Ecosystem Report:
Transparency and Technology in Natural Resource Governance

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I. Goal of Ecosystem Map

This document identifies existing uses of technology by civil society organizations around the world in order to understand the nuances and varying approaches to transparency in the natural resource governance (NRG) field. The ecosystem map illustrates the community of practice that is growing around new technologies and transparency by listing organizations, the technologies they employ to advance their mission, their offline and online strategies, their target audiences, and their partners and funders.

We present the information by sector in order to explore whether there is a logic that joins certain types of natural resource governance efforts with particular technological approaches. This approach also illuminates whether there are certain sectors that are ahead of others in employing new technologies in strategic ways. For instance, groups advocating transparency in the forestry sector appear to be the most robust in employing sophisticated web-based tools to further their goals. In terms of the technologies employed, this sector shows an affinity between the disclosure of information around industrial deforestation and geospatial mapping. These deforestation maps primarily target policymakers and other NGOs, but also hope to raise public awareness of the impact of logging and energy development on climate change and local communities. The World Resources Institute, for example, has been an important supporter of

transparency in the forestry sector. In contrast, the oil & gas sector shows promise in employing geospatial approaches to detailing oil & gas concessions and joining this information with contracts and revenues (e.g. RWI proposal and World Bank effort in Ghana), but at present appears to rely on disseminating reports about these issues along with evocative accounts of the impacts of this industry on local communities. This limited example illustrates the likelihood of cross-sectoral opportunities for learning between organizations in the extractives advocacy field.

Thus, we anticipate that this top-level survey of organizations through the ecosystem mapping exercise will be a valuable tool in guiding a deeper analysis of the political effectiveness of these civil society groups in employing new technologies to achieve their strategic aims.

II. Methodology

The goal of mapping the NRG ecosystem is to identify ongoing trends and assess how technology is used to promote transparency and accountability across sectors. It does not (and cannot) aim to be comprehensive or representative of all projects in NRG around the world. Below, we discuss the methodology employed in producing the ecosystem report.

Scope. This ecosystem outlines major players in the following NRG sectors: agriculture & land, fisheries, forestry, mining, oil & gas, and water. This document also identifies promising technology groups and major funders in the field.

Snowball Sampling. We employ a snowball sampling method that first identifies groups already known within the existing advocacy networks of the Transparency and Accountability Initiative (T/A Initiative), particularly relying on sector knowledge by the Revenue Watch Institute (RWI). Through web searches and phone interviews, we have expanded our list of groups working in this space and filled in our understanding of their functions and use of new technologies. These steps are detailed below:

- *Existing Networks.* The existing networks of the T/A Initiative and the RWI are the initial source of information for the eco-system map. These networks are used in order to identify the major players in the field.

- *Interviews.* We conduct interviews with the most promising organizations identified by the T/A Initiative and RWI in order to better understand their action cycles and strategies of employing technology for transparency and accountability in extractive industries. We also ask these organizations to help us determine what other organizations should be contacted, thus generating a snowball effect of information. Our interviews will therefore cover groups within the existing networks of the T/A Initiative and RWI and some groups within one degree of separation from these networks.

- *Web Searches.* We complement interviews of promising organizations by crawling the web and exploring the more diffuse NRG networks (e.g., the GOXI social network for

individuals working in the extractives field). The goal of this stage is to identify organizations and projects that are not part of the traditional NRG networks but should nevertheless be included in the ecosystem map.

Limitations. This approach certainly has its limitations. It relies on information drawn from existing advocacy networks with nodes in the developed world, such as the T/A Initiatives partners, and depends on groups having an online presence.

- *The limits of existing networks.* This methodology is naturally limited to organizations that are active and known in the networks of TAI and RWI. Although web searches may uncover some independent actors that are not part of these networks, they do not allow the compilation of a comprehensive and representative list of organizations and projects.

- *The bias of online presence.* As the ecosystem consists of a very large number of organizations across NRG sectors, time constrains do not allow us to interview all of them. Our mapping exercise therefore relies on information that organizations make available on the internet, generating a bias against organizations with limited online presence. Similarly, this factor also diminishes our ability to identify organizations that may be contemplating the use technology in the future.

III. Ecosystem by Sector

To begin the ecosystem map, we categorize civil society groups working in the NRG field by sector: 1) Agriculture & Land, 2) Fisheries, 3) Forestry, 4) Mining, 5) Oil & Gas, and 6) Water. We also include tables detailing the work of technology-focused groups that have developed platforms or methodologies that could benefit the work of advocacy groups in the above sectors, and list those funders that are most active both in the NRG sector and the technology sectors.

The ecosystem currently contains **102** entries: **63** projects in the various NRG sectors, and **39** technology groups.

We are looking for patterns and logics that may tie particular sectors together at the intersection of transparency and technology, while being sensitive to opportunities for cross-sectoral pollination – where learning can happen between sectors in the extractives field of NRG.

Glossary of terms

The ecosystem is organized according to the following categories:

Project (Organization): Name and website of the project surveyed on the map. If the project belongs to an organization, the organization's name will appear in brackets.

Country: The country or region in which the project operates.

Focus: The type of information or activities targeted by the project.

<u>Tech:</u> What technological tools the organization employs and how (e.g., simple website, videos, interactive mapping, visualization tools, data analytics, social networks).

<u>Data Source</u>: How the project receives its data. We identify four major data sources:
- *Governmental information*: official data that is published by governmental authorities.
- *Independent*: data that the project produces as part of its own research.
- *Collaborative*: data that is produced by various members of the civil society.
- *Crowdsourced:* data and reports that flow from the public.

<u>Output:</u> The contents of the project's website (e.g., interactive maps, databases, reports) or the technological results it achieves (e.g., sending SMS alerts).

<u>Online Strategy:</u> For what purpose does the project use ICTs. The typical goals are the following:
- *Disseminate information:* placing online validated and accurate information in order to educate and affect the audiences of the project.
- *Collect and monitor information*: employing ICTs to crowdsource the collection and monitoring of information.
- *Mobilize*: relying on various technological tools in order to mobilize the constituencies of the organization to act in support of its causes;

<u>Offline Strategy</u>: For projects that have both an online and an offline presence, the general "offline" strategy of the project (e.g., research, advocacy, mobilization, community empowerment). This category is important in order to understand to what extent the online strategy of the project follows it offline objectives.

<u>Age:</u> The date of the project's initiation.

<u>Audience</u>: The target audience for the organization or project, including citizens, NGOs, journalists, policymakers, and governments.

<u>Funders</u>. The major funders that provide financial support to the organization or project.

1. AGRICULTURE & LAND

Our analysis reveals that organizations that aim to improve the transparency and accountability of the Agriculture & Land sector focus their efforts on two major fields: agricultural subsidies and land rights.

Transparency of Agricultural Subsidies

Large agricultural subsidies are prevalent in both developed and developing countries, amounting to billions of public spending every year. Lacking public scrutiny and transparency, they provide considerable opportunities for corruption and skewed budgetary preferences. Several transparency NGOs have launched projects that harness ICTs to expose this spending and exhibit information on subsidies in a user-friendly manner to the public. Such NGOs are currently active in the European Union (Farm Subsidy), the United States (Farm Subsidy Database), and Mexico (Subsidios al Campo).

Agricultural subsidies are a convenient target for ICT-based transparency projects, as considerable amounts of official information on subsidies are already available in the public domain. In some countries, government is required to disclose its spending on agricultural subsidies. In others, freedom of information legislation allows NGOs to file requests and compel the government to disclose its subsidies records. Either via mandatory disclosure or Freedom of Information requests, information on subsidies is typically made available in the form of raw datasets that require analysis and visualization. ICTs play a preeminent role in this respect. NGOs employ tools for data mining and analytics in order to extract from governmental datasets useful information on subsidies' distribution and trends. Interactive mapping technologies and other visualization tools (e.g., charts, graphs, statistics) are then used to display the information in an effective manner on the website.

The most promising projects are developed by the Environmental Working Group, which is responsible for the American Farm Subsidy Database and partially for the Mexican Subsidios al Campo (launched by Fundar). The Mexican project proved to be particularly effective as it revealed irregularities and corruption in subsidy awards. Collaborating with the Mexican newspaper El Universal, the project incited public debate and reevaluation of agricultural subsidies policies.[1] The NGO "EU Transparency" is also worth noting in this context. Based on the agricultural subsidies data of the EU, it launched a platform similar to Farm Subsidy Database and Subsidios al Campo. This organization also initiated a comparable project on fishery subsidies (Fish Subsidy).

