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Mobile Phones:
An Appropriate Tool
For Conservation And
Development?

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Executive Summary

<div style="text-align:right">**1**</div>

Mobile phone technology is developing at an extraordinarily rapid pace and is being applied to an increasingly wide range of human activities and the environment in which we live. It brings both benefits and challenges. This report looks at the implications and applications of mobile phone technology on conservation and development initiatives in the developing world. It takes into account the integration between mobile phones and other Information and Communication Technologies (ICTs), identifying ways in which mobile phones play a role in the digital divide debate. Having considered the policies of governments, donors, businesses and non-governmental organizations (NGOs) towards mobile phones and other ICTs, the report details a number of case studies where they are being applied to development and conservation work.

The research for the report was mainly desk-based, although complemented by field research coming from an existing Fauna & Flora International (FFI) project in southern Africa.[1] It does not attempt to examine the whole range of ICT applications and initiatives being used in development. Nor is the report a definitive account of the use of mobile phone technology for conservation and development projects. Nevertheless, we hope the report can contribute to the understanding and debate of the use of mobile phone technology in these areas, and perhaps for the first time, bring together a whole range of projects and practices.

The following conclusions are drawn and recommendations are made:

1. Mobile phones have fundamentally changed how we communicate in society. They have become a dominant technology in the developed world. With innovation racing ahead in the West, there is the danger of developing countries once again being left behind, this time technologically (what is called 'the digital divide').

2. However, the impact of mobile phones has possibly been more profound in developing countries that have had poor telecommunications infrastructure. To an extent, mobiles are 'leapfrogging' the technological gap between the developed and developing world.

3. Historically, there has been a slow uptake of many ICTs in developing countries, due to equipment costs, lack of infrastructure, logistical problems, lack of finance or political/commercial commitment. On the other hand, mobile phone growth in the developing world has been staggering, due to ease of network expansion, cheaper relative costs, high demand, and willingness of companies to invest. Rates of mobile phone uptake have differed markedly between and within countries in the developing world.

4. On their own, however, mobile phones will not, and cannot, bridge the digital divide. They must also be considered alongside other ICTs in an

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[1] *The project, 't4cd' (technologies for conservation and development in southern Africa) is a joint venture by FFI and its partner organization in South Africa, ResourceAfrica.*

integrated approach. Mobile phones may not always be the most appropriate form of technology, even where there is good Global System for Mobile Communications (GSM) coverage.

5. It is important to emphasise that mobile phones and other ICTs are only tools, and *not* a solution in themselves to the problems encountered in the conservation and development arenas. In this respect, ICTs should be seen as tools of wider strategies and programmes, which aim to deal with threats to wildlife and the environment, as well as poverty.

6. Conservation and development projects applying ICTs at the community level should consider access criteria for bridging the digital divide. Issues of access, appropriate technology, affordability, capacity, content, socio-cultural factors, trust, legal and regulatory frameworks, local economic environment, macro-economic environment, political will, relevance and using existing infrastructure, are all highly relevant. If not properly considered, there is a danger of failure.

7. Governments, business and civil society are all engaged in developing strategies and applications for ICTs in development, and sometimes, conservation work. The challenge for governments, business and civil society alike is to consider the above-mentioned criteria in their policies, programmes or business plans. For an international conservation agency, such as FFI, there is an equally complex challenge of incorporating such criteria into the piloting and development of ICT applications in support of its conservation programmes in order to demonstrate that there is the potential for biodiversity gain.

8. It is important to realise that mobile phone applications in the developed world can be adapted to the developing world, and visa-versa, providing there is commitment, resources, and involvement of local partners. In Europe, there are projects underway, or being piloted, that use mobile phone technology to support socio-economic development and environmental activities.

9. It is an encouraging sign that some, but not all, of the major mobile phone operators in Europe have published Corporate Environmental and Social Responsibility (CESR) policies. This is undoubtedly good business practice, as well as opening up the opportunity for conservation agencies to pilot and develop applications for conservation projects.

10. As for any sector, there are clear business drivers, as well as CESR expectations, for mobile telecommunications companies to engage in conservation and development. And there are many, generic, environmental management issues, which companies should monitor, including energy efficiency, transport and water consumption. But there are also a variety of industry-specific issues that need to be considered: environmental impact of network rollout, waste management/end-of-life product control, and supply chain management.

11. Mobile phone companies should consider measuring how they perform against internationally agreed environmental goals, and the Millennium Development Goals (MDGs). This is a challenge to the corporate sector but it could be incorporated into future CESR reports.

