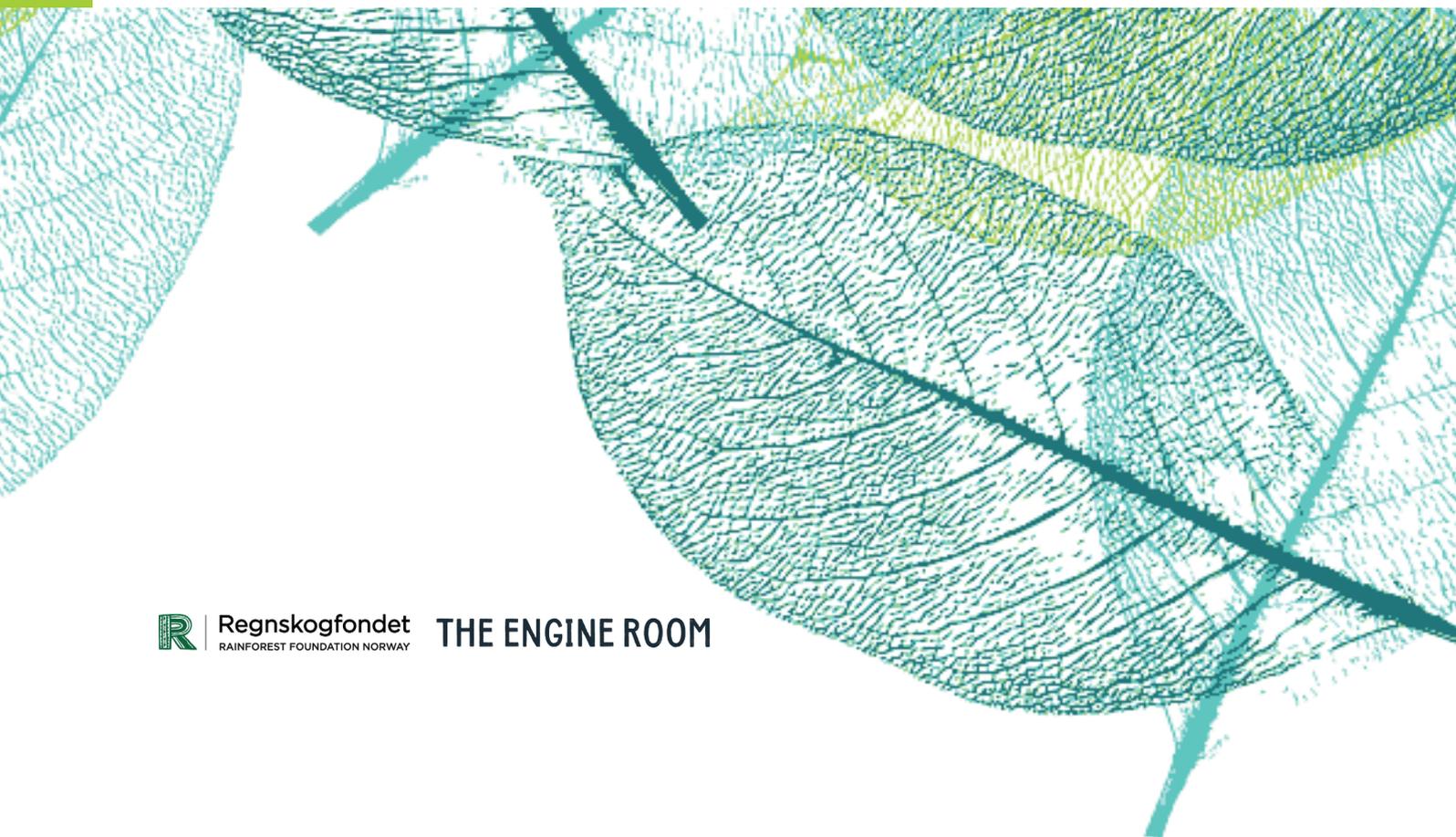


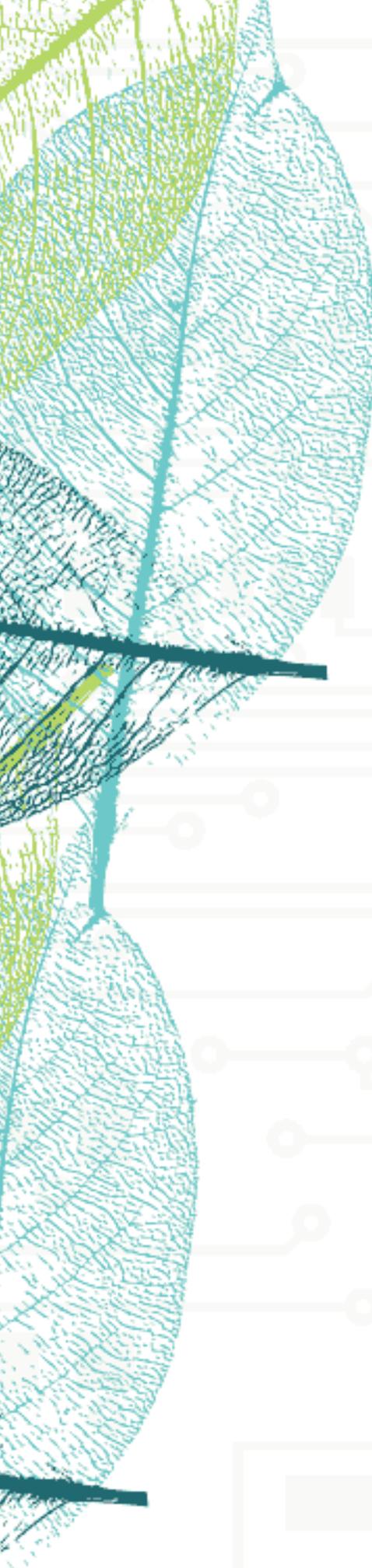


Primer

technology

**to monitor and share information on
rainforests and forest peoples' rights**





nrq

Primer on using technology to monitor and share information on rainforests and forest people's rights.



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Foreword

How can new and evolving technology be useful in advocacy for rainforest protection and forest peoples' rights? This broad, open question is the starting point for this primer.

In 1989, when Rainforest Foundation Norway was founded to promote rights-based rainforest protection, phones were hardly mobile and the world wide web was science fiction. A lot has changed. Now advanced technology has become cheaper, more available and easier to use, opening up exciting new opportunities for rainforest monitoring and sharing of information. Every week a new tool or platform seems to be created to help us map forest resources, detect illegal logging, report on human rights abuses or trace the origins of commodities.

However, other things have not changed at all. Indigenous peoples and local organizations in rainforest countries still struggle to claim their customary rights and protect rainforests under difficult conditions. Often infrastructure and means of communication are poor, and lack of training and funding can be serious obstacles to taking advantage of the opportunities that technology offers. In general, the interest groups behind unsustainable forest exploitation have more resources to use new, evolving technologies than the local groups or civil society organizations working for forest protection.

Even so, there are a lot of amazing examples of how local activists employ new technology in ingenious ways to make their work more effective and efficient. Unfortunately, there are also a great number of unsuccessful projects where money and hard work is wasted. Although objectives and tools vary greatly, what the **successful projects** generally have in common is that they are solidly designed, and based on clear goals and a thorough analysis of the problem at hand.

Seeing how important solid planning and design is for the success of technology-projects, Rainforest Foundation Norway has partnered with *the engine room* to make a basic introduction to the use of technology in rights-based rainforest protection. In the process of mapping the myriad of existing initiatives that could be useful in our work and for our partners, we decided that a basic introduction to the use of technology in rights-based rainforest protection could be useful to many.

That is the purpose of this report. It describes advantages and disadvantages of different tools that may be used, using many concrete examples. It also provides a step-by-step guide to strategic project development, suggesting essential questions that must be answered to ensure that technology serves the project's needs, and not the other way around. While the report can be read from start to finish, it is designed to allow readers to easily access the information that interests them the most. Suggestions for further reading are provided for those who want to explore a particular tool or experience in more detail.

Use of technology has a great potential for strengthening indigenous peoples' rights and forest protection – and it has been inspiring to see so many inventive ways that indigenous peoples and local activists already employ technology. Hopefully this “primer” can help those who want to start projects or develop their projects further use technology effectively, as well as inspire us to learn more from each other's experiences.

Lars Løvold

Director

Rainforest Foundation Norway

A handwritten signature in black ink that reads "Lars Løvold". The signature is written in a cursive, flowing style with a large initial 'L'.

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Introduction

This primer is an introduction to using technology to monitor and share information on rainforest issues, land rights and indigenous rights.

It is designed as a starting point for organisations and activists interested in adding technology to improve their advocacy work, but can also be useful for organizations with some experience using technology to reflect on how they can increase the impact of their work.

The primer has been structured so that you don't need to read the whole thing, but can explore sections that are relevant for you and use them to find more detailed guidance.

This primer

- » shows ways in which technology can help your work,
- » highlights some of the tools that are available,
- » gives practical information to help you decide what you need, and
- » provides links for more detailed guidance on specific tools and strategies.

What do we mean by “technology”?

The word “technology” in this primer doesn't refer to a specific technological solution (like satellite maps) or tool (like mobile phones). We're including a whole range of tools, methods and techniques: computer software, digital devices like mobile phones or cameras, analysing large amounts of data, using online tools to communicate information, and more.

How to use this guide

This guide is not comprehensive – it gives you the basic information you need to get started, with a selection of good places to go if you want to learn more. It has three main parts:

Goal and strategy

This is probably where most projects fail. A successful project requires explicit goals and a solid strategy – from planning out how the project will work, to managing information when the project is in progress. The first section of this primer sets out general principles and things to think about when designing any project that uses technology.

Tools

The second section introduces some of the tools that can be useful in rainforest-focused projects, grouped into six types:

- » mobile (cell) phone applications to collect and record data from the field
- » maps produced together with communities (participatory mapping)
- » satellite imagery
- » do-it-yourself aerial photography (such as drones)
- » audio and video
- » online maps that combine and layer different types of data on top of each other

Further resources

The final section lists a series of guides and tools with more detailed information that can help you take the next steps in adding new technology into your project.

Section 1

Information technology and forests

Information technology, and forests

What's new

Sharing information is easier

Internet access and mobile phone networks are spreading across countries and into previously isolated areas. Organisations can now document and share information about incidents as they happen (in 'real time'). Technology also makes it easier to collaborate with organisations from other countries (like the Amazon-focused network RAISG) or other continents (like Rainforest Foundation Norway's network of partners).

Tools are being developed for your needs

A wide range of tools – many designed for use in rainforest environments – have been shown to make it easier to campaign and monitor information.

It's simpler to find and use the data you want

Data on topics like land usage, forest cover and natural resources used to be hard to find, expensive or difficult to use. Now, this is changing. Combined with information collected by your organisation (such as community boundaries or biodiversity), this can give you a rich, powerful set of data to use in advocacy.

Technology is cheaper and more powerful

More and more organisations can now think about accessing tools like smartphones and data visualisation software, which were previously out of reach.



What's not new

Technology still needs humans

No matter how sophisticated the technology, it cannot replace the need for strong relationships with communities, based on trust and knowledge of local context.

