sensitive to address, such as price information of regional markets and the prevalence of zoonosis diseases. Additionally, some of the programmes have been overly complicated and technical.

However the potential gains are enormous given Tajikistan's large rural population. The real issues farmers face must continue to be tackled in a straightforward, transparent, and comprehensible manner. That means that the topics outlined above, prices, taxation, diseases, analysis of the complexities of registration, and long-range weather forecasting must be addressed.

*To get at the roots of poverty in Tajikistan, attention must focus on the countryside*

Deeper and broader involvement of the farmers themselves in the selection and exploration of topics would also increase the programme's effectiveness. By deeper we mean more in depth discussions of topics that cannot be covered satisfactorily in a 20 minute timeframe, including greater follow-up, and more responsiveness to viewer questions. By broader we mean greater inclusion of the specific difficulties women encounter, given the fact that many women are the heads of households in the wake of the civil war, or because their husbands have sought employment elsewhere in the CIS; greater inclusion of specific problems and solutions from all regions; greater advertising to increase viewership; perhaps even a better timeslot, when more farmers will be listening.

The ultimate end should not only be farmers with a better understanding of the market they seek to supply, but also farmers empowered by a deeper understanding of the legal environment they operate in, the extent of their rights, and the knowledge to increase their own productivity. Equally important should be the initiation of a discussion amongst farmers themselves, unmediated by local or national authorities, allowing farmers to share best practices, and discuss common problems encountered. The farmers themselves are the ones who best know the extent and type of difficulties they encounter; by empowering and connecting them through such radio programmes it is hoped just these types of solutions may become attainable.

*RESEARCH & DEVELOPMENT*

For better management of crops and export, related agencies should have a corporate net on R&D. This unified network for R&D in agriculture should connect the Academy of Sciences, Ministry of Agriculture, Tajik Academy of Agriculture, Tajik Agricultural University, the Ministry of Health, Environment, Education, and Economy and Trade. This system could then gather, store, analyse, and use collated information resources for R&D.

The 2001 Global Human Development Report offers a variety of innovative ways in which developing nations can increase investment in research and development. Though having the government provide matching funds for firms investing in R&D or low interest, long-term government loans to those engaged in R&D may be too ambitious at this stage, tax breaks, as used in East Asia, could provide a solution. Ever closer ties between the academic community and industry may also reap larg returns, in addition to building networks. These measures could have significant effects, resulting in the emergence of new products more specifically tailored

to Tajikistan's own needs, as well as building the human resource base in the country.

*TOURISM*

Tajikistan has unique flora and fauna and picturesque mountains, valleys, rivers and gorges. The Internet can convey these attractions to a wide audience, and possibly increase the number of tourists visiting the country each year. Currently, there are a number of websites featuring Tajikistan as a tourist destination, among them www.traveltajikistan.com and www.pamir-travel.com. These sites offer a variety of information on transport and hotel services, site-seeing information, and visa and customs regulations.

With better facilities, more up-to-date information, and greater connectivity, the level of activity of tourist enterprises can rise. But before the tourist industry can be considered realistically, a number of current obstacles must be overcome. There is an almost complete lack of local travel agencies, and most travel agencies in North America and Europe lack information regarding Tajikistan or air flights to and from the country; there are almost no Tajik diplomatic missions abroad for the issuance of visas; additionally, once inside Tajikistan, credit cards and travellers cheques are not accepted by any hotels, restaurants or shops. The prospect of carrying large amounts of cash acts as a disincentive to what is widely considered a volatile region. Additionally, infrastructure within the country is in need of major repairs, and would act against the free and easy movement of tourists from various sites and cities. On the geopolitical level, though the prospects for stability in Afghanistan have certainly increased over the past year, they are by no means secure. Finally, most of the websites regarding Tajikistan have not been updated since their inception. Conditions have changed radically in the past few years, but these obstacles must be eliminated if there is to be any realistic hope of changing the current situation. Almost all of these are recognised in the PRSP as factors limiting the number of tourists in the country.

*POLICY RESPONSE*

The government's PRSP speaks directly to the creation of an environment friendly to entrepreneurs and investors. Unemployment or underemployment are identified as major contributing factors to the poverty in the country; thus job creation, particularly in the private sector, is viewed as a means of remedying the current situation. The PRSP focuses on creating an environment for the emergence of a vibrant private sector, a more flexible labour market and privatising state enterprises. The government specifically hopes to increase competition in a variety of sectors by removing the obstacles for small and medium-sized enterprises; this means simplifying the often complex and difficult procedures for licensing, which pose a substantial barrier to entry for most enterprises, but also goes beyond that, to include improved financing and a reduction of public interventions in the private sector through inspections which often turn into rent seeking opportunities for public officials. The PRSP is instructive here, and seeks in the coming years to "improve institutional conditions by reducing requirements, permissions, reviews, and reducing bureaucracy, and simplifying rules of taxation."
The attraction of foreign investment is

seen as key to revitalising enterprises and increasing productivity. It is crucial to note that for foreign investors, many of these issues are interdependent with one another; money will not flow in unless competition exists and the regulatory environment is stable and predictable. Clarifying the current contradictions in property rights and contracts, and improving bankruptcy procedures are also targeted areas for attention, and should assist in the growth of the private sector.

*It is crucial to note that for foreign investors, many issues are interdependent with one another; money will not flow in unless competition exists and the regulatory environment is stable and predicable*

Tourism is also recognised in the PRSP as a means of reducing poverty and creating job opportunities. Key for this is the removal of administrative obstacles that currently limit the growth of competition in the sector. The PRSP views the liberalisation of the tourist market, transparency of licensing for tourist companies, and easing the entry and exit for prospective tourists as measures necessary for growth. These are important, but not exhaustive preconditions for enhancing Tajikistan's image abroad.

As should be apparent, economic opportunity is pivotal for human development and triggering the development dynamic. In this sector, the importance of policy, particularly with regard to liberalisation of markets and licensing regimes, is crucial for the development of free enterprise. Atop that, liberalised markets hold the best potential to unleash entrepreneurial activities across Tajikistan, providing spillover benefits to other sectors of the economy and helping to reduce poverty. Free enterprise also holds the possibility of identifying new sources of investment for infrastructure. But, as has been stressed, key for all of this is human capacity. And at the heart of human capacity is education.

### 3.3 ICT for Education

Education is the one sector that must not be overlooked for improved human development. It has already permeated our discussion of governance and economic opportunity, and will continue to do so through health and the environment. Though Tajikistan's school system in the past boasted near universal enrollment and literacy rates, dropouts have increased in recent years, primarily due to high cost. Furthermore, to compete in today's global marketplace, one must not only be literate in a language, but also computer literate. How is Tajikistan doing in expanding access to ICT, and ICT-related studies in its schools and universities?

**BOX 3.4: FINANCIAL SERVICES AND E-COMMERCE**

There is some movement toward offering greater financial services on-line. Banks are actively developing and hope to soon introduce on-line payment systems, and ensure direct access to clients' account.

Most people using e-commerce are not in fact consumers to producers, but suppliers to producers, or business-to-business (B2B) e-commerce. However in the summer of 2002, the first virtual super-market opened in Tajikistan at www.shop.somoni.com. A joint Tajik-Austrian enterprise, this new service is already building a substantial client base, including international organisations, private firms, and embassies in Dushanbe. Further developments in e-business have been stymied by national legislation, though now some amendments are currently being drafted.

Firm Raksh

*BACKGROUND*

As with most transition countries of the former Soviet Union, Tajikistan has experienced a considerable brain drain. Currently, there is a lack of human resources in the telecommunications sector. This rather gaping hole is due in part to the emigration of 40% of specialists from Tajikistan, mostly as a result of the civil war. Between 1990-2000, 4,426 people left the sector, of which 721 had university educations, and 460 had secondary specialist educations. During these years, immigration numbers could not compensate for the loss, with only 189 engineers and 141 mechanics and 685 technical assistants arriving. Training and retraining has been restricted to 1422 employees. Political instability, opportunities abroad, low salaries, and significant salary arrears lay a basis for understanding the brain drain.

However, there has been a noteworthy expansion of specialties in most Tajik universities. Currently, telecommunication engineers, informatics, automated systems and management of information systems (MIS) software, and programming specialists are trained primarily in Tajik Technical University (TTU), the Technological University of Tajikistan, as well as in Tajik State National University and Russian-Tajik Slavonic University.

Since 1994 radio-communication and broadcasting specialists started to be trained at TTU. In 1996 a Department of Communications was set up. In 1999-2000, the first radio and telecommunication engineers graduated from the university. One hundred and forty-one students are now being trained to become communications experts at the university, in addition to 71 students in the Technical College. The Department of Automated System of Management was established in 1981 and trains 30-40 experts annually. The areas of specialisation are programming, computer networking, and network technology. Graduates mainly work in management, installing corporate networks, and designing Web pages.

Human capacity is improving with a rise in the number of students enrolled in IT-related university programmes since the late 1990s. Additionally students from a variety of disciplines are finding ICT courses useful within their own specialisation, especially economics students.

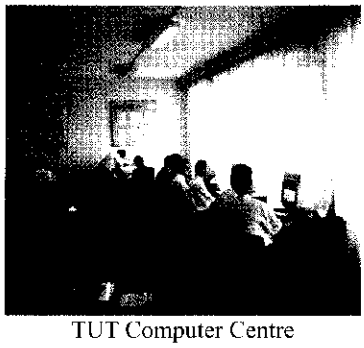
*Human capacity is improving with a rise in the number of students enrolled in IT- related university programmes since the late 1990s*

Computers are being used in some classrooms, but only 11% , or 431, of all secondary schools benefit from actual computer centres. As of 17 October 2001, around 3468 computers in secondary schools across Tajikistan provide instruction in computer skills, thus reaching a far greater number of beneficiaries. The country possesses 942 teachers of information science, and "informatics" as a subject has been inserted into most schools' curriculum.

**BOX 3.5**

*In April 2001, the President of Tajikistan called for the creation of an environment friendly for investment, saying: "Foreign investments are mainly allocated to those countries with a favourable environment for investing, with a developed infrastructure of roads, telecommunications, energy, water, and high levels of education and reliable healthcare. Due to budget limitations, we cannot fully finance this. That is why we cooperate with international financial institutions and donors, who will support us in the solution of these problems."*

**President Emomali Rakhmonov before Parliament**


TUT Computer Centre

*Educational programming need not be strictly focussed or confined to schools, but should include farm communities, entrepreneurs and governmental actors*

All ministries, particularly the Ministries of Education, Economy and Trade, Finance, and oblast khukumats (local governments), and town and regional administrations were charged by the President with preparing concrete programmes to set up computer classes and ensure IT availability in secondary schools within 3 years. This will be crucial for the long-term success of ICT endeavours and should be studied carefully and comparatively to establish successes and failures in various regions. Key for the success and sustainability of these programmes will be the inclusion of local populations in the process.

