

# **Using ICTs for Poverty Reduction and Environmental Protection in Kenya**

## **The “M-vironment” Approach**

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# Using ICTs for Poverty Reduction and Environmental Protection in Kenya

## The “M-vironment” Approach

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### Abstract

Mungai recommends a more significant consideration of environmental issues in the regional and national poverty reduction and ICT discussions in Kenya. Specifically, he recommends addressing poverty reduction as proposed in the MDGs and resolutions of the WSSD. Opportunities for quick gains for Kenya lie in e-environment and e-agriculture initiatives. An illustration of a potentially beneficial application of new technologies is found in mobile telephony. The author presents the “M-vironment Framework,” a mobile telephony platform which can help enable financial sustainability for environmental protection efforts; facilitate awareness-raising and exchange of information; strengthen early warning systems; raise environmental consciousness among ICT solutions providers; create employment; and protect livelihoods.

This paper is dedicated to my son, Jesse—the first of the next generation that will, as a result of aggressive national m-vironment initiatives, inherit a more sustainable world.



“Nations are like the traditional African three-legged stool. When the three legs of peace, democracy and equitable sharing of environmental resources are firm, there is a seat for sustainable, productive development to take place. Wobbly legs, make for wobbly nations.”<sup>1</sup>

*Professor Wangari Maathai, Kenya’s Environment Assistant  
Minister and winner of the Nobel Peace Prize in 2004*



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<sup>1</sup> Prof. Wangari Maathai, during a visit to the Women’s Edge Coalition, Washington DC, USA.  
<http://www.womensedge.org/pages/newsandevents/news.jsp?id=402>

# 1

## Introduction

In 2005, the United Nations organized separate global summits to set the agenda and review the status of the emerging information society and sustainable development issues. The two events were The 2005 World Summit in New York and the World Summit on the Information Society (WSIS) in Tunisia. According to discussions, it has become apparent that the sustainable development and information society communities continue to work in isolation from each other leading to a lack of policy coherence at the national level. There is a need to ensure that the separation of information society issues and sustainable development concerns does not result in incoherent policy approaches.

This paper seeks to identify the policy implications of the development of the information society on the attainment of sustainable development goals in Kenya. The paper is premised on the belief that “sustainable development can best be advanced in the Information Society when ICT-related efforts and programs are fully integrated in national and regional development strategies”<sup>2</sup> and informed by existing research on the linkages between sustainable development and the information society. In relation to national development priorities in Kenya, the paper seeks to clarify the implications of the Millennium Development Goal (MDG) that aims to “make available the benefits of new technologies, especially information and communications technologies”<sup>3</sup> and forms the basis for the new ICTs for development approach anchored on MDG-based poverty reduction strategies.

A review of literature on the national sustainable development priorities in relation to the global trends led to a focus on the potential implications of the information society on poverty and environmental protection in Kenya. In appreciation of the need to include environmental protection as a factor in the design of solutions, products and lifestyles,<sup>4</sup> this paper explores the opportunities for inclusion of this principle in future information society policy in Kenya. To achieve this, the author further reviews recommendations in the WSIS Declaration of Principles on E-environment<sup>5</sup> and E-agriculture as well as national case studies that provide a guide for policy recommendations.

Apart from contributing to the global, national and sectoral IS and SD policy debates, the paper seeks to specifically recommend a more significant consideration of environmental issues in the regional and national Poverty Reduction and ICT discussions facilitated by the International Development Research Centre (IDRC) and partner organizations.

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2 ITU 2004, *Helping the World Communicate*, World Summit on the Information Society (WSIS), Geneva, 2004.

3 UN, MDG 8, Target 17, *Millennium Declaration*, 2000, United Nations, New York, USA.

4 See: Shauer, Thomas, Proceedings of Southern E-Forum, <http://lists.iisd.ca:81/read/?forum=issd>

5 ITU 2004, WSIS Declaration of Principles, *Helping the World Communicate*, World Summit on the Information Society (WSIS), Geneva, 2004.

## 2

### Organization of the Paper

The paper begins by discussing the information society and sustainable development policy situation in Kenya. After reviewing the ICT policy development process since the 1980s, the paper outlines the development of sustainable development policies since the 1992 United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil. It goes further to detail the national position at the World Summit on Sustainable Development in 2002. The review of policy development is followed by suggestions on ways to address the challenges in prioritizing environmental protection and ICT issues.

Based on the *Millennium Development Goals Report for Kenya 2003*, a discussion of the current status in fulfilment of the MDGs is presented. Case studies of projects that use SMS, satellites and geographical information systems are used to demonstrate the linkages between the information society and sustainable development in Kenya.

Analysis of the case studies forms the basis for the emerging *m-vironment* approach—a framework for environmental sustainability initiatives using mobile telephony—to propose implementation of an aggressive environmental sustainability initiative using mobile phones, while detailing how it advances IS and SD linkages.

The paper concludes with a discussion of opportunities that exist for better linkages between IS and SD within sectoral and overarching policies.

Finally, several policy changes are recommended, including the implementation of the national *m-vironment initiative* and increased interaction between IS and SD practitioners.

## 3 Methodology

This paper was developed after a desk review of literature, interviews with national advisors and stakeholders as well as material gathered during information society and sustainable development events.

The first phase of the study involved a review of literature on global sustainable development and information society issues. The separation of issues at the global level became apparent and the various priorities for different countries were revealed. The literature review then focused on national priorities of sustainable development and information society. This involved an exploration of the history of IS and SD policy development in Kenya.

The next phase of the study involved identifying the national priority issues according to stakeholders. The priority issues for Kenya were based on feedback received from about 30 respondents interviewed by the author and via e-mail interviews on IS and SD issues. Respondents included scholars, researchers, business people, students, heads of NGOs in Kenya and representatives of the National Environment Management Authority (NEMA). The feedback was used to develop an overall picture of IS and SD priorities. To build the case for SD and IS interplay in Kenya, the study also relied on comments submitted by participants in the *KICTANet Online Discussions on the Draft ICT Policy*. Several ideas were presented and weekly summaries circulated. Discussions were held with National Advisors at different stages of the project—during events and through the position papers they made available to clarify their perceptions.

## Country Overview for Kenya

Kenya has a population of over 32 million people living on a total surface area of about 587,000 km<sup>2</sup> out of which 576,000 km<sup>2</sup> is land area and 11,000 km<sup>2</sup> is water. This eastern African country has been undergoing economic, social and political transition with positive indicators in many of the sectors. The changes are propelled by the political transition that began after the change of government in December 2002—10 years after the introduction of multi-party democracy—that saw the exit from power of the Kenya African National Union (KANU) that had ruled the nation for 40 years. The ascent to power of the National Rainbow Coalition (NARC) led to unprecedented optimism about the future of the nation leading to Kenyans being rated as the most<sup>6</sup> optimistic people in the world in 2003. The result has been an expanded democratic space with Kenyans enjoying freedoms such as political expression and multistakeholder consultations with the government.<sup>7</sup> The country is also in the process of constitutional review, which is scheduled to result in the adoption of a new constitution in December 2005 and has contributed to the open multistakeholder discussions on issues of governance and politics.

Economic indicators have also been positive with the country achieving record economic growth in real Gross Domestic Product (GDP) that expanded by 4.3 per cent in 2004 compared to a growth of 2.8 per cent in 2003.<sup>8</sup> The tourism and hotels sector expanded by 15.1 per cent while the communications sector grew by 10.1 per cent. It is estimated that the country generated about 500,000 jobs annually in 2003 and 2004. The rate of growth in the agricultural sector, which contributes 24 per cent of the GDP, declined to 1.4 per cent in 2004 from the more significant 2.6 per cent growth in 2003. An indicator of confidence in Kenya's economic progress is demonstrated in the *Kenya Business Leaders Confidence Index for 2005* that indicated that 73 per cent of business leaders are confident that the economy would grow by 5.3 per cent.<sup>9</sup>

Several significant challenges exist for the majority of Kenya's 32 million people. The challenges may be seen in the fact that over 57 per cent of the population

6 Republic of Kenya 2005, *Kenya's Experience With the Peer Review Process Under Partnership for African Development and Its Relevance for Poverty Reduction*, Speech by Prof. Anyang' Nyong'o to the Kenya Conference of Catholic Bishops, St Thomas Aquinas Seminary, Lang'ata, May 6, 2005. [http://www.planning.go.ke/Speeches\\_Min\\_Catholic\\_Bishops\\_on\\_APRM\\_6\\_May\\_2005.htm](http://www.planning.go.ke/Speeches_Min_Catholic_Bishops_on_APRM_6_May_2005.htm)

7 Munyua, Alice Wanjira 2005, *New Generation of Policy Development: The Case of Multi-stakeholder ICT Policy Process in Kenya*, CATIA (Catalysing Access to ICTs in Africa), Association for Progressive Communications, Nairobi, Kenya. <http://www.catia.ws/Documents/New%20Generation%20of%20Policy%20Development%20in%20Kenya%20Version%202.doc>

8 Nyong'o, Hon. Prof. Peter Anyang', *The Economic Survey 2005*, Ministry of Planning and National Development, Republic of Kenya, May 25, 2005.

9 Nation Media Group 2005, New Survey Shows CEOs Hopeful About Economy, *Daily Nation*, September 14, 2005, Nairobi, Kenya.

lives below the national poverty line,<sup>10</sup> an HIV prevalence level of up to seven per cent<sup>11</sup> of the population, and a life expectancy at birth of 44.6<sup>12</sup> years. Other issues include landlessness that has led to conflict over land, official corruption and decreasing support by development partners. The tourism industry has also been adversely affected by travel advisories imposed on Kenya by the United States after two terrorism-related attacks on the country since 1998.

On environmental issues, the country is experiencing a strain on resources; for example, only 17 per cent of the land is arable, yet 64 per cent of the economically active population depends on agriculture. Further, over 75 per cent of Kenyans live in rural areas, yet 57 per cent of the population lacks sustainable access to an improved water source. Due to landlessness and the need for fuel, the depletion of forest cover has continued unabated with traditional fuel (timber) making up 70.6 per cent<sup>13</sup> of the total energy requirements. The situation is aggravated by the fact that forests cover only two per cent of the land in Kenya,<sup>14</sup> most of which is made up of indigenous forest.

