Improving Adaptive Capacity through Open Collaborative Science: A Case Study in Two Model Forests



Photos of the final events in Colombia and Costa Rica

February 2015 – February 2017

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1. Executive Summary

Our overall goal was to contribute to improving the adaptive capacity of communities through fostering a transformative participation of citizens in scientific debates, agenda-setting and knowledge production.

Sub-objectives included: a) creating awareness concerning anthropogenic climate change issues at the landscape-level and enhancing capabilities of selected individuals, groups and communities within the Model Forest; b) promoting an environment conducive to the adoption of open and collaborative practices between citizens and researchers; c) creating opportunities for self-organization in order to tie knowledge to local problem-solving.

The project related to OCSDnet themes 1, 3 and 4 since it contributed to our understanding of motivations, attitudes and interactions among actors, explored pathways to make science more open and inclusive, and looked at some of the challenges and barriers in so doing.

Core Activities:

Ten community groups were selected based on their leadership and motivation, which was assessed through initial visits and focus groups. We used participatory methods and conducted a collaborative process, with a strong focus on capacity-building and knowledge-exchange (workshops, field trips and meetings), to help the groups propose and develop locally-relevant initiatives in relation with climate change adaptation, at different scales. Seven community-led initiatives were implemented (organic fertilization, tree nursery, ecotourism project, rainwater harvesting, agro-ecological information sharing, biodiversity recovery plan, cultural and educational strategy for responsible consumerism). The dynamics of the project were analyzed throughout the process to understand better the barriers and incentives for the adoption of open collaborative practices.

Key observations and findings:

- ➤ The initiatives developed and the ideas proposed by the groups were diverse and creatives. They did not only responded to real needs but were also relevant to solve the problems identified in their area.
- > The level of motivation of community groups remained high throughout the process, and the researchers succeeded in building a relationship based on trust and collaboration with them.
- ➤ The back-up and support of the academic institution in Colombia, was key to ensure the successful development and continuity of the local initiatives.
- > Experiential learning through community-led initiatives prove to be an excellent way to empower the local groups who retained complete ownership of their projects.
- ➤ Thus, the path chosen is a valid approach for community-based local development. It is an opportunity to build a scientific practice that is socially valid, relevant and inclusive of other ways of knowing.

Main lessons and recommendations:

- Universities and rural research centres can be the natural allies of communities, but they have to be capable of adopting more flexible work models which integrate human values and are not only merely based on competitiveness or efficiency. Researchers need to feel supported by their institution if they want to engage more in such practices; there are little incentives at the moment
- ➤ This was a small-scale, high-involvement process that can be very demanding in terms of time commitment. It is especially important that the researchers engaging in such a process have an open mindset and soft skills, which may not be required to conduct their usual scientific activity. They must also be willing in some cases to volunteer part of their time.
- ➤ Most development projects focus on outcomes, but processes are also fundamental.

> With proper support, low-educated people and children can contribute actively to open science

2. Research Problem

The main problem addressed was the lack of real collaboration between the academic institution and society and the fact that scientific knowledge is often disconnected from other ways of knowing.

Within the project, the original questions we sought to address included:

- a. How can we involve rural communities and citizens in climate change research? How can we motivate citizens/communities to participate more in research agenda-setting and/or data production and analysis? What are the incentives?
- b. What specific aspects of the research process can be opened up further?
- c. Are the Model Forest platforms as a process, a philosophy and an institutional context conducive to opening up the research process?
- d. What are the main barriers to overcome for the adoption of OCS practices by the academic community and the civil society?
- e. What is the potential of small-scale initiatives and of each of the strategies implemented by the stakeholders to trigger interest within communities and to be replicated at a larger scale?

We did not respond to all of these questions thoroughly but they guided the whole project.

We also asked ourselves the following question: What is the difference between classic participatory methods and what we define as "open science"? How do we explain it? Are we really going beyond participatory methods, or are we simply using a different concept for the same thing? Thus, we have struggled to define our approach which has evolved naturally along the way. It was based on participatory methods and included a capacity-building and knowledge-exchange component. Through a series of focus groups, workshops, field trips and meetings we conducted a process to provide rural groups the opportunity to collaborate with members of the academia, combine diverse types of knowledge to improve decision-making and self-organize through local initiatives.

