# Guidance Note on Technology Use in Conservation

## Introduction

The Technologies for Conservation & Development project (t4cd) aims to help conservation and development practitioners identify and implement technologies that can aid them in their work, driving tangible conservation and livelihoods benefits. This document presents the 7 key lessons learned that have been distilled from the t4cd project. It is intended to provide useful insights that will assist conservation practitioners planning to incorporate a technology component within their work.

t4cd [established in 2004 as a joint initiative of Fauna & Flora International (FFI), and the southern African conservation and development NGO ResourceAfrica (RA)], focused on a selection of core technology areas identified as offering significant potential to support conservation activities. Geographic information systems (GIS), global positioning systems (GPS) and wildlife tracking technologies will already be familiar to many, as their application in the conservation context is well established. The project also sought to include mobile communications and remote power supply within its area of focus.

The focus on technologies was a new and challenging subject area for both partner organisations. t4cd sought to build capacity in the use of technologies and deliver conservation value through implementation of 8 pilot projects, in collaboration with a range of new and existing partners.

## Lesson 1: Defining the technology need

Any decision to invest in and implement a technology should be based on a clearly identified need. Including new technologies in a project without considering the demand this will place on human and financial resources, and whether they will deliver added value in terms of meeting conservation objectives, can cause a project to fail.

A needs assessment with the relevant partners was a fundamental first step in project design. This process enabled open discussion of the costs and benefits of the technologies under consideration, and an informed decision on how to proceed.

## Lesson 2: Firm partnerships assist effective implementation

Building technology solutions into *existing* partnerships, where the need is clearly defined, increases the likelihood of success and can deliver real efficiencies in conservation actions.

Whether a technology is to be implemented within a new or existing partnership, a pre-requisite for success is to gain the support of all relevant stakeholders. Introduction of a new technology often demands significant financial and human resource investment, and may demand changes to work practices and/or acceptance of an unfamiliar tool. In such situations, it is essential that all those affected have a clear understanding of the purpose of the technology, or it will be a challenge to secure support for investment in, or regular use of, any new system.

**Case Study: SMS Communities**

The t4cd project SMS Communities sought to implement a mass text messaging (SMS) system that would enhance dialogue between staff of a protected area (PA) and the surrounding communities, and contribute to improved relations between these two stakeholder groups. Working with the PA field staff, t4cd secured the full support and trust of the local communities, and implemented the SMS system for management by the PA staff.

However, whilst there was clear demand and commitment from the field level staff and local communities, there was insufficient understanding of the technology need and commitment to the new approach within the PA senior management, which prevented the project moving forward.

This example underlines the importance of clearly defining the technology need at the outset of projects, and ensuring that there is understanding of, and support for, the technology approach amongst all relevant stakeholders.

## Lesson 3: Building capacity to use the technology is key

Technologies are an *enabler* of conservation rather than solutions in themselves. For example, investing in geographic information system (GIS) software will not improve mapping capabilities unless there is human resource with the skills to use the system; collecting data on animal movements using global positioning system (GPS) units will not substantially improve monitoring efforts unless the data is then analysed.

As noted above, a shared commitment to a new technology is an important element in ensuring that it is used. Other factors that can help increase likelihood of success include:

**1. Capacity building:** Provision of practical training to ensure that those expected to use the technology have the skills to do so effectively. If staff change occurs, it is very important that the relevant skills are transferred to the new staff member(s).

**2. Technology champion:** The presence of an individual with a particular interest in / commitment to the technology

will help to sustain enthusiasm for the use of new tools, and can play a trouble-shooting role should any technical issues arise or other members of the team have questions about the equipment.

**3. Simplicity is key:** In the financially-constrained conservation sector, where access to technical support and highly qualified information and communication technology (ICT) professionals is limited, simple creative solutions are invaluable. The focus of all technology applications should be to identify the simplest effective solution and ensure that use of the technology makes the operating environment easier and more productive, rather than increasing its complexity.

**Case Study: Multi-stakeholder forest monitoring in the Afi River Forest Complex, Nigeria**

In Nigeria, t4cd supported the deployment of a GPS-enabled data collection system called CIEarth™, developed by Helveta Ltd, to dramatically improve monitoring of a range of environmental parameters in the Afi River Forest Complex. The tool (a handheld computer with integrated GPS device) allows the user to record information such as animal sightings, evidence of illegal activity, and farm and protected area boundaries, using a simple touch screen system.