With the growth in cities, pollution is a great concern with 62 per cent<sup>15</sup> of pollution originating from urban domestic waste. This trend needs to be reviewed in consideration of the high poverty levels in urban centres. Up to 70 per cent<sup>16</sup> of the people in Nairobi live in slums that lack waste management systems and are, in some cases, located next to the city's dumping sites.

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10 Republic of Kenya 2003, *State of the Environment Report for Kenya 2003*, National Environmental Management Authority, Kenya. <http://www.NEMA.go.ke>

11 Nyong'o, Hon. Prof. Peter Anyang, *The Economic Survey 2005*, Ministry of Planning and National Development, Republic of Kenya, May 25, 2005.

12 UNDP 2004, *Human Development Report for Kenya*, UNDP, Nairobi, Kenya.

13 UNDP 2004, Energy and environment Indicators, Traditional fuel consumption (% of total energy requirements), 2001, *Human Development Report*, NY, USA. [http://hdr.undp.org/statistics/data/cty/cty\\_f\\_KEN.html](http://hdr.undp.org/statistics/data/cty/cty_f_KEN.html)

14 UNDP 2003.

15 NEMA 2003.

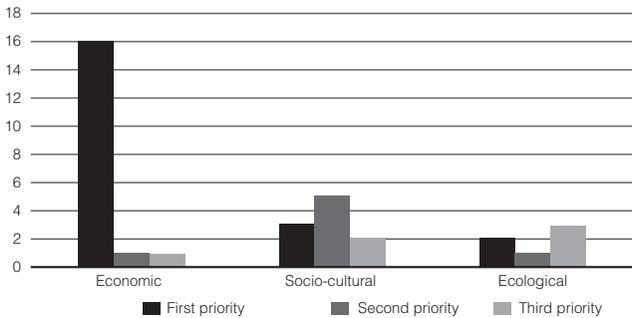
16 Government of Kenya and the United Nations Kenya Country Team (2003), *Millennium Development Goals Progress Report for Kenya*, Ministry of Planning and National Development, April 2003, Nairobi, Kenya.

## 5

### Poverty, ICTs and the Environment: The Links

An analysis of literature and feedback from stakeholders resulted in a focus on the interplay between poverty, ICTs and environmental protection in Kenya. It sought to identify innovative approaches in the area of ICTs for environmental protection and poverty reduction. In relation to the MDG framework, the poverty reduction and environmental protection study provides an ICT link between Goal 1 on elimination of extreme poverty and Goal 7 on environmental sustainability.

**Figure 1: SD priorities for Kenya based on 26 respondents interviewed 06/2005**



The ICT, poverty reduction and environmental protection study was verified by responses from 26 of 40 stakeholders interviewed via e-mail. Feedback received from 26 respondents (see Figure 1) familiar with Kenya’s ICT and sustainable development efforts indicates that economic issues should remain the principal concern for policy-makers. Social cultural dimensions such as political participation, youth and gender issues came second while only two respondents felt that the environment should be the first priority. Only three respondents explicitly stated that there should be interplay of the three sustainable development pillars. Some respondents only mentioned one area of priority—poverty reduction—with several urging that the adoption of ICTs should be done cautiously. According to the respondents, the main link between environmental protection and poverty reduction was in economic activities such as agriculture and tourism. Although tourism may be viewed as having minimal destructive impact on the environment, it has great implications on increased energy consumption and global warming especially when tourists travel by air. In a country where woodfuel makes up 70.6 per cent of energy consumption with only two per cent forest cover, it is imperative that environmental protection be prioritized in all development policies while encouraging Kenyans to adopt economic activities that have minimal adverse effects on the environment.

As evidenced in the above responses, the “environment tends to come late and superficially into the agenda of critical development initiatives due to its low priority in development contexts.”<sup>17</sup> On the other hand, a key conclusion of the *World Employment Report 2004: Life at Work in the Information Society*<sup>18</sup> is that the ability of ICTs to reduce poverty and spur development will be determined by their impact on employment, as well as economic growth. Therefore, to elevate environmental issues in national IS and SD policy, the economic gains must be emphasized especially at the grassroots level.

A review of IS policy in Kenya<sup>19</sup> reveals an unfortunate case of a country dependent on natural resources yet without clear policy guidelines and strategies on how ICTs can facilitate the protection of the environment. This is despite being a signatory to the Millennium Declaration that, among other goals, seeks to integrate the principles of sustainable development into country policies and programs while reversing the loss of environmental resources.<sup>20</sup>

The prioritization of poverty reduction can be explained by a review of the poverty dynamics in Kenya. More than half of the population lives below the national poverty line with a high dependency on rain-fed agriculture. This has resulted in excessive pressure on natural resources, which at times has led to conflict between communities over water and grazing grounds. Only about 1.8 per cent of the country is covered by water. Efforts to reduce poverty are usually inhibited by adverse climatic conditions such as drought and floods that result in low economic productivity. Poverty reduction is, therefore, the main national sustainable development priority.<sup>21</sup> Four or five times in a decade, drought and/or heavy rainfall are likely to cause increased morbidity and mortality rates<sup>22</sup> among people and livestock in the arid and semi-arid lands.

Inequality in the distribution of the nation’s scarce natural resources is a problem as significant as the high levels of poverty as it breeds counterproductive social tension and in some cases, conflict over resources. The socio-political stability of the country is therefore dependent on sustainable use and distribution of resources and the protection of the environment.

The National Environmental Management Authority admits that the relationship between poverty and environment is complex.<sup>23</sup> The poor are often the victims

17 Statement From the African Civil Society Forum to the 23rd Session of UNEP Governing Council//Global Ministerial Environment, 4. (d) *International Environmental Governance (IEG)*.

18 “World Employment Report 2004: Life at Work in the Information Society.”

19 Government of Kenya 2004, Draft National Information and Communication Technology (ICT) Policy, Ministry of Information and Communications, Kenya. <http://www.information.go.ke>

20 Goal 7 (MDGs): Ensure environmental sustainability: United Nations 2000, *Millennium Development Goals*, New York. <http://www.millenniumgoals.org>

21 Government of Kenya 2002, *National Sustainable Development Priorities*, National Assessment Report to the WSSD, Ministry of Environment, Natural Resources and Wildlife, Nairobi.

22 UNDP-Kenya 2002, *Crisis Prevention & Recovery in Kenya*, UNDP Disaster Reduction Unit. <http://www.undp.org/bcpr/disred/index.htm>

23 Government of Kenya 2003, *State of the Environment Report for Kenya 2003*, National Environmental Management Authority, Kenya. <http://www.NEMA.go.ke>

of environmental degradation caused by other members of the society. At the same time, the poor often engage in livelihood activities that result in environmental degradation. Poverty leads to overuse and destruction of natural resources where short-term development goals are pursued at the expense of long-term environmental sustainability. Policy-makers cannot, therefore, ignore the interplay between environmental protection and poverty reduction. Several initiatives such as the Lake Victoria Environmental Management Project, *Eco-Schools* by Kenya Organization for Environmental Education (KOE) and the work of the UNEP Poverty and Environment Unit demonstrate this interplay.

In exploring the links between poverty and environment in Kenya, the story of Kieran Cooke<sup>24</sup> in Maasai provides an enlightening anecdote. According to Cooke, “The Maasai have come to know all about climate change. ‘Normally we have two rainfalls a year,’” says Wilson, “‘the long rains from March to May and the short rains from October to November. This year the long rains failed and the short rains have come late—it’s the worst drought we’ve ever had.’” Other anecdotes include the displacement of 60,000 people by floods in Budalangi division of Kenya’s Busia District in 2003 as well as the loss of about 2,000 lives during the El Niño floods of 1997–1998,<sup>25</sup> which were disasters resulting from climate change and are direct causes of poverty. The impact of climate change, one of the main topics of the 2005 G8 Summit<sup>26</sup> in Gleneagles, Scotland is, therefore, felt beyond the developed nations that together contribute 47 per cent of global greenhouse gas emissions that have led to global warming. It is little wonder that the G8 has commissioned a study to look into Africa and climate change.

According to the WSIS Action Plan, *governments, in cooperation with other stakeholders, are encouraged to use and promote ICTs as an instrument for environmental protection<sup>27</sup> and the sustainable use of natural resources*. On the other hand, research by IDRC and others has shown that “there is a positive correlation between ICT<sup>28</sup> access and income levels.” The poverty, ICT and environmental protection linkage is, therefore, in line with a call to governments to “review economic production and growth models and make adjustments to existing strategies and tools that are inclusive of the environment and technology with an emphasis on poverty eradication.”<sup>29</sup>

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24 Cooke, Kieran 2004, “People are going hungry. Our cattle are dying. What can we do?,” World Report, *Environment Times*, UNEP/GRID-Arendal.

25 Maathai, Prof. Wangari and Grace Akumu 2004, in speeches during the workshop on Dialogue with East African Legislators on Climate Change and Sustainable Development Issues, Nairobi, Kenya. [http://www.sarpn.org.za/documents/d0000889/P985-CNA\\_Climate-Change\\_April2004.pdf](http://www.sarpn.org.za/documents/d0000889/P985-CNA_Climate-Change_April2004.pdf).

26 2005 G8 Summit in Gleneagles. <http://www.g8.gov.uk/>

27 ITU 2004, *Helping the World Communicate: WSIS Geneva, 10-12 December 2003*; Action line C7: ICT applications, Benefits for all, Action 20. E-environment (a): WSIS Plan of Action.

28 Adeya, Nyaki 2005, *Regional Workshop on ICTs and Poverty Reduction*, January 17–19, 2005, Nairobi. Kenya.

29 UNEP 2003, *Environment and Poverty: Outcomes from the Fourth Global Civil Society Forum*, Kenya, UNEP Headquarters, Nairobi, February 2003.

## 6

# The IS and SD Policy Situations in Kenya

## 6.1 Kenya's progress in the development of information society policies

The development of the information society in Kenya can be reviewed in terms of the development of ICTs, informatics, e-government or telecommunications reform policies, which have been actively pursued since the early 1980s. During that period, reforms have been influenced by private sector and civil society organizations<sup>30</sup> with significant efforts by the Computer Society of Kenya (CSK); Telecommunication Service Providers of Kenya (TESPOK); Africa Regional Centre for Computing (ARCC);<sup>31</sup> IT Standards Association (ITSA); Kenya Community Media Network (KCOMNET); Kenya Information Society (KIS); ABANTU for Development; Africa Technology Policy Studies Network (ATPS); Kenya ICT Policy Project; and, most recently, by a multisectoral consultative forum<sup>32</sup> known as the Kenya ICT Action Network<sup>33</sup> (KICTANet). UNECA's Africa Information Society Initiative (AISII); National Information and Communication Infrastructure (NICI); the COMESA Model ICT Policy; World Trade Organization agreements; ITU and UNCTAD resolutions; as well as the WSIS process are some of the regional and global factors that have influenced debate on ICT policy in Kenya over the years. A unique aspect was the year 2000 millennium bug scare that led to the Y2K Taskforce, supported by government.