Universities are faring far better than secondary schools. All universities are connected to the Internet with 60 hours of free access per month.

At present, however, the bulk of the population knows little about ICT. Students are no different; as Internet services are expensive, few have access. Furthermore, most schools are not equipped with computers. A further obstacle relates to content and applications. It is important to remember that one of the reasons Taji-kistan lags bchind its competitors is the lack of software in Tajik script. However the TUT Computer Centre is hoping to remedy this; it submitted the nccessary documents to Microsoft's Moscow office in April 2000, and hopes to obtain a Tajik version of Windows 2000 in 2003. Moroever, the NGO Youth Opportunities has created a Tajik version of Linux, potentially widening the base of users further.

*BENEFITS*

ICT can bring about a quantitative and qualitative change in education. Educational programming need not be strictly focussed or confined to schools, but should include farm communities, entrepreneurs and governmental actors. ICT can amplify education, allowing one teacher, programme, or course to reach many students simultaneously. This is the quantitative change.

Qualitatively, ICT for education can be more interactive and enable lifelong learning, while computers specifically can allow for better monitoring and tracking of pupil progress, ease administrative tasks, make free and easy e-copies of useful materials, while bypassing the need for expensive textbooks if materials can be acquired on-line. Importantly, increased communication can also allow for standardisation of core curriculum, enabling an even and equitable development throughout Tajikistan's school system. This is crucial to put remote regions on a more equal footing with oblast centres. Whether the course is transmitted through CD-ROM, radio, or via distance learning, old and young, rural and urban, male and female can all benefit.

Installing computers in all schools is no silver bullet or substitute; it should run parallel, as a complement

**Table 3.1: ICT-related salaries in TJS in 2001**

| | Average salary | Salary arreras as of 1 January 2002, thousand of somoni |
|---|---|---|
| National Average | 23.50 | 28820,7 |
| In communication | 59.58 | 106.3 |
| In information and computing | 19.35 | 5,9 |
| Science | 23.41 | 43,1 |

*Source: State Statistical Committee*

**BOX 3.6: TECHNOLOGICAL UNIVERSITY OF TAJIKISTAN'S COMPUTER CENTRE**

Established in 1998 by the government and with the financial support of UNDP and UNESCO, the Computer Centre provides ICT services and information training skills to the academic community, businessmen, students and government officials. Connected to the Internet since 1999, the centre is equipped with seventy-five computers, and a number of useful peripherals such as scanners and printers, and additionally copy machines, a fax machine and two laptops. Since October 2001, the Computer Centre has been providing around the clock Internet access and e-mail through radio modems for up to 800 students and teachers annually.

It is of crucial importance that specialists operating within Tajikistan obtain internationally recognised certificates. The TUT Computer Centre has strived to build its professional reputation in this capacity, with staff trained in the USA, Slovenia, and Russia. There are also plans to send employees to certified Microsoft and Cisco courses in Kiev and Baku, with the hope of shortly establishing a Cisco Network Academy within the Computer Centre.

TUT

to two of the greatest ways to improve schools: good teachers, and reduced student to teacher ratios.

*DISTANCE LEARNING*

Distance learning is another unique feature enabled through ICT, and could prove invaluable for overcoming two obstacles, prohibitive cost of ICT and geographic distance, with the click of a mouse.

Enlarged choice is central to human development, and distance learning can be key to expanding student choice,

**Table 3.2: Breakdown of university students enrolled by specialty, 2001**

| Field | 2000/01 | Of which women |
|---|---|---|
| Scientific | 9837 | 2,600 |
| Humanitarian-social | 24,413 | 6,930 |
| Education | 8,092 | 2,192 |
| Medical | 3,724 | 1,495 |
| Culture and art | 986 | 205 |
| Economics and management | 20,560 | 4,058 |
| Interdisciplinary scientific specialties | 539 | 59 |
| Geology | 340 | 11 |
| Minerals exploration | 219 | 3 |
| Electrical energy | 357 | 13 |
| Metallurgy | 147 | 12 |
| Machine-assembling and metal proceeding | 265 | 17 |
| Vehicles and tractor design | 674 | 10 |
| **Electro technique** | 467 | 30 |
| Technological machines and equipment | 478 | 4 |
| **Communication, radio-technique, electronics** | 318 | 23 |
| MIS (Management of information systems) | 267 | 51 |
| Informatics and computer technique | 417 | 101 |
| Transport operations | 443 | 11 |
| Chemical technology | 259 | 20 |
| Forestry | 60 | 1 |
| Food processing technology | 420 | 78 |
| Consumer goods technology | 732 | 380 |
| Construction and artitecture | 797 | 19 |
| Agriculture and fishery | 2644 | 87 |
| Ecology and use of natural resources | 246 | 6 |
| **Total** | **77,701** | **18,416** |

*Source: State Statistical Committee*

**BOX 3.7: TAJIK-TURKISH LYCEUM**

There are six Tajik-Turkish lyceums in all of Tajikistan's regions except Badakhshan, four of which are connected to the Internet, providing 896 students with free Internet access. These computers have become an integral part of the education process. Books and manuals are available for instruction in English and Tajik, and separate CD-ROMs exist for a variety of subjects. Additionally, each lyceum has an intranet, allowing easy communication, and teachers to issue assignments via computer.

Dushanbe International School

*Enlarged choice is central to human development, and distance learning can be key to expanding student choice*

allowing students to obtain degrees and training in courses not otherwise offered domestically. There are at least four benefits to a national programme for distance learning: wider access for all groups, including women, the elderly, invalids, remote or rural regions and ex-soldiers; an introduction of new standards, as communicated from Moscow, or elsewhere in the CIS; reduced costs, allowing for still greater enrolment; and finally, greater flexibility enabling lifelong learning.

In August 1999, a Distance Learning Centre (DLC) was established in the TTU. Through the DLC, 84 students presently study at the Moscow University of Economics, Informatics and Statistics and at the Moscow State Institute of Steel.

Of these, 16 have higher educations and are seeking a second degree. Most are employees of TADAZ, Barki Tojik, the Anzob mining plant, and the State Ministry for Industry.

**BOX 3.8: PRIVATE SCHOOL FOR ICT**

The Private School for ICT is a prime example of targeting children when they are young. Old institutions not only need to be rehabilitated, but new institutions need to be created to support the development of specialised training. Following the success of its early "Computer Literacy" project, where 194 students received computer training over 10 months, the children's foundation Oshyoni Baland established a Private School for ICT. Targeting 13-16 year olds, classes are held two times a week for 3 hours after normal secondary school hours. With the support of the OSI for equipment and Babylon-T for paying teachers' salaries, a 4-year curriculum has evolved.

| Currently 300 students are enrolled | Course of Study |
|---|---|
| 2000 intake: 160 students | First Year: Computing basics |
| 2001 intake: 40 students | Second Year: Programming and web design |
| 2002 intake: 100 students | Third Year: Programming |
| | Fourth Year: Practical application |

Located in the heart of Dushanbe, the school's first year was a great success, and competition was fierce for the second course, with four applicants vying for every one place. Two classes were subsequently formed. Though a lack of places remains a problem, CADA has helped by presenting 10 more computers to the school. Each class works on these 10 computers with 2 seats for every computer, thus a total of 20 students are reached through each class.

Great needs still remain for sustainability and expansion: the number of teachers must be increased, and the school should have its own premises. Currently, the school is located in a specialised school for disadvantaged children. Fortunately, seven of these disadvantaged children also receive instruction at the School for ICT. Most have shown exceptional ability and gifts. Last year, 4 more disadvantaged children received instruction in computers.

This school is an instructive example of the cooperative links that can be forged between the private commercial sector and other organisations, and also a prime example of identifying the needs and demands of the population, particularly the young. Once these initial pilot projects have identified needs and raised demand, they tend to have a lifespan beyond themselves.

Private School for ICT

**Table 3.3: Distribution of personal computers across Tajikistan's Universities**

| Regions | University | # of PC in University | Total # of PCs by Regions | # of Students |
|---|---|---|---|---|
| Sughd | | | | |
| | Khujand branch of Technological University | 70 | | 600 |
| | Panjakent Open University | 7 | | 800 |
| | Branch of Technical University in Khujand | 15 | 147 | |
| | Modern Humanitarian University | 20 | | 400 |
| | Branch of Commerce University in Khujand | 10 | | |
| | Khujand State University | 55 | | 10,000 |
| Gorno Badakhshan | Khorog State University | 10 | 10 | |
| Khatlon | Kurgan-Tyube Polytechnic College | 3 | | |
| | Kulyab State University | 8 | | 5000 |
| | Kurgan-Tyube State University | 5 | 18 | 4000 |
| | Technological Gymnasium, Kulyab | 2 | | 230 |
| Dushanbe | Tajik State National University | 60 | | 13,000 |
| | Tajik State Pedagogical University | 5 | | |
| | Tajik Technical University | 120 | | 3000 |
| | Tajik State Medical University | 30 | | |
| | Tajik State Agricultural University | 15 | | |
| | Tajik State University of Commerce | 20 | | 2608 |
| | Tajik State University of Art | 0 | 397 | 1600 |
| | Tajik Institute of Business and Services | 13 | | 3000 |
| | Tajik Russian Slavonic University | 37 | | 1400 |
| | Technological University of Tajikistan | 40 | | 950 |
| | Tajik Tax Law Institute | 50 | | 4000 |
| | Tajik Institute of Languages | 7 | | 400 |

*Source: GIPI*

More than 50 tutors administer tests and monitor assignments locally. Without leaving Tajikistan, these students are able to acquire new skills and degrees from prestigious universities in Moscow. Furthermore, TUT and TTU have both joined the 35-university strong International Virtual University of Europe and Central Asia. Though courses have yet to be established, curricula have so far been exchanged.