The body of knowledge on community-based adaptation (CBA) to climate change is growing fast and in the last two years, there has been considerable attention paid to these approaches.

3. Research Objectives and Findings

We explored a specific pathway to make science more open and inclusive and have succeeded in showing it was possible, even with low resources. We also wanted to understand better what environment, attitudes and incentives were conducive to adopting open practices. We have particularly reflected on the motivations of researchers, citizens and other participants in order to serve as a basis to develop a future proposal that would take into account those dynamics and in which communities would play a central role. We have also reflected around institutional barriers and challenges; in particular, the two institutional contexts in which we worked were very different (in each country) and this had an influence on the project, especially in terms of interest and participation by the researchers (if they perceived benefits or incentives to participate).

We have achieved most of our project objectives, although at a smaller scale than initially envisioned, including the following:

❖ Creating awareness concerning anthropogenic climate change issues and enhancing capabilities of selected individuals, groups and communities within the Model Forest landscape. We have created awareness on these issues among local groups and they are in turn contributing to creating awareness in their respective communities. The challenges in terms of capacity-building were mostly educational challenges, which are commonly encountered in environmental education; in particular, it is difficult for people to relate to complex global problems if they do not see what are the concrete impacts on their lives. Thus, we provided them the opportunity to actively connect knowledge with their context and to expand and produce new

knowledge. Finally, active, experiential learning took place through the development of community-led initiatives. We have also provided the groups with opportunities to discover other parts of the broader landscape with which they share common issues.

- ❖ Promoting an environment conducive to the adoption of open and collaborative practices between citizens and researchers. The researchers have promoted such an environment by adopting and developing new methodologies and behaviors to work in partnership with communities in an open and collaborative fashion. We have dedicated efforts to disseminate a set of ideas and practices associated with OCS with the aim of changing the traditional culture of research; unfortunately, our message did not always come through. Based on our experience, we are also at the first stages of planning a strategy for the university in Pereira to integrate OCS further in the curriculum structure. This is supporting OCSDNet's stated goal of understanding better how the next generation of researchers can be trained to practice and value OCS.
- ❖ Creating opportunities for self-organization and tying knowledge to local problem-solving. We have accomplished this by supporting community-led initiatives at different scales, including through establishing cooperation agreements with the communities and by giving them clear, yet flexible, steps to follow. Communities were therefore involved in all stages, starting with the identification of the problems. It allowed the groups to directly use their knowledge, apply new knowledge gained through both capacity-building activities and concrete experience. This process has been especially empowering for the communities.

Some of the challenges included

- People need enough time and space to interact, share opinions, ask advice and go off- topic while scientists tend to value speed and efficiency above other things. It is necessary to negotiate a balance between the needs of both.
- Conveying the meaning of complex concepts in simple terms. We have also struggled in defining our approach and finding our own definition of the term "open science". However, we have noticed a change during the second year in the adoption of "ciencia abierta" and "ciencia ciudadana" by the community groups in Colombia. They have given the term their own meaning; in particular they associate it with the participatory methods we used in facilitating the workshops and in other meetings, and they referred often to the "open science methodology".
- Few scientists have contributed to the project on an ongoing basis; it has been difficult to engage them more in the project in a voluntary manner. This could be due to the fact that the process requires a significant investment of time and efforts and calls for a specific type of researcher, one that values internal rewards over other external benefits.
- It has also been difficult to involve some of the actors of the Model Forests, especially government representatives. In some cases we have felt their support in words, but not in actions.
- Due to a lack of time, we have not been able to develop a more efficient information system to
 follow up the initiatives implemented by the local groups and systematize the knowledge. Such a
 system would be needed to implement a project like this at a larger scale. We provided support
 and customized the approach on a case-to-case basis, but if we had more groups, this would not
 be possible.
- Other challenges include internal conflicts within a few local groups or misunderstanding some of the instructions we gave during the meetings.

What does all of this suggests about the nature/context of open science in development?

Above all, openness is a mindset. This has several implications, including that our job is to work on promoting a certain type of attitudes (more openness in the community to the elites and scientists, and more openness in the academia to sharing and co-creating with the community). However, we are constantly reminded that this type of work is not for everyone. Openness should not be forced

upon people: we need to respect people's will if they choose not to engage or if they still prefer the conventional way of doing science.