The first Draft National Information Policy was developed in the 1980s with a Draft National Informatics Policy following suit in 1993. There were several reforms in the media sector in the 1990s that saw the licensing of commercial radio and television broadcasters. The reforms, however, remained incomplete because of the failure by government to create a framework for community broadcasting<sup>34</sup> and amend the Kenya Broadcasting Corporation (KBC) Act, which established the public broadcaster as a regulator and monopoly service provider.

One of the most significant developments in Kenya's IS policy was the telecommunications sector reform that culminated in the enactment of the Kenya

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30 Mureithi, Muriuki 2002, *Africa ICT Policy Monitor Project: Kenya*, Association of Progressive Communication (APC).

31 ARCC introduced the first Internet services in Kenya in the form of FidoNet before commercial ISPs were established.

32 Munyua, Alice Wanjira 2005, *New Generation of Policy Development: The Case of Multi-stakeholder ICT Policy Process in Kenya*, CATIA (Catalysing Access to ICTs in Africa), Association for Progressive Communications, Nairobi, Kenya.

33 Banks, Ms. Karen 2005, *The Priority Issues for Civil Society*, Civil Society Session, Tokyo Ubiquitous Network Conference, Association for Progressive Communications (APC), USA, May 2005.

34 Githaiga, G. 2000, *Rural Community Broadcasting and the Role of National Networks*, MISA, a presentation in Windhoek Namibia.

Communications Act in 1998. This new legal framework, informed by the World Bank Telecommunications Reform theories, sought to separate the regulatory, postal and telecommunications service provision functions of the then national service provider, the Kenya Post and Telecommunications Corporation (KPTC). As a result, the Communications Commission of Kenya (CCK) was established as a regulator while Telkom Kenya Limited and the Postal Corporation of Kenya (PCK) were set up as the telecommunications and postal service providers. The Act also established the National Communications Commission that was to play a policy advisory role within the communications ministry. A Communications Appeals Tribunal was also established to arbitrate any disputes in the industry.

The impact of the progressive Kenya Communications Act was limited by the Telecommunications and Postal Sector Policy (TPSP) of 1999, which restricted the commercialization of several telecommunications services and allocated Telkom Kenya a five-year exclusivity period for provision of services such as international calling, Internet backbone and telecommunications in the capital city. The policy set out a market structure that was to lead to the failed establishment of Regional Telecommunications Operators (RTOs) in rural areas and restricted mobile phone network services to only two providers. The latter provision was in conflict with the legal requirement that abolished monopolies and duopolies.<sup>35</sup> The market structure was revised in 2001 when the TPSP was changed to allow for the licensing of new players such as equipment re-sellers and courier service providers. The restrictive nature of the TPSPs did not, however, limit the explosive adoption of mobile telephony that resulted from the licensing of the second GSM network service provider in 2000. The competition between Safaricom Limited and Kencell Communications Limited (now Celtel Kenya Limited) provided most of the telecommunication benefits that Kenyans lacked when they depended on Telkom Kenya for inefficient provision of landlines. The mobile phone subscription has grown from 200,000 in 2000 to over 4.2 million in June 2005.<sup>36</sup> Since 2000, Safaricom Limited has registered six million subscriptions but only three million remained active by mid-September 2005. It is expected that the licensing of the third mobile network provider would result in increased access to ICTs and a more competitive and customer-conscious operating environment. However, the licensing process has remained controversial with the winner of the tender, Econet Wireless Kenya Limited, taking the government to court for cancellation of a licence already issued by the Communications Commission of Kenya.

Although there have been three different draft ICT policy documents since 2002,<sup>37</sup> there has been a demonstrated focus and growing trust in the ICT policy development process. The invitation of civil society and private sector to an open

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35 Section 5 (5), *Kenya Communications Act* (1998).

36 Wandera, Noel 2005, Battle for the Numbers: Cellphone companies' competition turns to quality products, *Financial Standard, The Standard*, Tuesday, July 5, 2005. <http://www.eastandard.net>

37 Government of Kenya, The First National Information and Communications Technology (ICT) Policy Conference, FINAL COMMUNIQUE, (March 23–28, 2003).

debate on ICT policy issues may have resulted from lessons learned in the development of the Poverty Reduction Strategy Paper (PRSP) that was launched in 2000. The government has since held three National ICT Policy Conferences with the active involvement of civil society and the private sector. In early 2004, the government launched the first-ever E-government Strategy that set out immediate, medium-term and long-term e-government targets. The establishment of an e-government secretariat under the leadership of a cabinet-level ICT secretary was another positive structural step in the adoption of ICTs in the development planning process.

Despite the various reform efforts, development has been hindered partly by the lack of a coordinated approach to ICT issues in government. There is a multiplicity of government departments and institutions that have for long lacked centralized coordination.<sup>38</sup> For many years, government information technology functions have been coordinated from the Government IT Services (GITS) within the then Ministry of Finance. This was due to the history of data processing functions in government that initially focused on payroll systems and statistical analysis. On the other hand, the policy issues had been divided between the Ministry of Information and Tourism and the Ministry of Transport and Communications that handled broadcasting and telecommunications functions, respectively. The latter conflict was, however, resolved with the establishment of the Ministry of Information and Communication in late 2004. The establishment of the new *converged* ministry was a positive development coming as it did after the exclusivity period<sup>39</sup> of Telkom Kenya had lapsed in June 2004 resulting in an open market environment. The opening up of the telecommunications and information technology market as well as the convergence of various technologies has put pressure on the industry regulator, CCK, to develop a new regulatory<sup>40</sup> framework.

There have been several attempts to achieve understanding and trust between stakeholders in the ICT policy development process. Such efforts have included the hosting of the National ICT Vision Workshop in November 2004, annual National ICT Conventions and other forums that have included media and community organizations in the process. The WSIS process has resulted in the establishment of a Kenya Civil Society Caucus on WSIS, WSIS Youth Caucus (Kenya) and the government-led National WSIS Taskforce whose secretariat is at the CCK. The CCK has led the government's participation in the WSIS process due to the structural relationship with the International Telecommunications Union (ITU). The process has resulted in the active participation of Kenyan representatives in the Working

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38 Mungai, Wainaina 2003, *Linking the Information Society to Sustainable Development in Kenya*, a presentation at the WSIS/ICT4D Platform, Geneva, December 11, 2003.

39 Government of Kenya 2001, *Telecommunications and Postal Sector Policy Statement*, Ministry of Transport and Communication.

40 Kemei, Christopher K. 2004, *Post Exclusivity Licensing & Regulatory Strategy In a Liberalized Communications Industry*, Communications Commission of Kenya, October 2004.

Group on Internet Governance,<sup>41</sup> Gender Caucus and Internet Consortium on Assigned Names and Numbers<sup>42</sup> (ICANN).

In June 2005, the Ministry of Information and Communication hosted a National ICT Stakeholders Conference that was viewed as the most inclusive multistakeholder ICT policy discussion aimed at finalizing the adoption of the Draft National ICT Policy. The conference applied an open debate system that was informed by the comments on the Draft National ICT Policy (2004) from, among others, the Kenya ICT Action Network, and adopted resolutions of the various topical working groups. The consultative nature of the conference can also be credited to the lessons learned from participation of government and civil society players in the WSIS process, the development of the PRSP and the constitutional review process that involved multisectoral input. An indicator of the inclusion of civil society in the policy process is in the recent appointment of a civil society representative<sup>43</sup> as director of the reconstituted board of the CCK.

There were, however, some challenges such as the difference in perspective between the two schools—one that was influenced by the global ICTs for development agenda; while the other is founded in the telecommunications reform approach that has historically influenced policy, legal and regulatory frameworks in the broadcasting and telecommunications industry. Such challenges in the process were overcome by the focus on the conference theme that centred on *Harnessing ICTs for National Development*. The challenge may have been resolved by the adoption of cross-cutting issues<sup>44</sup> such as vision and mission, content issues, universal access service, human capacity, innovation, legal and regulatory frameworks, institutional frameworks and e-governance. Many of the participants from civil society had previously taken part in the multisectoral *Poverty and ICT Roundtable discussions* that attempted to identify ways in which poverty can be reduced through the application of ICTs in Kenya.

The final National ICT Policy in 2005 will result in the development of sectoral policies, enactment of relevant legislation such as the Draft Freedom of Information Act (2005), repeal of the Kenya Broadcasting Corporation Act, as well as the establishment and restructuring of relevant institutions. It is hoped that the final policy will aggressively pursue the agenda of the Economic Recovery Strategy for Wealth and Employment Creation<sup>45</sup> (ERSWEC) that seeks “to make Kenya a less agricultural-dependent country by diversifying to other sectors while still recognizing the strategic position of agriculture in fighting poverty. The

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41 Waudu Siganga, Chairman of Computer Society of Kenya, was appointed to the WGIG by the UN Secretary General, Kofi Annan.

42 Njeri Rionge, CEO of Wananchi Online is active in ICANN board.

43 Alice Munyua, National Coordinator for the APC/CATIA project and KICTANet.

44 Presentation of findings by the Cross Cutting Issues Group at the National ICT Stakeholders Conference, May 2005.

45 Magana, Owino 2005, *ICT Policy & Implementing Kenya's ERS*, a presentation at the Second National ICT Convention, March 8–9, 2005, Nairobi.

agricultural sector share of GDP will consequently decline from 24.0 per cent in 2002 to 22.2 per cent in 2007.<sup>46</sup>

According to the proposed National ICT Policy awaiting approval by the cabinet,<sup>47</sup> Kenya had 240,000 fixed telephone line subscribers and 2.8 million cellular mobile subscribers by September 2004, translating into fixed teledensity of 0.75 per 100 inhabitants for fixed and 9.75 per 100 inhabitants for mobile against the world average of 19 and 21 respectively. This growth in ICT coverage is complemented by the 73 registered ISPs, 16 of which are active and reaching approximately 1,030,000 Internet users. Most Kenyans access the Internet through the over 1,000 cyber cafés and telephone bureaus identified by April 2004. There were an estimated 520,000 personal computers at the beginning of 2004 giving the number of computers per 100 inhabitants as 1.6. There are also more than 16 operational television stations and 24 FM radio stations reaching an estimated 60 per cent and 90 per cent of the population, respectively. It is on this ICT infrastructural background that the policy intends to catalyze faster overall national development. Fortunately for Kenya, the rapid adoption of mobile telephony and other ICTs has resulted in almost five million active mobile phone users.