Introducing any new tool takes time, money and effort

Nothing slows a project down like discovering too late what resources a technology component needs. Project staff and local communities need time and ongoing support to use new tools or information sources to their full potential. Technology is never a magic bullet and rarely a quick fix.

Technology can help organisations protect forests or people's livelihoods, but it also helps those with the opposite objectives

Governments seeking to suppress data or companies behaving illegally also benefit from technological advances, and often have the advantage of more money and human resources.

Section 1

Information technology and forests

Principles in designing projects involving technology

Define clear project objectives and use technology only when it helps you achieve them – not for the sake of using technology. (*For more on this, see the Planning section.*)

Don't assume—ask. Learn about how your organisation and the people you're working with relate to technology, and factor this into your project design. Don't assume you know how staff will respond to new mapping software, or what a community will find useful. Ask them – and keep asking all the way through the project.

Recognise that **you will have to commit resources to use tech effectively.** You may need to invest in hardware at the start, train people in how to use a new tool, or bring in external expertise. You will definitely need to dedicate funds to maintaining and replacing technology, as well as expert support when things go wrong.

Don't spend time and money on new technology if a good solution already exists. Take the time to research what has worked for similar efforts before choosing any tools, and collaborate with organisations that have had similar experiences.

Think about your project's potential impacts on people and the environment.

Here are some principles:

- » **Do no harm:** Make a written list of ways in which your project could inadvertently harm people or environments, or help other actors that are causing harm. For example, could companies benefit from knowing the location of a particular community or a valuable resource?
- » **Let people decide how data about them is collected and used,** particularly when working with marginalised communities. The communities themselves should have the final say on the level of risk and exposure they are willing to take.¹
- » **Use data responsibly:** Think about how the data you are collecting could affect people or environments, and how you will manage those risks (*see Strategy section.*)
- » **Collect and present data in a rigorous way and expect to be held accountable for the data you present:** data can be used to mislead. Be aware of any assumptions that might affect how you collect and analyze data. If you find flaws or gaps, be open about them when sharing or publishing.

¹ If you are working on any project working with marginalised communities, try asking yourself this list of questions: <http://www.fabriders.net/qafs/>

Matching your objectives with tools

Are you clear about your organisation's goals but not sure where technology could fit in? A few common objectives are listed in the table below, with some types of tools that might help achieve them.

Keep in mind that technology tools can only help achieve these objectives when they fit into a well-designed programme strategy. The **Strategy section** gives tips for thinking about how to ensure a tool fits with your priorities, and the **Tools section** provides more detail on each tool.

Remember, **the best tool for different objectives will be different in every situation.**

The table below shows some common uses, but isn't a roadmap.

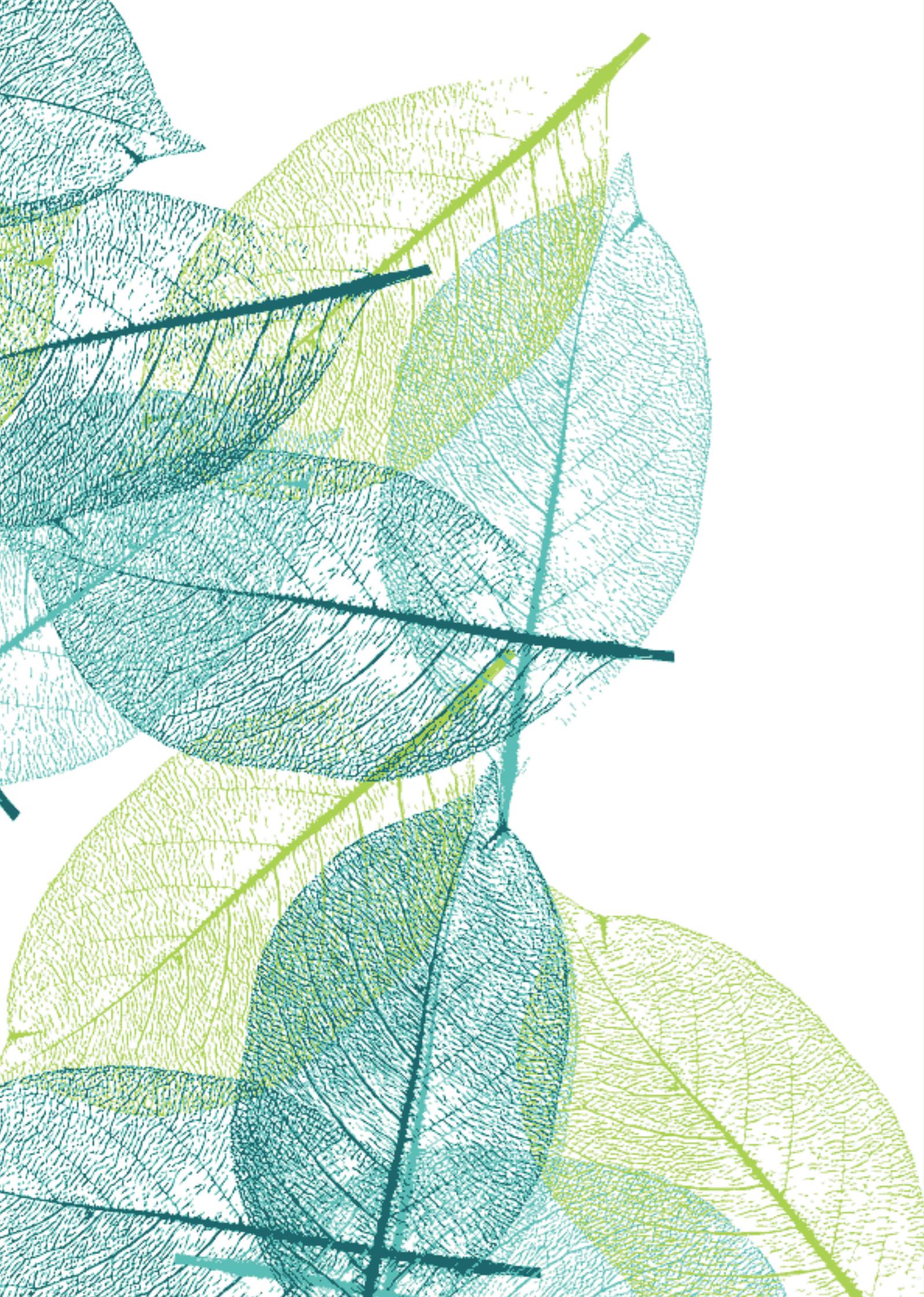
Objective	Tools that could help achieve that objective
Starting or supporting dialogue between communities and the government.	<i>Participatory mapping, Video and audio.</i>
Providing evidence to governments to encourage them to recognise indigenous lands.	<i>Participatory mapping, Online mapping, DIY aerial photography, Mobile applications, Video and audio.</i>
Collecting evidence of deforestation or forest degradation.	<i>Satellite mapping, Participatory mapping, Mobile applications, DIY aerial photography, Video and Audio.</i>
Providing evidence of wrongdoing towards individuals or communities.	<i>Mobile applications, Video and Audio.</i>
Providing evidence of companies' wrongdoing in their use of land.	<i>Satellite mapping, Online mapping, DIY aerial mapping, Video and audio, Mobile applications.</i>
Recording and monitoring the environmental value of areas of land.	<i>Satellite mapping, Online mapping, Participatory mapping, Mobile applications, DIY aerial mapping,</i>
Supporting communities by presenting and providing knowledge.	<i>Participatory mapping, Audio and Video, DIY aerial photography.</i>



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Strategy

This section draws on the Transparency and Accountability Initiative's 'Fundamentals' guide,² which is a great place to go for more tips.

Planning

Agree on the fundamentals: Strategy, vision and organisational health check

Define your long-term strategy

Work out your organisation's long-term strategy, involving staff and anyone who has a stake in your work. Ask three questions: What do you want to change? Whose behaviour needs to change for this to happen? How could you change their behaviour?

Then, state how technology will support this strategy (your technology vision)

- » Identify all the practical activities that your organisation does (for example: communicating with local communities or monitoring satellite imagery).
- » Rank them in order, with the most important at the top.
- » Choose the activities at the top of your list. Could technology improve the way that you do them?.
- » Then decide what practical steps you would need to introduce technology (read the rest of this primer for more details on this).

² <http://tech.transparency-initiative.org/fundamentals/>

Section 2

Goal and strategy > Planning



Case study

How one organisation decided to use technology to support their strategy

In Congo (DRC), the government created a protected area and granted a logging concession on the same piece of land belonging to the villages of Mpole and Mpaha in Mai-Ndombe. The overlaps created disputes between the different groups involved.

How did they decide to use technology?

- » The *long-term strategy* of Congolese organisation Natural Resources Network (Réseau Ressources Naturelles–RRN) was to ensure that the government took local communities' customary rights into account.
- » Their *technology vision* was to use participatory mapping to collect local knowledge of the geographical area, and combine it with existing maps to show evidence of overlaps and bad practice by government or companies.
- » RRN took *practical steps* including training local cartographers to use GPS receivers, recruiting GIS mapping specialists and giving them an office, and working with the community to validate the maps.

Give your organisation a tech health-check

Assess how well your organisation currently uses technology – do you have the right equipment? Can you get technical support easily when you need it? Sort out any existing problem areas before starting any new project.

Design your technology project

Define your goals

State what you hope your project will achieve. Base your goals on the three points above: your organisation's strategy, your technology vision and your technical capacity.³

Design together with your users

Think about who might be involved in implementing the project (from your organisation's staff, to local communities or forestry officials), and involve them in your planning. Timing is everything: when asking for input, make space to incorporate it into the project. Consult specialists like technologists and lawyers before deciding on any essential components.

Make a project plan

Decide on the critical features you need before choosing any tech tool, and be sure that it tool can grow along with your program. Ask other organisations if they have conducted any similar projects. What worked, and what didn't?

³ See page 28 for guidance on defining how to reach the people you want to influence.

Think about what a reasonable timespan might be for your project. Then, add in plenty of extra time for training, problem-solving and delays to implementation. Start thinking early about the end of the project – what will happen to any equipment, and the data? Some projects take time to make an impact: plan how you will continue after the project deadline has passed.

Pilot your project first

A pilot allows you to test at a small scale, identifying early on what is working and what isn't. Choose something that you can measure easily. (For example, for a system monitoring illegal logging, this could be the number of reports collected by monitors in one month.) Design your project so that the pilot's results can influence how the rest of the project develops. This will make your plan much more flexible if circumstances change.



Case study

Piloting a new piece of technology can bring unexpected benefits

In 2013, Rainforest Connection held a pilot project in West Sumatra (Indonesia) to test an application to monitor illegal logging using a modified mobile phone.

How did it help?

- » The pilot was designed to assess whether the technology worked, but it did even better than expected, capturing information that allowed local authorities to catch illegal loggers two weeks after it was installed.
- » The loggers have not returned to that area since then. Rainforest Connection is now holding a second series of pilots in Equatorial Africa.⁴

Monitor the difference you make

Before starting, assess the situation and write down what you find. This will give you a 'baseline' that you can use to measure what has changed as the project progresses, and to demonstrate results for partnerships and fundraising.

Then, think about your project's potential effect on that situation, and how you can measure any changes. Decide when and how often to track progress using these measurements.