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[1]   For details, see a case study on Fundar: http://informacioncivica.info/mexico/fundar/.

Land Rights Transparency

Land rights present a peculiar problem in many developing countries. Local land owners are often unaware of their legal land rights and land records are difficult to access. This reality leads to land grabs and other abuses of rights. Multiple NGOs in the global south are active in this field, building awareness and capacity, empowering communities, providing legal support and advice, and advocating for greater transparency and accessibility of land ownership records.

ICTs can be very promising in this context. Digitalizing land records and making them available on a centralized website can facilitate access and help land owners vindicate their rights (assuming the existence of proper legal and political institutions). While this logic is rather intuitive, our survey identified only one NGO that is engaged in this effort. Bhoomi, a governmental project of Karnataka, India, uses a simple interface to provide a database of land records on its website. The apparent scarcity of organizations in this field can be explained by implementation problems. While the database does not require sophisticated technological tools, in many countries governmental land records have to be first scanned and placed online in an open format—an effort that governmental agencies are not keen to undertake.

Other projects target more general aspects of land rights transparency. The Land Portal (launched by the International Land Coalition) is a new collaborative platform for information sharing on all issues related to land rights. It aims to aggregate relevant information and become "the reference point on land related information on the internet." The Peruvian Tierra y Derechos uses its website to provide legal information, daily news reports and other publication related to land rights of small Peruvian farmers. The use of ICTs in these projects is simple—technology is only required to provide basic databases or downloadable reports.

Miscellaneous

Other interesting examples of NGOs that employ ICTs include EastAgri—a project designed to facilitate information sharing with regard to agricultural investments and business ventures in Eastern European countries. ICTs are used in this project in order to visualize investments on interactive maps and provide detailed databases for investors and companies working in the field.

In recent years, multiple NGOs have relied on ICTs in order to demonstrate the effects of climate change and encourage sustainable agricultural practices in developing countries. CIRAD is one example of such NGO. It largely relies on ICTs for information dissemination. In general, these projects are beyond the scope of the ecosystem as they are not directly relevant to natural resource governance.

Project (Organization)	Country	Focus	Data Source	Tech	Output	Online Strategy	Offline Strategy	Age	Audiences	Funders
Farm Subsidy Database (Environmental Working Group)	US	**Agriculture subsidies**	Gov. information	Maps, visualization tools, data analytics	Interactive maps & database, Summary statistics.	Disseminate information (advocacy purposes)	Policy advocacy	Since 2010	Politicians, journalists, academics, NGOs, public	Multiple foundations incl. Hewlett & individuals
Farm Subsidy (EU Transparency)	UK (covers 27 states of the EU)	**Agriculture Subsidies**	Gov. info (obtained via FOI requests)	Maps, visualization tools, data analytics	Database for each country, transparency index comparing among countries	Disseminate information (advocacy purposes)	Policy advocacy	Since 2005 (data available since 2000)	Politicians, journalists, academics, NGOs, public	Hewlett, OSF, European Social Fund
Global Subsidies Initiative (Institute for Sustainable development)	Global (HQ in Switzerland)	**Agriculture Subsidies**	Gov. info., independent	Website	Reports, policy briefs, newsletters,	Disseminate information	Research	Since 2006	Politicians, journalists, academics, NGOs, public	Governments of DK, NE, NZ, SE, UK; Hewlett.
Subsidios al Campo (Environmental Working Group; Fundar; U.C. Santa Cruz)	Mexico	**Agriculture subsidies**	Gov. info. (mandatory disclosure, available on government website)	Data analytics, visualization tools, maps in PDFs	Interactive maps, charts & graphs	Disseminate information	Policy advocacy, partnerships with journalists	Since 2008 (data available since 1994)	Politicians, Journalists, academics, NGOs, public	Environmental Working Group; Fundar; U.C. Santa Cruz
Bhoomi	India (Karnataka)	**Land Rights**	Gov. info.	Basic website	Governm-ental database with online land records	Service provision	N/A	?	Citizens	The Revenue Department in Karnataka
The Land Portal (International		**Land Rights**	Collaborative (partner NGOs),	Map, social networks, visualization	Reports, news, discussions,	Disseminate information,	N/A	Since 2011	Gov't NGOs,	EC, IFAD, Norad, Omidyar

Name	Location	Focus	Type	Tools	Outputs	Purpose	Activities	Since	Target audience	Founders
Land Coalition)			crowd-sourced	tools, videos	videos	collect information			practitioners, lawyers	
Tierra y Derechos (Centro Peruano des Estudios Sociales, International Land Coalition, Oxfam)	Peru	**Land Rights**	Independent, collaborative (other NGOs)	Visual. tools, social networks	Reports, databases, legal analysis, maps	Disseminate information	Advocacy, community empower-ement, education,		NGOs, gov't	Centro Peruano des Estudios Sociales, International Land Coalition, Oxfam
EastAgri (Agriculture Organization of the UN, the European Bank for Reconstruction and Development, the World Bank and the Central European Initiative)	Eastern Europe, Central Asia (HQ in Rome)	**Agricultural investments**	Collaborative (local partners), Independent	Maps, visualization tools, data analytics	Database with project records per country or sector, case studies of best practices, press releases, maps	Disseminate information	Networking and information sharing (organize annual meetings, workshops)	Since 2002	Businesses, NGOs	The founding organizations
CIRAD (French Gov.)	Global South	**Sustainable agriculture**	Independent	Website	Reports, databases	Disseminate information	Research, education, awareness building	Since 1984	Citizens, NGOs, policymakers	French government
ERC Resource and Response Centre	India	**Envt'l impact assessment of development projects**	Gov. info. independent	Website	E-journals, reports, data sets	Disseminate information	Advocacy, legal advice, communities empower-ment, scientific advice	Since 2007	NGOs, affected communities	The Access Initiative (TAI), Rufford, Critical Ecosystem, Dleep Mathai
ISEAL Alliance	Global	**Developme nt of envt'l**	Independent, collaborative	Website	Reports	Disseminate information	Developing best	Since 2004	Companie s, NGOs,	Hivos, ICCO,

| | best practices and standards | (partner NGOs) | | practices, supporting constituencies | governments | Overbrook Foundation, Packard Foundation, Ford Foundation, World Bank |

2. FISHERIES

Global overfishing and overexploitation of marine areas are the primary concerns of NGOs in the fisheries sector. Accordingly, the two primary areas in which technology is employed are fisheries governance (contracts, licenses, fees, subsidies) and protection of marine areas.

Fisheries Governance

In many countries the management of commercial fisheries is obscured from public scrutiny. The lack of transparency and public accountability with regard to fishing licenses, revenue flows, governmental subsidies, and fishing quotas facilitates corruption, wasteful spending, and illegal fishing, often leading to the destruction of large marine areas.

Several projects seek to employ technology in order to infuse transparency into the governance of commercial fisheries. Similarly to agricultural subsidies, these projects benefit from the fact that governments and international organizations release considerable amounts of fisheries-related datasets into the public domain. Avoiding the need to collect dispersed information, these projects attempt to process and exhibit data in an effective and user-friendly manner. The required technological tools include data mining and data analytics (in order to process large datasets), along with mapping and other visualization tools (in order to present the results of the analysis on the project's website).

Following the strategy of agricultural subsidies, Fish Subsidy relies on official information on EU fisheries' subsidies and provides on its website interactive maps, databases, and indexes. Benefiting from official datasets on fisheries, FishStatJ—a software developed by the UN Fisheries and Aquaculture Dept.—offers statistics and analysis on fisheries production and other governance related questions. While these two projects operate on the basis of available government information, TransparentSea takes a different approach. It aims to expand the amounts of data that is currently publicly available on commercial fisheries. As part of this, it is

starting to develop a fisheries' transparency index for different countries, engaging citizens in reviewing the types of information available online in their countries and reporting back to TransparentSea.