12. Any ICT project for conservation and development should consider working in partnership with private business, government, civil society and academia. A wealth of experience and knowledge resides in the various sectors. The wheel should not be re-invented in different places, but replicated. A forum between the different parties could be established to share learning and experiences, both positive and negative. For example, the World Summit on the Information Society (in December 2003) was a good opportunity for different stakeholders to come together and share experiences.

13. If introduced appropriately, mobile phones can be a useful tool for development. There are a

number of examples from around the world which demonstrate the use of mobile phones in support of development work. Mobile technology is being used in rural phone networks, telemedicine, small business development, market trading and farming, humanitarian aid and community services. There are definite benefits of the use of mobile phones in supporting development, although certain criteria are necessary for their application to be successful.

14. In one particular area of development – microfinance – mobile telephony is being introduced and piloted extensively. Besides microfinance institutions (such as the Grameen Bank), the corporate sector has seen the potential value of using mobile phone technology for commercial applications in the microfinance sector. There are potential benefits, as well as concerns, about the technology being adapted to meet the needs of the poor.

15. Due to the isolation of many conservation areas, mobile phone use is often restricted. Where they are used, it tends to be on a practical level only, providing simple but crucial voice communications. Hence, an even greater reason to consider other technologies.

16. ICTs can be used to benefit biodiversity and conservation in a number of ways. There are case studies from around the world that demonstrate potential biodiversity gains of ICT use in the following areas: at a practical, hands-on level; basic data collection, information, education and research; community-led conservation initiatives; conservation project management; tracking and monitoring.

17. A whole range of other ICTs are being applied to conservation work based on a pure scientific need, such as with the tracking of species or the implementation of GIS to digitally map the natural environment. At another level, the simple introduction of mobile phone coverage into an area can present huge benefits to both conservation organizations working in the area, and the local communities, without the need for any direct conservation NGO intervention. Indeed, NGOs encouraging mobile phone operators to extend coverage into national parks and reserves by presenting a strong business and biodiversity case is already happening.

Setting the Scene

2.1. Mobile phones: The global picture

> Phones are now the dominant technology with which young people, and urban youth in particular, now define themselves. What sort of phone you carry and how you customise it says a great deal about you, just as the choice of car did for a previous generation.
>
> The Economist (2004a)

> The good news for Iraq is that the use of mobile phones has increased several hundred-fold since before the war . . . The bad news is that the supply of electricity, of vastly more concern to millions of sweltering Iraqis, is still below the pre-war level and at that only for a limited time each day.
>
> The Guardian (2004a)

The mobile phone dominates our lives. It is more than just a 'must have' item in developed, western countries. To many young people, it has become a fashion item. Uptake in more established markets has now reached saturation point; there are currently more than 51 million users in the UK (BBC News Online, 2003b). While the demand for mobile phones seems to be insatiable, it is after all only a technology. There are always going to be more pressing needs. Nevertheless, it is a technology that has the potential to have a positive impact in society.

The mobile phone industry is unique in its rate of innovation – both in terms of the handsets themselves and the range of services on offer. Over the past couple of years in particular, the mobile phone has become a key information communication device, spurred on by the earlier introduction of text messaging (Short Message Service, SMS) and the more recent mobile internet (Wireless Application Protocol, WAP) services. In its early days, WAP was over-hyped and badly promoted to a sceptical public, resulting in disappointing uptake. For many, expectations of the 'mobile internet' were just that, and handsets at that time simply were not able to deliver.

More recently, however, the introduction on some phones of colour screens, polyphonic sound[2], built-in cameras and innovative operating systems such as Symbian[3] has enabled WAP-related services to come of age, and services such as Vodafone live![4] are a testament to how far things have come. The rollout of 3G[5] networks will significantly enhance the services on offer, and the continuing trend to provide mobile access to websites, albeit still limited at present, is a classic example of how the two technologies are beginning to converge. As a result, competition amongst mobile phone companies has boomed, with new firms trying to get a piece of the action in a market estimated to be worth over US$70 billion worldwide (The Economist, 2004b).

With innovation racing ahead in the West, there is the danger of developing countries once again being left behind, this time technologically. The aptly

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[2] *Polyphonic – the ability to play two or more independent sounds at the same time.*
[3] *Symbian – an advanced, open operating system used in many new data-enabled mobile phones.*
[4] *Vodafone live! – the mobile internet platform of Vodafone.*
[5] *3G – third generation (mobile phones), which provide enhanced speed and richer content (such as videos and photo-messaging).*

titled 'digital divide' was already an issue, with emphasis on access to telephones, computers and the internet. For reasons discussed in section 3.2, mobile telephones have been able to 'leapfrog' some of the barriers, and as a result have found themselves at the forefront of the digital divide debate. The impact of mobile phones has been considerable.