Budget what you need

Be realistic: don't underestimate costs. Ask other organisations how much they spent on similar projects, and remember that unexpected expenses will always occur.

⁴ <http://news.mongabay.com/2014/0624-rainforest-connection-interview.html>; <https://rfcx.org/>

Section 2

Goal and strategy > Planning

Training

Training may take up a significant proportion of the budget: make sure there is money for people to get the skills they need. Other things to think about include:

- » Do your staff have enough technical capacity to use a new tool, or might they need external support to help them use it?
- » Don't rely on one 'expert' who has essential skills in one area – what if they leave?
- » What do technical staff need to know about the communities you are working with?
- » Do staff need security awareness training?



Using data responsibly

Planning to use data responsibly

Almost every project involves dealing with data in some way, even sending emails or using a spreadsheet. Failing to manage this data carefully can put your organisation and the people you work with at risk. Data leaks might lead to violence, open data might help land speculators, and hardware might be tracked to target activists. A risk assessment is an essential part of a project plan that helps you prepare for the unexpected.

Start by identifying a set of events and actors (people or organisations) that could stop the project from achieving its goals.⁵

- » Write down answers to these questions: How likely is each of these events to happen? How serious would their impact on the project be?
- » Prioritise the events that are most likely to happen and the most serious.
- » Create a set of practical steps: what can you do to make each event less likely? Can you limit the damage if it does occur? What is your back-up plan?
- » **Preparing for the worst** Even with the best planning, emergencies happen. Responding might require resources from external advocacy support to emergency medical funds, legal support, increased security funds, or tool replacement costs.⁶

Technology costs

Always include user development, testing, maintenance and support. Budget to replace devices that get lost or broken, as well as strategies. How much will it cost to replace your software in one year? Five years? If you are collecting sensitive information, is your software secure? This costs money, but it could save you more later on.

⁵ Consider including digital security risks, but also think about how the collection of data might impact local power relationships, or how data might be re-used by others (see <https://securityinbox.org/> and <https://responsibledata.io> for examples of risks).

⁶ Digital Defenders' Digital First Aid Kit gives some simple advice on dealing with emergencies, and suggests organisations to contact if you need further help: <https://digitaldefenders.org/digitalfirstaid>

Get the data

Any piece of information that you collect during a project is 'data.'

Go back to your project goals and list all the types of data that might be available (from maps to survey responses, photos or interviews). Select the data that will help achieve your goal.

Where can you find the data?

If good data already exists, don't waste time and money collecting it again. Think creatively: do international datasets include your country? Has another organisation created a database on the same issue?⁷ If you can't access map data on a topic, can you use information published by a company instead?⁸ If the data has been collected but is not publicly available, check whether Freedom of Information laws can help push governments to publish it.⁹



Case study

Sharing data from different sources

The Indonesian news site Ekuatorial creates interactive maps and presents them with articles on environmental issues written by partner publications. The maps combine geo-referenced data from Global Forest Watch on palm oil plantations and forestry concessions; information collected by the Indonesian Forestry Ministry, international datasets like the World Database on Protected Areas, and volunteer-submitted information from Humanitarian OpenStreetMap. To make the map, Ekuatorial hired professional cartographers, who used CartoDB and MapBox to create the maps and then published them directly on the WordPress theme JEO (see the *Online Mapping* section).

How did it help?

- » Ekuatorial allows other organisations to republish its maps on their own site using an easy-to-use 'share this map' function.
- » The raw data collected is also useful for other Indonesian organisations because it is regularly updated, and available to download for free.¹⁰

7 You can find publicly available datasets in the Open Access Directory's data repository list http://oad.simmons.edu/oadwiki/Data_repositories, Data Portals (<http://dataportals.org/>) or the Open Knowledge Foundation's DataHub site: <http://datahub.io/about>.

8 For example, the Environmental Justice Atlas is a global map of environmental conflicts (<https://ejatlas.org/>), while the GDELT project provides free data of media reports of protests and conflicts (<http://www.gdeltproject.org/>).

9 The Data Journalism Handbook has more information on how to make Freedom of Information Requests: http://datajournalismhandbook.org/1.0/en/getting_data_1.html. In Brazil, you can use the Queremos Saber website to help you make requests: <http://queremossaber.org.br/>

10 <http://ekuatorial.com/>

Section 2

Goal and strategy > Get the data

Set standards for your data

Before starting, double-check that your methods will give you data that you can actually use. Collecting the wrong type of data can be expensive and time-consuming. 'Qualitative' data like texts of interviews with forest communities can be powerful in advocacy, but **'quantitative' data that can be counted will be easier to analyse**, more manageable in large quantities and simpler to compare with other sources.

Create categories for your data, to help you organise and analyse it later. Take time to decide on the categories that you need, and test them first to make sure that all your data will fit into them (it will be time-consuming if you have to re-categorise half-way through).

Pick the right format

Collect data in a format that computer programmes can read and process automatically. Avoid formats that can only be read by software from a particular company (like Microsoft), which may become unreadable if the company stops making the software.

Consider recording and publishing it as Open Data, which means that it that can be freely used, reused and redistributed by anyone. This involves two things: choosing a suitable format (there is a list here¹¹) and licensing it so that it can be re-used.¹² There are many benefits to publishing like this: it shows that your organisation is transparent about the data it collects; and other organisations may be able to use your data to help them.

Understand where you can compare data – and where you can't

Combining different data sources can reveal entirely new information and present powerful messages for campaigning. For example, you can combine aerial photography collected by DIY satellite photography with participatory mapping data. But examine these data sources carefully. Can they be compared? Do both sources cover the same geographical area, and is the quality of the data consistent enough? If the right data isn't available, think about changing the way you collect it so that the results fit better with data that already exists.

Sometimes the simplest option is the best

Don't spend money on technology unless you're certain that you need to. For example, if you are collecting data from a small number of people in an accessible area, it may be cheaper and easier to do it using paper rather than a specific technology solution.

11 The Open Data Handbook has a lot of useful information on this, including a set of open file formats that you can use to publish data in an open way: <http://opendatahandbook.org>

12 <http://opendatahandbook.org/>



Case study

Combining different types of information

Organización Regional AIDSESEP Ucayali (ORAU) established a monitoring system designed to document the existence of indigenous peoples living in voluntary isolation (IPVI) and threats to the environment in Peru.

How did it help?

Photographs of evidence, GPS data and other information is saved and systematized in a digital database.

- » Together with similar information from other indigenous peoples' organizations, this has made it impossible for the Peruvian state to keep denying the existence of IPVI.
- » The authorities are now more cooperative with ORAU on address cases involving IPVI and developing policies relating to IPVI territories, and have allocated funds for this purpose.

Practical considerations when working with data and rainforests

Power: **Unstable power supply can corrupt data:** if possible, use an uninterrupted power supply (UPS) and power surge protectors, or battery-powered external hard drives. Some mobile phone batteries have much longer lives than others—test thoroughly before use.

Connectivity: **Think carefully before relying on communications networks.** If mobile internet isn't available, pick tools that use regular mobile phone (GPRS) networks; if phone networks aren't available, don't use them. Always have a back-up plan if any network goes down.

Internet connection: Be realistic about what you can achieve with a weak internet connection – it will slow progress and increase costs. Consider modifying project websites to work in low bandwidth¹³ or choose tools that work offline.

Don't rely only a company to store your data online

For example, millions of photos hosted on the Twitpic service were at risk of deletion in 2014 when the company closed down¹⁴, while in 2011, thousands of videos hosted on the South African site MyVideo were lost because the service lacked back-ups and servers hadn't been properly maintained.¹⁵

¹³ Aptivate has a guide to designing websites that work better in poor internet connections: <http://www.aptvate.org/webguidelines/Home.html>; Engage Media provides advice on compressing files that work better in low-bandwidth areas: <http://www.engagemedia.org/help/how-to-compress-video>

¹⁴ <http://www.dailydot.com/technology/twitpic-twitter-acquisition> See this list of websites at risk of being shut down for more information: <http://www.archiveam.org/index.php?title=Deathwatch>

¹⁵ <http://www.engagemedia.org/Members/toysatellite/files/secure-my-video-guide-pdf>

Section 2

Goal and strategy > Get the data

Storing data: Physical storage like DVDs and flash memory drives can develop mould or get dust inside them: keep them in airtight, waterproof plastic bags. Don't rely on any one piece of storage: **back up your data in several locations.**

Preparation

To start with, **create a methodology** (an explanation of how you have collected and analysed the data). Check your methodology is robust with experts, and present it clearly whenever you publish results. Be ready to explain your methodology or use it to defend the credibility of your work. For examples, look at Open Development Cambodia (for a simple methodology)¹⁶ and the Land Matrix (for a more detailed one).¹⁷



Case study

Getting recognition for the quality of your evidence

Borneo Resources Institute (Brimas) trains communities in Sarawak (Malaysia) to map their own communities using GPS, plotting indigenous territories, land use and areas with natural resources. The government and private sector companies initially dismissed Brimas as not being knowledgeable enough. However, law courts recognised the quality of the data collected during cases to prove indigenous ownership of land, improving Brimas' reputation for accuracy. Malaysia's Land and Survey Department now uses Brimas' maps to validate their own products.



Using data responsibly

Know when NOT to collect data

To reduce risks, only collect the minimum amount of data that you need to carry out your project.¹⁸ Think back to your risk assessment (see *Planning* section) and collect sensitive data in a more secure way if necessary.¹⁹

Informed consent

When you collect data about an individual, you hold information that is personal to them. It is up to the person providing the data – not you or your organisation – to decide how that information should be used. Create a process to follow whenever you collect data from people that includes the following steps:

¹⁶ <http://www.opendevdevelopmentcambodia.net/briefings/forest-cover/>

¹⁷ <http://landmatrix.org/en/about/>; see also <http://maaproject.org/about-maap/>

¹⁸ For an example of how to share data while considering people's rights, read this guide from Forest Compass: <http://forestcompass.org/how/resources/data-sharing-community-based-forest-monitoring-lessons-guyana>

¹⁹ Try the Responsible Data Handbook's section on collecting data (<https://responsibledata.io/resources/handbook/chapters/chapter-02a-getting-data.html>) or Access Now's helpline for advice on next steps: <https://www.accessnow.org/help>

- » Explain how the data you are collecting will be used, published and stored.
- » Discuss any risks with the person, and check if they have additional concerns.
- » If they decide that they are still happy to participate, record a statement from them agreeing to this (either by signing a document or recording a spoken statement).
- » Allow people to change their decision about how their data is held or used later on.²⁰

Get feedback

Don't wait until the end of your project to find out how well it is working: ask at regular intervals, and adjust your activities accordingly. You can collect this information using methods like surveys, face-to-face meetings and tracking other measures like online interactions.²¹

Manage the data

Before you start collecting information, plan out some categories to help organise the data. Base these categories on the people you want to reach (see page 28 for more on how to do this).

Control the quality of your data early

Don't wait until you have finished collecting the data to check it: check the factors below before starting.

Make your formats consistent

Have a clearly defined system, format and set of categories for collecting information. This will save time in preparing it for analysis later: for example, record dates in the same way throughout (rather than some like '12-March-2015' and others like '12/03/15'). Double-check that anyone inputting data understands the system.