To increase the success of the DLC, the following challenges must be met:

- Creation of the national programme for DL in Tajikistan
- Creation of a national system for DL based on an open database and proper education materials
- Creation of fully-equipped and trained DL centres in Tajikistan's regions, enabling equal access
- Creation of a DLC net, uniting all levels of education in the country and with the world
- Attract investments to compensate for a lack of public funding

Though at present there are no legislative acts directly dealing with distance learning, following a speech by President Rakhmonov to the Majlisi Oli, where he indicated the urgent need to utilise computers in education, the Law on Education was reviewed and amended, recognising new methods of education. The Law on Higher Education, existing in draft form, also

**BOX 3.9: EDUCATION/RESEARCH NETWORKS**

Additional benefits can accrue through the establishment of research networks. The Aga Khan Humanities Project for Central Asia is encouraging Central Asian scholars to develop university-level curriculum material in the humanities that promotes critical thinking, ethical reflection and cultural pluralism by drawing on Central Asian culture. The project is based in nine universities in Kazakhstan, Kyrgyzstan and Tajikistan, and calls for close interaction between curriculum development, teacher development and students. This requires a degree of interaction impossible without the use of information technology.

The Academy of Sciences was the first to apply to the NATO Science Programme in Central Asia in 1994 and, with support from NATO, OSI, CADA, and the Association of Operators, the Academy developed a radio network linking 7 reserch institutions in 2000. In response to NATO's Virtual Silk Highway project to provide high-speed access for the 8 countries of Central Asia and the Caucasus, the Academy and major universities registered TARENA, the Tajikistan Research and Education Network Association in 2000. TARENA has recently received a second grant to create the Dushanbe Science Network, or DuSciNet, linking 18 Dushanbe universities and institutes in a single network. DuSciNet will serve as the city's backbone for NATO's Virtual Silk Highway implementation, bringing satellite connectivity in 2002-2004. The initial connection will be 1 Mbps; in 2003 this will increase to 2.5 Mbps, and in 2004 4 Mbps . TARENA has met 2 of NATO's conditions for Silk Highway implementation by registering and receiving a license to provide connectivity on a non-commercial basis. Once TARENA receives its license to transmit data by satellite and develops an Acceptable Use Policy for TARENA network members, NATO will ship its dish and other network equipment to Dushanbe.

By the end of 2002, TARENA should have completed installation of both the NATO dish and the DuSciNet network. In 2003, with support from other donors, TARENA should expand its services to Khujand or Khorog, making it one of the largest networks in Tajikistan and serving effectively as the largest advertiser of the Internet in Tajikistan. Through the institutes, universities, schools and libraries in the TARENA network, Tajikistan's students and future leaders will have access to Internet services and training, providing an engine for growth in local language Internet content and services as well as a bridge to the digital opportunities of the 21st century.

AKDN, Internews & TARENA

stresses the need for the introduction of distance learning in a more comprehensive manner. These are useful, positive steps as Tajikistan moves toward formulating a broader National Programme for Distance Learning.

*ICTs such as computers and radios can increase the quality of instruction in the classroom, while expanding the resources at teachers' disposal*

*POLICY RESPONSE*

Education has been identified as a priority area for rehabilitation in the government's PRSP as a means to increase the economic opportunities of Tajikistan's citizens. This involves raising the quality not only of the school buildings themselves, but also of the teachers, and the equipment they use. ICTs such as computers and radios can increase the quality of instruction in the classroom, while expanding the resources at teachers' disposal. Though ICTs cannot by themselves increase enrolment rates in primary and secondary schools, they can, once enrolment has been boosted, ensure a higher quality of education.

Passed in August 2001, the law "On Informatisation" deals directly with ICT and education in Article 39, and speaks of erecting a "system of universal, on-going education and diffusion of knowledge" in all schools, from primary to university levels, so that students can learn basic computing skills. It also

charges public management bodies, including the executive branches, with working to increase public awareness of ICT.

ICTs have been used across the world for educational purposes, assisting in literacy training in Mexico and Mali, providing mathematics instruction in Thailand, and supporting primary education in the Dominican Republic and Paraguay. For the development dynamic to be triggered, education is key. Policy is crucial for prioritising the revitalisation of Tajikistan's educational infrastructure. That means fixing, equipping, and connecting schools. This can result in an increase in human capacity, however we have been careful to not restrict this increase to the classroom, but have broadened it to include teachers, who can have the greatest impact on Tajikistan's youth. But their use should not be overlooked for entrepreneurs, government officials, in short, everyone.

### 3.4 ICT for Health

Improved healthcare is a clear human development priority for Tajikistan. Unfortunately, the past years have seen the reemergence of many diseases, such as tuberculosis in the population. But ICT can do very little if the infrastructure is not in place. That means not only the phone lines, but also the hospitals, equipment, and trained, competent staff to tend to every patient who walks through their doors.

What can ICT do for improved healthcare delivery? ICT can establish and improve contacts for local and national healthcare professionals with their counterparts both in the CIS and the West. These contacts can create networks, allowing for the consultation, collaboration,

**BOX 3.10: WIRING THE REGIONS**

As in many places where the computer revolution has hit, the arrival of computers in Khorog has changed many habits and practices, albeit on a much smaller scale. Since March 1998, the Aga Khan Education Services (AKES) have purchased over 70 computers for its operations in Khorog. The bulk of these were allocated to the Aga Khan Lycee (AKL), a private school. The others are being used in the AKES office for administrative functions: report writing, budget control, e-mail and organisation of work schedules.

In the Lycee, the computers have been set up in three key areas: the Learning Centre (a multimedia resource centre for teachers and pupils), the Finance department, and the offices of the administrative staff and Professional Development trainers. The impact has been immediate and far-reaching. All the pupils now attend computer classes and will be computer literate by the time they complete their schooling; indeed, they will be proficient users of most Microsoft applications, plus they will be able to apply these skills to their professional activities, like writing reports, researching, and sending/receiving messages from anywhere in the world. Currently 903 students are enrolled in the Lycee's primary, secondary and higher secondary classes. Since 1999, 350 students have graduated from the AKL.

The teachers and the administrative staff have been offered free courses in basic computer literacy and now apply this knowledge to making presentations in PowerPoint, producing spreadsheets of pupils' records and tests results, preparing financial statements and issuing brief reports and announcements. In other words, computers have been accepted and used as efficient tools assisting staff in daily duties. Measuring the impact on development processes at large is certainly not easy at this early stage. Probably the most salient feature of computerisation is exposure and openness. Awareness of the benefits of computers is growing in Khorog, the popularity of the CADA e-mail service (free for the first 250 KB) is ample evidence of this.

Aga Khan Foundation

and sharing of innovative solutions to common problems. It can also keep medical personnel more up to date regarding new techniques and procedures, and allow them to access information off-site.

ICT can also assist in administration of hospitals and policlinics. In much the same way as outlined for improved governance, ICT can assist in creating and cataloguing patient histories, allowing for improved and more individual tracking and monitoring of patient health.

But we should not focus solely on the Internet or e-mail to achieve improved health outcomes. Radio and TV programmes can raise the awareness of the population toward disease prevention measures. This is particularly relevant for combating one of the scourges of our age: HIV/AIDS. Halting and reversing the spread of HIV/AIDS is one of the Millennium Declaration Goals. Though the numbers in Table 3.4 appear small, it should be stressed that they are for registered cases of HIV-infection only, as of November 2002. Additionally, due to the limited capacities, testing of donor blood is done irregularly, covering only about 40% of donors.

Moreover, the environment is ripe for the further spread of HIV in Tajikistan due to three main reasons: a large youth population, increasing intravenous drug use, and labour migration.

*POLICY RESPONSE*

ICT for health has had numerous applications and resulting benefits in a variety of countries. In Nicaragua and Swaziland, ICTs have been used to disseminate general public health information; in South Korea and Sri Lanka they have assisted in family planning; and in the Philippines they have brought a wider understanding of nutritional education. What can they do for Tajikistan?

The PRSP sets the improved welfare of Tajikistan's citizens as a national

**BOX 3.11: CREATING SYNERGIES**

On 16-18 January 2002, a seminar devoted to ICT in Education for university professors from all of Tajikistan's regions was held at TUT, organised by TARENA and GIPI/Internews, with sponsorship from the OSI. This was the first such event of its kind in Tajikistan. More than 20 university professors took part, and discussed the possible benefits of using ICT in the education process.

This should be seen in the appropriate context: the economic situation in the country does not permit the active communication of university professors. Professors often solve problems often in isolation. This kind of seminar is a catalyst for change, providing a crucial forum for teachers nationwide to share experiences and lessons learned, helping all to better formulate innovative solutions to common problems. Bringing professors together also provides the opportunity to standardise course material; this is crucial to allow for a more even development of subjects across Tajikistan's universities

Following the seminar, a set of recommendations were developed and have been sent to the relevant state bodies, and other policy makers on ICT and education. With unanimous support, the seminar voted to establish an Association of ICT Experts, which will combine all efforts across the country for expanding the use of ICT in education, with a particular focus on the regions.

GIPI

**BOX 3.12: THE DYAKOV CLINIC**

A database is being created in the Dyakov Clinic, located in Karabolo. This database will allow for the tracking and monitoring of patients throughout the region. This is of crucial importance because the Dyakov Clinic is a National Hospital, which means regional hospitals often refer the most complicated and serious cases to it. Annually, more than 3000 patients pass through its doors. Additionally, a system called "Patient" has already been developed at the National Diagnostic Centre in Dushanbe. The "Patient" programme assists in the consultation and examination of patients, in effect, creating computerised patient files. Each visit is entered into a personal computer file and stored for future reference. Within the National Diagnostic Centre, a local net has been established, allowing access to these consultations and examinations, providing better treatment and observation. It is hoped that "Patient" will be continuously evolving and expanding, building complex patient history files that will expand capacity and boost productivity, and hopefully lay a sound basis for a more preventative approach to medicine.

Ministry of Communications & Parliament

priority. It hopes to widen access to basic healthcare through a package of basic guaranteed health services, especially with regard to primary care. Though not explicitly identified, ICT can assist in at least three of the PRSP's modes of improving healthcare throughout the country: improved training, management, and data collection. Improving the professionalism of healthcare workers means not only increasing salaries and reducing informal fees, but connecting them to healthcare professionals in other countries, allowing for an exchange of innovative solutions and modern technology. To improve reporting, registration and

**BOX 3.13: WHO ASSISTANCE FOR STRENGTHENING THE REPRODUCTIVE HEALTH (RH) MANAGEMENT CAPACITY OF THE MINISTRY OF HEALTH (MOH)**

Access to reproductive health services for those who want it is crucial and one of the Millennium Declaration Goals. Executed in 2000 with financial support from UNFPA, the World Health Organisation's project has as its key objective capacity strengthening of the Ministry of Health and National Reproductive Health Centre, and to enhance the quality of life of Tajikistan's citizens through improved reproductive health and data collection. With this in mind, the RH centres of Moscovsky and Dangara districts of Khatlon oblast, and Kanibadam and Isfara districts of Sughd oblast received in 2001 computer equipment (7 computers equipped with fax-modems, as well as 7 printers). Medical equipment, including two ultrasound scanners, will also be provided for RH Centres, for a total amount USD 49,293.

