Crowdsourcing data and implementing on the ground projects that help people and nature in a changing climate

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Abstract

Climate change is one of the greatest threats facing society and is already having a significant impact on people and biodiversity around the globe. Rural communities in developing countries are experiencing some of the worst impacts of climate change, but removed from decision-making bodies and financial resources, they are often left to their own devices to cope with and adapt to these changes. Through WWF's Climate Crowd initiative, large amounts of data on how vulnerable communities are affected by changes in weather and climate, how they are coping with these changes, and how their responses might negatively impact biodiversity are being crowd-sourced. WWF then curates data sourced from partner organisations, analyses it, and disseminates it on wwfclimatecrowd.org for use by researchers, educators, and conservation and development practitioners. This data is also used to develop and implement site-specific solutions that reduce the vulnerability of people and wildlife to changes in climate.
Keywords: *Crowd-sourcing, Communities, Climate crowd, Data, Conservation*

Introduction

Under the Paris climate change agreement, all countries committed to create better adaptation strategies by 2020. But, few governments or institutions are incorporating data on climate impacts into their planning. If we fail to better understand how climate change is impacting people and nature, we will be unable to develop solutions that keep pace with the changes in climate we are already observing. As the human population grows and the impacts of climate change become more severe, it is therefore imperative that we better understand how climate change is impacting communities and ecosystems, and that we develop and test adaptation strategies that reduce the climate vulnerability of people and nature. To date most research on climate impacts to biodiversity has focused on the direct impacts of climate change, including species range shifts (Pecl et al., 2017) and changes in phenology (Post et al., 2018).

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As the world comes to better understand and document these risks, a potentially greater and much-less studied threat is how people are unintentionally harming nature as they struggle to cope with the sometimes devastating impacts of climate change on their daily lives (Pacifici et al., 2015). Unless we understand the needs of people and empower them to find better ways to manage changes in weather and climate, conservation efforts will ultimately not succeed. For example, as global freshwater availability patterns change (Rodell et al., 2018), incidents of human-wildlife conflict over access to water may increase (Mariki et al., 2015).

Data collection

Conservation currently lacks comprehensive, current, and reliable datasets, particularly from climate-vulnerable communities in sectors that rely on ecosystem services, such as small-scale agriculture and fishing. WWF Climate Crowd (wwfclimatecrowd.org) is a new initiative used to rapidly crowd-source large amounts of data on how vulnerable communities are affected by changes in weather and climate, how they are coping with these changes, and how their coping strategies impact biodiversity. This represents a novel way to gather data in the field of conservation and climate change, and allows us to gather data from very hard to reach places, which are often hotspots for biodiversity. In other fields, remote-sensing products have been fused with crowd-sourced data to improve the accuracy of global cropland maps (Fritz et al., 2015), for example.

Researchers should therefore look to open-source platforms such as crowdsourcing to harness the potential of big data (Ford et al., 2016). Much of the data gathered through Climate Crowd is based on indigenous, local and traditional knowledge systems. These can be a major resource for adapting to climate change, but we need to better integrate this knowledge with existing practices to increase their effectiveness (IPCC, 2014).

WWF works with a number of partners to collect this data, largely through key-informant interviews, conducted in the region where the partner organisation is based. The survey protocol WWF uses was refined and field tested over a 2 year period. Partners are also trained in data collection. As data is gathered, it is curated, analysed, and reports are submitted at wwfclimatecrowd.org/form. WWF then approves reports and posts them on the website, wwfclimatecrowd.org, for use by researchers, educators, and conservation and development practitioners. All the reports are freely available to the public. The homepage has a number of methods for accessing the reports, including summary statistics, reading each report individually, and doing a bulk download of reports as a .csv file. WWF also analyses all the reports and regularly publishes summary reports for each country. These can be found at wwfclimatecrowd.org/publications.

To date, the methods employed by the Climate Crowd project have proven to be very successful. WWF has provided resources for partners to work with communities to collect much needed data, including interview tools and guidance, and an open access platform for the data to be housed.

Findings

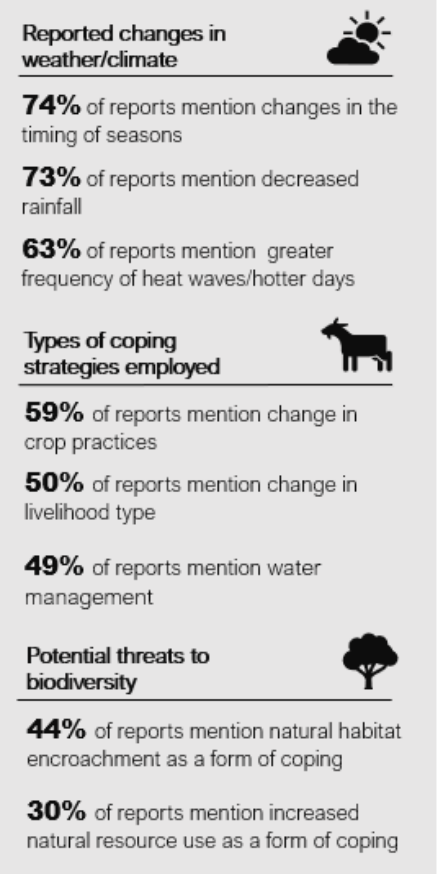

Figure 1: Summary of key findings from Climate Crowd data collected from 2014-2018 (Source: Authors own)

WWF then works with partners and community members to develop and implement solutions that help them adapt to a changing climate. The Climate Crowd model therefore provides a rapid way to gather data and mobilise financial resources for the most vulnerable communities, through a participatory method, working with the communities to understand their needs and develop solutions.