Identify where problems are most likely to occur

Think about the people using the technology: where will they make mistakes? Once you know where these points are, introduce a second check on the data or include extra training for staff. Technology tools can help: for example, you can make certain fields in an online survey only accept a response in a format you specify.

Make sure all your data goes through the same process

Ensure all data is collected with the same methods and analysed in the same piece of software—this will make it easier to compare and analyse.

²⁰ The Responsible Data Forum has a checklist for creating Consent policies
https://wiki.responsibledata.io/Framework_for_consent_policies

²¹ The engine room has a hands-on guide to monitoring and evaluating projects: <https://www.theengineroom.org/diy-for-me/>. Feedback Labs' toolkit has more resources and tools to help you collect information (<http://feedbacklabs.org/toolkit/>)

Section 2

Goal and strategy > Get the data

Making the data useful

Here are the main things you need to think about when preparing and analysing data:²²

Preparing your data

You may need to clean data (manually removing any errors or fixing keyboard mistakes) and convert it into another format. This stage is commonly called 'data wrangling', and it may take up a lot of time. Include it in your budget.

Statistics 101

There are many techniques for finding meaning in data. These include straightforward methods like percentage increases and more complex statistical techniques like correlation ("increased logging has been matched by increased flooding"). If the dataset is very complex, people on your team may need to understand statistical analysis to extract meaningful, robust information. If your project needs more expertise, consider hiring a consultant or asking an NGO that provides pro bono data support.²³

Presenting data clearly

Communicating what your data shows is one of the most important parts of a project – if you do it well, you can grab your audience's attention and encourage them to act. There are many free or cheap tools that can help you make data visual—see Tactical Technology's *Visualising Advocacy* project for examples based on your needs.²⁴



Using data responsibly

Look after your data

How will you store your data within your organisation?

If you are storing data on a network in your organisation, it will be kept on a server (a computer that provides data to other computers). If you have a server that is kept physically in your location, budget for someone with skills to take care of it. If you are paying to host your data on an external server, check that the provider offers all the features you need and has good security measures.²⁵

Encrypt physically stored data

Data can be stored physically on computer hard drives or external hard drives, which can be encrypted using software like TrueCrypt or FileVault. (This is not a substitute for strong digital security measures: if a person can access your password, encryption will not help you.)

²² School of Data's 'Data Fundamentals' course has more information on all the sections below:
<http://schoolofdata.org/courses/#DataFundamentals>

²³ For example: School of Data (<http://schoolofdata.org>), DataKind (<http://www.datakind.org>), DoingGood Fellows, Data Look (<http://datalook.io>)

²⁴ <https://visualisingadvocacy.org/resources/visualisationtools>

²⁵ https://wiki.responsibledata.io/Newbie_guide_to_select_hosting

Deleting or archiving your data

It is best to keep your data only for the period that you need it. *The data may not be at risk now, but it is difficult to know what the future will hold.* To delete data on a hard disk properly, you need to write over it several times. However, if the data has lasting cultural or historical value, or might be useful as evidence in the future, you may want to preserve it. *Pick a format that is likely to be usable in future,* and consider partnering with an archive that will maintain the archival systems for you.²⁶

Check for legal restrictions

Legal issues will vary depending on your country and the kind of data you have, but can include data protection, copyright issues and even prohibitions on encryption technology. If you find that you have been breaking the law halfway through the project, you may have to pay a fine or even stop work. Look into this carefully, and get legal advice if you are unsure.²⁷

Who else can access your data?

If individuals are identified in data you collect, your staff, allies or local communities could face threats. Lower the risks by taking three steps: only collect and upload the information that you really cannot do without; remove names and information that might identify people wherever possible; and avoid using any technology services that are a particular risk in your country.²⁸

26 Some organisations you could contact are listed here:

<https://responsibledata.io/resources/handbook/chapters/chapter-03-closing-a-project.html>

27 See the Responsible Data Handbook for more: <https://responsibledata.io/resources/handbook/chapters/chapter-02-managing-data.html#what-types-of-laws-and-procedures-apply-to-your-data-project>

28 The UK Anonymisation Network provides a free course on assessing when you need to anonymise data: <http://theodi.github.io/ukan-course/>.

Section 2

Goal and strategy > Use the data

Use the data

Now you've collected the data, you need a carefully planned campaign strategy to use it well.²⁹

Planning your campaign

Map out the field

List all the people and organisations that are involved in an issue. Be as specific as possible: avoid broad categories (like 'the public' or 'government officials') and choose specific sub-groups (like business journalists). Then group them into three categories:

- » **Allies** – people or organisations that already support what you do.
You need to get these people to actively support your campaign.
- » **Neutral parties** – people who are not currently involved.
You need to educate these people to turn them into allies.
- » **Opponents** – people who oppose the change you want to see.
You need to counter these people – either by changing their mind or limiting the impact they can have.

Identify allies

Any advocacy campaign needs a network of allies. Plan how to engage the groups you listed above, keeping them interested and involved. Think creatively about whether you can help each other: would your data be useful for them? Do they have contacts that you need?

Case study

Using your allies

In 2007, the Chilean organisation Movement for the Defence of the Environment (MODEMA) produced a series of posters of the Punta de Choros to make local residents aware of the risks of building four thermoelectric plants. The posters were seen by a visiting group of Chilean video-makers, who filmed a documentary about the area and started a campaign called Chao Pescao ('Bye-Bye Fish' in Spanish).

How did it help?

The groups worked together to increase their impact. As the campaign grew, more allies got involved, with national media covering the issue for over ten days.

- » The campaign combined online and offline tactics: the documentary was screened on the streets of the capital Santiago using bicycle-powered cinemas, and citizen demonstrations were immediately uploaded and shared through YouTube and among the 10,000 members of Chao Pescao's Facebook group.
- » In January 2010 the government cancelled building the thermoelectric plants, and new presidential candidates were pressured to keep Punta de Choros clean.³⁰

²⁹ FERN have produced a guide to advocacy for organisations focused on forests:

http://www.fern.org/sites/fern.org/files/provokingchange_LR.pdf

³⁰ <https://archive.informationactivism.org/en/chaopescao>

Choose a target audience

Choose one or more of these groups whose behaviour you want to change: they are your target audience. Do you want civil servants to change policy on land rights, or get a company to improve forest management practices? Avoid targeting very large groups: it will be more difficult it will be to craft relevant campaign messages.

Figure out how to reach that group

Start with what you already know: where do they get their information? What are they interested in? What media do they use? What kind of change can they realistically influence? Fill in the gaps in your knowledge: go public meetings, scan social media or meet people directly.



Case study

Choosing your target

Indonesian organisation Aliansi Masyarakat Adat Nusantara (AMAN) received information through its SMS reporting platform that 30 people had been detained in north Sumatra (Indonesia) for allegedly obstructing a company's operations.

How did it help?

- » AMAN used the information from the SMS alert to identify who had detained them – and who they should target in their advocacy campaign.
- » They then created a team of communications, mapping and legal experts, who successfully lobbied for the people to be released.

Running your campaign

Choose the right tactics for the situation

Use your knowledge of your data and target audience to decide which tactics you should use:

Present data in a way your target audience can use and understand

Find out what information your audience needs. If your audience doesn't understand your data or work out what to do with it, they won't act on it. Sometimes you might want to target a particular newspaper's readers; at others, you might need to give input to policy documents.

Section 2

Goal and strategy > Use the data

Think about both the words you use and the way you present them: Choose the words you use carefully and think about developing different materials for different groups. Some groups might not know the technical terms involved in land rights negotiations, while others might only take you seriously if you use them. Using English might let you reach an international audience, but could limit your reach in your home country. Vary how you present your data according to your audience. Members of the public with limited time may only read a short summary of your findings, while policy-makers may need detailed reports.



Case study

Using video footage to mobilise support

In 2009, the Peruvian organisation AIDASEP recorded eyewitness footage of police violence against a group of indigenous people in Bagua region and uploaded it to the video sharing site YouTube.

How did it help?

The video was distributed widely online by bloggers, providing evidence of an incident that might otherwise have been ignored by a wider audience.

- » Solidarity marches took place worldwide and a government commission was established to investigate the incident. In 2013 Peru's state entity responsible for indigenous peoples officially recognised that people living in voluntary isolation were resident in the Napo-Tigre region (although a campaign to establish an indigenous reserve is still continuing).³¹

Check whether your campaign is working

If you can analyse different parts of your campaign while it's in progress, you'll be able to work out where to focus your effort.

What to track

The list of potential sources to check how people are responding is long, but **monitoring everything can be time-consuming**: focus the most important sources for your campaign. Three things you should be tracking:

- » **Who is talking about the issue**: has it changed during your campaign?
- » **Your data or campaign message**: is it being mentioned in public? Where, and how?
- » **Your target audience, opponents and allies**: have they responded to the campaign, or changed in any way?

³¹ <http://hub.witness.org/en/blog/social-media-and-online-technologies-indigenous-rights-peru>;

Make progress measurable

Create targets that you want your campaign to achieve and track progress against them.

Good targets are **'smart'**:

- » **specific**—make a precise definition of what you are measuring (i.e. the number of newspaper articles that use your data on incursions into indigenous land)
- » **measurable**—choose things that can be counted, like the number of people that sign a petition in one month.
- » **achievable**—don't aim to reach 100% of a particular group, unless it's actually feasible
- » **relevant**—pick useful indicators: for example, if your audience doesn't use social media much, don't measure it.
- » **time-bound**—pick a time by which you expect to have achieved your goal.

Using technology to track your campaign

Technology tools can improve advocacy campaigns in a number of ways, from monitoring campaigns,³² to managing data, to visualizing data for powerful presentations.³³



Using data responsibly

Publishing data responsibly

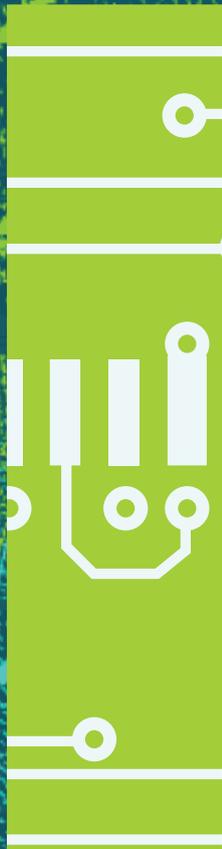
If you use an external online service to visualise or present your data, remember the risks. Once you have uploaded your data, you can't always know whether the company can access it or will provide it to other people, or what would happen if that service went out of business. If you upload data to them, try not to include data that could put people at risk.

³² For suggestions on using technology to track media attention, user engagement or project implementation, see this guide: <https://www.theengineroom.org/diy-for-me/>.

³³ The **Visualising Advocacy** gives many more examples of things that you can do with your data: <https://visualisingadvocacy.org>



GO



Section 3

Tools > Mobile phone applications



Mobile phone applications

Possible objectives

- » **Collecting evidence** of deforestation or forest degradation
- » **Capturing evidence of wrongdoing** towards individuals or communities
- » **Recording and monitoring the environmental value** of land or forest areas
- » **Providing concrete evidence to governments** to encourage them to recognise indigenous lands

What is it

- » Mobile applications (or 'apps') are software programs that work on mobile devices like phones or tablets. In rainforest-related projects, they are mainly used to collect data in the field and transmit it directly to an organisation.
- » Mobile applications can be used for many purposes, including recording illegal mining or logging; biodiversity surveys; helping communities to map their own land; or validating government maps.
- » Applications can work on both low-tech 'feature phones' using SMS (Short Message Service) or more expensive smartphones (which include GPS sensors and cameras).