We should not overvalue the label: one can do "open science" without calling it that way. The name or label is useful to promote the belonging to a community, the integration to a broader movement, etc. but on the ground, it is difficult to convey the meaning of this concept, and perhaps not always necessary. Openness therefore is a philosophy, which translates for us in a certain way of doing things, a certain methodology to work with the communities. Platforms such as Model Forests can enrich the openness discourse because they share similar values (as well as other values that are compatible). The fact that the word openness as such is not being used should not be seen as a restriction. In Colombia, we discovered that there were several dispersed initiatives throughout the university that did not label themselves as "open science" but that pursued similar objectives or were based on similar principles; the future proposal could help grouping these initiatives together.

Other observations include:

- There seems to be few external rewards for researchers at the moment for a project like ours, which builds strongly on internal rewards (desire to cooperate, satisfaction in giving back to the community, etc.)
- We also found that the process (of empowerment) was at least as important as the actual results.
 Indeed, the process helped creating trust, building capabilities and brought long-lasting change through the empowerment of the individuals and groups who participated. With more resources, the accomplishments could have been quite impressive.
- Presenting the citizen groups as "entrepreneurs" during a public event was a good way to sell the
 approach in Costa Rica (rural innovation, rural entrepreneurship) rather than using the term
 "ciencia abierta" which did not work very well. (Another term widely used in Spanish is "diálogo de
 saberes".) This could be due to the stakeholders/groups and partners chosen, whose profile was
 quite different from the one in Colombia. Indeed, once the local initiatives were under
 development, we also received support from the agri-business unit at CATIE.

4. Project Implementation and Management:

Completed Activities (February 2015 - 2017)			
Type of Activity	How does this activity relate to your research and OCSDNet's objectives		
1 Initial presentation of the project and selection of community groups through visits and focus groups	Needed to ensure that the groups represented different areas of the landscape and that they were committed throughout the process		
2 Two 2-day workshops in Colombia with field trip, two 2-day workshops with field trip in Costa Rica, plus three half-day workshops in Costa Rica	Capacity-building and knowledge-exchange		
3 Collaboration with local groups to implement seven local initiatives, including through six cooperation agreements with local groups; follow-up visits, calls, meetings, etc.	Leads to one major outcome of the project (seven local initiatives implemented)		
4 Dissemination of the local project and its philosophy through the Model Forests website, two blogs, two Model Forests local meetings (Reventazón and Risaralda Model Forests) and one regional meeting (in Puerto Rico). Organization of one international seminar on open science in Colombia.	Outreach and advocacy for the project, for Model Forest and for Open Science		
5 Participation in meetings in Nairobi (2014) Bangkok (2016) and Limassol (forthcoming). Participation in the	Networking with the eleven other OCSDNet subgrantees, the coordination team and the advisors,		

drafting of the manifesto and in the production of the book on contextualized openness	outreach through collective outputs			
6 Coordination with partners in Colombia and Costa Rica	Partnerships established to implement the project and as part of sustainability plan			
Any Future Activities Planned?				
Type of Activity	How does this activity relate to your research and OCSDNet's objectives			
Preparation of a project profile / proposal that integrates open science principles by UTP / CARDER / Coffee Committee for the Risaralda Model Forest	Looking for future opportunities to keep working with the methodology/principales adopted within our open science project			

5. Project Outputs and Dissemination

Workshops held: February 2015 - 2017

Name of workshop	Objectives of workshop	Outcome(s) of workshop	Number of participants present	Any relevant links to event information
1 First workshop in Colombia and first workshop in Costa Rica	Learn and exchange knowledge in relation with climate change.	The participants defined the problems in their areas and brainstormed ideas for possible solutions. They committed to researching more the problem and one idea of initiative to present at the next meeting.	15-20 participants duration: two days and a half	More information on project website
Second workshop in Colombia and second workshop in Costa Rica	Set up a plan for the local initiative	Local initiative structured and timeline established. They reflected on how it would impact their community	15-20 participants One day and a half + two-hour follow-up visits / meetings with each group between one and three months later	More information on project website
3 mini-workshops in Costa Rica – two at the community of VillaMills and one at CATIE	Further definition of initiatives and present initial results	Participants gained practical presentation skills and defined in more details certain components of their initiative	Between 6 and 15 participants each	More information on project website
Final event in Costa Rica and in Colombia	Share results of initiatives with a larger audience, discuss next steps	Seven local initiatives shared successfully with the public	Between 30 and 50 participants	More information on project website - forthcoming

