

PROJECT TOOLKIT

Research Guide for Gender-Disaggregated Analysis of Climate Change Impacts and Adaptation

ELIZABETH BRYAN, CHIARA KOVARIK, SIMONE PASSARELLI, AND KATIE SPROULE

This toolkit provides a compilation of tools developed for and used in the research project titled “Enhancing Women’s Assets to Manage Risk under Climate Change: Potential for Group-Based Approaches,” (2011-2014) which was supported by the Federal Ministry for Economic Cooperation and Development, Germany, and was undertaken as part of the CGIAR Research Program on Policies, Institutions, and Markets (PIM). **Section 1** provides an introduction to the research project and answers frequently asked questions regarding research on gender, climate change, assets and collective action. **Section 2** provides a brief description of the various qualitative and quantitative tools used in the project with links to relevant briefs and papers that use those tools. This toolkit highlights the tools and techniques that were used in the aforesaid research project and is therefore not meant to be an exhaustive list of information and tools related to gender, climate change, and collective action. It is aimed, primarily, at researchers interested in the topic of gender and climate change; however, the studies summarized here also provide insights for practitioners implementing gender and climate change projects. **Section 3** provides links to other external resources, including other tools and initiatives we think are useful to practitioners and researchers doing work related to gender and climate change.

SECTION 1: INTRODUCTION AND FAQs

What is the project about?

Poor rural households in Sub-Saharan Africa and South Asia are highly vulnerable to the adverse impacts of climate change due to widespread poverty, low levels of human and physical capital, poor infrastructure, dependence on agriculture, and expected severe climatic changes. Searching for information on gender and climate change uncovers widespread claims that climate change more adversely affects women than men, despite lack of supporting evidence. This project aimed to build on the small but growing literature on the linkages between gender, assets, climate change, and collective action in order to provide evidence on how climate change may differentially affect men and women, and on how group-based approaches—which are increasingly used in development projects—can improve resilience to climate change. The goal

of the project was to provide insights on how to help poor female and male farmers and pastoralists in Africa south of the Sahara and South Asia (focusing on Ethiopia, Kenya, Mali and Bangladesh) manage risks under climate change by using effective programs to protect or strengthen their control over critical assets, including natural resources and social capital. The project also examined the potential for group-based approaches to increase women’s assets and strengthen their risk-management capabilities in the context of climate change.

FAQs

- **Why should we be concerned about climate change?**
Climate change poses great challenges for poor rural people in developing countries, most of whom rely on natural resources for their livelihoods and have limited capacity to adapt to climate change. It has become clear that even serious efforts to mitigate climate change will be inadequate to prevent devastating impacts that threaten to erode or reverse recent economic gains in the developing world. Traditional coping strategies are insufficient to deal with unprecedented climate changes. Individuals, communities, and countries must adapt to a new reality and become resilient to the potential negative impacts of future climate changes. Thus far, there has been relatively little attention given to the gendered distribution of assets in the context of climate shocks, nor to the potential for collective action efforts to support communities’ adaptation to climate change. Understanding how climate change differentially affects men and women and the role and limitations of collective adaptation efforts can inform policies and programs aimed at improving the livelihoods and resilience of poor people and communities in developing countries.
- **Why are asset holdings important for climate change adaptation?**
Households hold a range of tangible assets, such as natural resources, physical and financial capital, and intangible assets, including human and social capital. There is evidence that both types of assets play a fundamental role in increasing incomes, reducing vulnerability and providing pathways out of poverty.

In the context of climate change, assets can help individuals and households cope with the negative impacts of extreme weather events, such as droughts, floods, and storms, which are occurring more frequently and at greater intensity, and adapt to long-term changes in climatic conditions. Gender is an important consideration in asset holdings because the gap between men's and women's access to and control over key assets suggests that women may be at a disadvantage in access, control and use of assets to deal with the negative impacts of climate change. Knowing how shocks affect men's and women's assets can also help in the design of social protection programs.

○ **Does climate change affect men and women differently?**

Considerable differences exist in the ways that climate change and climate shocks affect men and women in the areas of agricultural production, food security, human health, natural resources, conflict and migration, and natural disasters. However, the gender-differentiated impacts of climate change are neither straightforward nor predictable. Changes in asset holdings are one of the most visible ways in which we can observe the gender-differentiated impacts of climate change. Husbands and wives accumulate and own assets both individually and jointly and may hold different types of assets (for example, men may hold more land and agricultural equipment and women more jewelry and small livestock). Gender differences in asset holdings have implications for how households and individuals within those households are affected by and cope with climate shocks. Research conducted for this project shows that the gendered distribution of assets and responses to shocks are context-specific. For instance, weather-related shocks had only a small impact on wives' assets in Bangladesh but a significant negative impact on wives' nonland assets in Uganda, which may be attributed to women's different roles and asset holdings in these contexts.