A different trend in fisheries governance is "direct consumer transparency"—informing consumers which fish products can be trusted and encouraging the development of sustainable fishing practices. While this organization does not provide such information, other groups undertake this task. These projects use ICTs in order to incentivize fisheries to build their reputation as sustainable and environmentally friendly businesses, and establish direct connections between fishermen and their consumers. The Marine Stewardship Council (MRC) is one example. It operates a certification and ecolabel program based on robust scientific standards for assessing whether wild-capture fisheries are ecologically sustainable and well-managed. The MRC currently has more than 120 certified fisheries and 130 fisheries in assessment, representing over 10% of the annual global harvest of wild capture fisheries. The online strategy of the Council complements its offline activities. Its website publicizes certified fisheries, allowing users to track them on a map, and guides consumers where to buy sustainable seafood. Another promising project is the Canadian ThisFish. It allows fishermen to create on the website online profiles and post information about their catches, aiming to "better connect [fishermen] to their markets and to brand their catch through personal storytelling." The website enables consumers to trace the origins of sea food and send feedback back to the fishermen. In the future, it will also provide fishermen with data on how many visitors viewed their profile and which catch was traced.

The Revenue Development Foundation is the most unique group in this field. The general objective of this non-profit organization is to help governments increase their domestic revenues, providing advisory services and technical solutions to governments in low-income countries and focusing on improving revenues from natural resources and property tax**.** Among other activities, it develops software that enables governments to administer licenses and manage the payment of license fees in an accountable and transparent manner. The aim of this project is to help governments to enforce the rules and regulations governing such licenses, while generating an environment of incentives to conform to the regulations, and make the licensing process more transparent.

Marine Protection
While projects that focus on fisheries governance employ technology for better data analysis and visualization, projects that address marine protection take a less neutral stance, seeking to raise awareness and mobilize supporters. The Ecoceanos group in Chile employs a low-capacity approach for awareness building and mobilization by engaging constituents through Facebook and Internet radio broadcasts. MarViva is the most promising organization among the ones surveyed in this field. The "offline" strategy of the

organization includes community empowerment in endangered marine areas, political advocacy, and awareness building with regard to marine protection in Colombia, Costa Rica, and Panama. MarViva's use of technology is modest. By and large, it aims to augment the offline objectives of the organization (albeit in a top-down and non-interactive manner). The organization uses its website to disseminate reports and notices on marine protection, and it is active on the major social networks, aiming to raise awareness, publicize its offline activities, and post relevant images. In line with its offline strategy, a logic development for an organization such as MarViva would be to use ICTs in order to collect information on marine areas' abuses in a crowdsourced manner and more actively educate and mobilize supporters on social networks (by launching online campaigns, for example).

Organization (Project)	Country	Focus	Data Source	Tech	Output	Online Strategy	Offline Strategy	Age	Audiences	Funders
FishStatJ (UN, Fisheries and Aquaculture Dept.)	Global	**Fisheries governance**	Gov. info.	Software with datasets and statistical tools	Statistics, databases	Disseminate information	N/A	Since 1998 (data available since 1950)	Scientists, NGOs	UN FAO
Fish Subsidy (EU Transparency)	UK (covers 27 EU states)	**Fisheries subsidies**	Gov. info. (EC)	GIS Mapping, visual. tools, data analytics	Databases by country, Maps of vessel subsidies, database of identified fishing infringements, ranking of subsidy schemes (good, bad, and ugly) reports	Disseminate information (for policy advocacy purposes)	Policy advocacy	Since ~2010	Journalists, NGOs, government	Pew Charitab-le Trusts
Marine Stewardship Council	Global	**Fisheries governance and reputation**	Independent, collaborative (partner fisheries)	Mapping, visual. Tools, data analytics	Database and maps of certified fisheries with sustainable production, online certification support	Disseminate of information, guidance to consumers about sustainable fisheries and seafood	Certification of sustainable fisheries and ecolabel program	Since 1999	Consumers, retailers, Journalists, government, NGOs,	Hivos, Packard, Oxfam Novib, and many others

[Revenue Development Foundation](#)	Global (current focus: Sierra Leone)	**Fisheries governance**	The software is based on gov. info., collaborative (stock and vessel reports from on-board wardens, radio call-in reports, dock observers, and vessel assessments)	Software that enables governments to administer licenses and manage the payment of license fees in an accountable and transparent manner; social networks	Data management software, position papers.	Publicize software, disseminate information	Consulting to gov.	?	Governmnets	UNDP, EC, German Agency for International Cooepration
[This Fish](#) (EcoTrust Canada)	Canada	**Fisheries governance and reputation**	Crowdsourced (fishermen, suppliers, retailers, chefs)	Visual. tools, social networks,	Consumer information on different kinds of fish, online profiles for fishermen, online traceability tool (used by fishermen to upload their catch information), tool for consumer feedback	Connect between providers of seafood (fishermen, distributors, retailers, restaurants) and consumers, disseminate information	N/A	2011?	Consumers	Ecotrust Canada
[TransparentSea](#) (Coalition for Fair Fisheries Arrangements)	Kenya, Belgium (global focus)	**Fisheries governance**	Gov. info., independent, collaborative (partner NGOs)	Basic website	Country surveys of fisheries management transparency (proposed)	Disseminate information	Research, policy recommendations, awareness building, litigation	Since 2011	Governments, industry, NGOs, funders	[unclear]
[Centro Ecoceanos](#)	Chile	**Protection of marine areas**	Independent	Social networks, internet radio, videos	Publications	Disseminate information, mobilize supporters	Research, advocacy, policy recommendations, campaigns	N/A	NGOs, workers, SMEs, coastal	[unclear]

MarViva	Colombia, Costa Rica, Panama	**Protection of marine areas,** sustainable fisheries	Gov. info., collaborative (NGOs, scientists)	Social networks, data, visual. tools	Publications, social networks presence (facebook, twitter, youtube)	Disseminate information, mobilize supporters	Research, awareness building, policy recommendations, advocacy, community empower-ment	Since 2003	Journalists, NGOs, public, governments	Inter American Development Bank
Aquatic Species Distribution Map Viewer (UN, Fisheries and Aquaculture Dept.)	Global	**Species Distribution**	Gov. info. (UN databases)	GIS Mapping	Map	Disseminate information	N/A	N/A	Scientists, NGOs	UN FAO

3. FORESTRY

The major environmental concerns tackled by transparency NGOs in the forestry sector include industrial deforestation, abusive concession agreements, and, more generally, corrupt and wasteful forestry governance.

Industrial Deforestation and Concessions

Projects in this area seek to monitor deforestation, exhibiting the results of industrial logging on interactive maps and, at times, adding further analysis or explanations. GIS mapping techniques and satellite imagery are particularly effective to achieve these ends. These tools allow to visualize geographic areas covered with forests and demonstrate the progress of deforestation. In most cases, raw satellite data is combined with information on logging concessions, wood processing, and timber trading in order to put deforestation into context. The combination of satellite deforestation images with information that may explain its causes creates an impactful tool for third-parties who might use it for advocacy, research, or other purposes.

The organization that is responsible for the majority of the surveyed projects is the World Resources Institute (WRI). The Forest Atlas of the Democratic Republic of Congo (DRC) offers an effective mash up between satellite imagery and detailed official information obtained from the DRC government on companies that hold concessions in the relevant areas. The Forest Transparency Initiative of the WRI follows a similar strategy on a regional level, providing information on deforestation and concessions in central African states, and relying on information provided by a variety of governmental and non-governmental stakeholders. The Global Forest

Watch implements a similar strategy, expanding the amount of indicators and search fields that appear on the interactive map and accompanying the map with research and commentary. Moabi, yet another project of the WRI in the DRC, takes a slightly different, bottom-up approach, attempting to engage the public in tracking deforestation and logging, and providing a variety of discussion tools for networking and community building.

In sum, the surveyed projects operate on national, regional, and global levels, and differ from each other in their data sources and the indicators they cover. All these projects, however, employ a similar ICT toolkit: first, they require satellite imagery and GIS mapping techniques in order to visualize deforestation and track its progress; second, they need tools for data mining and analytics in order to extract relevant indicators from the data they possess on various industrial activities. The Global Forest Watch seems particularly effective in this respect as it also provides high quality commentary that puts the findings of the interactive map into a better context.

Forestry Governance

While forestry governance is closely associated with deforestation and industrial activities in forests, projects that target governance address broader social, political and economic concerns related to forestry. For instance, The Rights and Resources Initiative (RRI) is a global coalition of organizations working to encourage forest land tenure and advocate to expand and strengthen the tenure rights of local residents in the forest economy.[2] As part of this, the RRI develops systems and methodologies to collect, analyze and maintain quantitative and qualitative data on the global dynamics of forest tenure. The online strategy of RRI generally follows its "offline" objectives, but does not seem to benefit from ICTs for purposes of data mining and analytics. On its website, the RRI simply provides access to the data and materials it produces in PDF formats.