Whilst more expensive than using a standard GPS unit to record locations and taking hand written notes of sightings, all the information recorded using CIEarth™ is automatically geo-referenced, making management of the data much easier. Also, users are guided through the system via a sequence of icons, rather than text, making the tool accessible to rangers or community members with low levels of literacy.

In this case it was the simplicity offered by a more advanced technology that made CIEarth™ an attractive option. As in the case study above, training was provided to ensure that there was sufficient local capacity to use and maintain the technology.

*Rangers learning to use the CIEarth monitoring tool / FFI*

**Case Study: GIS and GPS at the Wilderness Africa Trust, Zimbabwe**

t4cd's work with the Wilderness Africa Trust in Northern Zimbabwe focused on the implementation of GPS and GIS technology to replace a paper-based method of wildlife monitoring, which had become unwieldy and inefficient. t4cd facilitated intensive training in the use of GPS units and computer equipment for 14 patrol scouts, which included practice in the field.

This training ensured that the skills were in place internally to maintain a GPS-enabled monitoring system, and was greatly enhanced by the fact that there was a technology champion within the organisation who took responsibility for GIS skills to ensure that the data collected was analysed and used effectively.

## Lesson 4: Must be appropriate technology

Any technology used must be appropriate to the operating conditions. This is true for both the technology design, the resource required to implement it, and its ability to withstand challenging operating conditions. The concept of 'appropriate technology' applies equally to web based communications tools as to field equipment.

In the CIEarth™ example described above, the software was appropriately designed to meet the conservation need, but the hardware was also highly portable and 'ruggedized' to protect it from the rigors of extensive field use. In the case of SMS Communities, the technology solution was less appropriate, as explained in the box on the following page.

It is very easy for non-experts to be completely overwhelmed by the sheer range of options available within a single technology area. However, there are a variety of websites that provide advice on topics such as GPS, GIS, wildlife tracking, mobile communications and power supply technologies. The t4cd website provides guidance and project case studies on all these themes, and has a list of other useful websites at the following URL: http://www.t4cd.org/Resources/Pages/UsefulLinks.aspx

**Case Study: SMS Communities**

The mass SMS system selected for SMS Communities was internet-based; as such text messages could only be sent to groups of community members from a computer with an internet connection, making use of the system whilst traveling or in the field impossible, or very expensive. Building on the SMS Communities experience, t4cd consultant Ken Banks has sought to develop an alternative mass SMS platform that is more appropriate for the needs of NGOs.

This system, FrontlineSMS, does not rely on the internet. Messages can be sent to contacts on the system's database from a computer requiring only connection to the local mobile phone network. The system also makes it very easy to *receive* SMS from contacts as well as to send them – often such 2-way communication is very important, particularly if being used as a tool to enhance stakeholder relationships. In addition, FrontlineSMS is one of an increasing number of Open Source (free of charge) technologies.

**Case Study: dSimba GPS logger**

The dSimba GPS logger project was unusual in that, instead of involving the implementation of an existing technology, it sought to develop a new tool that was more appropriate to the conservation need. Many GPS units on the market are over-manufactured, offering more functions than many users require, at the expense of simplicity and battery life. t4cd supported the development and field trial of the dSimba GPS logger, a stripped down unit that takes location readings at a fixed time interval allowing rangers to automatically record patrol routes as they move, and quantify patrol effort against wildlife sightings, for example. The battery unit also has a significantly longer battery life than most GPS units – up to 2 weeks – making it better adapted for long periods of use in remote field locations.

## Lesson 5: Consider logistics

The appropriate use of technology should enhance the ability to achieve conservation objectives. There are a number of logistical issues worth considering that may help to avoid complications later in implementation:

**1. Challenges of operation in remote field locations:** Consider the impacts of field conditions on hardware: how will it respond to dust / heat / humidity / water / being dropped? Where necessary (and feasible) opt for more durable hardware and contact experts to find out whether there are certain technology brands that perform better in the relevant field conditions. For example, Optoma projectors use a different technology to many other projectors and are said to be better suited to dusty conditions.

Where relying on off-grid power such as generators to run sensitive electronics equipment like laptops, ensure that the power supply is sufficiently stable to be safe for such sensitive electronics.