A key activity of the project is the development of a reproductive health MIS in Tajikistan. Following recommendations from a WHO expert, a single reporting form on RH indicators and a computer programme on RH data entry and processing has been developed, and training courses on RH MIS were conducted.

110 reproductive health and medical statistics specialists were trained during workshops in Khatlon oblast, and 85 reproductive health and medical statistics specialists in Sughd oblast. National and local TV broadcasted the workshops and the presentations of the WHO, UNFPA, and representatives from the MOH.

Six workshops for reproductive health programme managers have been conducted on the topic, "Preparing analytical reports and managing reproductive health database", throughout the regions of Tajikistan. In total, 179 specialists were trained in the management of reproductive health services, including 75 directors of reproductive health centres; 74 deputy chief physicians were trained in organisational-methodological procedures.

WHO

*ICT can assist in at least three of the PRSP's modes of improving healthcare throughout the country: improved training, management, and data collection*

communication between and within hospitals, computers can play an invaluable role, facilitating electronic filing instead of the current manual filing. And finally, if the collection and processing of medical statistical data is a priority for identifying health trends within the country, and comparing it with others, computers and a computer net could also provide a unique tool for improved synthesis and analysis.

The PRSP also states that a key goal of the government is the promotion of family planning and reproductive healthcare, including the provision of contraceptive means to the population. ICT can play a crucial role in such an awareness raising campaign, allow for the wide dispersal of information, and also interactive question and answer debates.

For any of this to work, however, the human capacity must be present or fostered. Staff must be retrained and retained. This should be carried out not only at the national level, but also the local level. By increasing the capacity of local hospitals, regional hospitals can be alleviated of the current surfeit of patients and provide higher quality care to those whom remain; improved local hospitals will also provide

**BOX 3.14: USE OF COMPUTER TECHNOLOGY IN THE HEALTH SECTOR**

The Aga Khan Health Service in Tajikistan uses computer-based information technology for the following: to implement its "English Language and Computer Programme", presently carried out in Khorog, Ishkashim, Vanj and Murgab of Gorno-Badakhshan. A total of 414 participants, 216 in Khorog, 106 in Vanj, 54 in Murgab, and 48 in Ishkashim, are presently enrolled in this voluntary programme, which has experienced a dropout rate of less than 3%. The overall goals of the programme are:

(a) To provide high quality training for health professionals, enabling them to have access to worldwide knowledge in medicine and nursing through distance learning.

(b) To develop a culture of continuous learning in the English and Russian languages.

(c) To facilitate the "International Clinical Partnerships Programme", where local doctors team up with visiting doctors from Canada, the US and Europe, enabling discussion of common problems and implementation of patient care initiatives. E-mail will allow them to keep in touch and consult after the visits have ended.

(d) To accomplish the "English for Medicine Programme", an innovative, computer-based, interactive programme using articles from medical journals, a dictionary of medical terms and an English-Russian dictionary, participants learn English medical terminology, and also improve their computer skills.

(e) To promote "Distance Learning" by way of an e-mail-based master's degree programme with the University of Edinburgh. This programme aims to provide professional development for English language teaching professionals.

(f) To equip the "Health Care Professional Development Centre". Renovations at Khorog General Hospital have been completed for the establishment of a Professional Development Centre. Besides books and medical journals in print and electronic format, the centre will be equipped with several computers. Similar centres are planned for neighbouring districts, allowing for an alleviation of professional isolation.

AKHS is training its doctors in Khorog as well as surrounding districts to use computers, thus positioning them to take full advantage of innovations in the area of information and communications technology as it develops and becomes accessible in Tajikistan. When access to the Internet is available, it will open up a world of information that the doctors will be able to utilise to further their knowledge and learn about medical practices in other parts of the world.

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**Table 3.4: Geographic Distribution of HIV/AIDS cases in Tajikistan**

| Regions | Total | Men | Women | Total deaths |
|---|---|---|---|---|
| Dushanbe | 10 | 9 | 1 | |
| Kofarnigon | 1 | 1 | | |
| Khatlon: | 2 | 2 | | |
| Kumsangir | 1 | 1 | | |
| Yavan | 1 | 1 | | |
| SO: | 62 | 43 | 19 | 2 |
| Khujand | 12 | 8 | 4 | |
| **TOTAL** | **75** | **55** | **20** | **2** |

*Source: National Centre of HIV Prevention and Control in Tajikistan*

patients with service closer to home. As stressed before, development of software and other programmes in Tajik script is also key for increasing the capacity of rural hospitals. For the content to have any relevance, needs assessments must be carried out.

More broadly, adding a health dimension to an overall ICT strategy will:

- Expand opportunities to prevent diseases, improve diagnosis, treatment and rehabilitation
- Practice treatment and diagnostics over great distance
- Introduce "Virtual medical establishments", such as virtual policlinics or hospitals, offering citizens individual services for improved health
- Ensure rapid communication between medical establishments, laboratories, drugstores, and public health centres
- Manage the health sector in a coordinated fashion
- Introduce a new systems for the storage of medical e-cards

**BOX 3.15: HIV/AIDS**

On 27 September 2002, the government approved a national strategic plan for HIV prevention in Tajikistan for 2002-2005 which focusses on preventive measures for the most vulnerable, high risk groups, including youth, drug users, prisoners and prostitutes. The plan seeks to maintain a careful balance between the interests of society and the individual. Key for this is making sure the individual is provided with the most timely and relevant information for making informed lifestyle choices. A central plank of this programme is education, and raising awareness about the modes of transmission and the effects of the disease.

Currently, the programme is focusing on healthy lifestyle campaigns, including information on HIV prevention in secondary schools and the publishing of teachers' manuals. Importantly, under this programme, centres will be established for the exchange of syringes. Means to safeguard the country's blood supply will also be identified.

How can ICT specifically assist in halting the spread of HIV in Tajikistan? Through developing a database of HIV cases and integrating it into the CRIS (Country Response Information System, a database containing HIV information from 100 countries), it will be possible to move beyond manual filing of information, the only means at present, to electronic filing which will better monitor the country's blood supply and the health of identified HIV cases confidentially. However, presently, neither the infrastructure nor the experts to maintain such a database exist.

Only through wide-scale public mobilisation, further financial funding, and increased public awareness will the fight to halt and reverse the spread of HIV have a lasting impact in the country.

UNAIDS

**Table 3.5: Mode of HIV transmission in Tajikistan**

| Risk factors | Number of cases |
|---|---|
| Intravenous drug abuse | 51 |
| Sexual contacts | 10 |
| Unknown | 14 |
| Total | 75 |

*Source: National Centre of HIV Prevention and Control in Tajikistan*

- Enhance monitoring of public health
- Expand medical education

### 3.5 ICT for the Environment

Access to retransmitter in Pamir

Tajikistan has a unique environment, with some of the largest water resources and highest mountains in all of Central Asia. But the harmful legacy of the Soviet cotton monoculture, and the lack of a diversified economy, with those industries that do exist being heavily polluting, pose serious problems to Tajikistan's fragile ecosystems. This threat, combined with a variety of natural disasters, including droughts, earthquakes, floods, landslides and mudslides can effectively wash out or block key roads for months at a time, leaving some regions accessible only by plane for certain parts of the year.

ICT, whether through satellite imaging or radio broadcasts, can provide citizens with more accurate weather forecasting. This improved monitoring can assist in the collection, processing and dissemination of information. Through enhanced monitoring, there is a potential to either prevent disasters, or provide rapid response. Because many of Tajikistan's regions are remote, such monitoring can quite simply mean the difference between swift and delayed response. Education is a fundamental component of prevention. Whether through instruction via radio, television or the Internet, rural communities can receive education in, for example, proper irrigation and drainage technology, resulting in the more efficient allocation of scarce resources, but also avoiding harmful mudslides and flooding. This kind of empowernment is invaluable: it not only saves scarce resources, limits monetary damage, but, most importantly, can save lives.

The future should see Tajikistan's citizens transformed into environmental enforcement agents. For example, officials can create a public access database for rating the degree of factory compliance on water purification systems in order to raise public awareness of water contamination. ICT applications can be used to reduce the wasteful consumption of energy, water and other essential resources through more efficient agriculture and industrial procedures. Furthermore, Geographic Information Systems can facilitate weather and soil monitoring, crop forecasting and the ability to optimise returns on investments, ensuring more efficient use of scarce resources. These policy measures have an environmentally conscience edge, while still allowing for the productive and profitable exploitation of Tajikistan's natural resources.

*POLICY RESPONSE*

Given the agricultural base of the economy, and the fact that over 70% of the population is rural, the PRSP recognises the environment as a priority. Protecting the environment and preventing natural disasters is

**BOX 3.16: MONITORING THE ENVIRONMENT THROUGH SATELLITES**

The Tajik Hydro-Meteorological Services used satellites for weather forecasting in the 1960s. Progress in space technology has facilitated a detailed study of the environment and created the basis for Geographic Information Systems. Based on space images, the Mapping Research Centre "Nature" in 1980 issued "Natural Resources", an atlas containing a series of large-scale maps on various themes, such as glaciers, landscapes and floods. This centre developed original technology for de-coding satellite imagery, mineral exploration (oil and gas), and assessing the state of vegetation and fire threats. Tajik Hydro-Meteorological Service in 1999 installed a TV-Meteo-Inform system for acquiring information on the weather in the CIS and Central Asia. In 2000, a computerised working station was established to take images of the Earth's surface and clouds from stationary satellites (Meteosat) and those in orbit (NOAA). These satellite systems facilitate and increase the efficiency of weather forecasting.

High-resolution space imaging can now monitor glaciers, assessing the rate of decay and sliding. In 2001, based on image data and land based equipment, the sliding of the Medvezshyi glacier was observed, causing experts of Tajik Hydro-Meteorological Service to visit the site and measure the slide. This slide was fortunately not as dangerous as previous slides in 1963, 1973, 1989, when they threatened to break through Abdukagor Lake dammed by a glacier in the upper river Vanch. It is planned to install automated meteorological stations, which are connected via satellite with data collection and data processing centres, and monitor rains and floods for the forecasting and prevention of natural disasters.