People in some of the poorest parts of the world now have access to mobile technology. Addressing their specific needs, and supporting and encouraging the use of mobile technology as a force for positive social and environmental change presents the industry with unique challenges and opportunities.

2.2. A view from the developed world

> The mobile phone has rapidly become an integral part of our lives. In many countries more than half the population uses a mobile phone and, in some developing economies, mobiles are often people's only means of telecommunication.
>
> Sir Christopher Gent, cited in Vodafone
> CSR Report (2003)

Aside from yet-unanswered questions relating to health, the positive use of mobile technologies lies largely in our hands – in the hands of government, when it comes to environmental issues and safety regulations; in the hands of operators, who can do much to ensure the smooth integration of the technology into our society, both in terms of equipment design and aesthetics, and through initiatives which help train people in mobile phone etiquette; in the hands of employers, who can take pains to ensure staff with corporate mobiles are not abused; and ultimately, in the hands of users, who need to cultivate a greater level of awareness and work to ensure that their phone use does not negatively impact the lives of those around them.

> International Telecommunications
> Union (2004)

It is important to recognize that mobile phone innovations in the UK in support of developmental, environmental and conservation needs could easily be adapted in the rest of the world.

Box 1: The digital impact: mobile phones

- By May 2004 there were an estimated 1.325 billion mobile phone subscribers globally;
- Between 1995 and 2005, the number of mobile phone subscribers across Africa is forecast to leap one hundredfold from 652,000 to over 67 million;
- During the first quarter of 2004, over 153 million mobiles phones were sold globally;
- Global revenue from mobile services leaped from US$19 billion in 1991 to an estimated US$414 billion in 2003;
- By 2003, there were an estimated 80 million browser-enabled mobile phones (with Internet access), up from 1.1 million in 1999. The number of mobile internet users is forecast to hit 600 million by 2008;

- In 1991 the number of fixed lines in use around the world totalled 546 million, compared with just 16 million mobiles. By 2002, the number of fixed lines doubled, whilst mobile lines have increased over seventy times;
- In Bangladesh, an investment of $80 million by Grameen Phone provided cellular phone service to rural areas, covering 100,000 subscribers in 250 villages.

Sources: Gartner Group, NUA Internet surveys and News, Africanews, Inktomi, asia.internet, e-commercetimes, Financial Times, Jupiter Communications, Cnet, Forrester Communications, PC Magazine, Far Eastern Economic Review, Hindustan Times, IDC, Forbes, MobileChoice, International Telecommunications Union (ITU)

Box 2: How mobile phones have changed everyday life in the Democratic Republic of Congo – a western perspective

My first visit to the Congo was in 1994, to a town called Goma in the eastern part of what was then Zaire, during the Rwandan genocide and refugee crisis. Like most international aid agencies, we were equipped with some of the most recent ICT equipment, including high-frequency (HF) radios and a satellite telephone. However, for the majority of the Congolese, there was no access to phones, the internet, or radios, let alone mobile phones. They relied upon traditional forms of communication, sometimes travelling hours to send a message, or crossing the border into Rwanda (which, in 1994, was not the safest thing to do). A few had fixed lines, but these were unreliable. Very few could afford to pay for email or voice calls on a satellite phone.

By 2003, however, one of the most dramatic changes in everyday life was the proliferation of the mobile phone. When I returned to Goma in this year, the mobile appeared to be an everyday item for some people, such as entrepreneurs, NGO staff, church leaders, government officials, cooperatives, and military officers. Instead of driving for a couple of hours, you could just make a call or text message, to arrange a meeting, buy and sell produce, pass on information, and so on. And this was taking place in a town where there are high levels of poverty, compounded by two protracted civil wars, a volcanic eruption, riots and looting, and the occupation by a foreign army, all in the last ten years. The majority, however, continue to have no access to mobile phones.

But the mobile has a 'reputation' in the Congo. At the turn of the century, a sudden boom in the price of coltan (a tantalum-bearing ore, used in the manufacture of capacitors for mobile phones and other hi-tech equipment), led to a short-lived 'gold rush'. While some benefited, the vast majority saw little reward. The exploitation of natural resources in the Congo has resulted in human suffering on an unprecedented scale, together with the destruction of wildlife and the environment, because it happened in a chaotic and unregulated fashion, largely controlled by military or political factions. The solution is to press for the regulation of coltan mining, for the benefit of the Congolese, private business and wildlife.