## 6.2 Kenya's progress in the development of sustainable development policies

The development of sustainable development policies shares several similarities with the development of IS policies in Kenya. For decades, government policymakers have advocated for proper environmental management. However, it was not until 1994—two years after the launch of Agenda 21—that the government adopted the National Environmental Action Plan (NEAP).<sup>48</sup> In 1995, Kenya became a signatory to the resolutions of the World Summit on Social Development (WSSD) held in Denmark. This was followed in 1999 by the parliamentary adoption of Sessional Paper No. 6 on Environment and Development and the resulting enactment of the Environmental Management and Coordination Act (EMCA). The EMCA established an autonomous National Environment Management Authority (NEMA); the Standards Review and Enforcement Committee; the Public Complaints Committee; and the National Environment Tribunal. The Act also calls for the review of all policies and laws touching on environmental management as well as the development of Environmental Standards and Environmental Impact Assessment (EIA) Guidelines and Regulations. The launch of the PRSP in 2000 signalled the government's increasing commitment to participatory policy development processes for poverty eradication. The launch of the PRSP in the same year as the

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46 Government of Kenya 2003, *Economic Recovery Action Plan, Economic Recovery Strategy for Wealth and Employment Creation 2003–2007*, Ministry of Planning and National Development, Nairobi, Kenya.

47 ICT policy was still awaiting Cabinet approval in September 2005.

48 Government of Kenya 2003, *State of the Environment Report for Kenya 2003*, National Environmental Management Authority, Kenya. <http://www.NEMA.go.ke>

Millennium Declaration has resulted in a continued process of integrating<sup>49</sup> the local PRSP framework with the MDG targets.

The PRSP process led to the establishment of the Poverty Eradication Commission (PEC) at the Office of the President to implement a 15-year National Poverty Eradication Plan (NPEP) whose mandate includes achievement of the MDG-related poverty reduction goal by 2015. However, the actual implementation is in the form of three-year rolling Poverty Eradication Plans.<sup>50</sup>

In 2001, with the launch of New Partnership for African Development (NEPAD), Kenya became signatory to a multilateral environmental agreement within the framework of the African Union (AU). As a result, Kenya is the focal point for the marine and coastal sub-program of NEPAD with a secretariat at NEMA.

The World Summit on Sustainable Development (WSSD), held in 2002, provided an opportunity for government to review the progress in development and implementation of SD policies. The review resulted in the submission of a National Assessment Report for WSSD. With Kenya being the headquarters of the United Nations Environmental Programme (UNEP), a lot of assistance was available in the development of the report. However, the contributions by civil society organizations and non-governmental organizations were late or otherwise not included despite their active participation at different levels of the WSSD preparatory process, commenting on the national position, especially in the PrepCom 3. Unlike in the case of the delegation to the WSIS in 2003, the WSSD delegation failed to include civil society as official representatives. There were, therefore, separate groups from Kenya participating.

In 2003, the launch of the ERSWEC created an opportunity for sustainable development policies to be clearly articulated in the government planning process. There were positive indications in the language of the ERSWEC of a plan to strengthen SD policies, especially on environmental degradation issues. However, there was little mention of the environmental issues in the implementation plan as revealed in the excerpt from the *Implementation Matrix of the ERSWEC 2003–2007* in Table 1.

The implementation matrix mentions only one project, the Lake Victoria Environmental Management Project (LVEMP), which is a program co-funded by the World Bank and the Global Environment Facility (GEF). According to the World Bank Group,<sup>51</sup> LVEMP is a comprehensive program aimed at maximizing the benefits to communities living around the Lake Victoria basin by using resources within the basin to supply safe water and ensure a disease-free environment; conserving biodiversity and genetic resources; and integrating national

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49 Government of Kenya, *Press Release – Government to Launch ‘MDGs’ Planning Process*, Ministry of Planning and National Development, <http://www.planning.go.ke/mdg.html>

50 Government of Kenya 2002, Ministry of Foreign Affairs, *Kenya’s Perspective on Selected Global Issues, 2002*. [http://www.mfa.go.ke/kenyas\\_perspective.html](http://www.mfa.go.ke/kenyas_perspective.html)

51 World Bank Group 2005, *ICT and Environmental Sustainability*, Selected World Bank Group Funded projects.

and regional management programs to reverse—to the greatest extent possible—environmental degradation of Lake Victoria. The main concern for the lake is pollution and the encroachment by reduced lake wood (hyacinth). The project provides one of the cases linking the use of ICT for poverty reduction and environmental protection as shall be reviewed in sections that follow. Another link between the information society and sustainable development is the planned implementation of a Land and Environmental Information System (EIS) that will improve the performance of sectors that use GIS in the ongoing development of the Web site for the Ministry of Environment, Natural Resources and Wildlife at <http://www.environment.go.ke> under the E-Government Strategy.<sup>52</sup>

**Table 1: Excerpt from Implementation Matrix of the ERSWEC 2003–2007**

<b>8. Cross-cutting issues</b>					
<b>Sub-sector Objectives</b>	<b>2003/2004</b>	<b>Proposed Action</b>	<b>Expected Outcome</b>	<b>Implementing Agency</b>	<b>Time frame</b>
Environment	Environmental protection	Implementation of National Environment Action Plan (NEAP) and Environmental Management and Coordination Act (1999), Implementation of WSSD and Millennium Development Goals, Implementation of Lake Victoria Environmental Management Project	Sustainable environmental management, Domestication of Agenda 21, Improvement of fish output from Lake Victoria as a result of reduced lake wood (hyacinth)	MOENRW	2003 to 2007

Source: GoK, *ERS Implementation Matrix 2003–2007*

During the 12th Session of the Commission on Sustainable Development (CSD) in April 2004, two ministers from the Ministry of Environment and National Resources and the Ministry of Water Resource Management and Development represented Kenya. The two made enlightening presentations that revealed that Kenya’s SD focus remained anchored in poverty reduction. In his statement, the Minister for Environment stated that poverty and unemployment were the biggest challenges facing Kenya<sup>53</sup> and that the challenge was being addressed by the development of the ERSWEC in relation to the Millennium Declaration and the Johannesburg Plan of Implementation. In her submission, the Minister for Water Resource Management and Development revealed that the government’s

52 Republic of Kenya 2004, *E-Government Strategy: The Strategic Framework, Structure, Training Requirements and Standardization Framework*, Cabinet Office, March 2004.

53 Republic of Kenya 2004, Statement on “Meeting Targets, Goals and Timetables,” By Head of Delegation to CDS 12, Hon. Dr. Newton Kulundu, Minister for Environment, Natural Resources and Wildlife, New York, April 28, 2004.

efforts recognize the link between proper sanitation<sup>54</sup> and poverty. She also emphasized that sanitation had a rural dimension. This was in line with the national SD priorities for water and sanitation set out in the report to WSSD on the central role played by water in food production, public health, industrial and power production, recreation, and overall poverty alleviation. It was estimated that only about 60 per cent and 34 per cent of the country's urban and rural populations, respectively, have access to safe drinking water.

To address these challenges, the key priority actions had been set out as follows:

- i) improving poor people's access to productive resources;
- ii) integrating natural resource and environmental conservation into the national planning process; and
- iii) paying particular attention to the provision of safe drinking water, adequate sanitation and shelter to Kenyans.

The launch in 2004 of the *State of Environment Report 2003* was a sign of positive progress in the implementation of the Environmental Management and Coordination Act of 1999. The EMCA had set a requirement for the preparation of a State of Environment (SoE) report every year. Progress can be credited to the autonomous nature of the National Environmental Management Authority (NEMA).

Sustainable development issues received a significant elevation from the announcement of the winner of the 2004 Nobel Peace Prize as the Assistant Minister for Environment, Natural Resources and Wildlife, Hon. Prof. Wangari Maathai. Prof. Maathai is a long-time environmental protection activist and founder of the Green Belt Movement. She has since been quoted making statements such as, "If we did a better job of managing our resources sustainably, conflicts over them would be reduced. So, protecting the global environment is directly related to securing peace." According to Prof. Ali Mazrui, "the sense of peace for which (Maathai) won the Nobel Prize was not conflict resolution or the absence of war. For the first time, in the one hundred years of the Nobel Prize, peace was defined in environmental terms."<sup>55</sup> To demonstrate the gains for environmental protection, Kenya signed the Kyoto Protocol only days before its launch, which was graced by the presence of the Nobel Laureate. Failure to ratify the protocol before it came to force in February 2005 would have been an embarrassment for the country, which is the headquarters of UNEP and is the home of the globally respected sustainable development activist.

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54 Republic of Kenya 2004, *Statement on Meeting Basic Needs in Water, Sanitation and Human Settlements With Particular Focus on Sanitation*, by Hon. Martha W. Karua, MP, Minister for Water Resources Management & Development, New York, April 30, 2004.

55 Mazrui, Prof. Ali 2005, "Green Eyes on the Prize: From Softy Westernisation to Hard Modernisation," July 22, 2005, JKUAT, Thika, Kenya.

The envisaged review of the National Environmental Action Plan (NEAP) presents an opportunity for linkages between the ICT policy development process and the sustainable development policy development. According to comments submitted to the Ministry of Information and Communication on the draft ICT policy,<sup>56</sup> environmental issues had only received cursory mention. The National ICT Policy, however, states that one of the objectives shall be *to achieve sustainable conservation of natural resources*. There is no explicit mention of sustainable development unlike the case in the draft ICT policy.

### 6.3 National WSSD position and sustainable development priorities for Kenya

The National Assessment Report to the WSSD stated that the critical SD challenges were poverty, agriculture and food, infrastructure, health, energy, water and sanitation, trade, and market and regional integration.