As the collected data is analyzed, WWF works with partners and communities to develop on-the-ground solutions. Over the past 2 years, WWF has implemented a number of projects, focused on improved water access, climate-smart agriculture, natural resource management, and more. To date, over 1200 reports have been submitted from over 28 countries. Key findings from all these reports are summarised in **Figure 1**.

Communities are increasingly dealing with increased water scarcity and changing seasonality of rainfall (**Figure 1**). This is particularly true for East Africa. A number of projects have been implemented to help communities adapt to these changes. These include converting open water springs into protected wells (Uganda), construction of a solar-powered irrigation system for farming (Uganda), recycling plastic water bottles to build a rainwater harvesting system (Uganda), construction of a rainwater harvesting and hand-washing station (Tanzania), and contour trenches and tree planting for soil and water conservation (Tanzania).

Encroaching on protected areas and use of natural resources have been identified as frequent coping strategies employed by communities (**Figure 1**). In Mexico for example, communities are shifting their activities closer to forested areas as the land is perceived to be more suitable for crops. To mitigate this, WWF supported a project using fog catchers to collect water during dry periods, and small water channels to mitigate against the effects of frost.

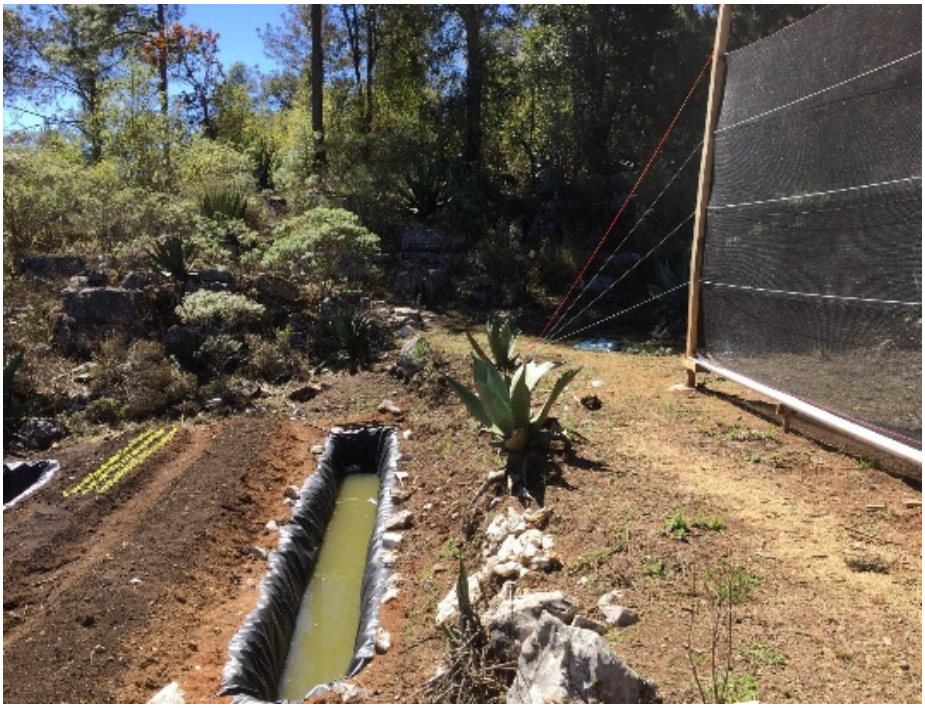

Image 1: Fog catcher and water channel in Mexico (Source: Authors own)

On-going monitoring of these projects suggest they have been successful in reducing climate vulnerability of both people, and in some cases biodiversity. For more about these and other projects, see wwfclimatecrowd.org/projects.

Conclusion

In the field of conservation in particular, communities are often not consulted to the extent they should be when research is being undertaken on climate change impacts. Instead the focus is often on modelling studies, taking a much longer-term view of how climate change might impact a particular system of interest. This neglects a very real and present threat to biodiversity, that of human coping strategies to changes in weather and climate. Additionally, where vulnerability assessments have been conducted, translation of this knowledge into tangible adaptation initiatives is still limited.

Conservation practitioners need to be a bit more daring in our approach. Conservation has historically been a very backward looking discipline, often looking to restore ecosystems to past states, rather than embrace the inevitable changes in climate we are already seeing, and the increasing pressure of human population growth. Through this Climate Crowd initiative, WWF works with communities to understand the challenges they face, and develop and implement solutions that help both people and nature. Findings from the project are then used to create evidence-based recommendations for better adaptation strategies by governments, financial institutions, and others.

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