Richard Burge (2004)
See also Hayes & Burge (2003)

In Europe, projects are under way, or being piloted, which use mobile phone technology to support socio-economic development and environmental activities. These include sending data to doctors to facilitate remote diagnosis and provide patient support, mobiles being provided to flood victims in areas where land lines have come down, and farmers being able to update livestock databases via General Packet Radio Service (GPRS) on a mobile handset. By learning from these initiatives, knowledge and skills can be transferred to the developing world and adapted according to the particular context and need.

This learning and innovation requires commitment and resources. The Vodafone Group Foundation has given both, providing a grant to FFI to carry out research project development into how mobile phone technology can support international conservation and sustainable development efforts. This report is one product of the research. Its conclusions and recommendations are, however, made entirely independently of the company.

It is an encouraging sign that some, but not all, of the major mobile phone operators in Europe have published Corporate Environmental and Social Responsibility (CESR) policies. This is undoubtedly good business practice, as well as opening up the opportunity for organizations such as FFI to pilot and develop applications for conservation projects. At the same time, the CESR statements and activities of corporations should be continuously monitored, their impact evaluated, and their effectiveness improved. The challenge will be to put newly developed policies into practice. Chapter 4 looks into CESR issues in more detail.

A main focus of this report is to examine the benefits, or otherwise, of mobile telephony for conservation and development. While most of the case studies included are projects in the developing world, it is important to highlight a few examples in the developed world, which are promoting international conservation and development issues: SMS texting to campaign on fair trade (*e.g.*, The Catholic Agency for Overseas Development's Jubilee Campaign), SMS donating for good causes (*e.g.*, Comic Relief), and the use of the mobile internet to raise awareness and funds (*e.g.*, FFI's wildlive!, see Box 3 below).

2.3. A view from the developing world

> Africans' insatiable appetite for cell [mobile] phones has made the continent a profitable market for the high-tech gadgets, which were

introduced only a decade ago. But in the intervening ten years, the sales figures have masked a larger social story: how the proliferation of cell phones is changing Africans' relationships with one another.

> Hall (2003)

The growth of the cell phone industry in Cameroon is being choked by expensive cell phone handsets, with a motorbike being cheaper than a cellular telephone . . . Cameroonians are keen to be part of the world by using cellular telephones . . . Cellphone manufacturers and network operators themselves are best placed to change this dire situation, but they seem unaware or uninterested in solving the problem.

> Balancing Act (2004)

Box 3: wildlive! – a case study

Combined web/WAP approaches are nothing new to news service providers such as the BBC who have had a simple text-based, mobile news service available for some time.

There are unique opportunities for the conservation movement to harness mobile technology as a tool in promoting their work. December 2003 saw the launch of wildlive! – a joint venture between the Vodafone Group Foundation, Vodafone UK and Fauna & Flora International. A fully-featured website providing a wide variety of conservation news stories, discussion boards, field diaries, competitions, downloadable resources and image galleries was developed using a shared database which also feeds directly into a micro-site on Vodafone's live! platform. Vodafone live! users can access a wide range of these services, in addition to downloadable animal-sound ringtones, wildlife images and conservation-themed Java games. This is the first time that conservation-based materials have been made available to mobile subscribers, giving them the opportunity to engage in conservation in a completely new way. As wildlive! proved highly successful in the first six months after its launch in the UK, the Vodafone Group is expanding the service to engage live! users across the world in conservation.

Plans have also been put in place to create a 'low bandwidth' version of wildlive! This will feed conservation information through to earlier (legacy) models of handsets and, for example, allow tourists to receive location-specific information relating to the conservation areas they are visiting, or provide them details of local markets or cultural events taking place. These will be provided via simple WAP access, or via SMS, or a combination of both.

Box 4: The digital impact: other ICTs

- The cost of going online ranges considerably from US$18/month in Sweden to US$78/month in Argentina. On other hand, internet access in Chad costs US$10.50 for just one hour, where the average annual GDP per person is US$187;
- An estimated one in three internet users in 2003 accessed the web from North America. Five years earlier the figure was nearer one in two;
- E-business will account for 10% of the world's GDP by the year 2005;
- In industrialised economies, about 25% of consumer spending and 70% of business-to-business spending will be influenced by the internet;
- In 2000, 94% of all online transactions took place in the developed world, a 19:1 ratio against Africa, Asia and Latin America;

- India's software exports are expected to grow from US$4 billion at present to about US$100 billion by 2005;
- By 2005, global demand for specialized IT skills will outstrip supply by 20%;
- The Asia-Pacific PC market, excluding Japan, grew 35% in 1999 to 14.1 million units, while the number of internet users jumped from 12.9 million to 21.8 million. Within five years, the total is expected to reach 95 million.