Conferences Attended (to discuss Open Science) February 2015 - 2017

Name of Conference	Your contribution to the event	Outcomes of the conference? (collaborations, contributions, etc.)	Any relevant links to event information
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Conference FORCE 2015 – January 2015	Panel discussion with other OCSDNet members (J. Lorenzo)	This was part of the project although it was held in January 2015 before the official start of the project	https://www.force11.org/node/611 5/#diversity
Seminario Ciencia Abierta – October 2015	Organizer (J.M. Rodriguez, V. Benavides J. Lorenzo). With the participation of OCSDNet coordinators (L. Chan, D. Albornoz)	Creation of a working group on open science at the UTP. OCSDNet Coordination team became more aware of the importance of defining Open Science in Context	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwie8buRhofMAhWIHB4KHYqaBUIQFggfMAA&url=http%3A%2F%2Findustrial.utp.edu.co%2Fseminario-ciencia-abierta.pdf&usg=AFQjCNH7F7IPIMf4glYURvhz-t32DjToA&sig2=NrfkpQSj1aaJtGDvr2tGgA
OCSDNet Bangkok workshop meeting – February 2016	Participant as sub- grantee of the network (J. Lorenzo)	Accomplishments shared. Short-term and long-term priorities highlighted for the network	http://ocsdnet.org/category/events- and-conferences/ocsdnet- workshop-2016/
Ibero-American Model Forest Board Meeting in Puerto Rico – March 2016	Participant as member of the RIABM network (J. Lorenzo, J.M. Rodriguez)	Increased visibility of the projects	http://www.bosquesmodelo.net/reunion-directorio-de-la-riabm-2016/
First meeting on Participatory Science for biodiversity conservation in Bogotá, Colombia, Humboldt Institute, Nov.2016	Participant as representing a "participatory science initiative" from the coffee region of Colombia (V. Benavides)	Networking with other like- minded people from all over the country Sharing about the project and about ideas and participatory methodologies for biodiversity conservation	http://www.humboldt.org.co/es/noticias/actualidad/item/966-ciencia-participativa
Final OCSDNet meeting in Cyprus	Participant as sub- grantee of the network	Forthcoming	Forthcoming

List of relevant publications (February 2015-2017):

Name of Publication	Type (book, journal article, newspaper, blog, etc.)	Authors	Link
Project's website	Website	N/A	http://www.bosquesmodelo.net/c olaborar/proyectos- actuales/ciencia-abierta-y- colaborativa-para-el-desarrollo/
Proyecto Ciencia Abierta y Colaborativa	Newsletter of Reventazón Model Forest (Costa Rica)	N/A	http://us3.campaign- archive1.com/?u=73cf42d5fad41 f897c80f0bd2&id=ffec42c41d&e =a4cc376885
Small is beautiful: Promoting Community Empowerment in Model Forests of Costa Rica and Colombia	blog	J Lorenzo	http://ocsdnet.org/small-is- beautiful-promoting-community- empowerment-in-model-forests- of-colombia-and-costa-rica/
Tying Open Science	blog	D Albornoz, J Lorenzo	http://ocsdnet.org/lessons-from-