Chief Board for Hydrometeorology and Monitoring Pollution of the Environment at the Ministry of Environment

crucial for securing the livelihoods of Tajikistan's rural citizens. It is hoped this vulnerability can be reduced through the creation of a national strategy for disaster management, rational use of natural resources, maintaining biodiversity, and improved monitoring and publishing of the heaviest polluters, for which ICT could prove an invaluable resource. Of paramount importance to all of this is creating the human capacity to undertake such monitoring. ICT can provide some tools to better manage and mitigate Tajikistan's often erratic weather, but tools need people to use them.

*ICT can provide some tools to better manage and mitigate Tajikistan's often erratic weather, but tools need people to use them*

**BOX 3.17: EARLY WARNING SYSTEM**

In 1999, at the request of the Government of Tajikistan, with funding from ECHO, the NGO FOCUS implemented Disaster Preparedness Training for Vulnerable Communities of the Bartang Valley, GBAO. The main goal of the project was to reduce vulnerability to residents against potential outburst from Lake Sarez and other local hazards such as avalanches, rock-falls, land and mudslides, and earthquakes.

One of the project objectives was to design and install a two-way radio communication system that would be used for disaster warning and management. A team from AT Electronics and Communications International, together with representatives of the Ministry of Emergencies and FOCUS, installed radio receivers with antenna masts, solar panels and batteries.

At the eight Bartang Valley sites, radios were installed in the homes of cooperators, so that they could be accessible for emergency use and monitored for warnings at all times. Where feasible, the radios are located in houses that are high enough above the river in case of flooding. The houses playing host to the radios were carefully selected by local leaders to assure that capable, reliable families would take responsibility. In most villages both the host household and their neighbours were trained to operate and maintain the radios and the solar systems to power them.

Radios were also installed at the offices of the Ministry of Emergencies in Dushanbe and Khorog. During the last two years, this chain of communication has been the only link for local residents with the outside world. It has immensely changed their lives, and has been helpful in a number of emergencies caused by local hazards, traffic and other accidents.

FOCUS

**BOX 3.18: SATELLITE IMAGING**

The Mapping Research Centre in Dushanbe was opened in 1975. Its main task is to make maps based on the use of space images transmitted to Earth via satellite.

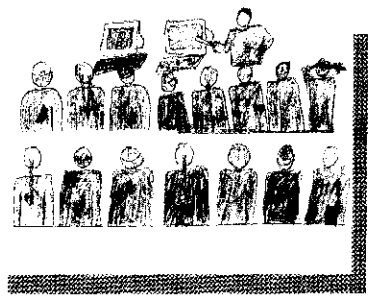
This information is widely used for the assessment of natural resources and forecasting of natural calamities. Specifically, images of Pamir taken every 5 years have catalogued the trend towards desertification of pastureland. These images are also used for forestry and monitoring, and implementation of forest and land protection measures. Additionally, through space images it was identified that in Tajikistan the land covered by glaciers had shrunken by 25-30% since 1950.

These images can also be used for economic ends, in particular for agriculture, engineering, and geology. With regard to agriculture, the satellite images can help recommend how much cultivation can be planned in certain areas, and which crops to cultivate. Space information also gives more accurate weather forecasts, critical for agricultural production and other sectors. Landscape maps, geological maps, glacier maps and tectonics map all generated through satellite imaging assisted engineering works around Sarez Lake. Satellite images can also assist in identifying mineral deposits and other natural resources. In the 1980s, these images helped find natural gas deposits in Khatlon, and iron ore deposits in Pamir.

Mapping Research Centre " Kharitasoz"

# CHAPTER 4

# WHERE WE'VE BEEN, WHERE WE'RE GOING



As it should be clear, there is a great need for rapid assistance in Tajikistan for the attainment of human development goals, and that ICT can play a real and substantial role in this process. However, at this time, ICTs are poorly understood and inefficiently distributed throughout the country. This conclusion will seek to sum up how close Tajikistan is to a development dynamic, ways in which that process might be accelerated or strengthened, and will finally provide a cautionary note for the future.

## 4.1 The Digital Dynamic

Throughout this report we have referenced a "development dynamic." This report has tried to highlight a number of those concrete and specific steps to be taken in achieving it, but we must always keep in mind that the "development dynamic" is not a thing in and of itself, detached from real life, but a series of interconnected actions real people must take on the ground, and that, if taken within a holistic strategy, can have wide and far reaching effects for the attainment of development goals. It is also important that development goals as such do not become abstractions either. Rather, when we have spoken of development goals, we are talking about more choices for the people of Tajikistan through better education, better access to healthcare, access to reliable infrastructure, greater equality among regions and sexes, and less governmental interference in the private sector. We are talking about basic things, like clean drinking water and textbooks for children. How close is Tajikistan to reaching such a dynamic, particularly with regard to ICT as one of the means?

Infrastructure is the foundation for any hopes of reaching sustainable human development. But such rehabilitation and extension will not happen by itself, and, given budget constraints, is unlikely to happen through the public allocation of funds. This has been the situation since independence, and its prolongation sets the stage for further decay, growing regional, social and financial disparity. New and innovative means and solutions need to be formulated if results are to be seen in the near to mid-term. Some of these means have been outlined with regard to policy steps that can be taken, in particular with regard to fostering an environment friendly to the emergence of the private sector. The government has an enormous amount of needs to contend with. But a large and unfettered private sector will focus on roads, one at a time, and phone lines, one at a time, and can prove an invaluable partner for the even and wide rehabilitation of infrastructure if it is given the chance.

Policy must be actualised. Declarative statements mean nothing if the action to back them up is not taken. The PRSP sets an ambitious schedule for implementation of a variety of goals

*The development dynamic is not a thing in and of itself, detached from real life, but a series of interconnected actions real people must take on the ground*

that, if taken together, can have an ameliorative effect on development in Tajikistan, particularly with regard to privatisation. The government must stick to this timeframe to cast itself as a reliable and predictable partner with its own citizens and with the international community. Action must be seen, must be published widely, and must incorporate the views of the broadest segments of society possible, from local governments, to NGOs, to the citizenry itself.

Entrepreneurs must not be burdened unnecessarily by governmental interference. The present licensing environment in Tajikistan is untenable. Tajikistan has many priorities, and they have only increased because of the years lost through civil war. If proper steps are taken towards deregulation, privatisation, and a transparent, entrepreneur-friendly tax regime, existing enterprises will find greater room for manoeuvre, and more will be able to enter the market thanks to lowered barriers. The benefits of a

**BOX 4.1: LESSONS LEARNED FROM WORLDWIDE EXPERIENCE IN ICT**

The Digital Opportunities Initiative's analysis of ICT targeting key development imperatives suggests that, while individual ICT interventions have a positive impact on social and economic development, many initiatives experience barriers to sustainability under current conditions. World experience of lessons learned advocate the following recommendations:

- Initiatives should be explicit about their development goals and how they will directly impact the target population. Initiatives that clearly identify development goals within the needs and context of the target population are more likely to develop effective operating models and deliver tangible results.

- Initiatives should be driven by user demand, identified and realised through direct participation and ownership. It is important that initiatives are demand-driven and locally owned. Technology imposed on a community who have not independently identified a need for it will predictably encounter obstacles among the local population. Higher rates of use will be experienced if local people and NGOs participate in tailoring the service to meet specific needs.

- ICT solutions should be "built to last." Initiatives that are planned and managed using a business model are likely to be more sustainable and have a lasting impact. To be successful, operations should include such components as a solid business plan, a cost recovery system, a marketing strategy, and emphasis on local community services.

- Initiatives should be sensitive to local conditions and limitations. The technology employed should be environmentally-friendly, affordable, physically accessible, user-friendly, and low-maintenance. They should also be flexible enough to accommodate user demands for new services with, for example, minimal Internet training and in conditions of poor connectivity.

- The interests of key stakeholders must be broadly aligned with each other and with the goals of the intervention. Identifying or engineering "win-win" situations is critical for securing a lasting commitment from all necessary parties, including participation from local communities, private enterprises, NGOs, multi-lateral organizations and national and local governments. Strong public and private institutional support and leadership is required to maintain commitment and alignment from all parties. This requires a clear vision and direction, along with defined roles and responsibilities for all partners, adequate funding, sufficient technical and administrative means, and integration with existing local institutions.

ICT interventions focussing on development goals must address a variety of interrelated dimensions to secure an enduring impact. While grassroots entrepreneurial activity is to be universally encouraged, the potential impact of these ICT interventions would be far greater had they been conceived as part of a comprehensive national ICT strategy for development.

Taken from *Creating a Development Dynamic: The Final Report of the Digital Opportunities Initiative, 2001*

strengthened private sector have already been outlined, but it is important to stress them again. They include job creation, higher incomes, greater potential for innovation, greater dispersion of technology and benefits, and also an expanded tax base for the government to draw upon. Only the monopolies will suffer. And, if they are willing to accept the necessary challenge of competition, they will only see their own enterprises, and employees, profit.

Human capacity should be strengthened. The greatest threat is that those with specialised education, knowledge and experience will leave the sector for better opportunities elsewhere. As has been already highlighted, by inclusive policy formulation, and clear, accountable implementation, steps meant to foster a private sector, and increase the standards of education and health, can possibly act as incentives to those specialists remaining in the country, or abroad to return, especially if they feel the government is engaged in an active and sweeping effort to develop the country, while also working to reduce inequalities. Such developments would lay a foundation for increased foreign investment flows, further reinforcing policy moves.

Relevance to the people concerned, whether rural or urban, is of course a consideration that must inform all of the above. We have already stressed the need for an inclusive process of

**BOX 4.2: COPYRIGHT PROTECTION IN TAJIKISTAN**

Copyright protection is crucial not only for the protection of local producers, but also for international corporations and investors. A clear commitment to protecting international and national patents and copyrights demonstrates that Tajikistan is a willing partner in the emerging global market.

The National Centre for Patents and Information (NCPI) was established within the Institute of Scientific and Technical Information of the Ministry of Economy and Foreign Trade. Its function is to protect state interests in the field of inventions, industrial patents, trademarks, services and other objects of industrial property in the country and abroad.