Ensure that the cost of transporting equipment to the field is factored into your budgets and consider taking spare parts if regular use of the equipment is important and there is no local supplier. Also, if equipment is valuable and is being sent by courier rather than transported in person, ensure that it is appropriately insured.

**2. Value of small-scale technology trials:** It is clear from the t4cd experience that implementing technologies in support of conservation can be immensely valuable, but can also present unexpected challenges. t4cd aimed to conduct small scale pilot projects to identify these challenges, build understanding and capacity in the use of the technologies, and establish models that could be scaled-up once they had demonstrated conservation value. This precautionary approach has proved invaluable and is particularly appropriate where there is limited previous experience of implementing the relevant technology.

**3. Avoid long-term dependencies:** It is important to consider the ongoing cost of using any technology, which includes commitment of human resource as well as maintenance of, or changes to, equipment. Whilst these costs are unavoidable, and should be amply exceeded by the value-added delivered by access to the technology, it is important that they are quantified and prepared for.

Equally important is to think carefully before embarking on long-term relationships with external technology suppliers. Whilst external suppliers are keen to secure your business and will often offer a preferential rate at the outset, if you are dependant on the provider for ongoing technical support be sure to have a clear understanding of the cost and what that support will cover.

Such caution should also apply when accepting in-kind donations of technology or technical expertise. Whilst the initial contribution may be very valuable, the ongoing cost of maintaining the technology may be difficult to bear.

## Lesson 6: Stakeholder participation in technology design

A collaborative and iterative approach to developing new technologies, or customising existing ones for a specific conservation purpose, is very valuable. Involving all key stakeholders, particularly the intended users of the technology, in the process of project design through contribution of feedback and recommendations, will help to build understanding and confidence in the proposed technology. It will also enable expectations to be identified and managed appropriately and, critically, ensure that the resultant technology is designed and implemented in a way that best meets the expectations of the user.

**Case Study: dSimba GPS logger**

The dSimba GPS logger was developed by an individual with a personal interest in the technology, but limited experience of its application in the field conservation context. However, t4cd was able to identify partners in the field with a need for the technology and a willingness to participate in its development. These partners trialed the prototype in the field and their feedback and recommendations directly informed subsequent changes to the technology design. Whilst issues remain, including the difficulty of balancing unit size and weight versus cost, the dSimba does offer a remarkably low cost solution to GPS logging over substantial periods of time. The collaboration between developer and user has been crucial to reaching this point.

A similar model has been adopted to drive improvements to the FrontlineSMS system discussed above, with NGOs trialing the software and providing invaluable feedback to the developer.

**Case Study: Multi-stakeholder forest monitoring in the Afi River Forest Complex, Nigeria**

In this case it wasn't a question of developing a new technology but rather customisation of an existing tool for a specific conservation purpose. The CIEarth™ software was customized to allow rangers in Afi River Forest Complex to collect data specific to the site, for example sightings of key species including Cross River Gorilla and chimpanzee and evidence of illegal logging. All key conservation stakeholders at Afi, as well as local community representatives, contributed to the design of the final system by providing recommendations on the data that the system should collect during a participatory workshop.

## Lesson 7: Innovative cross-sectoral partnerships

A key aim of t4cd was to assist in bridging the divide between conservation and technology experts to help drive innovative collaborations that further conservation objectives. Our work with Helveta Ltd in Nigeria is an example of where this cross-sectoral approach has borne fruit. In this case, CIEarth™, a technology originally developed for the timber industry as a tool to create concession inventories, was readily adapted for conservation purposes. For FFI and the Nigerian Conservation Foundation (FFI's key partner in Nigeria) there were clear conservation benefits. For Helveta, the benefits included further development of the conservation application of their monitoring tool and the opportunity to thoroughly test the technology.

Such cross-sectoral opportunities may be less obvious than choosing to utilise a technology that is already being applied in the conservation context. However, where there is innovation and a willingness on both sides to collaborate, there may be scope to employ technical expertise to achieve important results for conservation.

## Further Information

For more information about the t4cd project, or any of the case studies featured in this document, please visit t4cd's website, where you can find details of over 200 technologies that may be usefully applied to support conservation activities. The site also features a wide range of case studies of existing technology-focused conservation and sustainable development projects, as well as news items and links to other relevant information sources.

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