At the WSSD, Kenya held the position that sustainable development challenges were surmountable if national efforts received adequate capacity development, technology transfer and financial assistance. Capacity development priorities lay in the strengthening of human resources as well as institutional and managerial capacity. Further, there was a stated need to mobilize domestic and external resources including additional official development assistance (ODA), foreign development investment (FDI) and forging of genuine partnerships for development financing. The call for increased ODA and FDI financial support was based on the reduction of multilateral and bilateral funding for environmental projects in Kenya by 30 per cent<sup>57</sup> over the previous 10 years.

In the same breath, Kenya held a position that inadvertently offered a solution for its sustainable development challenges. It acknowledged that the ICT sector the world over had facilitated growth in creating jobs, raising productivity, increasing incomes and opening up opportunities for increased trade. Kenya also acknowledged that it was necessary to integrate ICTs in all sectors of the economy in order to ensure its access by both rural and urban communities in pursuit of sustainable development. The challenge thus lay in creating and diffusing the technologies needed to eradicate<sup>58</sup> poverty.

It is noteworthy, however, that during a multistakeholder *ICT Visioning Workshop*<sup>59</sup> held in Nairobi two years after the WSSD, the national development priorities identified to guide ICTs for development discussions did not match

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56 Comments by Joseph Masinde (NEMA) who had consulted with the author on Kenya ICT Policy Comments: <http://www.information.go.ke/policy/comments/jmasinde.htm>

57 See: *Financing for Environment in Republic of Kenya 2003*, State of the Environment Report for Kenya 2003, National Environmental Management Authority, Kenya. <http://www.NEMA.go.ke>

58 *5.5 Information and Communication Technology (ICT) in Republic of Kenya 2002*, National Assessment Report for the World Summit on Sustainable Development (Rio+10), Johannesburg, South Africa, Ministry of Environment and Natural Resources, Kenya. p. 53.

59 ICT Visioning Workshop, November 18, 2004, Norfolk Hotel, Nairobi.

priorities stated by government at the WSSD. The resulting sector visions outlined the role of ICTs in education, health, government, trade and industry, small and medium enterprises (SMEs) and agriculture. The difference in approach between IS and SD policy groups was evident in the fact that presenters during the workshop were mainly from the information society policy community.

### 6.3.1 Challenges in prioritizing environmental conservation and ICT adoption

From the preceding review, it can be concluded that environmental protection is mentioned as a priority in general statements on sustainable development. Despite this, it still receives low priority in implementation. This is clear from the Implementation Matrix of the ERSWEC 2003–2007; the shrinking domestic, multilateral and bilateral financing; and cursory mention in the draft national ICT policy, as well as in project design and implementation.

A case in point is the draft ICT policy, which mentions environmental issues<sup>60</sup> as those related to telecommunications and broadcasting masts. Although it is not included in the draft ICT policy, the issue of “public perception” of the effects of radioactivity from telecommunications equipment is an environmental issue that the Communication Commission Kenya sought to address in a workshop organized with support from the NEMA.

Further, ICT experts and development practitioners at a *Poverty Reduction and ICT Workshop* in Kenya in January 2005 identified remote sensing as a means of using ICTs for environmental protection while addressing poverty. However, as seen in Table 2, the connection between poverty and ICT-enabled environmental protection systems becomes unclear as the details are reviewed.

The tendency in most policy discussions observed during the study was to view environmental issues as marginal factors under agriculture or tourism. The environmental link was deemed relevant only to the extent that it affected the economic activities.

Dependency on agriculture forms the basis of the dilemma on whether to develop an agriculture-based economy or a knowledge-based society in Kenya. As stated by Kenya at the WSSD, “agriculture is the mainstay of the Kenyan economy.” As such, farmers and pastoralists play a central role in agricultural production and ensuring food security. Agriculture currently contributes 24 per cent of GDP and supports about 64 per cent of Kenya’s employed population, most of whom live in rural areas. With the effects of climate change and the limited availability of arable land, the continued reliance on agriculture is environmentally and economically unsustainable. National policies must, therefore, develop new opportunities for a significant number of the rural population for sustainable development to be achieved. As admitted at the WSSD, agriculture in Kenya faces many

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60 Republic of Kenya 2004, *Draft National ICT Policy*, Ministry of Information and Communication, October 2004, Nairobi, Kenya. <http://www.information.go.ke>

challenges that include rain-fed production; increasing climate variability; high costs of inputs; inadequate market and institutional infrastructure; and limited access to financial resources and appropriate technology. Competing land use practices and enterprise result in the mixing of pests and diseases; poor breed and seed quality; poor extension services; and other unsustainable practices also adversely affect agriculture.

**Table 2: The potential role of ICTs in poverty reduction efforts**

Level	Potential Impact	Barriers	Actions	Examples	
Macro	Foster more efficient and transparent markets, more participatory processes of governance and new forms of economic and social innovation that benefit the poor	<ul style="list-style-type: none"> <li>• Remote sensing technologies for more effective monitoring, resource management and mitigation of environmental risks</li> <li>• Facilitate knowledge exchange, networking and policy-making</li> </ul>	<ul style="list-style-type: none"> <li>• Unequal access to ICTs</li> <li>• Lack of a supportive policy environment – absence of a national ICT vision, policy, or strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Positive measures to meet the ICT needs of the poor</li> <li>• Pro-poor policy and regulatory environment</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of the E-Government Strategy</li> <li>• Development of a land information system</li> </ul>

Source: *Poverty and ICT Workshop report, January 2005*

The stated dilemma caused by agriculture may be solved if environmental protection were to be made a priority objective in the development of new opportunities for rural population. The ERSWEC has, in principle, begun to address the issue by resolving to apply ICTs for increased productivity in agriculture while expanding the economic opportunities so that fewer Kenyans remain dependent on farming. However, if environmental protection is lacking at the core of the strategy, the new economic opportunities may lead to unsustainable activities such as pollution or depletion of forest cover to facilitate the setting-up of telecommunication equipment.

To achieve prioritization of environmental issues in the information society, it is important to have policies that explicitly state the commitment to environmental protection and extend the same clarity to project design and implementation. Advocacy in this area of work may be based on the WSIS, WSSD, PRSP and the MDGs but would require a high level of detail as well as continued interaction between information society and sustainable development practitioners. In the case of Kenya's draft ICT policy, the cursory mention of environmental issues may be due to the low-level participation of sustainable development practitioners in ICT policy processes. For instance, junior IT officers represented the Ministry of Environment, Natural Resources and Wildlife, and the Ministry of Energy at the National ICT Stakeholders Conference. The IT officers, originally from the Government IT Services of the Ministry of Finance, had been seconded to the respective ministries to facilitate the implementation of the E-government

Strategy. The issue of high-level representation in policy discussions may be resolved with the enactment of the new constitution by the end of 2005 because it proposes the establishment of a high-level National Environment Commission.<sup>61</sup>

Participants at the *Regional Workshop on ICTs and Poverty Reduction* made similar observations on the need for poverty reduction and ICT<sup>62</sup> practitioners to interact and share knowledge. This approach may be applied in the ongoing review of the National Environment Action Plan by having stakeholders who had been active in the ICT policy process contribute to the ICT-related aspects of the action plan. The converse is true of the implementation strategy for the National ICT Policy, which will also result in the development of sectoral ICT policies. There is need for environment practitioners to ensure prioritization of the environment in overarching policies so that the principles of ecological sustainability may trickle down to the other sectoral policies.

However, as shall be seen later in this paper, an aggressive campaign may be more successful in raising environmental protection issues in the information society. By implementing projects that tie in with ICT systems such as mobile phones—known to have had positive impacts—the national profile of environmental issues will be elevated while providing awareness and fundraising and early warning systems.

### 6.3.2 Implementation status of MDGs in Kenya

According to the MDG Progress Report for Kenya 2003, poverty remains a major impediment to the fulfillment of basic needs of Kenyans, especially women and children. The report recommends that only rapid economic growth can lift the country out of this vicious cycle of poverty. Failure to aggressively grow the economy will result in increased levels of poverty from the current 57 to 65.96<sup>3</sup> per cent in 2015. However, there has been significant progress in some areas such as provision of free education for all primary school children, increased representation of women in parliament, reduced HIV prevalence rates, increased access to ICTs and reduction in per capital energy consumption, as well as the emission of greenhouse gases. The report commends the government's launch of the ERSWEC that focuses attention on specific deliverable poverty reduction targets.

To improve their participation and performance in schools for children in arid and semi-arid areas, the school feeding program has been implemented and has also supplemented dietary needs of those children. Kenya has also been

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61 CKRC 2004, *Draft Constitution of Kenya 2004, Chapter Eight: Environment and Natural Resources*, Nairobi, Kenya. <http://www.kenyaconstitution.org/docs/chapter8.htm>

62 Adeya, Nyaki – Rapporteur General, *Regional Workshop on ICTs and Poverty Reduction*, January 2005.

63 Government of Kenya and the United Nations Kenya Country Team 2003, *Millennium Development Goals Progress Report for Kenya*, Ministry of Planning and National Development, April 2003, Nairobi, Kenya.

commended for systematic implementation of environmental impact assessments prior to road works and industrial projects to ensure sustainability of livelihoods and ecosystem management.

Further, there has been increased access to ICTs, as seen in the teledensity, computer and Internet usage statistics. However, the impact of gains in environmental management are countered by the fact that forests in Kenya cover only 1.64 million hectares—about two per cent of the land area of Kenya—of which 1.24 million hectares constitute indigenous forest. The forest cover continues to be depleted for human settlement, subsistence agriculture, and by an illegal timber and charcoal burning industry.

The MDG campaign aimed at raising awareness about the importance of the different dimensions of development is coordinated by a *National MDG Taskforce* comprising representatives of the Ministry of Finance, the UN system, donors, NGOs, CSOs and the private sector. The MDG Report for Kenya in 2003 was developed with support from the UNDP in conjunction with the government. Several stakeholder consultative meetings set up to discuss the draft report, sensitize stakeholders and ensure a participatory approach in the reporting process preceded the launch of the MDG report. The stakeholder meetings were preceded by a regional conference for eastern African policy-makers held in June 2002, an NGO Forum on MDGs in July 2002 and a Technical Seminar on MDGs held on September 2002. In 2003, a *CSO Forum on MDGs and MDG Report Validation Workshop* ensured that issues such as the PRSP and emerging concerns of civil society were discussed under the stewardship of the government and UNDP. The CSO forum was led by ActionAid, which has remained active in the *Make Poverty History* campaign. These events have resulted in the prioritization of MDG-based poverty reduction strategies in many policy documents such as the draft national ICT policy 2004.