According to the Declaration of the Government of Tajikistan, the following conventions and treaties are valid in Tajikistan:

- World Intellectual Property Organisation (1967, amended 1979).
- Paris Convention for the Protection of Industrial Property (1883, amended 1967 and 1979).
- Madrid Agreement Concerning the International Registration of Marks (1891).
- Nice Agreement on the International Classification of Goods and Services for Purposes of Trademark Registration (1957, amended in 1977 and 1979).
- Locarno Agreement Establishing an International Classification for Industrial Designs (1968, amended 1979).
- Strasbourg Agreement Concerning the International Patent Classification (1971, amended in 1979).
- Budapest Treaty on the International Recognition on the Deposit of Microorganisms (1977, amended 1980).
- Nairobi Treaty on the Protection of the Olympic Symbol (1981).
- Berne Convention for the Protection of Literary and Artistic Works (1914, revised 1971, amended 1979).
- Patent Cooperation Treaty (1970, amended in 1979 and 1984).
- Eurasian Patent Convention.

To demonstrate further a clear and lasting commitment to the protection of intellectual property rights on an international scale, the following treaties and conventions must also be analysed and considered:

- The Patent Law Treaty (2000) and the Trademark Law Treaty (1994).
- The Vienna Agreement Establishing an International Classification of the Figurative Elements of Marks (1973)
- The Hague Agreement concerning the International Deposit of Industrial Designs (1925).

These factors are crucial as Tajikistan builds upon its bid, initiated in 2001, to join the World Trade Organisation.

*The participation of the population is crucial, and will also alleviate the government from attempting to micro-manage the process*

policy formulation and implementation for the sustainability of all projects. Content and applications means that ICT interventions must address targeted local needs which are either pre-existing, or have been identified through an inclusive process of formulation. The PRSP sets out a wide variety of goals; if progress is to be made on all of them, the participation of the population is crucial, and will also alleviate the government from attempting to micro-manage the process.

Key for any ICT intervention is language and affordability. If the local communities work in Tajik, then the content must be in Tajik. This calls for close consultation throughout the duration of all projects, enabling bottom-up feedback mechanisms. Affordability

**BOX 4.3: PUBLIC AWARENESS**

Raising awareness of ICT for development is crucial, providing a broader foundation upon which to build future initiatives. In 2001-2002, the following mass events were held in support of ICT:

| Event | Date | Sponsor |
|---|---|---|
| International seminar in Osh "Role of ICT in Education" | March 2001 | |
| Regional workshop in Kyrgyzstan on NREN | September 2001 | NATO |
| TARENA Round Table | September 2001 | GIPI,OSI |
| Seminar in Pedagogic University "Use of ICT in Education" | September 2001 | OSI |
| Contest for the best School Composition on ICT | October 2001 | UNDP |
| Contest on the best ICT drawing | October 2001 | UNDP |
| Internet cafe in TUT | October 2001 | UNDP, TUT |
| Conference "On Information resources of Tajikistan" | October 2001 | NCPI |
| Global 2001 HDR on ICTD Launching | October 2001 | UNDP |
| Seminar in TTU "Use of new technology in education" | November 2001 | OSI |
| Contest for the best website | November 2001 | TANTIS |
| Hotline conference with the MC | December 2001 | Government |
| GIPI/Internews established in Tajikistan | 2001 | Internews |
| Seminar in TUT " ICT for Education" | January 2002 | OSI,GIPI, TUT |
| Round Table Discussion | February 2002 | OSI, GIPI |
| Press Conference on ICT | August 2002 | Government |
| Mobile Round Table Discussions | August 2002 | OSI, UNDP, GIPI |
| Introduction of Bishkek-Moscow Conference on IS | September 2002 | OSI, GIPI, UNDP |
| Seminar: Digital Divide into Digital Opportunities | November 2002 | UNDP, GIPI, OSI |

TANTIS, or the National Association for High Technologies and Information Systems Development of Tajikistan is a public association founded in 2000, uniting hi-tech industry, mass media and providers. Its main aim is to facilitate the introduction and use of hi-tech in Tajikistan, and advocate ICT for development. The association supports the integration of the country into the world community, and supports public policy in the search for efficient mechanisms for the implementation of laws. TANTIS participates in discussions on legislation, and also organises round tables meetings and competitions. TANTIS has also organised the National Internet Award of Tajikistan devoted to the 10th anniversary of Tajik independence looking for the best Tajik Internet site on the web.

GIPI, or the Global Internet Policy Initiative project, was established jointly in 2001 by the Internews Network and the Centre for Democracy and Technology. It aims to create an enabling legislative environment and policy for the expansion of the Internet through decentralisation and more competitive market conditions. In particular it focusses on legislation dealing with intellectual property, taxation, and information security. GIPI also promotes Internet centres in public places for increased access among the general population.

World Poverty Eradication Day, 17 October 2001, saw the UNDP support a variety of public activities on ICT advocacy. The Educational Department of Dushanbe City Administration organised a contest for the best-written composition on "ICT and new technologies for poverty reduction" and a contest for the best drawing among schoolchildren. Aimed at raising the awareness of the uses of ICT for reducing poverty, the events were televised and broadcast to a wider audience.

TTU, TANTIS, GIPI

**BOX 4.4: 21ST CENTURY AND NEW TECHNOLOGIES**

We all know that the 21st century is one of new technology. At present most countries use new technologies. With new technologies we can improve our lives. In many offices and government buildings, workers are using new technologies because it can make their work easier.

But it is also very important for youth to know about it too. Previously, study at schools and universities was free. But now it is very difficult to have a higher education because most parents cannot afford to pay for it.

Our future depends on the youth. Our country is underdeveloped and we must develop it. In most Tajik schools there are no computers and the pupils do not know anything about computers. We must have contacts with many other countries of the world to develop our country, and I am sure this century our republic will become developed. And new technologies will be used in our country too.

Mohinisso Faizova,10th grade, School No. 77, Dushanbe

is also paramount. It is useless to offer ICT services, for health or distance learning, if the computers to access them are prohibitively expensive.

Education, environment, health, governance, and enterprise cannot all profit at once; the resources for across the board action are currently not present. Thus local priorities should be set to address the most pressing issues first, while not relegating those left in abeyance to an indefinite future.

## 4.2 Making ICT Work for Human Development

ICT is generally regarded as having two roles, by no means mutually exclusive, for enabling development. The first is as a means to position a national economy in the global economy, and the second for targeting and reaching development goals. Tajikistan's priority is for the latter, but action toward development goals will also better position the country in the long-term in the global economy. However, for this to happen, much work must be done.

Leadership is necessary at all levels, in the public sector, at national, oblast, and local levels, but no less importantly in the private sector, among motivated entrepreneurs, free of strict regulations or tax regimes, from NGOs, and from ordinary citizens who understand the benefits of ICT for development, and are willing to work together in overcoming barriers and seizing opportunities.

E-Assessments can be vital in understanding the specific needs of local communities, and can also help in prioritising which sectors require most help; will provide benefits to the greatest number; and which regions require special attention and services. The holistic approach does not require action in the five interlocking dimensions of the development

**Table 4.1**

| Mobilisation | | Strategic Direction | | Implementation Plan |
|---|---|---|---|---|
| Leadership & Vision | → | e-Assessments | → | Transitional Mechanisms |
| Development Goals Focus | | Holistic Approach | | Roll-out Sequence |
| Obstacles and Opportunities | | Strategic Compacts | | Rules & Responsibilities |
| Advocacy & StakeHolder Campaign | | National e-Strategies | | Funding & Resources |

*Source: Digital Opportunity Initiative*

dynamic to take place at the same speed; rather, a holistic approach can assist further in prioritising what needs to be done in the short-term, and in the long-term. The holistic approach also does not mean an indifference to local conditions or concerns; holistic does not mean a "total, uniform" approach, but rather one that takes into consideration all dimensions of the development dynamic, and all local concerns and conditions. Strategic coordination is also of vital importance. All actors, whether international, national, local, public or private sector, must look for partnerships to not only implement their programmes or projects, but to ensure that they are sustainable. A national e-strategy is imperative for making sure the policy, both national and local, is in place to support ICT's potential to help achieve greater human development.

*A national e-strategy is imperative for making sure the policy, both national and local, is in place to support ICT's potential to help achieve greater human development*

All of this hopeful work can founder if during implementation the process falls apart. Therefore transitional mechanisms are necessary to address obstacles already identified or encountered on the ground. A clear understanding and separation of the roles all actors are undertaking before work begins is crucial not only to avoid overlap, but to ensure actors can be held accountable. Last but not least, the resources and the funding, whether locally, nationally or internationally derived, are necessary for successful implementation.

One of the overarching themes of this report has been "intercon-nectedness". Greater connectivity throughout the country is not simply a desired end state, but can also be viewed as essential for achieving that equitable end. This is in essence what the holistic approach attempts to recognise: that many factors and conditions are interdependent upon one another, and, without a national strategy, can leave some regions or communities behind, and ultimately provide little in the way of results or benefits for Tajikistan's citizens in the long-term.

### 4.3 Cautious, Not Conservative

It is important to conclude with a cautionary note. By cautious we mean open to hearing a range of ideas, but also rationally weighing them. That means not getting carried away with the possibilities, but also not dismissing them out of hand. One can be cautious and optimistic simultaneously. One can also be cautious and take risks, as long as they are calculated. An approach that is too conservative will have little eye for new opportunities.

This section will seek to highlight some of the attendant dangers to what a lack of an overall national ICT strategy might bring to Tajikistan. Though by no means exhaustive, it will help to highlight some of the major stumbling blocks, and seeks to build upon the lessons learnt outlined in Box 4.1. Many of the ideas that follow have been taken from the 2001 Global Human Development Report, and the work of Richard Heeks.

***Idolised over integrated.*** There is a major misconception as to what ICT can and cannot do for development. ICT will not solve all ills. ICT is a tool for development, not development itself. It is important to separate the two, and remember that ICT as part of a national strategy must remain subordinate to development goals. Clean drinking water and shoes are needed before computers and cell phones.

Additionally, a high profile given to a project or policy that becomes a failure will result in a loss of credibility for

all parties concerned. In fact, a lack of strategy to the allocation and application of ICT can impede the development process through expending scarce resources on overambitious, unrealistic pursuits. It is tautological to say that technology will bring development, and that we will be developed when we have technology. This also gets to the heart of another theme, that ICT is a complement, not a substitute. ICT can increase feedback mechanisms for local and national governance, but they are no substitute for face-to-face communication. Computers in classrooms can be beneficial, but they will be worthless if the school is bereft of good teachers. This brings us to our next point.