The Making the Forest Sector Transparent project, launched by Global Witness, takes a more targeted approach. The project is piloting a 'transparency report card' that gathers data on the level of public access to forestry information in several countries (currently Cameroon, Ghana, Liberia, Peru, and Ecuador). The report card examines the legal obligations of each state to enhance transparency and participation in forestry governance, and works with forest-dependent communities to identify information needs, so that communities can assert their rights, and hold duty-bearers to account. These activities take place "offline," but report cards are displayed and visualized on the project's website, allowing easy comparisons among countries. While Global Witness is more sophisticated in its use of data visualization tools than the RRI, both organizations use ICTs only to disseminate information.

Friends of the Earth (which deals with a range of environmental issues and not only forestry) presents another interesting example. The organization consists of 76 national member groups and 5,000 local activist groups. In the forestry sector, it leads global and

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[2]   Forest tenure is a broad concept that includes ownership, tenancy and other legal arrangements for the use of forests.

national campaigns in order to improve forestry governance. As part of this, it monitors and resists logging companies and other actors that encroach on territories, by protecting community rights and broadcasting community testimonies through national and international media. The online strategy of Friends of the Earth closely follows its offline objectives. Its website offers multiple opportunities to get involved in the organization's campaigns, receive first hand information via the web radio, and spread the word via social networks.

Organization (Project)	Country	Focus	Data Source	Tech	Output	Online Strategy	Offline Strategy	Age	Audiences	Funders
Forest Atlas of the Democratic Republic of Congo (World Resources Institute and DRC)	DR Congo	**Concessions, deforestation**	Gov. info. (DRC Ministry of Environment, Conservation, and Tourism)	GIS mapping	Interactive Map (search fields: concessions date and review, companies, timber production, forest change)	Disseminate Information	N/A	Since 2006	NGOs, gov't, journalists	WRI and DRC
Forest Transparency Initiative (WRI)	Cameroon, Central African Republic, DR Congo, Gabon	Concessions, deforestation	Collaborative (private sector, NGOs, research institutions), Gov. info.	GIS mapping	Interactive Map (search fields: country, private firms, certification, species)	Disseminate information	N/A	?	Journalists, NGOs, policy-makers, academics, public	WRI, UK DFID, COMIFAC, OFAC
Global Forest Watch (WRI)	Brazil, Canada, Central Africa, Chile, Indonesia, Russia, US, Venezuela	Deforestation, logging concessions	Collaborative, governmental information	GIS mapping, visual. tools, data analytics	Interactive maps (search fields: logging concessions, protected areas, transportation, natural features), spatial data explorer & downloads, publications	Disseminate information	Research		Journalists, NGOs, policy-makers, academics, public	WRI

Name	Location	Focus	Approach	Tools	Content	Purpose	Activities	Since	Audience	Funded by
Moabi (WRI)	DR Congo	Deforestation	Crowd-sourcing, collaborative (NGOs, gov't, academic)	Collaborative mapping	Interactive map, discussion tools	Disseminate and collect information	N/A	Since 2010	grassroots & international civil society groups (NGOs)	World Wildlife Fund, OSFAC, World Resources Institute
The REDD Desk (Global Canopy Programme, Forum on Readiness for REDD)	Global (currently focus on Brazil, Cameroon, Vietnam)	Deforestation	Collaborative (partner NGOs), gov. info., independent research	Visual. tools	Collaborative repository of REDD info: detailed country information on REDD implementation, comparisons, reports, policy documents, articles, videos	Disseminate information	Research, advocacy	Since 2011	NGOs, public, policymakers	Moore Foundation, Climate and Land Use Alliance
Friends of the Earth International	Global	Forestry governance	Collaborative (partner NGOs), crowdsourced (supporters)	Visual. Tools, web radio, animation, social network	Newsletters, web radio, reports, videos, photo galleries and competition, social networks, e-cards, blog,	Mobilization of supporters	Campaigns and advocacy	?	National and international media, donors, supporters,	Unclear
Greenpeace	Global	Forestry governance	Collaborative, independent	Visual. tools, data, social network	Blogs, media, social networks, reports, newsletters, donations, mobilization tools	Mobilization of supporters, disseminate information	Campaigns and public advocacy	Since 1971	Citizens, journalists, NGOs, policymakers	Members
Making the Forest Sector Transparent (Global Witness)	Cameroon, Ghana, Liberia, Peru,	Forestry governance	Gov. info., collaborative (by in-country NGOs, incl.	Visual. tools, data analytics	Country report cards (measuring the level of public	Disseminate information	Aware-ness building, policy recommendations,	Since 2009	Policy-makers, public	Global Witness

	Ecuador		Grupo Faro)		access to forest information) with statistics and detailed info		advocacy			
[Observatorio de Investimentos na Amazonia](#) (INESC)	Brazil	Forestry governance	Gov. info., collaborative	Visual. tools, data analytics, social networks	Database, reports, newsletter, case studies, multimedia, social networks	Disseminate information	Research and analysis of private and public development investments in the Amazon; advocacy	unclear	NGOs, general public, journalists, governments	[unclear[
[Project POTICO](#) (WRI)	Indonesia	Forestry governance (Palm, oil, timber, carbon offsets)	Collaborative (partner NGOs)	Visual. tools	Video, publications	Disseminate information	Research, advocacy	Since 2009	Journalists, NGOs, public	World Resources Institute, New Page Corporation
[Rainforest Action Network](#)	Global	Forestry governance (palm oil, paper, coal, tar sands)	Collaborative (partner NGOs)	Visual. tools, social networks	Publications, social networks	Mobilization	Advocacy	Since 1995	Policymakers, individuals, journalists	[unclear]
[Rights and Resources Initiative](#)	Global (office in Washington DC)	Forestry governance	Collaborative (partner NGOs)	Visual. tools, data analytics, video, audio, social networks	Reports, forest tenure data and trends, presentations, news, video, audio	Disseminate information	Research, policy recommendations, advocacy, aware-ness building	Since 2006	Policy-makers, NGOs, journalists	DFID, Ford Foundation, Ministry for Foreign Affairs of Finland and others

| [Russian Forest Fires "Help Map"](#) | Russia | Location of forest fires and coordination of rescue efforts | Crowd-sourced | Ushahidi mapping platform | Interactive map | Collect and disseminate information | N/A | Since 2010 | Public, bloggers, government | Crowd-sourced |

4. MINING

Organizations that focus on transparency in the mining sector typically cover the oil and gas industries as well. Therefore, this list is concise and narrowly focuses on transparency in mining. The surveyed projects focus their attention on the governance of mining concessions (including revenues, taxation, internal governance, extraction methods, geographic boundaries) and impacts of mining.

Mining Concessions
Mining concessions are the primary focus of transparency NGOs in the mining sector. Grupo Propuesta Ciudadana (GPC), for instance, monitors revenues from mining concessions in different regions in Peru. As part of its "offline" strategy, GPC engages in community empowerment and education and pursues national campaigns related to different aspects of mining concessions. The online presence of GPC is fairly modest and largely oriented to the dissemination of information produced by the group. Its website contains publications, legal documents, news, and a simple database with reports on concessions in different Peruvian regions.

Integrity Watch Afghanistan, an organization established in 2006, has a new project dedicated to research and monitoring the revenues of mining companies in Afghanistan. Its website is supposed to serve for basic information dissemination and include online reports, news, and pictures. The Indonesian group Jatam pursues a "low tech" approach. The offline activities of the group include advocacy and community empowerment, but its online presence is limited to a simple website with case studies of mining companies.

In sum, the surveyed projects represent groups with rich offline strategies, but modest online presence, typically limited to the dissemination of reports and other basic materials. This reality is not optimal, as projects that monitor mining concessions can benefit from a variety of technological tools mentioned in this ecosystem report (e.g., data analytics, visualization tools, interactive maps, and mobile technology for collecting information).

Mining Impacts
Aside from monitoring the general aspects of mining concessions, transparency NGOs have been targeting the more specific question of the impacts of mining on local communities. The survey includes two projects in this field. The first, Earthworks, pursues campaigns as part of its offline strategy and limits its online presence to a top-down dissemination of reports and other materials. The

second, Observatorio de Conflictos Mineros, only operates online and undertakes a promising interactive approach, directly engaging the public in information collection. The project invites citizens to report on conflicts and abuses related to mining companies, and offers an online searchable database of such reports. While currently reports should be posted directly to the website, a mobile approach (e.g., sending reports via SMS) can be more effective in this context.