The *Launch of the MDGs Planning Process* by the Minister for Planning and National Development at the MDG Stakeholders Workshop in March 2004 resulted in a communiqué committing the government, donors, the UN System and the Millennium Project to act aggressively to achieve the MDGs. There is apparent political will in the pursuit of MDGs. Although the commitment by government is evident in the policies being developed, the benefits of the process require aggressive action towards rapid economic growth.

On environmental issues, the attainment of increased forest coverage in Kenya will require very active and aggressive support for the tree-planting campaign led by Nobel Laureate, Prof. Wangari Maathai. There exists an opportunity for an aggressive campaign presented by the diffusion of ICTs, especially mobile phones which are expected to grow in use. The MDG adoption process in Kenya has also provided an avenue for increased advocacy on IS and SD linkages as the various goals require interaction between stakeholders from both policy communities.

## IS and SD Policy and Program Analysis

Several initiatives in Kenya are already providing linkages between ICTs and sustainable livelihoods in activities such as agriculture, pastoralism, entrepreneurship and provision of employment vacancy information. The initiatives covered by this research apply technologies that have a wide reach and focus on national sustainable development priorities. The examples include the use of mobile phone text messaging to provide market prices to farmers, employment vacancy alerts to the unemployed and local news to disadvantaged communities and slum dwellers. Other initiatives apply WorldSpace satellite radio receivers to disseminate locally relevant content in audio and data formats to pastoralists in arid areas. These, along with the use of geographical information systems in the protection of the environment in the Lake Victoria basin, are initiatives that are exploiting the information dissemination capacity of ICTs to address national sustainable development priorities.

### 7.1 SokoniSMS: Empowering farmers through SMS market price service

The Kenya Agricultural Commodity Exchange (KACE) is a private-sector firm launched in 1997 to facilitate linkage between sellers and buyers of agricultural commodities; provide relevant and timely marketing information and intelligence; provide a transparent and competitive market price discovery mechanism; and harness ICTs for rural value addition and empowerment. KACE launched an SMS-based information service—*SokoniSMS*<sup>64</sup>—for farmers. The SokoniSMS service enables farmers to receive market prices in various market centres around the country through their mobile phones. Equipped with this information, the farmers are able to determine the most profitable market centre to transport products to and circumvent middlemen who usually offer to buy the products at much lower prices.

KACE has several market information points around the country, from which they send price information to a headquarters in Nairobi. In turn, the team at the KACE headquarters uses a simple application that offers a Web-based interface to update market prices onto the servers at the mobile phone network (in this case Safaricom). As a result, mobile phone users can send a short text message to retrieve the market price they are interested in. The SMS-based service offers farmers a timely source of information, as they no longer have to wait for newspapers to publish the information a day after the prices are reported.

The farmers are automatically charged seven shillings for each final market price message delivered to their phones. The menu surfing process is free to the users.

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64 “Sokoni” is a Swahili word for “market.”

**Step 1:** The farmer types a message to retrieve market price information for MAIZE



**Step 2:** The farmer sends the word MAIZE to the number 411 on the Safaricom mobile network



**Step 3:** The farmer receives a menu of market centres from which to choose (main centres where KACE has MIPs—market information points)



**Step 4:** The farmer replies back with the chosen market centre choice to the number 412

**Step 5:** The farmer receives price details



By providing farmers with the opportunity to increase profit margins from agriculture, the service addresses the issues of poverty reduction for the majority of Kenyans who rely on agriculture. The service is a commendable linkage between ICTs and poverty reduction. Indirectly, by increasing the profitability of farming, the service enables farmers to earn more money without necessarily increasing output. It is, therefore, easier for a farmer to appreciate the benefits of protecting his land from pollution or unsustainable use that may in future deny him the returns on investment. A similar initiative by Drum Net in the rural town of Karatina uses the Internet to get pricing information from Nairobi on a variety of agricultural goods. The information on current pricing and market analysis is published to help farmers avoid middlemen.

## 7.2 ALIN: An information network for pastoralists and farmers

The Arid Lands Information Network (ALIN) provides farmers and pastoralists in drought prone areas with information for sustainable livelihoods. Through a network of Community Development Workers (CDW) ALIN encourages people in the dry lands to share experiences and ideas on good and bad development practices in agriculture or pastoralism and the use of ICTs. ALIN also publishes newsletters that are distributed to CDWs and partner organizations.

As part of the Open Knowledge Network (OKN) in Kenya, ALIN has set up access points in dry lands around the country where CDWs and community members can access information on sustainable farming practices. Each access point has a computer, printer and a WorldSpace satellite radio receiver with a multimedia adaptor that enables users to download specific content via satellite.

The radio receiver is aligned to a satellite beam that allows users to access up to 68 audio channels and four data channels. When the radio is tuned to the data channel and connected to a computer via an adaptor card, users are able to download Web-based text and images from the satellite without the use of a phone line. This access point set-up is appropriate for arid and semi-arid areas that lack tele-

phone, Internet and electricity coverage. Some access points use solar power to meet the energy needs of the set-up.

Community members and CDWs converge at the access point for relevant information, which may include farming practices, veterinary advice and accessing the national newspapers, including the *Daily Nation*. Newspapers do not have a significant reach in remote areas covered by the ALIN access points. This barrier is, however, overcome by the use of satellite downloads. CDWs also access information on behalf of community members and share the information during their focus group meetings.

By partnering with other organizations in the OKN, ALIN has enabled the geographically dispersed communities to share information via ICTs. CDWs collect information in the community, save it onto a diskette and send it to the ALIN head office or via e-mail at the office of the nearest partner organization. At ALIN, the information is edited and formatted for relay via satellite through a central OKN syndication centre in London. The syndication centre also receives information from many other “hubs” similar to ALIN in India, southern and western Africa. A review of information shared ranges from health issues, proper care of livestock, employment opportunities and others. Most of the information shared is also available from the Web site of the OKN at <http://www.openknowledge.net>.

From the information obtained at the access point, community members are able to make decisions that improve their farming, health and other livelihood practices. Such initiatives would benefit significantly if their impact would be reinforced by a universal access fund as proposed by many stakeholders throughout the ICT policy development process in Kenya.

One of the access points with a similar set-up is the field office of World Vision in Budalangi Division<sup>65</sup> where environmental disasters such as flooding have resulted in loss of lives, displacement of community members and destruction of crops. Such an access point would have greater impact if the ICT policy provides incentives for projects focused on environmental protection and early warning systems.

### **7.3 Lake Victoria Environmental Management Project (LVEMP)**

As indicated earlier, the Lake Victoria Environmental Management Project (LVEMP) is a comprehensive program aimed at maximizing the benefits to communities living around the Lake Victoria basin by reversing the environmental degradation of the lake. The main concerns for the lake are pollution and the previously untamed encroachment by water hyacinth. Nyanza province, which is served by the lake, also has the highest incidence of poverty of the eight provinces in Kenya.

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65 Government of Kenya 2003, *State of the Environment Report for Kenya 2003, Emerging and Cross-cutting Issues*, National Environmental Management Authority, Kenya. <http://www.NEMA.go.ke>

The project uses ICTs in the form of geographical information systems (GIS)<sup>66</sup> to create and update scientific and socio-economic baseline data on the current status of Lake Victoria's forest growth, land-use practices, pollution and water quality, among others. The government is thus able to make informed decisions on improvement of conditions in and around the lake. A significant gain from this has been the 80 per cent reduction in water surface coverage of water hyacinth leading to resumption of fish exports to the European Union. Fish exports from Kenya to the EU had been banned under stringent pollution and processing standards of the European Commission. The ICT-enabled gains in income due to improved environmental protection has resulted in increased consciousness of the direct linkages between the information society and sustainable development. After learning more about the water hyacinth, many enterprising people around the lake have learned to earn a living from the infamous weed by drying it and making mats and baskets for sale. Similar initiatives would have significant benefits for other lakes and dams in Kenya if tax and other incentives were provided for in the ICT policy in order to encourage private sector and civil society to supplement government efforts.

## **7.4 Empowering community members to solve their problems**

There are several other initiatives that demonstrate strong linkages between challenges of sustainable development and the information society as an enabler in solving the problems.

### **Simu ya Jamii Community Phone Service**

One such initiative is the *Simu Ya Jamii* (Community Phone) service that involves small-scale businesses running mobile telephone kiosks. Safaricom Limited, in partnership with local micro-finance organizations, has facilitated the ownership of branded mobile phone kiosks through a credit arrangement for small-scale entrepreneurs and continues to aggressively market the franchise. This has resulted in improved access to telecommunications services for many Kenyans who do not already own mobile phones while providing employment and business opportunities to many unemployed Kenyans. Being based on wireless technology, mobile phones also have fewer adverse impacts on the environment, as only a few masts are required.

### **Kazi560 vacancy alert service**

The twin problems of poverty and unemployment are also addressed through the *Kazi560* service, an SMS-based employment vacancy alert service run by OneWorld International. Realizing that the demand for jobs far outweighs the supply of jobs, *Kazi560* enables employers to advertise vacancies for free. In turn, mobile phone users can subscribe to receive vacancy information within a

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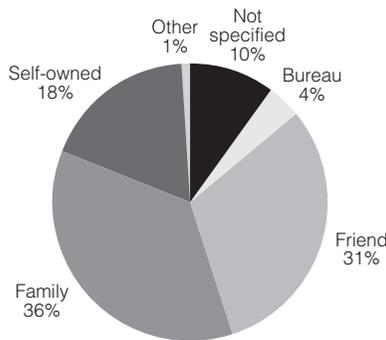
<sup>66</sup> World Bank Group 2005, *ICT and Environmental Sustainability*, Selected World Bank Group Funded Projects, New York.

specific line of work. For instance, by sending an SMS with the words “ACCOUNTANT ON” to the number 560 on the Safaricom mobile network, the job-seeker will receive vacancy details of all accounting vacancies availed to OneWorld International by employers. The job-seeker is automatically charged for each text message received with a vacancy. If successful, the job-seeker could decide to stop receiving the vacancy alerts by sending the words “ACCOUNTANT OFF” to the number 560. By removing the advertising cost for employers, the service has resulted in a simplified job-seeking process in Kenya where estimates show that only 20 per cent of the already few vacancies are advertised. In the first seven months since the launch of *Kazi560*, a significant number of people have reported being employed through the service that advertised over 150 vacancies per week in June 2005. The service—also known as OKN Mobile—was also nominated as a finalist for the APC Hafkin Communication Prize 2004–2005, and had a subscriber base of over 30,000 regular users by August 2005.