How can it help?

Collecting information from the field can be a time-consuming process that involves physically transporting large numbers of paper forms through remote areas, then manually transcribing them. Mobile applications make this process much quicker and easier.

One common approach is that forest monitors are given a mobile device pre-loaded with an application. They upload data to this application and transmit it over phone networks or a mobile internet connection to a server, where an organisation can access it. Most applications automatically capture common errors and ask for corrections. Most smartphones capture data that can be mapped and combined with other forms of data (see *Online maps* section).

Tools

You can choose from a wide range of applications: the right one for you depends on how much data you're collecting, how much technical support you need, and how specific your needs are.³⁴ There are websites that can help you identify what tools and mobile apps are the best fit, including Humanitarian Nomad³⁵ and Solutions Center³⁶.

Cost

Cost depends on three factors:

- » **Type of device:** For collecting geolocation data, dedicated GPS trackers are more accurate, and usually have longer battery life and are more durable. For collecting other types of data, smartphones with Android operating systems are available for under USD100, and prices are dropping all the time³⁷. If you only need simple functions, cheaper feature phones are a good option. These can be used to collect data using SMS or programmes designed in Java (J2ME).
- » **How complex is the application?** **The more features you want, the more training and troubleshooting support you'll need.** Support is included in services like ArcGIS, but it is expensive. Open source solutions like Open Data Kit, on the other hand, force you to figure problems out (which takes staff time) or call external experts (which usually costs money). Remember that remote technical support may only be available and accessible if you can access a good internet connection
- » **How much data do you want to collect?** **The more data you capture, the more you'll spend on the database** that holds the information, backing up data offline, or SMS message fees.

To give you a taste of the options available, here are two examples from opposite ends of the cost spectrum:

Free and open source, but technically challenging—Open Data Kit

Open Data Kit (ODK) is a collection of open source tools for mobile data collection that has been used successfully in a range of rainforest-related projects.³⁸ It is free, can be modified for you, and has an active community of developers providing technical and strategic support.³⁹ The downside is that it is not perfect software: built by layers of volunteers, you can expect things to go wrong. You will probably need to budget for a software developer to modify it, and make sure you can get technical support for when things go wrong.

³⁴ Forest Compass has collected a range of options and discusses their strengths and weaknesses for use in community-based mapping: <http://forestcompass.org/digital-technologies>

³⁵ <http://humanitarian-nomad.org/online-selection-tool/>

³⁶ <http://solutionscenter.nethope.org/>

³⁷ Forest Compass provide advice on choosing a mobile phone for use in forest monitoring: <http://forestcompass.org/choosing-digital-device-monitoring>

³⁸ <http://forestcompass.org/how/digital-technologies/open-data-kit>

³⁹ There is an active forum for Open Data Kit users at <https://groups.google.com/forum/#!forum/opendatakit>

Highly capable, but not cheap—Collector for ArcGIS

The ArcGIS suite of applications is a premium GIS product that offers powerful options for producing and analysing map data.⁴⁰ A basic user licence currently costs around USD 1,500 per year, including technical support (though a limited free version is available for non-profits).⁴¹ To make the most of it, you will need to pay for its full suite: an Android app, a programme that manages the collected data on your server, and a programme to publish the maps online. The advantage of using premium paid software is that it will have more features, and you can rely on it to function as it supposed to. The downside is that it is expensive, and because the code is closed, you cannot hire a developer to change it to match your project better.

Risks and challenges

It is impossible to collect and share data completely securely on mobile phones because of the way that the devices themselves are designed.⁴² This could threaten people collecting information; sometimes just possessing an application can put a community monitor at risk. People and environments can also be threatened as a result of information that you publish about them (see the 'responsible data' sections of the *Strategy* section).



Case study

Using community-based monitors for mapping in Guyana

Since 2011, the Global Canopy Programme has run a community-based monitoring system with 16 Amerindian communities of the North Rupununi (Guyana) to provide information on causes of forest loss, land-use practices and socio-economic issues. Community monitors complete forms on Android (Samsung Galaxy X Cover) smartphones using a mobile application developed from Open Data Kit. Each form submitted contains location data from the phone's in-built GPS and photos from its camera. The resulting data is then uploaded to an online data storage system for analysis using Microsoft Excel, ArcGIS, and ODK Aggregate, and later SMAP software, QGIS, and Google Maps Engine.

How did it help?

- » The technology enabled real-time, straightforward collection and aggregation of data, and removed the need to transcribe data from the field.
- » It was popular with local communities – 87% of local leaders and village councillors said the phones had been a positive addition to the community that helped them improve their knowledge of local resources.
- » The project encouraged collaboration between elders with knowledge about natural resources and young people, who were quick to pick up mobile devices.⁴³

⁴⁰ <https://www.arcgis.com/>

⁴¹ <http://www.esri.com/nonprofit/>

⁴² See Security in a Box for reasons why: <https://securityinabox.org/en/guide/mobile-phones>

⁴³ <http://tinyurl.com/q9jg3xt>



Case study

Using participatory mapping with online maps for advocacy in the Congo Basin

In 2013, Rainforest Foundation UK used the MappingForRights (MfR) platform⁴⁴ to present information about the presence, land use and rights of indigenous peoples and other forest-dependent communities in the Congo Basin. MfR allows It enables communities to map their lands through simple icon-based apps that can be downloaded onto most Android phones.

How did it help?

- » Communities in the region used MfR to defend their rights in relation to strictly protected areas and lobby for community forest legislation.
- » Authorised users can view the data through an online interactive map, which also shows the use of (and claims on) particular forest areas. This allows users to identify where logging activities, and infrastructure and agricultural expansion, affect areas, as well as analysing the implementation of REDD projects and protected areas..
- » MfR was used to inform a major REDD project development in Democratic Republic of Congo support the development of a new mapping tool aimed at reducing the damage caused by palm oil expansion in Cameroon.



Case study

Using GPS devices to document invasions of indigenous territory

The Pro-Indian Commission of Acre (Comissão Pró-Índio do Acre, or CPI-AC) trained indigenous people in the Acre region of Brazil to use GPS devices to record invasions of indigenous territory.

How did it help?

- » The information that the indigenous people gathered was then used to make maps that highlighted the problem and presented evidence of where the situation was worst.
- » One of these invasion maps was presented to the country's former Minister of the Environment, prompting a multi-sectoral action from the federal government against invasions.

⁴⁴ <http://mappingforrights.org>



Satellite imagery

Possible objectives

- » Collecting evidence of deforestation or forest degradation
- » Capturing evidence of companies' wrongdoing in how they use land
- » Recording and monitoring the environmental value of land or forest areas

What is it

- » Satellites orbiting the globe take photographs of the Earth's surface from space, which can include images of forests or community land.
- » These photographs can be used to produce analysis of changes to a forest area over time, or combined with other forms of information, including other types of maps.

How it can help

Satellite imagery was once too expensive for all but large institutions, governments and big corporations. Now, it is easily accessible and free (or very cheap). Comparing regular images of the same area can provide proof of deforestation, trends like increased commercial activity, or visible results of forest destruction like monocultures (which follow planting patterns that can be seen from above).

Tools

There are very good free, open-source tools to analyse satellite imagery: **QGIS** is the most widely used GIS software.⁴⁵ QGIS lets users add, edit, manipulate, and present GIS data. It has less advanced features than ArcGIS (see **Mobile phone applications**, above), takes longer to learn and is less stable – but it is free, and has an active volunteer community providing technical support. You will need to know programming languages like Python for more complex analytical processes.

Global Forest Watch (GFW) is the most comprehensive tool for analysing satellite imagery of the world's forest cover.⁴⁶ GFW collects satellite images from partners and makes them free to download and re-use. It automatically analyses forest loss, provides alarm systems for fires and sends alerts when a selected area undergoes changes.

⁴⁵ <http://www.qgis.org/en/docs/index.html>

⁴⁶ <http://www.globalforestwatch.org/>

Costs

Satellite imagery can be free⁴⁷, while commercial purchases range between \$10 and \$50 per square kilometer, depending on image quality^{48,49}. Purchase costs aside, analysing satellite images is an expensive and labor-intensive task, requiring considerable investment in time (analysing thousands of high-resolution images), resources (fast computers) and skills (GIS experts). Global Forest Watch helps to bridge this gap, but lacks flexibility, as well as the high-quality imagery needed to show change in great detail (see *resolution*, below).

Risks and challenges

The main problem with satellite imagery is **resolution**, which currently means that image quality is too low to show change in detail. Global Forest Watch provides imagery at 30 metres per pixel resolution in some countries. Currently, worldwide forest change imagery at 30m resolution is only available once every year, which isn't always frequent enough to be used as proof of deforestation. This brings us to the second problem: **updates**. Images are usually updated monthly, and sometimes yearly.⁵⁰ This makes them good for historical analysis, but sometimes impractical for real-time monitoring. Other methods (see **DIY Aerial Photography**, below) can help get more up-to-date images. Finally, cloudy weather in rainforest areas can often obscure the forest areas below – it can take some time to get pictures taken on a clear day.



Case study

Combining satellite data with other information sources

The Indonesian rainforest organisation Warsi combined satellite mapping data that they obtained from Landsat Thematic Mapper (Landsat TM) and Advanced Land Observation Satellite (ALOS) with other information sources to document the distribution of the Orang Rimba people and their use of natural resources.

How did it help?

- » Warsi was able to combine the satellite data with GPS data and digital maps that they made by converting paper maps on natural resource concessions.
- » The satellite imagery was relatively expensive for Warsi. Clouds sometimes covered crucial parts of the image, meaning that they needed to analyse a series of images to

47 <http://earthexplorer.usgs.gov/> or OpenForis' Collect Earth tool, which analyses data from Google Earth <http://www.openforis.org/tools/collect-earth.html>

48 Usually through resellers (<http://www.aas.org/page/high-resolution-satellite-imagery-ordering-and-analysis-handbook#VI>. Image Ordering)

49 <http://landscape.satsummit.io/>

50 This is changing: Global Forest Watch's GLAD alerts provide weekly alerts of likely tree cover loss in Peru, Republic of Congo, and Kalimantan (Indonesia), and Libra (<http://libra.developmentseed.org>) provides Landsat data every two weeks. The MAAAP project (<http://maaproject.org/about-maap/>) also aims to produce updates on the Andean Amazon every 1-2 weeks, while companies like Planet Labs (<http://www.planet.com>) promise to provide free daily images in the future.

Section 3

Tools > Satellite imagery

get a proper picture.

- » The Bukit Duabelas national park now provides the Orang Rimba with user rights and formally protects the area, though deforestation remains a serious problem.



Case study

Using satellite data to provide evidence of illegal logging

In January 2015 Greenomics-Indonesia's analysis of two NASA Landsat images (see Satellite mapping section, below) of Pulau Pedang island, off the coast of Sumatra, identified that large areas of peat forest had been cleared.