In general, a combination between top-down dissemination of information and bottom-up collection of reports seems to be the most effective strategy for monitoring the impacts of mining on local communities. As local communities possess an inherent advantage in on the ground monitoring of mining-related abuses, technology could be employed in order to funnel this information into the public domain. The capacity of NGOs to conduct research and analysis should be used in order to disseminate helpful information in an interactive manner.

Organization (Project)	Country	Focus	Data Source	Technology	Output	Online Strategy	Offline Strategy	Age	Audiences	Funders
Grupo Propuesta Ciudadana – Vigila Peru	Peru	Track revenues from mining concessions by regions	Gov. info.	Basic website, downloadable reports	Reports, news, database, legal documents,	Disseminate information, build awareness	Campaigns, community empowerment, education	Since 2004	NGOs, public, policymakers	OSI – Revenue Watch Institute
Integrity Watch Afghanistan	Afghanistan	Mining concessions	Independent, collaborative (partner NGOs), gov. info.	Downloadable documents, social networks	Reports, news, pictures	Disseminate information	Research, policy-making, mobilization(?)	Since 2006 (website since 2011)	NGOs, communities, policymakers	The Norwegian Embassy, DfiD, Tiri, UNDP and the World Bank
International Peace Information Service	DR Congo (regions include Kivus, South Katanga)	Mining concessions	Gov. info., collaborative	Very basic website, map	Interactive map	Disseminate information	N/A	Project since 2010?	International organizations, NGOs, policymakers, public?	European Commission
Integrated Social Development Centre (ISODEC)	Ghana	Mining concessions and revenues	Independent, collaborative (partner	Basic website	Reports, photos, audio, videos	Disseminate information	Campaigns, public advocacy, research	Since 1987	NGOs, citizens,	[unclear]

			NGOs)							policymakers
Jatam (Mining Advocacy Network)	Indonesia	Mining concessions, community empower-ment	Collaborative (partner NGOs), indepndent	Very basic website	Case studies of mining compa-ies	Disseminate information	Advocacy, community empower-ment	Org. established in 1995	NGOs, communities	[unclear]
Earthworks (Mineral Policy Center, Oil & Gas Accountability Project)	Global, focus on the US (HQ in Washington)	Communities protection from mining impacts	Independent, collaborative (partner NGOs, social activists)	Downloadable documents	Reports	Disseminate information	Campaigns	Since 2005	Policymakers, NGOs, journalists	unclear
Observatorio de Conflictos Mineros en America Latina	Latin America	Track mining conflicts (envt'l community, labor impacts)	Crowd-sourced (via web upload), collaborative	Basic website	Database by country, videos	Disseminate information, collect information	N/A	Since 2009	Advocates/ NGOs, affected communities, journalists	Unclear

5. OIL & GAS

The oil & gas sector has traditionally been notorious for the resource curse of oil-rich countries. Despite soaring oil prices and billions of dollars of oil & gas revenues, oil rich countries are often the poorest in the world. Secretive and wasteful management of oil resources presents a substantial difficulty in this respect. Lacking transparency and public accountability, oil companies may engage in corrupt practices in order to secure contracts, gain political influence, or avoid liability for various environmental, health and labor violations. Governments that are not subject to strict accountability standards may similarly misbehave, engaging in opportunistic and corrupt ventures with the oil production industry.

Due to these grave and widely acknowledged concerns, the sector of oil and gas is the most populated in the ecosystem report. However, although transparency NGOs are diverse and prevalent, their use of ICTs is largely limited to dissemination of information. Two major fields of activity can be identified in this sector: oil & gas fields governance, and impacts monitoring.

Oil & Gas Fields Governance

Transparency NGOs that are active in this field monitor a variety of aspects related to the governance of oil and gas fields.

- *National level*

One group of projects targets the operation and revenue flows of oil fields. On the national level, Grupo Faro complements its offline research, advocacy, and awareness building activities with an online publication of reports, data on oil subsidies, and videos. The Mapping for Results project of the World Bank takes a more interactive approach, displaying on an interactive map data on oil fields production and revenues in Ghana.

A different set of projects examines the effects of oil & gas production on the national budget. The Mexican organization IMCO used official governmental information in order to develop an interactive online budget calculator, which demonstrates the dependence of the Mexican economy on oil production. La'o Hamutuk took a low-capacity approach, analyzing the oil budget of Timur L'Este and presenting its findings on a basic website.

The American project "Well Watch" takes a unique networking approach, allowing individuals to find information about companies or wells on their properties and publicly log complaints and warnings. The project operates on a wiki-website, open for collaborative editing, and contains chats, forums, and other networking possibilities. The ultimate goal of this project is to make the market more transparent and improve oil companies' practices. This use of technology is currently unique, but it should be considered by other groups interested using ICTs for community development, information sharing, and networking (the caveat is that some digital literacy is required to actively participate in such projects).

- *Global level*

The most effective organizations in this field operate on the global level. The work of Publish What You Pay (PWYP) and the Revenue Watch Institute (RWI) are particularly worth noting. PWYP is a global network of over 600 member organizations that are active in more than 30 countries. As part of its offline strategy, PWYP is engaged in advocacy and campaigns that aim to impel companies to "publish what you pay" and governments to "publish what you earn." Despite the wealth and variety of its offline activities, the online presence of PWYP is limited to information dissemination (placing online reports, press releases and news items).

The RWI is a major organization in the field of extractive industry, engaging in a variety of activities to promote the transparency of oil fields governance and oil revenues. One of its most promising projects is a transparency index of oil producing countries. The index rankings are based on the availability of information in seven key categories of natural resource governance: access to resources,

generation of revenue, institutional setting, state-owned companies, natural resource funds, sub-national transfers and status of the country's engagement with the Extractive Industry Transparency Initiative (EITI) which require, disclosure of oil revenues. Similarly to PWYP, RWI uses its website in order to disseminate information gathered as part of countries' reporting to the EITI. It uses tools for data analytics and visualization in order to display countries' reports in an easily comprehensible and user-friendly manner.

Monitoring the Impacts of Oil Fields
Transparency NGOs that aim to expose oil companies' abuses and rights violations employ ICTs in a more interactive manner. These groups rely on crowd-sourced and collaborative approaches of gathering data from the ground up, and use their website in order to display violations in an impactful manner.
Several projects that operate on the national level are worth noting. Amnesty International's Eyes on Nigeria project uses satellite imagery, mapping techniques, eyewitness testimonies, photos and videos in order to display oil-related abuses on an interactive map, accompanied by commentary and testimonies. The Landman Report Card is an American project that gathers from landowners information on the behavior of landmen—agents who represent oil companies and negotiate with landowners. The Nigerian Stakeholder Democracy Network takes a more top-down approach. It complements its offline efforts of community empowerment, education, and advocacy with online analysis and visualizations of their work. SMS technology can be particularly effective in this field, but it seems to be still unexplored.

On the global level, Oxfam is particularly notable. The offline strategy of the organization in this field focuses on the "Right to Know, Right to Decide" campaign, which advocates for transparency with regard to the impacts of oil fields on local communities. The online activities of Oxfam complement this strategy, aiming to disseminate information and mobilize supporters for its campaign by relying on social networks and other online tools.