**CommunityNews service in slum areas**

Finally, OneWorld International runs a similar SMS-based CommunityNews service, which sends regular text messages on health, sanitation, business advice and scholarship opportunities to over 3,000 residents of Kenya’s largest informal settlement. Up to 70 per cent of Nairobi’s population lives in informal settlements, with Kibera accounting for the majority.

**Figure 2: Mobile phone access in Kibera**



Source: OneWorld

Unlike posters or word of mouth, the service is not prone to effects of weather or distortion as evidenced in the analogy of the *Broken Telephone*. SMS messages are personalized, immediate, reliable and can be easily shared.

As seen in Figure 2, which developed from the Information Needs Assessment conducted before the establishment of the service, 67 per cent of the respondents access mobile phones from their family and friends while 18 per cent own the

phones. Further, according to information collected at the Community Based Clinic operated by the Africa Medical Research Foundation (AMREF) in Laini Saba, Kibera, and at the Christ the King Church during their free medical clinics, four per cent of the patients attending clinics had learned about the clinics through the SMS-based *CommunityNews* service while 18 per cent and 31 per cent had learned from friends and neighbours respectively. From the above and findings of other organizations working in Kibera, it is evident that most of the information flows through infomediaries. The *CommunityNews* service has, therefore, improved the effectiveness of the existing community communications channel by equipping the infomediaries with reliable information. By sending information directly to mobile phones of intended recipients, the service also reduces the chances of distortion and doubt as the residents have a trusted source.

It is evident from the above initiatives that the lack of aggressive policies on ICTs for development is denying Kenyans opportunities to improve the livelihoods of slum dwellers, create employment, improve agriculture and other livelihood activities. The national ICT policy and related sectoral strategies must, therefore, provide incentives such as tax waivers and universal access and service funding for initiatives that promote poverty reduction and environmental protection.

## Emerging Framework for IS and SD Linkages

The global debate on the use of ICTs for human development has resulted in some observers urging caution<sup>67</sup> while others have assumed distinct optimistic and pessimistic approaches. ICTs may be considered as potential enablers and catalysts for strengthening existing initiatives except where there is significant evidence that an optimistic approach will yield positive results. As observed in the initiatives discussed above, ICTs can have far-reaching positive impacts on environmental protection and poverty eradication. The similarities between the initiatives are as follows:

They are scalable projects that:

- aggressively use the most effective technology;
- address the challenges that have high priority to the target audience; and
- reach as many people as possible.

They do this through community-based and multistakeholder partnerships, by breaking down the communication and attitude barriers, yet appreciating the existing communication networks and cultural realities.

This emerging framework is also influenced by the fact that mobile phone subscriptions in Kenya have grown from 200,000 in 2000 to about five million in September 2005<sup>68</sup> while, according to the draft national ICT policy, Internet users grew from about 200,000 to one million in the same period. The rate of subscription for fixed-line telephones has declined in the same period with indications that mobile telephony will continue to undermine future growth in fixed-line telephony. This has led the national telecommunications operator—Telkom Kenya—to offer wireless digital fixed-line solutions in order to increase its subscriptions.

Based on the lessons learned, mobile telephony has significant potential for environmental protection<sup>69</sup> in Kenya. As observed, it has been successful in substituting transportation of information on physical material with the more efficient and ecologically sustainable electronic form such as SMS. If used to complement geographical information systems, remote sensing, and disaster preparedness systems, mobile phone telephony can be effective in awareness creation and disaster

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67 Mungai, Wainaina 2001, The African Internet: Impact, Winners and Losers in *The Digital Pulse: The Current and Future Applications of Information and Communication Technologies for Developmental Health Priorities 2003*, A Report Published by The Communication Initiative. <http://www.comminit.com> p53

68 Wandera, Noel 2005, Battle for the Numbers: Cellphone companies' competition turns to quality products, *Financial Standard, The Standard*, Tuesday, July 5, 2005. <http://www.eastandard.net>

69 ITU 2002, *Telecommunications as a tool for Environmental Protection and Sustainable Development*, ITU Policy and Framework Action Plan, Geneva, Switzerland.

warning. Mobile telephony is the most potent technology in *promoting the use of science and technology for environmental sustainability*<sup>70</sup> and for overall sustainable development. This forms the foundation of this emerging *m-vironment approach* that recommends the use of mobile phones for environmental protection and early warning systems while addressing poverty reduction in Kenya.

The approach is in line with the recommendations of the Millennium Project Task Force on Environmental Sustainability, to build environmental sustainability into all development strategies across sectors. It recommends the adoption of quantified and time-bound environmental objectives, incorporating environmental sustainability into poverty reduction strategies, increasing funding for national environmental programs and in support of implementation of existing multilateral environmental agreements.

### **8.1 The M-vironment Approach: Using mobile phones to achieve environmental sustainability**

The existence of five million mobile phones versus one million Internet users in a country of 32 million people implies that the mobile network should be the channel of choice for interactive communication in Kenya. Unfortunately, the e-government strategy does not include the use of mobile telephony as a channel to communicate internally or with the citizens. The tide may be turning with the launch in June 2005 of an SMS service that allows Kenyans to send information to a government spokesperson. The service, provided by the private sector, is simple, as users are only required to send a simple text message to the number 2888. This has increased the citizen-to-government (C2G) communication and sensitized the government spokesperson to the priorities of Kenyans. Mobile phones, therefore, provide a platform for increased advocacy and debate on environmental protection in a country that so urgently requires it. The solution lies in an ambitious mobile phone-based environment initiative. With reference to the features of initiatives reviewed earlier, the *M-vironment Approach* for Kenya would entail the use of mobile telephony for:

- fundraising for national and community-based environmental protection efforts;
- awareness creation campaigns and exchange of information;
- strengthening early warning systems;
- environmental consciousness among ICT solutions providers;
- employment creation and protection of livelihoods;
- advocacy for policy integration of environmental protection; and
- pollution reporting and collection of feedback on EIA studies.

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<sup>70</sup> UN Millennium Project 2005, *Environment and Human Well-being: A Practical Strategy. Summary version of the report of the Task Force on Environmental Sustainability*, The Earth Institute at Columbia University, New York, USA.

During the tsunami that led to unprecedented loss of lives and property in Asia, the Swedish<sup>71</sup> government used SMS to contact their citizens who had used their mobile phones in Thailand in order to determine their status after the disaster. Many lives were saved in Nallavadu, India, after they received a warning obtained by a volunteer in an OKN access point similar to the one in the flood-prone area of Budalangi in Kenya. If the access point in Budalangi were to become part of a nationwide disaster-warning infrastructure reinforced by the automated alerts to mobile phones, many lives would be saved.

The *m-vironment* initiatives in Kenya may also be used to raise awareness on conservation<sup>72</sup> and create a community of interest. A similar initiative by Flora and Fauna in the United Kingdom uses mobile phone games and images of gorillas and other animals as mobile phone logos and screen savers. Other than awareness creation, the initiative uses the profits from the sale of the mobile content to finance conservation efforts. In Kenya, a similar initiative would address the fundraising challenges currently faced by environmental protection projects. In partnership with mobile network operators, environment awareness projects would achieve financial sustainability. This approach would begin to provide answers to one of the questions asked during the poverty reduction and ICT discussions thus: *Are there any ideas about where the resources for poverty alleviation will or can come from since donor agencies cannot do all the work?*<sup>73</sup> It would also address the funding concerns raised in the State of the Environment Report 2003.

In the Kibera slum of Nairobi, the SMS-based *CommunityNews* service has been successfully used to send alerts in cases of fire outbreaks and mobilizing the residents to take part in environmental clean-up activities. SMS may also be used as early warning systems in times of natural disasters. For instance, the UNDP Kenya Country Office runs a *Disaster Preparedness and Management Project*. The goal of the project is to strengthen the working relationships through increased common understanding and establishment of a central database to provide opportunity for prioritization of needs and intervention strategies that ensure preventive, rehabilitative and mitigation initiatives are integrated into development plans at national and district levels. It seeks to involve all programs within the UN system in Kenya, government, NGOs, private sector and development partners. By building on such existing networks and the initiatives already supported by NEMA and the UNEP headquarters in Nairobi, it would be possible to ensure multistakeholder participation in the *m-vironment* initiatives.

As observed in the cases of market price information service *SokoniSMS* and the success of the Lake Victoria Environmental Management project in employment

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71 Carvin, Andy 2005, *Knowledge, Awareness and the use of ICST*, UNESCAP. <http://www.andy-carvin.com>, <http://www.unescap.org/icstd/dmp.asp#knowledge>

72 Srivastava, Lara 2005, *Social and Human Considerations for a More Mobile World*, Telecom Policy Unit, International Telecommunications Union, Geneva, Switzerland.

73 Adeya, Nyaki – Rapporteur General 2005, *Regional Workshop on ICTs and Poverty Reduction*, IDRC, January 2005, Nairobi, Kenya.

creation and protection of livelihoods, mobile phones may be used to create a channel for strategic market information for products that promote environmental sustainability.

The national m-vironment initiative will be instrumental in integrating environmental protection in policy and raising its profile in Kenya's national psyche. The initiative should involve a multistakeholder partnership that will integrate environmental protection and early warning components in the poverty reduction agenda. The initiative may be piloted in a specific community but must be scalable. The national m-vironment initiative should work to break down the communication and attitude barriers in specific communities while learning from and strengthening the existing communication networks.

By involving mobile network operators as well as radio, television and Internet service providers in a national environmental awareness project through limited tax incentives, the m-vironment initiative would build a community of ICT practitioners who consciously support sustainable development. The mobile phone service sector has been the fastest growing sector in Kenya since the last quarter of 2000 with Safaricom Limited being the top taxpayer for two consecutive years. Fortunately, over the same period, Safaricom has supported several environmental conservation projects such as fencing off the forest around Mount Kenya and elephant tracking via sensors on the mobile networks. However, opportunity exists in the use of the mobile network infrastructure for strengthening early warning systems in cases of natural disaster. For an initiative involving the government, all network operators should ideally be involved to extend the reach of the project. In the period between disasters, the m-vironment initiative would form a fundraising channel for environmental protection initiatives that are in tune with poverty reduction efforts.