***Local relevance.*** Without the skills to use the technology, and the specific goal the technology is supposed to achieve, ICT applications across the country can quickly become mere public relations exercises with little local relevance or content. This can potentially work against any aims NGOs, the government, or international organisations may actually have, to say nothing of the communities involved.

***Lack of control.*** Far from enabling greater self-reliance, ICT can create greater dependence. If the technology is alien, if it lacks local content, if few know how to actually use it, local communities will become extremely reliant on intermediaries to use the technology for them. If those intermediaries are not aware of prevailing local conditions, or if they have little idea of what the target community requires, they will serve little function. Truly, new technologies require people to adapt to gain all the attendant benefits, but the technology itself must, in most cases, adapt even more. Intermediaries can provide significant assistance, however only if they are appraised of local conditions, have close contacts, and seek to tailor ICT uses to local needs and concerns.

***Too much information, not enough content.*** In fact, ICT can often provide the user with too much information, very little of which they actually need or will ever use. Relevant data is needed, not information overload, or inaccurate, out of date or incomplete data. This will only contribute to problems rather than solve them. This means that computers or other ICT can be installed in rural localities, but if the information net, perhaps up-to-date crop prices, perhaps on-line licensing procedures, are not in place, their impact will be insignificant.

***Failure should not be anathema.*** If a project or policy fails, it should not be hushed up or quietly swept under the carpet to spare the blushes of NGOs, international organisations or the government. Rather it needs to be scrutinised all the more closely to clearly determine the problems and causes of the breakdown so that the same mistakes are not repeated. This is pivotal for learning and adaptation to take place for future formulation and implementation of policies and projects. Even if a project is successful, an eye must be kept open for possible negative impacts or spillover effects, such as job losses, or increased centralised control.

Most of these points relate to a lack of strategic thinking about applying ICT for development goals. Strategic thinking means identifying and knowing what can be done in the short-term and the long-term and adjusting the priorities accordingly. It also means having viable and feasible tactics to achieve clearly delineated goals: what is needed to

*ICT is a tool for development, not development itself*

make those goals a reality, who can help with them, what are the possible obstacles, how can we overcome them, what is our exit strategy?

Key for the process is having a clear vision of where we want to go, while also remaining adaptable and flexible, for what works in one place may not work in another. Above all, we must remember that ICT is not meant to be a substitute for good governance or good teachers, but merely provides new avenues that, taken together with traditional methods of face-to-face communication, can build upon and enhance the entire process. They must remain firmly fixed as a complement, not an end in itself, not a panacea.

*A FINAL NOTE FOR THE FUTURE*

Given the poverty in Tajikistan, budget constraints, and the lack of knowledge of ICT, the need for a clearly formulated strategy is all the more necessary. The critical issue is defining right approaches to ensure consensus over the strategy among local stakeholders and to make it realistic rather than ambitious. Improving and expanding phone lines as a first step can have greater impact than aiming for computerisation of schools nationwide. Involvement of local authorities and populations in policy formulation and implementation is just as important as consultative roundtables with representation from the government and international experts. The analysis of this report shows that education is key for overcoming unfamiliarity, expanding human resources in the country, and raising awareness about the possibilities of new technology.

We should not overestimate the applications of ICT for development, but a careful policy response predicated on broad-based consensus among the people most directly concerned, the citizens of Tajikistan, can bring potential, long lasting benefits as the 21st century unfolds.

Iskanderkul Lake

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# SUPPLEMENTARY TABLES

## Human Development Index

| | Regions | Year | |
|---|---|---|---|
| Life expectancy at birth* | Tajikistan average | 2000 | 67.6 |
| Adult literacy rate (%, 15 –24 years old) | | 2000 | 99.8 |
| Literacy index* | | 2000 | 0.870 |
| Term of education (secondary level) | | 2001 | 9.5 |
| Knowledge index* | | 2000 | 0.88 |
| GDP per capita (PPP USD)* | | 2000 | 1,152 |
| Adjusted GDP per capita (USD) | | 2001 | 168.1 |
| Human Development Index* | | 2000 | 0.667 |

*Sources: State Statistical Committee, *UNDP*

## Profile of Human Development

| | Regions | Year | |
|---|---|---|---|
| Maternal mortality rate (per 100,000 live births) | Tajikistan average | 2001 | 46.6 |
| | Dushanbe | 2001 | 47.6 |
| | SO | 2001 | 46.3 |
| | KHO | 2001 | 39.7 |
| | Gorno-Badakhshan | 2001 | 111.6 |
| | RRS | 2001 | 53.8 |
| Population per doctor | Tajikistan average | 2001 | 471 |
| | Dushanbe | 2001 | 130 |
| | SO | 2001 | 416 |
| | KHO | 2001 | 952 |
| | Gorno-Badakhshan | 2001 | 520 |
| | RRS | 2001 | 878 |
| Scientists (per 1000 people) | Tajikistan | 2001 | 0.2 |
| Number of enrolled for all the levels (% age 6-23) | Tajikistan average | 2001 | 61.1 |
| | Dushanbe | 2001 | 79.7 |
| | SO | 2001 | 62.6 |
| | KHO | 2001 | 58.8 |
| | Gorno-Badakhshan | 2001 | 63.5 |
| | RRS | 2001 | 55.4 |
| Total education expenditure (% of public expenditures) | | 2001 | 16.0 |
| Total health expenditure (% of public expenditures) | | 2001 | 6.4 |
| Tertiary full time equivalent gross enrolment ratio (thousand) | | 2001 | 20.1 |
| Female (%) of totally enrolled | | 2001 | 27 |
| Newspapers (copies per 100 people per year) | | 2001 | 112.4 |
| Access to televisions (%) | | 2000 | 85 |

*Source: State Statistical Committee, Ministry of Communications, Centre for Medical Statistics*

## Profile of Human Distress

| | Year | |
|---|---|---|
| Unemployment rate (%) total | 2002 | 2.5 |
| Youth (15-24)) of unemployed by 2002 census (thousand) | 2000 | 126.8 |
| Female wages (as % of male wages) | 2001 | 52.5 |
| Average monthly rate of inflation (%) | 2001 | 1.0 |
| Injuries from road accidents (per 100,000 people) | 2001 | 9 |
| Intentional homicides (per 100,000 people) | 2001 | 4.5 |
| Reported rapes (per 100,000 women age 15-59) | 2001 | 4.1 |
| Sulphur and nitrogen emissions (kg $NO_2$, $SO_2$ a year) | 2000 | 0.4 |

*Source: State Statistical Committee*

## Female-Male Gaps (female as a percentage of males)

| | Year | |
|---|---|---|
| Life expectancy | 1999 | 107.1 |
| Population | 2002 | 99.5 |
| Years of schooling | 2001 | 10.4 |
| Secondary enrolment | 2001 | 86.4 |
| Completed secondary schools | 2001 | 58.1 |
| University full-time equivalent enrolment | 2001 | 37.5 |
| Labour force, 2000 census data | 2000 | 82.4 |
| Registered unemployment | 2001 | 112.1 |
| Wages | 2001 | 52.5 |

*Source: State Statistical Committee*

## Status of Women

| | Regions | Year | |
|---|---|---|---|
| Life expectancy at birth (years) | Tajikistan average | 1999 | 70.8 |
| Average age at first marriage (years) | Tajikistan average | 1999 | 21.47 |
| Maternal mortality rate (per 100,000 births) | Tajikistan average | 2001 | 49.9 |
| Secondary and special net enrolment ratio (%) | | 2001 | 47.9 |
| Secondary school graduates (% of females) | | 2001 | 36.7 |
| Tertiary full-time gross enrolment ratio (%) | | 2001 | 37.3 |
| Women in labour force (% of total) | Tajikistan average | 2000 | 45.2 |
| | Dushanbe | 2000 | 39.7 |
| | SO | 2000 | 44.8 |
| | KHO | 2000 | 46.4 |
| | Gorno-Badakhshan | 2000 | 46.4 |
| | RRS | 2000 | 45.3 |
| Administrators and managers in the Government (% of female) | | 1999 | 19.0 |
| Parliament (% of seats occupied by women) | | 2001 | 13.3 |

*Sources: State Statistical Committee, Centre for Medical Statistics*

## Health profile

| | Regions | Year | |
|---|---|---|---|
| Deaths from circulatory diseases (% of total) | | 2001 | 44 |
| Death from malignant cancer (% of total) | Tajikistan average | 2001 | 6.95 |
| Public expenditures on health (% of total) | | 2001 | 6.4 |
| Public expenditures on health (% of GDP) | | 2001 | 1.0 |

*Source: State Statistical Committee*

## Unemployment

| | Year | |
|---|---|---|
| Officially unemployed persons (thousands) | 2002 | 42.9 |
| Unemployment rate (% of registered unemployment) | 2002 | 2.5 |
| Female (thousands) | 2002 | 22.7 |
| Youth (aged 15-24, thousands) | 2002 | 15.7 |
| % of long term unemployment (more than 6 months) | 2002 | 11.0 |
| % of long term unemployment (more than 12 months) | 2002 | 5.4 |

*Source: State Statistical Committee*

## Demographic Profile

| | Regions | | Year | |
|---|---|---|---|---|
| Estimated population (millions) of 1/01 | Tajikistan | | 1970 | 2.9 |
| | | | 2000 | 6.1 |
| | | | 2002 | 6.3 |
| | Dushanbe | | 1970 | 0.4 |
| | | | 2000 | 0.6 |
| | | | 2002 | 0.6 |
| | RRS | | 1970 | 0.6 |
| | | | 2000 | 1.3 |
| | | | 2002 | 1.4 |
| | SO | | 1970 | 0.9 |
| | | | 2000 | 1.9 |
| | | | 2002 | 1.9 |
| | KHO | | 1970 | 0.9 |
| | | | 2000 | 2.1 |
| | | | 2002 | 2.2 |
| | Gorno-Badakhshan | | 1970 | 0.1 |
| | | | 2000 | 0.2 |
| | | | 2002 | 0.2 |
| Annual population growth rate (%) | Tajikistan | 1989 | 1995 | 1.6 |
| | | 1996 | 2000 | 1.8 |
| | Dushanbe | 1989 | 1995 | 2.2 |
| | | 1996 | 2000 | 2.8 |
| | RRS | 1989 | 1995 | 2.0 |
| | | 1996 | 2000 | 1.8 |
| | SO | 1989 | 1995 | 1.8 |
| | | 1996 | 2000 | 1.5 |
| | KHO | 1989 | 1995 | 2.3 |
| | | 1996 | 2000 | 2.0 |
| | GBAO | 1989 | 1995 | 2.5 |
| | | 1996 | 2000 | 1.7 |
| Total fertility rate | | | 1997 | 3.7 |
| Contraceptive prevalence rate (%) | | | 2000 | 30 |
| Population ratio rate 60 and over | Tajikistan average | | 2002 | 5.6 |
| | Dushanbe | | 2002 | 5.4 |
| | RRS | | 2002 | 5.3 |
| | SO | | 2002 | 6.5 |
| | KHO | | 2002 | 5.1 |
| | Gorno-Badakhshan | | 2002 | 6.9 |
| Life expectancy at age 60 (years) | | | 1999 | 18.7 |
| | Male | | 1999 | 17.6 |
| | Female | | 1999 | 19.7 |