Project (Organization)	Country	Focus	Data Source	Tech	Output	Online Strategy	Offline Strategy	Age	Audiences	Funders
Mapping for Results (World Bank)	Ghana	**Oil fields, production & revenues** (also mining)	Collaborative (World Bank grantees), governmental information	GIS mapping	Interactive map	Disseminate information, monitor WB projects and impacts	N/A	Since 2010	Policy-makers, NGOs, public	World Bank
Grupo Faro (RWI)	Ecuador	**Oil (& mining) contracts and**	Collaborative, governmental	Download-able	Publications, data on oil	Disseminate information	Research, advocacy,	Since 2006	Policymakers	Revenue Watch

		revenues	information	reports, visual. tools	subsidies, videos		awareness building			Institute
[Instituto Mexicano para la Competitividad (IMCO)]	Mexico	**Oil budget**	Independent	[Calculator], visual. tools, downloadable reports	[Calculator], reports, indexes	Disseminate information	Research, advocacy, policy-recommendations, awareness buliding	Since 2004	Policy-makers, journalists, NGOs, citizens	Hewlett, Mexican Council of Businessmen
[La'o Hamutuk]	Timor-Leste	**Oil & gas budge**t and related legislative documents	Collaborative, independent	Very basic website	News reports, images, analysis	Disseminate information	Research: monitoring, analysis	Since 2000	NGOs, international institutions, journalists, public	Foundations, NGOs, individuals
[Publish What You Pay]	Global	**Oil & gas (also mining) payments, receipts and revenues**	Collaborative (partner NGOs), governmental information	Data analytics and visual. tools, social networks	Press releases, publications, news stories	Disseminate information	Advocacy, network of NGOs, capacity development		NGOs, international institutions, journalists, public,	Revenue Watch Institute, OSF, among many others
[Revenue Watch Institute]	Global	**Transparency index** by country for extractive industries	EITI: Collaborative (partner NGOs), governmental information, Independent	Visual. tools, data analytics, maps,	Interactive database and data visualizations	Disseminate information	Research, advocacy, awareness building, network of NGOs		NGOs, policymakers, international institutions, corporations	Open Society Foundations, Hewlett Foundation, others
[Well Watch] (MIT Center for Future Civic Media)	US	Natural gas **facilities management** (information and complaints on wells)	Crowd-sourced	Wiki, videos, database, visual. tools, forum, chat	Video tutorial, images, well reports, news, publications, list of members,	Disseminate information, collect information, social networking	Community empowerment, advocacy	?	Landowners, NGOs, policy-makers	Knight Foundation and by the MIT Media Lab

				forum, chat						
[Eyes on Nigeria](#) (Amnesty International)	Nigeria	**Monitoring abuses** related to oil and gas production	Collaborative	Satellite imagery, mapping techniques, eyewitness testimonies, photos and videos	Interactive map with images, videos, personal accounts of witnesses	Disseminate information, mobilization (campaigns)	N/A	Since 2010 ?	Policymakers, NGOs, journalists, public	Oak Foundation
[Landman Report Card](#) (MIT, ExtrAct group)	USA	**Monitoring landmen** (agents of oil & gas companies that conduct negotiation with landowners)	Crowd-sourced	Interactive maps, visual. tools,	Interactive map, database of landmen and companies	Disseminate information, social monitoring	N/A	?	Citizens, NGOs, journalists, oil companies	MIT's Center for Future Civic Media
[Oil Spill Crisis Map (Louisiana Bucket Brigade)](#)	US	**Monitoring abuses** related to the Mexican Gulf oil spill	Crowd-sourced, collaborative (info from the media)	Interactive map, SMS (Ushahidi)	Interactive map, reports, news	Disseminate information, social monitoring	Advocacy, research	Since 2009	Media, public, policy-makers	Bucket Brigade
[Oxfam America](#)	Global	**Impacts of oil & gas** (also mining) development on local communities	Collaborative (partner NGOs)	Visual. tools, social network, mobilization tools, videos	Blog, photo galleries, publications, mobilization tools, videos	Disseminate information, mobilization	Advocacy (right to know, right to decide campaign)		Public, corporations, researchers	Multiple (individuals, corporations, foundations)
[Shell = Guilty](#)	Nigeria	Human rights and environmental **abuses** of oil company Shell	Independent, gov. info. (court proceedings), collaborative (from the	Social networking,	Reports, campaign tools and information, news, videos	Mobilization, disseminate information	Campaign against Shell	Since 2008	Journalists, public	[unclear]

					media)					
Stakeholder Democracy Network	Niger Delta (org. based in UK)	Environmental & social **impact** of oil spills	Collaborative, independent	Download able reports, videos	Publications, analysis, email digest, online videos	Disseminate information	Community empowerm ent, education, advocacy	?	Journalists, local NGOs, public	[unclear]
Sudan Oil and Human Security Initiative (SOHSI) (Collaborative for Peace)	Sudan	**Impact** of oil production on local communities	Collaborative (partner NGOs)	Download able reports	Reports, images (projected)	Disseminate information	Promote cooperation and communicat ion between oil companies and civil society	Since 2011	NGOs, oil companies, journalists	[unclear]

6. WATER

The surveyed organizations in the water sector target two issues that are preeminent for water governance in developing countries: water supply and quality, and corruption.

Water Supply and Quality

Water supply is often limited and unreliable in developing countries. The lack of transparency and accountability of water supply systems exacerbate this problem, making it difficult to demand reforms and improve poor services. Water quality presents a further obstacle. Absent effective monitoring, water suppliers do not comply with quality standards and the provision of clean water is perceived as merely optional.

The strategy chosen by the surveyed NGOs to alleviate these concerns is establishing a direct channel of communication with water consumers. NGOs that operate on a local level employ ICTs to facilitate crowdsourced collection of information, largely relying on mobile technology. For instance, the Tanzanian NGO Daraja launched a project named "Maji Matone" (Raising the Water Pressure). As part of its offline strategy, Daraja assists local communities to demand solutions to problems of rural water supply. Citizens report problems using mobile technologies, and Daraja transmits their reports to the responsible local governments and, if necessary, to the media. Next Drop, which focuses on India, also employs mobile reporting, using technology in order to connect between water consumers and suppliers. Water utility employees call the voice response system of Next Drop when they open valves to distribute

water. Based on this information, Next Drop sends SMS notices to consumers in relevant neighborhoods, alerting them about water delivery. In order to verify the accuracy of the system, consumers are encouraged to send notices that evaluate the water service back to Next Drop, thus generating a "feedback loop." Both Daraja and Next Drop therefore serve as technological intermediaries, allowing a two-way relationship between water providers and consumers.

Transparency NGOs that operate to improve water supply and quality on the global level use ICTs in a more traditional manner. Water Aid, for instance, complements its offline advocacy and community empowerment activities with a top-down online strategy, placing on its website reports, policy documents, statistics, and educational resources. The project Eutrophication & Hypoxia of the WRI follows a similar online strategy of information dissemination, employing more sophisticated mapping and visualization tools of water quality in marine environments.

Corruption in Water Management
Transparency NGOs also operate on the global level to target the problem of corruption in water resources management and water supply services. The Water Integrity Network and the Corruption in Water project of Transparency International are two examples of such projects. The bulk of these groups' activities occurs "offline" and involves awareness building, capacity development, national and international advocacy campaigns, and research. Their online strategy is limited to dissemination of information that they produce, employing visualization tools and largely targeting journalists, policymakers, and other large scale NGOs.

Organization (Project)	Country	Focus	Data Source	Tech	Output	Online Strategy	Offline Strategy	Age	Audiences	Funders
Daraja	Tanzania	**Water supply and quality**	Crowd-sourced	SMS, social networks	SMS-based citizen feedback	Collect and disseminate information	Community empower-ment, work with local gov't	Since 2007	Local government, media, citizens	[unclear]
Next Drop (U.C. Berkeley)	India	Water supply	Crowd-sourced (from citizens for verification, and from water	SMS, dashboard	SMS-based alerts	Collect and disseminate information (allow coordination between	Establish channels for cooperation with local gov't and water	?	Citizens, local water boards	Gates, Knight and Deshpande Foundation

			companies for notification)			citizens and water companies)	company employees			
ijanaagraha.org	India	Water supply & quality, sanitation	Collaborative (multiple contributors), crowd-sourced	Mapping, social networks	Media portal: social Network, interactive maps, news, blogs, videos	Collect (via SMS) & disseminate information	Community building, civic literacy	Since 2001	Journalists, NGOs, policymakers, public	Omidyar
Eutrophication & Hypoxia (WRI)	Global	Water quality (impact of nutrient pollution)	Independent	Maps, social networks, videos, visual. tools	Interactive map, publications, images, videos, links to other tools and resources	Disseminate information	Awareness building, advocacy, increase information exchange, identify data gaps	?	Journalists, NGOs, policymakers, citizens	Packard Foundation
Water Aid	26 countries in Africa, Asia and the Pacific region	Water quality	Collaborative (partner NGOs), gov. info.		Reports, policy documents, statistics, case studies, videos, education resources	Disseminate information	Community empower-ment, research, policy recommend ation	Org. since 1981	Policy-makers, NGOs,	[unclear]
Water Point Mapping (Water Aid)	Sub-Saharan Africa	Water supply	Crowd-sourced	Free software converting water point data into Google Earth maps, without the need for internet connectivity	Status of water supply services (district and village level coverage, functionality map, water quality map, revenue collection map)	Disseminate information, service provision	N/A	Since 2010	NGOs, communities	Water Aid

[Water Integrity Network](#)	Global	Corruption in water manage-ment	Collaborative (partner NGOs)	Basic website, downloadable publications	News, media, publications, case studies, list of network members and forum	Disseminate information, social network	Local, national, and international anti-corruption advocacy, awareness building, capacity development	Since 2006	NGOs, policy-makers, journalists	Gov. of Germany (BMZ), Sweden (SIDA), Switzerland (SDC), and The Netherlands (DGIS).
[Transparency International (Corruption in Water)](#)	Global	Corruption in water manage-ment	Independent, collaborative, governmental information	Basic website, downloadable publications	Reports, indexes	Disseminate information	Research, education, awareness building, creation of networks, advocacy	Since 2006?	Policy-makers, governments, NGOs, journalists	OSF

7. TECHNOLOGY GROUPS

Technology groups develop both neutral tools that can be useful to improve the transparency and accountability of NRG and tools that are specifically designed for NRG sectors.