## **8.2 Advancing existing IS and SD linkages through the m-vironment approach**

The initiatives reviewed earlier, as well as the emerging m-vironment framework, are possible because of the existence of sustainable development policies. Nonetheless, the impact of these policies has remained limited because of the absence of corresponding information society policies. A case in point is the low priority given to the development of a Land and Environmental Information System, which is the only environment project mentioned in the E-government Strategy. The National Environment Action Plan had foreseen the need and recommended the implementation of an EIS in 1994 but the same has remained a low priority project. Eleven years later, and a year after Kenya's Prof. Wangari Maathai of the Green Belt Movement won the Nobel Prize, the draft ICT policy and industry regulation developed by CCK, Kenya has a weak or non-existent framework for licensing and environmental issues. In turn, the NEAP and related environment laws and policies maintain a weak reference to ICT aspects of environmental sustainability.

At the WSSD, the government attributed the low levels of achievement to the lack of funding, relevant technology and human capacity in national sustainable development efforts. The m-vironment framework would provide the required technology and create a channel for fundraising. By creating awareness and a community of supportive ICT practitioners, m-vironment would contribute significantly to the first stage of capacity building. The gains to the nation would be greater if environmental sustainability efforts integrate poverty reduction.

Further, the m-vironment initiative as well as scaled-up versions of initiatives reviewed earlier, would address a gap in the current E-government Strategy by significantly incorporating mobile telephony into the country's e-government plans. By raising the profile of mobile technology in the government, the initiative would simultaneously raise the consciousness of environmental protection among policy-makers. Increased consciousness would result in a more significant inclusion of environmental issues in draft ICT policy and industry regulation by CCK. The formation of a National Environment Commission as proposed in the draft national constitution would reinforce the gains that would be brought about by m-vironment initiatives.

Opportunity also exists for the ICT aspects of the m-vironment approach to be incorporated in the envisaged review of the NEAP and related environmental laws and policies. A review of other opportunities for influencing policy follows.

## Opportunities for Better IS and SD Linkages in Various Policies

### 9.1 Overarching policies

After the finalization of the National ICT Policy, discussions have shifted to focus on an ICT Policy Action Plan. An example is the *Youth Declaration on the Implementation of the ICT policy* developed at the first *Kenya Youth and ICT Convention* in August 2005. Such discussions present an opportunity for integrating lessons learned into the implementation process and increase the government's budgetary allocations for ICT programs and environmental protection programs. However, the likelihood that the desired changes would take place during the review of the ERSWEC and National Development Plan in 2007, through reporting process of the MDGs with respect to the PRSP.

Advocacy at the community and national government level will increasingly focus attention on the roles of environmental protection in national development. Initiatives within the m-vironment framework are likely to have significant implications on the success of advocacy and public awareness in Kenya.

Since poverty reduction is the main development concern, it is necessary to present a sustainable development model that defines the returns on investment by both ICT adoption and environmental protection. The involvement of policy-makers in the ongoing discussions on poverty reduction and ICTs in Kenya would create opportunity for the two policy communities to strengthen linkages between the rapid growth of the information society and sustainable development.

To achieve the desired quick gains, national level initiatives should encourage partnerships between the civil society, public and private sectors. Further, the policies developed should be in appreciation of the theory that states that "sustainable development equals modernization minus dependency."<sup>74</sup> The theory proposed by Prof. Ali Mazrui calls for African nations to apply technology in addressing sustainable development challenges while preserving the cultural realities of the society in question. Multistakeholder initiatives must take such factors into account to ensure economically, culturally and ecologically sustainable development.

### 9.2 Sectoral policies

The launch of the National ICT Policy will trigger the development of sectoral ICT strategies with government ministries leading the process in each sector. The Ministry of Health has already started discussions on the e-health strategy while

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74 Mazrui, Prof. Ali A. 2005, *Is Development Sustainable Without Modernization?* The Dunstan M. Wai Memorial Lecture (1947–2005), June 16, 2005, New York.

the Ministry of Education has developed a sessional paper outlining the role of ICTs in education. This presents an opportunity for the Ministry of Environment, Natural Resources and Wildlife to develop an aggressive e-environment strategy that ties in aggressive m-virment initiatives with indications of how they would play a role in economic empowerment. The process has started with the review of the NEAP, which has provisions on the use of ICTs in environmental information systems and early warning systems. However, to achieve the desired results in future policy, increased interaction between IS and SD practitioners at a higher level will be necessary.

Another opportunity exists in the impending repeal of the Kenya Broadcasting Corporation Act, which will result in a new policy environment for the broadcasting sector. Environmental protection issues that may be included range from the effect of broadcasting masts, responsibility and incentives for public and private broadcasters who use their infrastructure for environmental sustainability. The broadcasting and telecommunication sectors are regulated by the Communications Commission of Kenya, which has the capacity to integrate environmental protection and early warning system issues into the industry regulation. Discussions on e-environment issues have begun between the CCK and the National Environment Management Authority.

Finally, Constituency Development Committees in the 210 parliamentary electoral constituencies present an opportunity to influence policy at the community level with expected impact on the awareness levels of Members of Parliament. By demonstrating the value of ICTs in environmental protection and its far-reaching impacts on poverty reduction in each parliamentary constituency, sustainable development activists would reap greater value in the form of the desired legislative changes. Legislators are more likely to support legal and policy recommendations that promise positive returns on investments to their constituents.

## 10 Recommendations

As observed in the review of Kenya's information society and sustainable development policy development and the initiatives that seek to strengthen linkages between the two groups of policy, opportunities exist for future policy development to promote existing and emerging linkages.

A strong case exists for environmental protection efforts that especially address poverty reduction as proposed in the MDGs and resolutions of the WSSD. Opportunities for quick gains lie in the recommendations of WSIS on the need for e-environment and e-agriculture initiatives. Kenya must, therefore, learn from the proposals of these and other international policy instruments as it develops sustainable development solutions and in efforts to ensure that environmental issues are given the deserved priority in national policies.

The draft constitution in its preamble declares that it is founded on the people's respect for the natural environment "that is our heritage, and determined to sustain it for the benefit of future generations." Once the new constitution for Kenya comes into force, the government must constitute the National Environment Commission and ensure that it has a multisectoral participation that appreciates the linkages between the information society and sustainable development.

Although the proposed constitution provides a sound foundation for future environmental stewardship, it lacks clear guidelines on the approaches that may be used in ensuring high-level appreciation of environmental issues among policy makers. The government must, therefore, work with all stakeholders to ensure an appreciation of the economic benefits of environmental protection especially for the majority of Kenyans who are poor. This may be achieved through increased interaction between IS and SD policy-makers and other stakeholders.

To achieve prioritization of environmental issues in the information society, it is important to have policies that explicitly state the commitment to environmental protection and extend the same clarity to project design and implementation.

Environmental consciousness by policy-makers and experts is not enough to resolve the environmental crisis that Kenyans face as they continue to deplete scarce resources, which they continue to rely on as a source of livelihood. Awareness must be reinforced at the community level with Kenyans being made to appreciate the risks associated with the continued encroachment on the indigenous forest and unsustainable use of limited arable land. The use of indicators such as forest cover, available arable land and their implications for poverty, hunger, lack of water, agriculture and sanitation may go a long way in improving stewardship.

The appreciation of risks associated with continued ecological degradation will not resolve the problem unless Kenyans are made aware of alternative ways to

earn a living. ICTs and other development policies must increase opportunities in information and communication services and apply ICTs to increase efficiency in agriculture while educating Kenyans on non-wood fuel sources of energy. There is also an urgent need for the scaling up of projects that teach pastoralists and farmers in arid areas how to increase productivity, thus reducing dependency on the limited arable land for communities that may not easily take advantage of non-agricultural opportunities. The government must be aggressive in implementing the proposal in the Economic Recovery Strategy that aims to use ICTs to increase efficiency in agriculture while creating new income opportunities that reduce the overall dependency on agriculture. The efforts must be demonstrated in both policy and projects that appreciate the environmental risks of unsustainable dependency on agriculture.

ICTs such as mobile telephony are used mostly by youth who constitute the single demographic grouping who will benefit from environmental protection and poverty reduction. Involvement of youth as equal players at all stages of policy and project development should be a minimum condition for any initiative that seeks to address the challenges of sustainable development.

Finally, Kenya should seize the opportunity presented by mobile telephony to implement an ambitious multistakeholder m-vironment initiative that will address many of its sustainable development concerns. The project would be based on existing multistakeholder networks and will focus on awareness creation, fundraising, networking, data collection and as an early warning system. The m-vironment initiative would also provide a foundation for the inclusion of mobile telephony in the provision of e-government services and improved environmental stewardship. Mobile phone networks have already provided a means of fundraising for development initiatives in Kenya and would provide a means for raising funds for environmental protection through simple text messaging. The m-vironment network would also be a ready network of over four million Kenyans who can receive personalized information on environmental issues such as the shifting climatic conditions, disaster preparedness and early warning in times of environmental and other disasters. The network would include existing and planned initiatives such as the Lake Victoria Environmental Management Project and the development of the Land and Environmental Information System that are the two priorities stated in ERSWEC and E-government Strategy, respectively. An opportunity exists for this concept to be adopted in the ICT aspects of environmental sustainability during the envisaged review of the National Environmental Action Plan and in the ICT Policy Implementation Plans.

The network would use text messages that ensure high communication speeds and a high level of response to any call to action. In a secure installation, the m-vironment network could be interconnected with the geographical information systems or famine and flood early warning systems and the information relayed to radio and television networks to ensure maximum coverage. It will, however, be necessary to involve all stakeholders in a win-win relationship by providing incentives to mobile networks and other ICT services that use their infrastructure

for environmental protection efforts. Incentives may include tax waivers for the private sector and funding from the universal access and service fund for initiatives by civil society.

The aggressive implementation of the m-vironment initiative in Kenya provides an opportunity to avert the environmental and economic disaster that Kenyans have been courting through unsustainable dependence on limited natural resources as a source of livelihood. It offers Kenya an opportunity to enjoy the economic, social-political benefits of ecological sustainability.

These requirements for changes at the national level should in time be translated into regional and international commitments through their adoption within the framework of WSIS, MDGs and other multilateral instruments on sustainable development and the information society.

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