with Local Development Needs			colombia-tying-open-science- with-local-development-needs/
Inventario de acciones que contribuyen a la adaptación al cambio climático en los Bosques Modelo de Iberoamérica, utilizando el marco de los capitales de la comunidad	Paper submitted and oral presentation at FAO's World Forestry Congress	F Carrera, J Lorenzo	http://foris.fao.org/wfc2015/api/fil e/552865b49e00c2f116f8e087/c ontents/d859f465-e702-453d- ad53-00c7a7b5543b.pdf
Colaborando con el CATIE en el diseño y desarrollo de proyectos	Informal account of our second workshop in Costa Rica	N/A	https://sites.google.com/site/fund acioncrinnovacion/0 noticias/colaborandoconelcatiee neldisenoydesarrollodeproyectos
Bosques Modelo: Nuevas formas de investigación desde la ciencia abierta	Interview	OVTT	http://www.ovtt.org/bosques modelo ciencia abierta colaborativa
Diálogo de saberes	Master graduation work	R Gualipa	http://repositorio.bibliotecaorton. catie.ac.cr/bitstream/handle/115 54/8175/Dialogo de saberes e n_el_proyecto_piloto_de_ciencia_ abierta.pdf?sequence=1
Across Latin America, Model Forests are providing a natural laboratory for learning and experimentation about landscape governance	Blog on the LPFN initiative, Ecoagriculture partners	J Lorenzo, L Fernandez	http://peoplefoodandnature.org/b log/learning-from-the-forests-a- latin-american-exchange-of- landscape-knowledge/
Poster about the project for presentation at the National Innovation Agency in Bangkok	Poster about activities up until February 2016	J Lorenzo	Unpublished
Openness in the Context of Model Forests of Latin America	Position Paper on Openness for OCSDNet	J Lorenzo	Unpublished
Manifesto of Open and Collaborative Science	Statement of principles	OCSDNet collective outputs	Forthcoming
Varied	7 posters about local initiatives	Local groups, in collaboration with V. Benavides, A. Rodera and J. Lorenzo	Unpublished

6. Community Building

We were successful in engaging local groups but not so much in generating lasting enthusiasm within the academic community (especially in Costa Rica). The concept of "ciencia abierta" is not very well understood and we have not been able to influence the traditional culture of research significantly (for

example, sometimes we also got the impression that the project was too small or alternative to be considered as important or interesting by senior researchers; however, the importance of sharing the results of research with the communities is widely recognized and regularly practiced within the institution). The idea of "open science in development" as we described it within our project was more appealing to early career researchers. (There is also a lack of resources in Spanish in this regard if we compare to English language.)

Relevant communities	Outreach Method/Tool
(e.g. policy makers, research/scientific communities, community group, etc.)	ex: online platforms (facebook, twitter etc.), word of mouth, email, other networks, conference networking etc.)
1 Government institutions (ex. CARDER in Colombia, ICE in Costa Rica)	Networking through the Model Forest Platform, invitation at final events
2 General Public	seminars, PYMES Radio Costa Rica 89,1 FM
3 Research/scientific communities – UTP, Fundación Costa Rica para la Innovación/LEAD University	word of mouth, emails, skype, networking, conferences
, ,	Whatsapp group, facebook, workshops, visits, phone calls

7. Impact

This was a small pilot project which evolved along the way. Our assessment is based on both observations and self-reported impacts by the local groups. We tentatively classify the impacts of our project in the following way:

- a) Improved human capabilities. Empowerment of local groups who adopted a more proactive behaviour and gained confidence and new skills (as demonstrated by their achievements and modes of communication during and between each meeting), leading to more community-led thinking. These groups are also influencing a larger group around them (organizations and communities where the local groups conducted their outreach activities). Uptake of the open science concept and methodology by a small number of researchers and community groups.
- b) **Positive effects on the environment**. The seven community-led initiatives are fostering environmentally-sound behaviours and practices, either through reducing negative impacts by less causing less harm to the environment or by fostering the adoption of good practices (e.g., reforestation, recycling, agro-ecological practices),
- c) Livelihoods and well-being of local groups strengthened. In some cases, the local groups or communities have been able to obtain an additional income through their initiatives that directly benefit them and their community and make them less vulnerable (e.g., better access to water for consumption, attracting more tourists in the area, selling organic fertilizers, beekeeping subprojects initiated). Moreover, the fact that they "own" their initiative means that they are doing everything they can to make it sustainable it is their own creation.
- d) New social capital and local knowledge networks. New links and bonds created (as indicated by the exchanges between the local groups in-between the meetings and workshops and future engagements). Trust created among researchers and local participants. As a major achievement, one new local organization was legally constituted as a result of the project (FRAGUA). In one of the communities in Costa Rica, the project also led to more collaboration between the local association and the rest of the community. Finally, the project contributed to revitalizing/energizing

the Model Forest platform in Risaralda through the establishment of links with new actors of civil society.