The following survey organizes technology groups according to their potential uses for transparency NGOs.

- The first category, "data management tools," contains technological products that help NGOs analyze and visualize data. It includes tools for data mining and analytics along with mapping and satellite imagery techniques.
- The second category, "crowdsourcing tools," contains tools for crowdsourced collection of information (typically via mobile technology) and technologies that allow the management and analysis of such information after it is collected.
- The last category contains miscellaneous tools that can be helpful for various purposes.

I. *Data Management Tools (data analytics, mapping, visualizations)*

   a. *Data Management and Analytics*

These tools can be helpful for organizations interested in using their websites to disseminate information. They are particularly useful for processing and mining large datasets, data analytics and visualization. The leading groups in this area are Civic Commons, Open Knowledge Foundation, Sunlight Foundation, and mySociety.

Project	Country	Focus	Technology	Audiences	Funders
CitiVox	[unclear]	Data analytics (data collection, management, analytics, sharing)	Software (cloud based service platform)	NGOs	[unclear]
Ciudadano Inteligente	Chile	Data analytics, applications development	Open source software	Journalists, citizens, NGOs, governmnet	Open Society and others
Civic Commons	US	Open data, data mining	Open data software (311 services)	Government, software developers, citizens	Omidyar Foundation
CiviCRM	India, Poland, US	Recording and managing information about various constituencies	Open source software	NGOs	OSF
Envaya	US (focus on Tanzania)	Data management (development of online software for communities in developing countries)	Open source software	NGOs	Google, Twaweza, and others
Google Fusion Tables	US	Collaborative data analytics	Open source software	NGOs, citizens, developers	Google
The Guardian Open Platform	UK	General applications development	Mapping, data visualizations	Government, Citizens	[unclear]
Mozilla	US	General applications development	Open source software		
mySociety	UK	General applications development	Open source software, mapping	Government, citizens	Omidyar, among others

Open Knowledge Foundation	UK	Data mining and analytics	Open source software	Government, NGOs, citizens	[unclear]
Sigmah	France?	Data management	Open source software	NGOs	DG ECHO, the Catalan Agency for Development Cooperation (ACCD), Ile-de-France region, Rhône-Alpes region, Fondation pour le Progrès de l'Homme
Sunlight Foundation	US	Data mining, analytics, applications development	Open source software	Journalists, citizens, NGOs, government	Omidyar, Knight Foundation, Open Society, and others
Tactical Technology Collective	UK, India, South Africa, Jordan, Philippines	Toolkits on using ICTs for advocacy	Social media, mobile phones, digital security, info design	NGOs	[unclear]

b. *Mapping and Satellite Imagery*

Tools for geospatial mapping and satellite imagery can be helpful for data visualization according to specific geographic boundaries and to track large scale environmental impacts (e.g., deforestation). The most promising groups in this field are Development Seed, OpenGeo, Google Earth Engine and the Public Laboratory for Open Science and Technology.

Project	Country	Focus	Technology	Audience	Funders
Blue Raster	US	Geographic mapping	Mapping, data mining	NGOs, governments	(this group is for profit)
Development Seed	US	Open data, geographic mapping, visualizations	Mapping, data mining	NGOs, policymakers, government, citizens	[unclear]
Google Earth Engine	Global	Satellite imagery and mapping	Mapping	NGOs, citizens, governments	Google Foundation
Open Street Map	UK	Free geographic data	Mapping	Citizens, NGOs	[unclear]

Project	Country	Focus	Technology	Audience	Funders
OpenGeo	US	Free geographic data	Geospatial software	Government, NGOs	[unclear]
Public Laboratory for Open Science and Technology	US, Peru	Satellite imagery of oil spill, land disputes	Low-tech aerial imagery	NGOs, policymakers	MIT, Knight Foundation
SeeClickFix	US	Urban services	Mapping	Government, citizens	OSF, Omidyar network

II. _Crowdsourcing Tools (Collection and Management of Information)_

a. _Collection of Information via Mobile Technology_

Similarly to other ICT4D projects, mobile technology serves a prominent role in NRG sectors, being particularly useful to organizations interested in crowd-sourced collection of information. The leading groups in this area are FrontlineSMS and Rapid SMS.

Project	Country	Focus	Technology	Audience	Funders
Cyber Tracker	South Africa	GPS field data collection	Open source application	NGOs, citizens	[unclear]
EpiCollect	UK	Mobile data collection	Open source application for smart phones		[unclear]
Episurveyor (Datadyne)	US	Data collection via mobile phones	Open source software		[unclear]
Frontline SMS	Global	SMS-based information service	SMS	NGOs	Knight Foundation, among others
Kiwanja	Mostly Africa	Mobile technology	SMS	NGOs, individuals	MacArthur, Open Society Institute, Hewlett, and others

| Rapid SMS | Global | Dynamic data collection, logistics coordination and communication, | Open source software | NGOs | UNICEF and others |

b. Management and Visualization of Information Collected via Mobile Technology

Technological tools do not only facilitate crowd-sourced collection of information, but also allow to manage, analyze, and visualize this information in preparation for its online publication. The most promising groups in this field are Indaba, Open Data Kit, and Ushahidi.

Project	Country	Focus	Technology	Audience	Funders
Awaaz.de	India?	Voice-based question and answer service, information portal, forum, asynchronous call center and narrow-cast radio platform	Open source software	NGOs	Development Support Center
Freedom Fone	Zimbabwe	Phone based information services using interactive audio voice menus, voice messages, SMS and polls.	Open source software		
Huduma	Kenya	Urban services	Mapping	Government, service providers, NGOs, citizens	OSF, among others
Indaba (Global Integrity)		Software for collection and management of information (design projects, collect data, write reports, edit documents, clean datasets, conduct quality control and peer review, and then publish or export the results).	Online platform	NGOs	Global Integrity
Map Kibera	Kenya	Urban Services	Mapping, SMS	Government, service providers, NGOs, citizens	[unclear]
Mobile Active	Global	Consulting re mobile technology	Mobile technology	NGOs	[unclear]

Open Data Kit	US	Data collection and management tools	Google		
Ushahidi	Kenya	Collection and visualization of information	Mapping, SMS	NGOs, citizens, journalists, policymakers, governments	OSF, among others

III. Miscellaneous

This category refers to a variety of tools that can be helpful in different contexts in developing countries, but are not directly relevant to NRG transparency and accountability. Global Voices and Sahara Reporters are promising platforms for citizen journalism. EngageMedia offers tools for video sharing. Question Box provides hardware and software for easy access to information.

Organization	Country	Focus	Technology	Audiences	Funders
EngageMedia	Indonesia, Australia	Video sharing focused on environment	Video	NGOs, citizens, policymakers	[unclear]
FreeBalance	17 developing countries	Budget transparency	Public financial management software	Government	[unclear]
Global Voices	Global	Citizen journalism	Blogs	Policymakers, journalists, citizens	[unclear]
Qeuestion Box (One Mind)	US (active in India)	Hardware (telephone intercom) and software, local residents ask questions, an operators with an internet connection answers	Hardware and software	NGOs	[unclear]
Sahara Reporters		Citizen journalism	Blogs	Citizen journalists, mainstream media, NGOs, citizens	[unclear]

8. FUNDERS

Organizations that offer financial support to organizations that employ technology to improve the transparency of the NRG field include a variety of foundations. The Ford Foundation supports a wide variety of natural resource governance organizations but is less active on the technology side of natural resource governance. The Overbrook Foundation focuses entirely on NRG grantees. The Indigo Trust, Omidyar Network and the OSF Information Program support a variety of technology groups, some of which develop tools that are relevant in the NRG context.