Sources: Gartner Group, NUA Internet surveys and News, Africanews, Inktomi, asia.internet, e-commercetimes, Financial Times, Jupiter Communications, Cnet, Forrester Communications, PC Magazine, Far Eastern Economic Review, Hindustan Times, IDC, Forbes, MobileChoice, International Telecommunications Union (ITU)

Unlike countless other high-tech products, mobiles are finding a readily accessible market within developing countries. Demand is high and, although it is a relatively new industry, mobile phone service providers tend to be highly profitable, operationally at least. With some operators able to turn a profit within a few months of operation, in recent years there has been a 'scramble' for licences and partners. With global growth forecast to hit over 30% in 2004, the rush is easily justified as Africa alone is set to grow at twice that rate (CellularOnline, 2003).

A key reason for the historically low uptake of many ICTs in developing countries lies in equipment costs and a lack of supporting infrastructure. Logistical problems, such as the vast distances involved, and a lack of finance or political/commercial will, have meant that the expansion of fixed-line networks has been slow and, in some cases, non-existent. Mobile technology, on the other hand, can be implemented without the need to run cables over vast distances, and solar energy is often available as an alternative or backup power source. Such factors, coupled with huge consumer demand, the opening up of telecommunications markets, the willingness of network operators to expand into emerging markets and the relative ease of network implementation have made mobile phones the communication method of choice in many developing countries. Indeed, uptake in some cases has been staggering – the number of mobile users in Swaziland, for example, overtook the number of fixed-line subscribers in just two years (Hall, 2003).

As mentioned, mobile phone uptake has been dramatic in the developing world. Mobile phone services, such as text messaging, have proved incredibly popular in places like the Philippines, while in Bangladesh they have connected some villages to a modern communications network for the first time. This has surprised some development practitioners, who thought that mobile telephones were a luxury item of the developed world and therefore inappropriate for many in the developing world.

In Africa, the demand for connectivity has been phenomenal. The boom in mobile phone usage has largely been facilitated by the availability of cheap pay-as-you-go SIM cards and recycled handsets, which has allowed even the poorest members of society to make

and receive calls. Some observers highlight the many countries across the African continent that are now 'leapfrogging' older technologies. Mobile phones and other wireless technologies are often the preferred options (AllAfrica.com, Oct 2003). Their impact has been felt across the board, no less so in rural areas:

> Farmers are using mobile phones to ensure the best prices for their crops, small-scale entrepreneurs are contacting potential clients, and grandparents are talking to their children and grandchildren hundreds of kilometres away.
>
> IDRC (2003a)

Their positive impact – as a communications tool – can be seen when comparing past and current practice:

> What happens now is this. People have buyers for their maize, their coffee, their produce in town. So they call a buyer and say 'Hello, we have 10 bags of maize. Do you need them? And what's your price?' They get the answer and then they call another buyer to ask 'What's your price?' They get the best price. They ask: 'How do you want it delivered, when do you want it delivered.' In the past, they would just put it on a lorry and deliver even when the buyer is not interested, even when the market is down. Now, they actually find out.
>
> IDRC (2003a)

There has clearly been a great deal of enthusiasm for mobile phones in many developing countries as in the West, albeit for different reasons. In the case of Africa, this is partly attributed to traditional African culture, with its emphasis on palaver and oral story telling. In Nigeria, for example, the average mobile phone is used for 200 minutes per week, compared with just 120 in the UK (Hall, 2003). However, the higher usage may also be due to other factors such as the lack of landlines and email facilities, larger families and social networks. While oral communication may be popular, high levels of illiteracy in some countries may negate the ability of people to use phones for other purposes, such as reading text messages.

Despite all of this, mobile networks may not always be as flexible or cheap as other technologies. In some cases, such as in Cameroon, new handset costs can actually prove to be a barrier.[6] Fixed line technology, where it exists, allows for internet access and in many cases cheaper phone calls. Mobile coverage can prove rather sketchy in some areas (see Map 1), with competing network operators tending to concentrate initially on the larger towns and cities. As markets mature, however, coverage tends to spread gradually to more rural areas.

In reality, though, literally millions of Africans are making regular mobile calls. Mobile coverage is widening and increasing numbers of handsets are becoming available to developing world markets. What role can, and should, mobile phones be playing in helping to close the 'digital divide'?

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[6] *However, there are schemes in the developed world such as Fonebak in the UK and the PhoneFund and CollectiveGood in the US, which have provided cheaper mobile phones in the developing world. These recycling schemes ensure that reconditioned handsets are sold to approved retailers in Asia, Africa and Eastern Europe.*

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