How did it help?

- » Greenomics used the information to target paper company Asia Pacific Resources International Holdings Limited (APRIL), which had publicly promised to end new plantation development by January 2014.
- » Greenomics chose to release this information to the media in English, producing a statement with images of their claim. In March 2015, APRIL publicly admitted there had been a breach and suspended a contractor and a plantation manager.⁵¹

⁵¹ [http://www.greenomics.org/docs/Greenomics_Press-Release_SFMP_Violation-\(LowRes\).pdf](http://www.greenomics.org/docs/Greenomics_Press-Release_SFMP_Violation-(LowRes).pdf)



Participatory & GPS mapping

Possible objectives

- » Starting or supporting **dialogue between communities** and the government
- » **Providing concrete evidence to governments** to encourage them to recognise indigenous lands
- » Supporting communities by **presenting and providing knowledge**

What is it

- » Participatory mapping (or community-based mapping) collects information from an area's inhabitants about how the area is used, and the local community's practices.
- » Information is collected in two main ways: through directly consulting a community, or giving communities the tools to document their knowledge.
- » This information is used to create maps based on names and definitions that the community itself uses, which can complement official maps.

How it can help

Official maps and registers of land ownership (cadasters) often only consider the "official" classification of land. They often do not recognise that land may be being used in other ways, sometimes by people who lived there long before official maps were made. This is a particular problem in forest areas, where drawing clear geographic lines is often difficult. Participatory mapping helps by showing how the area is actually being used, comparing this with "official" maps, and using the information to claim communities' rights to land.

Tools

There are many ways to conduct participatory mapping, covering a wide spectrum of technology and accessibility. The right technique depends on resources and community preference. Some examples are:

- » **Interviews** where communities are asked about how they use land, and how they think about their land and the ecosystem in that area. Communities choose any medium they prefer, from narration to drawing on paper, or on the ground.

Section 3

Tools > Participatory & GPS mapping

- » **Printing official maps** of the area, explaining how they relate to their community, and asking communities to draw on additional information. A more advanced method is producing **3D models** of the land.
- » Communities are provided with **GPS trackers** and record information as they walk through an area. The data can be used to create map overlays.

Costs

Participatory mapping requires significant investment in training and supporting field workers. Field workers play a crucial role in introducing the activity, training communities to interact with maps, and making sure that all community representatives understand it. Producing maps and entering the collected information requires GIS skills to ensure measurements are accurate and to scale. GPS tracker devices are not expensive⁵², but also require training.

Risks and challenges

Participatory mapping collects information about where communities live, and which areas have the most resources: companies could use this to their own advantage. It can also cause problems within a community: different communities may be using the same land, or there may be differing perspectives within the same community. The best response to these situations depends on the context: consult as many representatives as possible, and always take gender differences into account.



Case study

Participatory mapping in Cameroon

Forest People's Programme, Centre for Environment and Development (CED) and Planet Survey developed a programme for the Bagyeli community in Cameroon to map their lands and resources using training in GPS data collection. The resulting maps helped 14 Bagyeli communities from the Bipindi area gain some legal recognition of their land rights. They were also used to help negotiate local agreements over land boundaries between communities.

How did it help?

- » Illiterate community members successfully used modified mobile devices that used icons instead of text.

⁵² The most widely used brands, like Garmin (<https://buy.garmin.com/en-US/US/clinSports-c10341-p1.html>) and Magellan (<http://www.magellangps.com/Store/eXplorerSeries>), offer GPS locators starting at USD100. In addition, most entry-level smartphones have GPS capabilities.

- » Communities said that they became more aware of the power of maps as a way of claiming land that belonged to them.
- » As an advocacy tool the maps were most successful when presented to Western conservationist organisations and logging companies (though they were less effective with local companies).⁵³



Case study

Monitoring poaching in Congo

In 2013, Mbendjele hunter-gatherers worked with the ExCiteS Research Group at University College London to collect data to monitor poaching using an Android app. The project used the Samsung Galaxy XCover phone running Android, and a modified version of Open Data Kit Collect that used pictorial icons instead of words. To minimise risks to monitors if they were caught by poachers, the project included a simple phone-lock procedure that allowed users to hide the app's functions rapidly.

How did it help?

- » The project had built strong connections since 2005, when Mbendjele involved in data collection were impressed by the seriousness with which the timber company treated maps they created.
- » The monitors successfully learned to use the audio, photo and video functions, recording high-quality images. The robust build of the phones meant that they worked well in forest conditions.
- » The project used the Hatsuden Nabe, a cooking pot that converts thermal energy from a fire into electricity, to charge the phones (it provided a 60% charge in 90 minutes). Solar panels were also useful when the monitors was not directly under the rainforest canopy.
- » Although communications networks did not extend deep into the forest, the monitors were able to transfer information using SMS or 3G internet when they visited nearby towns.⁵⁴

⁵³ http://www.iapad.org/wp-content/uploads/2015/07/cameroon_unep_report_nov08_eng.pdf

⁵⁴ <http://dev3.acmdev.org/papers/dev-final45.pdf>



Audio & video

Possible Objectives

- » **Starting or supporting dialogue** between communities and the government
- » **Providing concrete evidence to governments** to encourage them to recognise indigenous lands
- » **Supporting communities by presenting and providing knowledge**
- » **Collecting evidence of deforestation** or forest degradation
- » **Providing evidence of wrongdoing** towards individuals or communities

What is it

- » Films or audio recordings can be recorded on mobile phones, or specialized devices like digital cameras, dictaphones or video cameras.
- » Videos can present short advocacy messages, collect visual evidence of human rights violations, publish participatory films by community members⁵⁵, or document deforestation over time. Audio recordings can perform many of the same functions.
- » Many smartphones now allow you to record, edit and upload video or audio to the internet. They can also automatically collect the GPS location of a photo or film, meaning that you can combine it with maps or combine it with other data.

How it can help

Video and audio can communicate information about people and places that it's impossible to explain only with text, maps or data. This makes them an effective advocacy tool that can explain a campaign quickly in a personal way.⁵⁶ Video and audio evidence can also be used in legal cases on human rights violations or illegal activity if you follow specific procedures.⁵⁷

55 [http://www.insightshare.org/sites/insightshare.org/files/file/Insights%20into%20Participatory%20Video%20-%20A%20Handbook%20for%20the%20Field%20\(English\)\(1\).pdf](http://www.insightshare.org/sites/insightshare.org/files/file/Insights%20into%20Participatory%20Video%20-%20A%20Handbook%20for%20the%20Field%20(English)(1).pdf)

56 The StoryMaker app for Android phones is designed to help you create multimedia stories on your Android device: <http://smallworldnews.tv/projects/storymaker/>

57 The CameraV Android app can help to collect digital evidence securely, and help to verify where it was produced: <https://guardianproject.info/apps/camerav>

Tools

Don't assume you need to buy a new smartphone or camera. Many older devices will still provide high-quality images (look for ones with 5 megapixels or more).⁵⁸ Audio and video files take a lot of digital memory – compress them using free software, or use lower quality files that are easier to publish when internet is slow. You can edit directly from a smartphone or use free software like Lightworks Free and Audacity.⁵⁹ Accessories like tripods and external microphones aren't essential, but will improve quality. Video4Change⁶⁰ and WITNESS⁶¹ have a wide range of resources that give technical advice.

Costs

You can now create video and audio very cheaply but generally, the more complex the product, the more it will cost. Filming an indigenous group's protest with a smartphone will be much cheaper than a professional-quality 20-minute documentary. Filming, editing and uploading can also be very time-consuming: does your organisation have time to produce a video itself, or would it be more realistic to pay a professional?

Risks and challenges

Risks to people making the recording: Recording audio or video can put video-makers at risk. Delete or encrypt personal data on devices, and clean devices frequently – fingerprints or residue can show where they've been. Only share sensitive information with trusted groups or lawyers before publishing, and check if it's legal to record before starting.

Risks to people you are recording: Follow the steps in the 'Consent' paragraph of **Get the Data** (page 21), ensuring that people understand that the recording could spread widely and be seen by anyone. Turn off any location-recording functions, and blur people's faces.⁶²

⁵⁸ <https://www.v4c.org/content/effective-video-low-cost-devices>

⁵⁹ <http://www.lwks.com> or <http://www.audacityteam.org/download/>

⁶⁰ <https://www.v4c.org/en/resources>

⁶¹ <http://library.witness.org>

⁶² <https://www.v4c.org/en/content/hands-using-obscuracam> or YouTube's blurring function
<https://blog.witness.org/2016/02/use-youtubes-new-blurring-feature-protect-identities/>

Section 3

Tools > Audio & video



Case study

Using videos recorded on mobile phones as evidence

HuMa collects data on land-related conflicts in Indonesia, including videos of local communities talking about their livelihoods and experiences. The videos were recorded on mobile phones by community members and combined with other data sources like GPS data, increasing its value as evidence.

How did it help?

- » The data has been used by groups including the National Commission of Human Rights, the Chief of National Police and other NGOs.
- » The certification agency for Perhutani (an Indonesian state-owned logging company) has also referred to HuMa's data as a basis for investigating particular incidents.



Case study

Using video to document illegal logging in Indonesia

In response to advocacy campaigns, Indonesian paper company APP signed a zero deforestation commitment. In September 2013, Eyes on the Forest (a coalition of 3 local environmental organizations in Indonesia), filmed a logging company clearing natural forest that was a known APP supplier.

How did it help?

- » The video was short and simple, making it easier to upload and publish quickly.
- » Although the video was filmed from a distance, it was still valuable as evidence because it clearly showed logging in progress. It was backed up by photographs with GPS coordinates and a detailed report.⁶³
- » APP was forced to respond to the video by stating that the logging was in an exclusion zone that it had not disclosed.⁶⁴

63 [http://www.eyesontheforest.or.id/attach/EoF%20\(16May13\)%20Deforestation%20continues%20in%20SMGAPP%20supplier%20concession%20FINAL.pdf](http://www.eyesontheforest.or.id/attach/EoF%20(16May13)%20Deforestation%20continues%20in%20SMGAPP%20supplier%20concession%20FINAL.pdf)

64 http://www.ran.org/asia_pulp_and_paper_caught_clearing_rainforest_credibility_of_app_deforestation_moratorium_in_doubt



Do-It-Yourself (DIY) aerial photography

Possible Objectives

- » Collecting evidence of deforestation or forest degradation
- » Capturing evidence of companies' wrongdoing in how they use land
- » Supporting communities by presenting and providing knowledge
- » Providing concrete evidence to governments to encourage them to recognise indigenous lands

What is it

Aerial photography can be produced by drones (flying vehicles without a human pilot), balloons or kites attached to a digital camera that takes pictures throughout the flight. Computer software combines (or 'stitches') these photos into maps or 3D models, which can be used for purposes including monitoring wildlife, recording land claims and documenting climate change impacts.

How it can help

High-resolution satellite maps can be expensive, out-of-date or difficult to access (see **Satellite Mapping** section, above). Creating aerial maps yourself gives you detailed map data for the exact area you want, in real time. It also allows you to fly over the same area regularly – giving you evidence of change over time – and lets you capture images of areas where it might be unsafe to go on foot.