Organization/project	Regions	Grantees: Technology groups	Grantees: Natural Resources Governance
Ford Foundation	Global	[to be completed]	Rights and Resources Initiative, Global Witness, Oxfam Novib, Amazon Working Group, Grupo Faro, FUNDAR, Ashoka, Center For International Forestry Research, and others [to be completed]
Hewlett Foundation	Mostly US	[to be completed]	Global Environment & Technology Foundation, The Energy Foundation, American universities (especially MIT)
Hivos	Global, focus on Africa	SODNET, Twaweza, Ushahidi	Supports "sustainable production" projects rather than NRG
Indigo Trust	Africa	Tactical Tech, FrontlineSMS, Africa Gathering, TAI, Hive Colab	N/A
Omidyar	Global	Ushahidi, Sunlight Foundation, SeeClickFix, mySociety, Global Voices, FrontlineSMS, Infonet (Huduma)	Janaagraha
OSF Information Program	Global	Frontline SMS, Tactical Technology Collective, Ushahidi, Open Street Maps, Global Voices Online, CiviCRM	N/A
Overbrook Foundation	Latin America, focus on environment and human rights	N/A	Earthworks, Environmental Investigation Agency, Fundación Cordillera Tropical, Rainforest Action Network, Rainforest Alliance

IV. Concluding Observations

The primary finding of our survey is that organizations that aim to improve transparency and accountability in the NRG sectors focus their efforts in two fields: governance and impacts.

a) Governance
The category of "governance" contains information on relevant laws and regulations, subsidies, licenses, contracts, fees, and management of corporations in various NRG sectors. NGOs seek to improve the transparency of governance across all the surveyed sectors and most of the projects in the ecosystem are part of this category.

Projects of governance transparency target two primary actors: national governments and private corporations. Governments are largely responsible for delineating the legal framework for the operation of NRG sectors, granting licenses and subsidies, and setting quotas. As these matters are naturally prone to corruption, transparency interventions seek to expose governmental decision-making in these areas and encourage public scrutiny and discourse. The second part of governance transparency is focused on the actual practices of corporations and examines their obedience by international and national rules and standards.

In the context of Agriculture & Land, projects of governance transparency bring to light information on the governmental distribution of agricultural subsidies (e.g., Farm Subsidy, Subsidios al Campo). Similarly, the majority of transparency projects in the Fisheries sector are focused on the governance of commercial fisheries, using technology to release information on fishing licenses and quotas and governmental subsidies (e.g., FishStatJ, Fish Subsidy). Along with exposing governmental practices, transparency organizations that are active in this sector specifically target commercial fisheries. They aim to expose and assess the management quality and environmental friendliness of fisheries and incentivize them to improve their practices (e.g., Marine Stewardship Council, This Fish). As part of this, some of this projects (e.g., TransparentSea) attempt to generate surveys and indexes that allow comparisons and cross-country evaluations.

In the Forestry sector, transparency organizations target both governmental decision-making and corporate practices. Some organizations monitor governmental obligations with regard to access to forestry-related information, participation in forestry governance, and tenure rights of local communities (e.g., Making the Forest Sector Transparent, Rights and Resources Initiative). Other groups monitor the activities of logging companies and advocate for improved management practices (e.g., Friends of the Earth, Project POTICO in Indonesia).

In the Mining sector, governance transparency projects expose previously unavailable information on concessions and revenues flows of mining companies (e.g., Grupo Propuesta Ciudadana, Integrity Watch Afghanistan). Transparency projects in the Oil & Gas sector follow a similar direction, albeit on a larger scale. Organizations such as the Revenue Watch Institute

and Publish What You Pay advocate that governments disclose their oil & gas revenues and companies release information on their payments for oil & gas concessions. As part of this, the EITI transparency index allows effective comparisons and evaluations among participating countries. Transparency groups in the Oil & Gas sector are also active at the national level, where organizations such as Grupo Faro (Ecuador), IMCO (Mexico), or La'o Hamutuk (Indonesia) attempt to expose information on oil & gas revenues and payments in their respective countries.

Based on our findings, projects of governance transparency are relatively less popular in the Water sector, but the aims of the existing projects are similar. Water Integrity Network and Transparency International attempt to expose corruption and management problems in the water sector.

The most widespread online strategy of governance transparency groups is data analysis, visualization, and dissemination. Some groups also employ technology to mobilize supporters to their offline and online campaigns. However, as most of these groups currently receive their data from official sources (governments or international organizations) or from their partner organizations on the ground, they do not take advantage of technology to collect information. The technological tools that are used for analysis, visualization, and dissemination widely differ: they include geospatial maps and tools for data analytics, visualizations, and management. Groups that are interested in online mobilization of supporters also rely on social media networks including Facebook and twitter.

b) Impacts
The second category of transparency projects deals with the impacts of the extractives industry and natural resource governance. In the context of Fisheries, these projects deal with marine protection, aiming to expose illegal and destructive fishing practices, raise awareness, and mobilize supporters for marine protection campaigns (e.g., MarViva, Centro Ecoceanos). In the Forestry sector, transparency groups focus on industrial deforestation and other impacts of corporate concessions on forests. These groups combine raw satellite data of deforestation with information on logging concessions, wood processing, timber trading, and other commercial practices, in order to link the causes of deforestation to its effects (e.g., the Forest Transparency Initiative, Global Forest Watch). In the Mining sector, transparency groups aim to expose the impact of mining on local communities and campaign for better mining practices (e.g., Earthworks). Groups in the Oil & Gas sector similarly use technology to bring to light first-hand evidence of abuses (e.g., Eyes on Nigeria, Oxfam). Along similar lines, groups such as Next Drop and Daraja attempt to improve the quality of water services by amplifying the voices of individual users and exposing problematic practices.

Local communities are often the best source of information on the impacts of extractives and NRG. Hence, contrary to governance transparency projects, these groups depend on information that flows from the ground and thus have to employ technological tools for a crowdsourced collection of information (and not only dissemination). For instance, the Moabi project in the forestry sector attempts to engage the public in tracking deforestation through a

crowdsourced mapping application similar to Open Street Map. The Observatorio de Conflictos Mineros follows a similar strategy, encouraging individuals to report on conflicts and abuses related to mining companies. Next Drop implements this logic in the Water sector. Mobile reporting technology and various tools for collection and management of crowdsourced information are therefore particularly useful for these purposes.

Another source of information that is unique for "impacts transparency" is satellite imagery. It has been particularly effective in tracking the effects of deforestation, and can also be used in other sectors (e.g., fisheries, mining, oil & gas). Satellite imagery and geospatial mapping are also important for the visualization of NRG impacts and they are indeed used by a variety of organizations in these area. In sum, as impacts transparency depends on diverse sources of information, the required data collection, management, analytics, and visualization tools are more complex than for governance transparency.

Next Steps

Our survey provides a first scan of the ecosystem of organizations that aim to promote transparency in the field of natural resource governance. These organizations largely use technology in order to disseminate information about their offline activities. However, the survey does not allow us to fully conceptualize the precise objectives of information dissemination and the extent to which other online strategies can promote the objectives of NRG groups.

The next steps of our research will examine how information technology can enable and amplify the transparency strategies of NGOs. We anticipate that the types of online strategies that are relevant to achieving impactful transparency and accountability will include:

- **Constituent mobilization**: mobilize constituents of an organization to put pressure on governments or corporations in support of its cause (eg. anti-corruption, environmental conservation, human rights).
- **Truth-based advocacy**: uncover new or surprising information as a means of triggering the attention of journalists, government officials, and the general public.
- **Social monitoring**: deploy digital tools to track public action and identify problems. This activity can be 'crowdsourced' when the public is enlisted to participate. (eg. environmental impacts, corruption, violence).
- **Policy advocacy**: influence policymakers in formulating or reforming laws and regulations, distributing resources or other public decision-making.
- **Capacity building**: develop the capacity of government and citizens to understand the decision-making processes of, for example, allocating resources (in budgeting) or contracting with corporations (in extractives). Transparency as an end fits into this strategy.
- **Legal empowerment**: taking advantage of previously unavailable information in courts and through other legal venues.

Based on these hypotheses, our goal will be to identify effective mechanisms – types of institutional arrangements, technological approaches, information sourcing, partnerships, target audiences, etc. – that operate along strategic pathways that link the use of information technology to accountability outcomes in the NRG sector.