*Source: State Statistical Committee*

## Educational Profile

| | Regions | Year | |
|---|---|---|---|
| Enrolment ratio for all levels (% age 6-23) | Tajikistan average | 2001 | 61.1 |
| | Dushanbe | 2001 | 79.7 |
| | RRS | 2001 | 55.4 |
| | SO | 2001 | 62.6 |
| | KHO | 2001 | 58.8 |
| | Gorno-Badakhshan | 2001 | 63.5 |
| Completed secondary school (thousands) | | 2001 | 61.1 |
| University full-time enrolment ratio (thousands) | | 2001 | 20.7 |
| Tertiary natural, applied science enrolment (% of total) | | 2001 | 10.5 |
| Total education expenditures (% of public expenditures) | | 2001 | 16.0 |
| Public expenditures on education (as % of GDP) | | 2001 | 2.4 |

*Source: State Statistical Committee*

## Human Capital Formation

| | Year | |
|---|---|---|
| Mean years of schooling (secondary level) | 2000 | 9.5 |
| Female | 2000 | 9 |
| Male | 2000 | 10 |
| Scientists (math and physics) (per 1000 people) | 2001 | 0.2 |
| Expenditure on research and development (% of GDP) | 2001 | 0,08 |
| Upper secondary graduates per 10,000 population | 2001 | 132.4 |
| Tertiary graduates per 10,000 population | 2001 | 19.1 |

*Source: State Statistical Committee*

## Employment

| | Regions | Year | |
|---|---|---|---|
| Labour force (% of total population) | Tajikistan average | 2000 | 63.2 |
| | Dushanbe | 2000 | 43.5 |
| | RRS | 2000 | 64.6 |
| | SO | 2000 | 62.0 |
| | KHO | 2000 | 68.6 |
| | Gorno-Badakhshan | 2000 | 71.0 |
| Earnings per employee annual growth rate (%) | | 2000 | 29.6 |
| **Earnings disparity (upper-lower half ratio)** | | 1999 | 15 t |
| Weekly hours of work (per person in manufacturing) | | 2000 | 40 |

*Source: State Statistical Committee*

## Trends in Economic Performance

| | Year | |
|---|---|---|
| Total GDP (US$ mln) | 2001 | 1.058.8 |
| Annual growth rate (%) | 2001 | 10.2 |
| GDP per capita annual (US$) | 2001 | 167.0 |
| Average monthly rate of inflation (%) | 2001 | 1.0 |
| Exports as % of GDP (% of annual growth rate) | 2001 | -16.9 |
| Tax revenue as % of GDP (% of annual growth rate) | 2001 | 14.0 |
| Direct taxes (as % of total taxes) | 2001 | 17.8 |
| Overall budget surplus/ deficit (as % of GDP) | 2001 | +0.13 |

*Source: State Statistical Committee*

## Natural Resources Balance Sheet

| | Regions | Year | |
|---|---|---|---|
| Land area (thousand of km $^2$) | Tajikistan average | 2001 | 143.1 |
| | Dushanbe | 2001 | 0.1 |
| | RRS | 2001 | 28.6 |
| | SO | 2001 | 25.4 |
| | KHO | 2001 | 24.8 |
| | Gorno-Badakhshan | 2001 | 64.2 |
| Population density (people per km $^2$) | Tajikistan average | 2001 | 44.5 |
| | Dushanbe | 2001 | 4310.9 |
| | RRS | 2001 | 49.0 |
| | SO | 2001 | 76.0 |
| | KHO | 2001 | 90.5 |
| | Gorno-Badakhshan | 2001 | 3.2 |
| Arable land and permanent cropland (% of land area) | | 2001 | 5.2 |
| Permanent grass lands (as % of land area) | | | - |
| Forests and wooded land (as % of land area) | | 2001 | 2.1 |
| Irrigated land (as % of land area) | | 2001 | 68.6 |
| Renewable water resources per capita (1000 m$^3$ a year) | | 1999 | 90.5 |
| Annual freshwater withdrawals (% of total) | | 1999 | 155.2 |
| m$^3$ per capita annual | | 1999 | 63.1 |

*Source: State Statistical Committee*

## National Income Accounts

| | Year | |
|---|---|---|
| Total GDP (US$ mln) | 2001 | 1.058.8 |
| Agricultural production (as % of GDP) | 2001 | 27.0 |
| Industrial production (as % of GDP) | 2001 | 21.8 |
| Services (as % of GDP) | 2001 | 37.9 |
| Consumption (as % of GDP) | 2001 | 78.9 |
| Private (as % of GDP) | 2001 | 69.8 |
| Government (as % of GDP) | 2001 | 8.2 |
| Gross domestic investments (as % of GDP) | 2001 | 11.0 |
| Tax revenue (as % of GDP) | 2001 | 14,0 |
| Central Government expenditures (as % of GDP) | 2001 | 15.0 |
| Exports (as % of GDP) | 2001 | 61.5 |
| With services | 2001 | 67.8 |
| Imports (as % of GDP) | 2001 | 64.9 |
| With services | 2001 | 69.8 |

*Source: State Statistical Committee*

## Pollution

| | Year | |
|---|---|---|
| Sulphur and nitrogen emissions (kg per capita) | 2000 | 0.4 |
| Pesticides consumption (kg per ha) | 2001 | 2-3 |
| Air pollution (kg per capita) | 2000 | 4.3 |
| Water contamination (kg per capita): | | |
| weight particles | 2000 | 11.5 |
| nitrogen amonium | | 0.14 |

*Source: State Statistical Committee, FAO, Ministry of Natural Protection*

## Wealth, Poverty and Social Investments

| | Year | |
|---|---|---|
| Real GDP per capita (US$) | 2001 | 167.0 |
| Share of industrial GDP (%) | 2001 | 21.8 |
| Social security expenditure (as % of GDP) | 2001 | 2.6 |
| Total education expenditure (% of public expenditures) | 2001 | 16.0 |
| Total health expenditure (% of public expenditures) | 2001 | 6.4 |

*Sources: State Statistical Committee*

## Communication Profile

| | Year | |
|---|---|---|
| Radios (per 100 people) | 2001 | 3.3 |
| Televisions (per 100 people) | 2001 | 3.4 |
| Annual theatre attendance (thousands) | 2001 | 429 |
| Annual museum attendance (per 1000 people) | 2001 | 318 |
| Registered library users (thousands) | 2001 | 817 |
| Newspapers (copies per 100 people a day) | 2001 | 112.4 |
| Book titles published (per 100,000 people) | 2001 | 6,9 |
| Letters posted and wires (per capita) | 2001 | 0.1 |
| Telephones (per 100 people) | 2001 | 3.8 |
| International telephone calls (# of calls per capita) | 2001 | 1.1 |
| Motor vehicle (per 100 families) | 2001 | 2.2 |
| Motorcycles and bikes (per 100 people) | 2001 | 0.6 |
| E-mail users | 2001 | 20.000 |

*Sources: State Statistical Committee, GIPI*

## Energy Consumption

| | Year | |
|---|---|---|
| Total consumption (bln kw/h) | 2001 | 15,73 |
| Consumption per capita (kw/h) | 2001 | 2,492 |

*Source: State Statistical Committee*

## Urbanisation

| | Regions | Year | |
|---|---|---|---|
| Urban population (% of total), 1.01 | Tajikistan average | 2002 | 26.5 |
| | Dushanbe | | 100 |
| | RRS | | 12.9 |
| | SO | | 26.2 |
| | KHO | | 17.3 |
| | Gorno-Badakhshan | | 13.3 |
| Urban population annual growth (%) | | | 1.8 |
| Population in the biggest cities (%) | Dushanbe | 2002 | 34.9 |
| | Khojand | | 8.8 |
| | Kulab | | 4.8 |
| Major cities with higher population density | Dushanbe | 2002 | 4310.9 |
| | Khojand | 2002 | |
| | Kulab | 2002 | |

*Source: State Statistical Committee*

## 1. Technology Achievement Index (TAI) in 2001

Technology creation

| | | |
|---|---|---|
| Patents granted to residents | Per million people | - |
| Receipts of royalties and license fee | USD per 1000 people | - |

Diffusions of recent innovations

| | | |
|---|---|---|
| Internet hosts | Per 1000 people | 0.04 |
| High and medium technology exports | % Of the total goods exports | - |

Diffusions of old technologies

| | | |
|---|---|---|
| Telephones (mainline and cellular, per 1000 people) | Per 1000 people | 28.4 |
| Electricity consumption | Kilowatt-hours per capita, 1998 | 2491.9 |

Human skills

| | | |
|---|---|---|
| Mean years of schooling | Age 15 and above | 9.5 |
| Gross tertiary science enrolment ratio (%) (natural science) | | - |

## 2. Investment in technology creation

| | | |
|---|---|---|
| Mean years of schooling | Age 15 and above | 9.5 |
| R&D expenditure | % GDP | 0.1 |
| Scientists and engineers in R&D | Per 100,000 people | 0.08 |

## 3. Diffusion of technology: Agriculture and manufacturing

| | | |
|---|---|---|
| Fertiliser consumption: | | |
| Organic | Kg per ha | 4500 |
| Mineral | | 107 |
| Tractors in use | Per ha | 0.02 |
| Low tech exports | (% of total export) | - |
| Medium tech exports | (% of total export) | - |
| High tech exports | (% of total export) | - |

## 4. Diffusion of technology (ICT)

| | | |
|---|---|---|
| Telephone mainlines | Per 1000 people | 28.0 |
| Cellular mobile subscribers | Per 1000 people | 0,4 |
| Internet hosts | Per 1000 people | 0.04 |
| Cost of three –minute local call | PPP USD | 0.0051 |
| Waiting list for mainlines | Per 1000 people | 0.9 |

*Sources: State Statistical Committee*

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