8. Reflective Learning on Internal Dynamics:

• What has been the successes and main challenges of your project (in terms of the way that the project was conducted)?

Challenges were linked to the experimental model chosen and the need to reshape the original proposal due to a change in circumstances at the very beginning (the project we initially wanted to build upon did not get his funding renewed and ended unexpectedly). Communication issues as well, since open science was a relatively new concept for us, it was difficult to find the right way to define it and explain it and we have not been so successful in so doing. Communications among partners was also difficult sometimes because of differences in work habits or institutional cultures, or in the way we defined the concepts and objectives; but these challenges were overcome through regular conversations. Another main challenge was linked to administrative/bureaucratic requirements which were especially a burden due to the small size of the project and limited the innovations we could make in the way we implemented it (e.g. constraints regarding setting up local agreements or transferring money to partners). And of course, time and resources are always a challenge!

Success is linked to all the small but beneficial impacts of the project on the communities as well as the feeling of intense satisfaction obtained by the researchers from this kind of work, which can be very rewarding. Success is also linked to the fact that many of the initiatives have a good chance to be sustainable in the long run due to the way they were developed and the importance they have for the groups who authored them. In terms of management, we were also successful in establishing good working relationships among all partners and in supporting an emerging organization (Fundación Costa Rica para la Innovación) comprised of young people from the city who had the opportunity to discover the potential that lies in rural areas and communities (in their own words, one lesson they learned is that the capabilities of the individuals – and of the communities to organize themselves – go way beyond their level of formal education and we should not underestimate them).

• Does your team have mechanisms in place to capture these lessons and share them internally? If so, which mechanisms and how have they benefited your project?

We do not have mechanisms as such, but we have held internal meetings to discuss about these lessons learned and what should be improved in future iterations of a project like this one.

 Please reflect on internal project power dynamics and its influence in project development and outcomes. How did you observe power dynamics to play out? How might north-south relations within the project have also played a role? (Note, this is not for individual naming and blaming but rather a self-reflective way to try to understand how power affects research collaboration.)

We did not feel north-south power dynamics in our project in a significant way. Although it did not totally question power relationships between the researchers and local people, the methodological path chosen for the project allowed us to establish a more horizontal relationship between local people and researchers, beyond what is usually permitted. "Empowerment" might sound like a *cliché* word, but when you see it happen in practice, you know it's real.

9. Recommendations (for OCSDNet):

• How did you find the (experimental) network model that was used by IDRC to administer the OCSDNet subprojects? What were notable strengths and weaknesses you experienced?

This model was very enriching. It allowed the flow of information between twelve small initiatives of all over the world. It was good to feel that our initiatives were not isolated but part of the efforts of a

global network. It inspired new ways of doing things. The collective outputs planned by the coordination team were particularly good ways to connect and foster collaboration between very heterogeneous projects.

Diversity was a notable strength of this network and pushed us to think and collectively reflect about open science in other contexts. However, such diversity also meant that the conditions were not the same for all researchers (some researchers might have been able to invest more time in their project than others, which could translate in 'unequal' contributions to the network).

A weakness is related to the lack of a clear sustainability plan from the onset (not knowing what is going to happen with the network once the project are over). Also, the experimental model meant that there was, sometimes, a lack of a clear direction or that some efforts were lost.

 In your experience, how might a culture of shared learning be fostered/improved for future iterations of a network such as OCSDNet?

Perhaps by giving the opportunity to the researchers to visit or host another project, there is nothing like in-person meetings to build a network.

• Has feedback from members of the network had an impact on your research? (consider insight from the coordination team, advisors and peers in the network).

It certainly had an influence, mostly through exposure to the outputs and outcomes of peers and conversations during the Bangkok meeting, including with advisors. We also followed the network's conversations and how the other projects evolved (via blog posts, reports, etc.), and this fed into our own experience.

• Do you have any other advice/feedback that you would like to provide to OCSDNet or IDRC? (consider modes of communication, evaluation, etc.)

Really hope this network will be given a continuity. Given recent political developments in some powerful countries of the world, we need advocates of openness and diversity more than ever.

10. Additional Comments (optional)

Example of posters presented at the final local events (8 in total)



Example of materials developed or under development with or by the groups









Example of materials used during the workshops