Tools

If you have a low budget and only want to cover a small area, kites and balloons are the cheapest and easiest option (see **Costs** section, below). They can be constructed from simple materials or pre-prepared kits.⁶⁵ If tree cover restricts where you can fly balloons and kites, you will need to spend more on a drone (see **Costs**, below). There are two main types: a drone with four or more multiple rotors (easier to fly, but can "only fly for a maximum of 20-30 minutes), or a remote-controlled 'fixed-wing' plane (these can fly for up to 60 minutes – easier to fix but harder to land).

⁶⁵ <http://publiclaboratory.org/wiki/balloon-mapping>; <http://publiclaboratory.org/wiki/kite-mapping>

You will also need a simple digital camera, software to plan flight paths, fly the drone, and edit photos – and electricity supply that lasts for 24-36 hours to process the images. For more detail, Forest Compass's guide and New America Foundation and Open Technology Institute's primer on drones are the best places to start.⁶⁶

Costs

While the materials needed to create and build a drone, balloon or kite are cheaper than ever before, using them effectively will take time, basic practical skills and the patience to learn new software. Allocate staff time to training, technical adjustments, managing data and communicating with communities where you will be flying. A basic kite able to carry a small camera can cost as little as USD 70, and you can buy a balloon kit for around USD 200. Kits are available that allow drones to be created for around USD 1,000–USD 2,000⁶⁷ – or you can buy simple ready-to-use drones for prices starting from USD 500.⁶⁸ ConservationDrones also collects unused drones and donates them to rainforest-related groups.⁶⁹ Free, open source autopilot and map creation software is available, and the ConservationDrones, DIYDrones and the Humanitarian UAV network can offer (often free) advice and support.⁷⁰

Risks and challenges

Drones and DIY aerial photography are new technologies, and best practices and legal regulations are still being developed.⁷¹ Involve local communities wherever possible, involving them in conducting the mapping themselves, including printing paper maps to ensure people can engage with them. Ensure that they understand exactly what data is being collected and how it will be used. Remove any information that identifies individuals, and share the information you have collected with the community being mapped afterwards. Some countries are starting to introduce legal restrictions on who can fly a drone and where. Check whether it is legal before you start.⁷²

66 <http://drones.newamerica.org/primer/>; <http://forestcompass.org/drones-pros-and-cons-community-based-monitoring>

67 <http://www.openrelief.org/home/open-source-airframe/>

68 For example, organisations like Digital Democracy have used the Parrot Bebop drone (which currently costs around USD 500) in its mapping projects: <https://store.parrot.com/uk/134-spare-parts-bebop>

69 <http://conservationdrones.org/2014/10/24/recycle/>

70 <http://conservationdrones.org/>; <http://diydrones.com/>; <http://uaviators.org/about-this-site-rules>; <http://opendronemap.github.io/odm/>

71 The Humanitarian UAV network's code of conduct is an excellent document to follow: <https://uaviators.org/docs>; see also this list of regulations on flying drones in different countries <http://wiki.uaviators.org/doku.php>

72 New America Foundation's map has up-to-date information on known regulations <http://drones.newamerica.org/#regulations>



Case study

Building and flying a drone in collaboration with the local community

In 2014, members of the Wapichana community in Guyana and the organization Digital Democracy built a fixed-wing drone using a kit, a GoPro camera (available from around \$100) and free open-source software. The drone was then used to create a detailed 3D model of Sholinab, a local village.

How did it help?

- » The Wapichan monitoring team had no previous engineering experience but were able to build the drone using materials from the local area, making the drone a more familiar object that they had built together.
- » Team members first learned to fly the drone without an autopilot. Although there were difficulties in landing at first, it helped them to gain confidence in how the drone worked.
- » The group identified several possible uses for the drone in future, including monitoring deforestation over time, mapping villages to allocate the management of resources, and documenting illegal logging.⁷³



Case study

Exposing illegal logging using a drone

In 2014, ConservationDrones and the Sumatran Orangutan Conservation Programme (SOCP) used a drone to take aerial photographs of part of the Gunung Leuser National Park in Indonesia. The organisation flew over the same area twice in two months, producing clear photographic evidence that illegal logging had taken place.

How did it help?

- » Without aerial photography, the logging might not have been discovered: the loggers had hidden their activities at ground level by leaving a strip of trees around the logged area.
- » ConservationDrones and SOCP gave the evidence to park officials, who were able to stop logging activities in that area.⁷⁴

⁷³ <http://www.digital-democracy.org/blog/we-built-a-drone/>

⁷⁴ <http://conservationdrones.org/2014/09/30/illegal-logging/>



Online maps

Possible Objectives

- » Capturing evidence of companies' wrongdoing in how they use land
- » Recording and monitoring the environmental value of areas of land
- » Providing concrete evidence to governments to encourage them to recognise indigenous lands

What is it

- » A powerful, visually engaging way to present the information you have collected about your focus issue (such as through participatory mapping, or mobile data collection). Maps can be: **static**, like images and illustrations; **animated**, for example showing a change over time; or **interactive**, where users can zoom in or out, click on areas of the map to see more information, or provide their own information (*crowdsourcing*)
- » Maps can be created from scratch and uploaded on the internet, or information can be added to existing online maps like OpenStreetMap, Google Maps or Crowdmap.⁷⁵

How it can help

Online maps can be used for **real-time monitoring** (showing the places where most incidents happen), **campaigning** (showing that forest cover is being dramatically reduced) or **analysis** (gaining new insights by overlaying different types of data on the same map).

Tools

Maps for campaigning don't always need to be interactive. Some maps work best as an infographic – a static image that clearly presents text explanations and color coding. **First, choose your online map platform:** It is often easiest to use existing online interactive maps, which already include information layers such as roads and satellite images. Commercial maps include Google, Bing or MapQuest⁷⁶. The free OpenStreetMap platform contains information from volunteers, and is usually less precise in remote non-urban areas.

⁷⁵ <http://www.openstreetmap.org/>; <https://www.google.com/maps/>; <https://crowdmap.com/>

⁷⁶ <http://www.bing.com/maps/>; <http://www.mapquest.com/>

Understanding coordinates and polygons

If you are collecting data through mobile tools, drones, or participatory mapping, **it's important to master mapping basics**. Any object on a map has coordinates that pinpoint its location on a grid of **latitude** (north-south) and **longitude** (east-west). Knowing an object's lat-long coordinates gives you its position (known as **point-based information**). To find an object's size, you need to join points around its perimeter into a single **polygonal shape**.

Then, create your own layers on top: There are many different ways to add information from basic markers to 'heat maps' (which show when a type of incident is concentrated in a particular area). Some sites provide data designed to be added into rainforest maps.⁷⁷ MapBox Studio, the JEO Wordpress theme and CartoDB⁷⁸ offer powerful, easy-to-use software for creating interactive maps. Creating your own interactive layers usually involves programming tools called Javascript libraries (Leaflet.js and OpenLayers are the most common).

Costs

The cost of designing and creating online interactive maps depends how easy the tools are to use, and what programming skills are needed. If you are not a programmer, the easiest tools are CartoDB and MapBox—but you will need to pay a fee for any more complicated maps (although both come with a free option that has limited functionality).⁷⁹ Using libraries such as Leaflet.js with OpenStreetMaps is free, but requires a skilled programmer. Maps produced by a commercial provider are often free at the outset, but can become expensive if used widely.⁸⁰

Risks and challenges

Companies store information about when, where and how you load maps on a commercial mapping platform, meaning that public maps on commercial platforms can pinpoint the location of individuals who uploaded information, putting them at risk. Avoiding errors is also crucial: information presented in the wrong spot could defeat the purpose of the campaign.

77 InfoAmazonia offers maps of the Amazon region on deforestation and forest fires: <http://infoamazonia.org/datasets/>. Sarawak Geoportal has similar information on Malaysian Borneo <http://www.bmfmaps.ch/>

78 <http://cartodb.com/>; <https://www.mapbox.com/mapbox-studio>. However, this requires you to upload your maps to MapBox servers, so it's unsuitable for dealing with sensitive information. A guide to installing JEO in English and Portuguese: <http://geojournalism.org/2014/06/portugues-jeo-primeiros-passos/>

79 MapFilter is an analysis and visualization tool, currently in the prototype stage, that is designed for collaborative use in remote areas. MapFilter imports GeoJSON files and related images, and presents them as interactive, filter-able maps and reports. <https://github.com/digidem/mapfilter>

80 Google Maps is free for up to 25,000 daily map loads (a very high number), but expensive beyond that.



Case study

Impact of animated maps to show forest cover loss

Open Development Cambodia works to collect and provide quantitative information on Cambodia's land, economic and environmental issues. They used the forest cover change information over a period of ten years to create a time-lapse video showing forest cover loss.

How did it help?

- » The video was quick and easy to make because ODC already had all the information prepared and uploaded on their interactive maps.
- » The time-lapse video was an effective advocacy tool because it clearly showed the extent of forest loss in Cambodia. It has been viewed more than two thousand times.⁸¹



Case study

Mapping resources and communities in the Amazon

RAISG (Amazonian Network of Georeferenced Socio-Environmental Information) is a multi-year project that aims to raise awareness and advocate for indigenous rights and environmental issues, and has collected information on protected areas, indigenous lands, water basins, and illegal logging.

How did it help?

- » RAISG presents all the collected information through online interactive maps⁸², as well as downloadable static maps with infographics⁸³, and reports. Their information is also used by other organisations such as InfoAmazonia.
- » RAISG maps are a useful tool for evidence-based advocacy because of their strong methodology. Its partner organisations are able to rely on the collected information when lobbying governments.⁸⁴

81 <https://cambodia.opendevopmentmekong.net/>

82 <http://raisg.socioambiental.org/mapa-online/index.html>

83 <http://raisg.socioambiental.org/amazonia-2012-areas-protégidas-e-territorios-indigenas#english>

84 http://raisg.socioambiental.org/system/files/Amazonia%20Under%20pressure16_05_2013.pdf

Further resources

This list of resources includes many mentioned in the Primer, with some additional resources. It is not comprehensive, but aims to highlight some of the most practically useful resources for rainforest organisations using technology in their work.

Getting data

The Open Knowledge Foundation's DataHub site provides openly available data on a range of issues: <http://datahub.io/>

Data Portals is a comprehensive list of governments' sites presenting open data <http://dataportals.org/>

The Open Access Directory's list of datasets on specific issues, including on environmental issues: http://oad.simmons.edu/oadwiki/Data_repositories

The Environmental Justice Atlas is a global map of environmental conflicts: <https://ejatlas.org/>

Data Journalism Handbook's advice on making Freedom of Information requests: http://datajournalismhandbook.org/1.0/en/getting_data_1.html

Supply Change tracks companies' commitments and performance on NGO scorecards <http://www.supply-change.org/>

Feedback Labs' toolkit has a wide range of resources and tools to help you collect information from the people you are working with <https://feedbacklabs.org/toolkit/>

Managing data

Security in-a-Box is a guide to digital security for activists and human rights defenders throughout the world produced by Frontline Defenders and Tactical Technology Collective <https://securityinbox.org/>

The Responsible Data Forum provides resources and guides to help organisations use data while addressing privacy and consent issues <https://responsibledata.io>

Digital Defenders' Digital First Aid Kit offers a set of self-diagnostic tools for organisations or activists facing attacks: <https://digitaldefenders.org/digitalfirstaid/>

EngageMedia's Secure My Video Guide provides video activists with tools to make their work safe and secure. It has an Indonesian focus but is relevant for other contexts too. <http://www.engagemedia.org/Members/toysatellite/files/secure-my-video-guide-pdf>

Support on collecting and using data

School of Data's courses include introductions to data and specific information on topics like scraping: <http://schoolofdata.org/courses>

DataKind creates teams of pro bono data scientists who work together with non-profit organisations to help them solve problems involving data: <http://www.datakind.org>

DoingGood Fellows connect professionals with technology skills and non-profit projects: <http://www.doinggoodfellows.org>

Data Look is an online community for people using data to address social problems: <http://datalook.io>

Open Knowledge's Open Data Commons has a 2-minute guide to open licences <http://opendatacommons.org/guide/>

The Open Data Handbook lists open file formats that you can use to publish data in an open way: <http://opendatahandbook.org/en/appendices/file-formats.html>

Help choosing technology

Aspiration have created a template to produce requests for proposals for technology support: <http://www.aspirationtech.org/training/workflow/templates/rfp>

Aptivate has a guide to designing websites that work better on poor internet connections: <http://www.aptivate.org/webguidelines/Home.html>

Engage Media provides advice on compressing files that work better in low-bandwidth areas: <http://www.engagemedia.org/help/how-to-compress-video>

Visualisation

Earth Journalism Network provides training and resources to help journalists in developing countries cover the environment more effectively, including through visualisations <http://earthjournalism.net/resources>

Environmental News Lab hosts tools and tutorials on reporting environmental issues in Brazil and throughout the Amazon region <http://lab.oeco.org.br/>

Tactical Technology Collective's Visualising Information for Advocacy gives examples and advice on using data and visualisations in campaigns: <https://visualisingadvocacy.org>

Geojournalism provides online resources and training for journalists, designers and developers to visualise geographic data <http://geojournalism.org>

Mobile phone applications

The engine room's Mobiles in Development report gives an overview of mobile usage in development, including more information on how mobile data collection works <http://www.scribd.com/doc/232305600/WeGov-Engineroom-Mobiles-Development>

NetHope and **Humanitarian Nomad** both offer sets of questions to help you choose a mobile tool: <http://solutionscenter.nethope.org/> and <http://humanitarian-nomad.org/online-selection-tool/>

Kopernik gives information for small organisations on mobile data collection tools, mapping platforms and sensors, with information to help you compare them. <http://impacttrackertech.kopernik.info/>

TechChange offers a free online course on mobile data collection apps: <https://www.techchange.org/online-courses/mobile-data-solutions/>

The World Bank's 'Opportunities and guidance on mobile applications for forest and agricultural sectors' report includes guidance on comparing mobile applications' features and planning short- and long-term costs <http://tinyurl.com/o5h5bq9>

FrontlineSMS's Data Integrity User Guide gives a framework to understand the level of risk involved in any SMS-based activity http://www.frontlinesms.com/wp-content/uploads/2011/08/frontlinesms_userguide.pdf

Forest Compass collected resources for community-based forest monitoring <http://forestcompass.org/how/resources>

OpenForis is a set of mobile applications and software tools that can help you collect and analyse data: <http://www.openforis.org/>

TechSoup has advice on choosing mobile devices that fit your needs <http://www.techsoup.org/support/articles-and-how-tos/choosing-a-mobile-device-what-to-look-for>

Global Forest Watch is an interactive online forest monitoring and alert system that provides satellite and other types of information: www.globalforestwatch.org

<http://maaproject.org/about-maap/>

CLASlite is designed to provide weekly updated high-resolution mapping and monitoring of forests with satellite imagery. <http://claslite.carnegiescience.edu/en/index.html> (English and Spanish)

AAAS's Geospatial Technologies Project contains detailed case studies of how satellite imagery was collected, categorised and analysed to document human rights abuses.
<http://www.aaas.org/case-studies>

Video and audio

The Guardian Project's CameraV, can help to collect video and photo evidence securely and in a way that can be verified by external groups <https://guardianproject.info/apps/camerav>

The StoryMaker app for Android phones helps you create multimedia stories on your Android device: <http://smallworldnews.tv/projects/storymaker/>

WITNESS and **Video4Change** both have useful resource libraries on using video in your work: <https://www.v4c.org/en/resources> and <http://library.witness.org>

Small World News offers guides on making video and audio
<http://smallworldnews.com/guides>

Audacity offers free audio editing capabilities <http://www.audacityteam.org/download/>, while **Lightworks Free** version can tackle many simple video editing tasks:
<http://www.lwks.com/>

Do-It-Yourself (DIY) aerial photography

New America Foundation and **Open Technology Institute** primer on drones has a wide range of information about using drones <http://drones.newamerica.org/primer/>

Conservation Drones' site includes a guide to building and flying drones, as well as examples of how they have been used in conservation work: <http://conservationdrones.org/>

DIY Drones has an introductory guide to UAVs:
<http://diydrone.com/profiles/blogs/a-newbies-guide-to-uavs>

Public Laboratory provides guides and support on building kites, balloons and sensors for mapping <https://publiclab.org/wiki/kite-mapping>

The Humanitarian UAV network (UAViators) has a range of useful information <http://uaviators.org/about-this-site-rules> and a survey of laws affecting drone flights in countries around the world <http://wiki.uaviators.org/doku.php>

Geojournalism's guide to balloon mapping: <http://tinyurl.com/odmd3mx>

NetHope's Solutions Center has webinars and resources on using drones
<http://solutionscenter.nethope.org/communities/unmanned-aerial-vehicles>

Resources by language

The resources below are available in the language described, and typically also include an English version.

Bahasa Indonesia

Ekuatorial creates interactive maps that combine data from a wide range of sources and combines them with articles on environmental issues written by its partner publications.
<http://ekuatorial.com/>

Global Forest Watch is an online monitoring and alert system that collects data for about forest landscapes worldwide <http://www.globalforestwatch.org/>

EngageMedia provides resources to organisations using video for social change
http://www.engagemedia.org/Bantuan-Dan-Tutorial?set_language=id

The Open Data Handbook has guides to finding and using open data
<http://opendatahandbook.org/id/>

Kopernik gives information for small organisations on mobile data collection tools, mapping platforms and sensors, with information to help you compare them.
<http://kopernik.info/id/technologies>

Datahub is a data management platform that lets you search for data, register published datasets, create and manage groups of datasets, and get updates from datasets and groups you're interested in. <http://datahub.io>

Video4Change collects guides, manuals and other resources useful for video activists
<https://www.v4c.org/id/bahasa-indonesia>

Security in-a-Box is a guide to digital security for activists and human rights defenders by Frontline Defenders and Tactical Technology Collective <https://securityinabox.org/id>

Français

The Open Data Handbook has guides to finding and using open data
<http://opendatahandbook.org/fr/>

Security in-a-Box is a guide to digital security for activists and human rights defenders throughout the world produced by Frontline Defenders and Tactical Technology Collective
<https://info.securityinabox.org/fr>

Frontline Defenders provides training and resources for human rights defenders
<http://www.frontlinedefenders.org/fr/>

Aptivate provides web design guidelines for low bandwidth environments
<http://www.aptivate.org/webguidelines/Home.html>

Global Forest Watch is an online monitoring and alert system that collects data for about forest landscapes worldwide <http://www.globalforestwatch.org/>

The Open Data Handbook has guides to finding and using open data

<http://opendatahandbook.org/fr>

Resource Extraction Monitoring provide a manual for independent monitoring

<http://www.rem.org.uk/documents/ManuelOIFLEG2013.pdf>

Resource Extraction Monitoring provide a guide on consent in forest communities

http://www.rem.org.uk/documents/FM_kit_formation_CLIP.pdf

WITNESS has a resource library on using video safely and effectively <http://fr.witness.org/ressources/>

FCTV have model texts for organisations involved in community monitoring, including agreement for community groups' use of project-owned mobile phone equipment

<http://flegcameroon.ning.com/page/documents>

Khmer

Global Forest Watch is an online monitoring and alert system that collects data for about forest landscapes worldwide <http://www.globalforestwatch.org/>

Open Development Cambodia offers maps, briefings on companies and economic sectors, and information about laws and regulations in Cambodia

<https://cambodia.opendevlopmentmekong.net/>

Datahub is a data management platform that lets you search for data, register published datasets, create and manage groups of datasets, and get updates from datasets and groups you're interested in. <http://datahub.io>

Português

WITNESS has a resource library on using video safely and effectively <http://pt.witness.org/>

Environmental News Lab hosts tools and tutorials on reporting environmental issues in Brazil and throughout the Amazon region <http://lab.oeco.org.br/>

Geojournalism.org provides online resources and training for journalists, designers and developers to visualise geographic data <http://geojournalism.org/>

The Open Data Handbook has guides to finding and using open data

<http://opendatahandbook.org/pt/>

Security in-a-Box is a guide to digital security for activists and human rights defenders by Frontline Defenders and Tactical Technology Collective <https://securityinabox.org/pt>

Imazon provides monthly maps of deforestation in the Amazon region <http://imazon.org.br/>

Datahub is a data management platform that lets you search for data, register published datasets, create and manage groups of datasets <http://datahub.io>

Global Forest Watch is an online monitoring and alert system that collects data for about forest landscapes worldwide <http://www.globalforestwatch.org/>

Español

RAISG (Amazonian Network of Georeferenced Socio-Environmental Information) collected information on protected areas, indigenous lands, water basins, and illegal logging <http://raisg.socioambiental.org/mapa-online/index.html>

Security in-a-Box is a guide to digital security for activists and human rights defenders throughout the world produced by Frontline Defenders and Tactical Technology Collective <https://securityinbox.org/es>

The Monitoring Project of the Andean Amazon (MAAP) collects data and maps for monitoring the Andean Amazon region <http://maaproject.org/acerca-d-maap/>

Frontline Defenders provide training and resources for human rights defenders <http://www.frontlinedefenders.org/es/>

The Open Data Handbook has guides to finding and using open data <http://opendatahandbook.org/es>

WITNESS has a resource library on using video safely and effectively <http://library.witness.org>

Video4Change collects guides, manuals and other resources useful for video activists <https://www.v4c.org/es/espanol>

Global Forest Watch is an online monitoring and alert system that collects data for about forest landscapes worldwide <http://www.globalforestwatch.org/>

CLASlite is designed to provide weekly updated high-resolution mapping and monitoring of forests with satellite imagery. <http://claslite.carnegiescience.edu/en/index.html>

Datahub is a data management platform that lets you search for data, register published datasets, create and manage groups of datasets, and get updates from datasets and groups you're interested in. <http://datahub.io>

tiếng Việt

Security in-a-Box is a guide to digital security for activists and human rights defenders throughout the world produced by Frontline Defenders and Tactical Technology Collective <https://info.securityinbox.org/vi>

Datahub is a data management platform that lets you search for data, register published datasets, create and manage groups of datasets <http://datahub.io/vi/about>