○ **Why is collective action important for climate change adaptation?**

Research suggests that collective action may be an important mechanism by which communities manage risks associated with climate change. Given that climate change impacts, appropriate responses, and, to some extent, adaptive capacity, are location-specific, collective adaptation approaches can help build the resilience of local communities to climate change. For example, collective adaptation approaches can increase resilience to climate risks by strengthening and expanding social networks and links with supporting institutions. Groups can also provide individuals and households with new ways to share climate-associated risks, such as crop loss, through group credit or savings schemes. However, collective approaches to adaptation are not without challenges. Understanding how group-based approaches can be effective in particular contexts, which type of groups should be involved, and how to deal with gender issues related to collective action are important considerations for practitioners and government agencies seeking to support collective adaptation efforts. For instance, climate change may make collective action more difficult by introducing new shocks,

intensifying existing ones, or introducing a considerable degree of uncertainty that complicates collective decision-making. In addition, social differentiation and local power structures influence the extent to which individual community members (e.g. men or women, or richer or poorer men and women) are able to participate in and benefit from collective adaptation efforts.

○ **Are there gender differences in adaptive capacity and priorities for adaptation?**

Men's and women's ability to adapt to the negative impacts of climate change depends on their adaptive capacity. The asset gap between men and women suggests that women have less ability to cope with climatic shocks and adapt to longer term climate changes. For instance, women generally have less access to formal and informal social networks and channels of information. As a result, women have less access to climate information, and consider themselves to be less informed about climate change and the appropriate responses than their husbands, which reduces their ability to adapt to climate change.

The perceived impacts of climate change and priorities for adaptation also differ between women and men and as a result, adaptive responses to the adverse impacts of climate change also differ. For instance, given women's focus on household food production and preparation, they tend to emphasize climate change impacts on the availability of resources for the household, such as drinking water, while men emphasize impacts on crops given their greater involvement in market-oriented production. This means that men tend to pursue adaptation measures that stabilize income, such as migration in search of work, while women seek to smooth consumption.

○ **How can government and civil society organizations more effectively support local adaptation efforts?**

While there is a general consensus that climate change directly affects the livelihoods of poor farmers and fishers in developing countries, organizations working in these countries, such as local and international NGOs, government agencies, and research organizations, face a number of constraints in their efforts to support poor communities as they cope with and manage the negative impacts of climate change. **Research** conducted for this project examined the capacity of local institutions and organizations in Bangladesh, Ethiopia, Kenya and Mali to manage collective climate change adaptation efforts using a tool to assess the knowledge, attitudes, and practices (KAP) of these organizations. This research revealed that many organizations operating in these countries have well-defined strategies and activities to promote climate change adaptation. However, there are a number of areas where improvements can be made within organizations working to promote climate change adaptation, including:

- Strengthening ties to large-scale national efforts.
- Obtaining input from target groups and beneficiaries during the design and planning of climate change adaptation projects.

- Increased focus within adaptation projects on issues related to profitability, financial sustainability, and market access.
- Paying greater attention to gender, social, political, and cultural issues during various stages of the project cycle (design, targeting, implementation and M&E).
- Stronger focus on accountability, M&E systems, and project impacts.

This research also revealed a number of institutional constraints that these organizations face, including limited mobility to carry out activities, inadequacy of resources to work on climate change issues, and corruption and mismanagement of resources. The research also highlighted a strong desire within organizations for additional training on climate change management and on gender and social analyses.

GLOSSARY

Adaptation: A response to climate change that seeks to reduce the vulnerability of social and biological systems to climate change effects.¹ Community-based adaptation is one type of adaptation that depends on the ability of communities to work collectively through social networks to manage the risks of climate change.

Asset: The stock of all resources that a person accesses, controls, or owns make up his or her assets. As stores of value for each person, an asset may increase or decrease in value over time, and it may also create new value (for example, through generating income). It may be liquid or illiquid, tangible or intangible, internally-embodied or externally-embodied. The term “asset” and the term “capital” are often used interchangeably.

Assets can be broadly categorized according to the following:

- Natural resource capital such as land, water, trees, genetic resources;
- Physical capital such as livestock, agricultural and business equipment, houses, consumer durables, vehicles and transportation, water supply and sanitation facilities, technology, and communications infrastructure;
- Human capital such as education, skills, knowledge, health, and nutrition;
- Financial capital such as savings, credit, and inflows (state transfers and remittances);
- Social capital such as membership in organizations, networks that increase trust, ability to work together, access to opportunities, reciprocity, and informal safety nets, and;
- Political capital such as citizenship, enfranchisement, and effective participation in governance—often key to controlling rights over other assets.²

Climate change: Refers to any significant change in the measures of climate lasting for an extended period of time. Climate change includes major changes in temperature, precipitation, wind patterns, and others, which occur over several decades or longer.³ Climate change includes changes in the frequency and intensity of climatic shocks.

Community-based adaptation: Includes any group-based approach that requires collective action and social capital, incorporates information about long-term climate changes and their anticipated impacts into planning processes, integrates local

knowledge and perceptions of climate change and risk-management strategies, emphasizes local decision-making processes, accords with community priorities and needs, and provides poverty reducing or livelihood benefits.

Gender: Refers to the socially-constructed differences between men and women, which is distinct from “sex”, which refers to biological differences.⁴ Although “a focus on gender” is often incorrectly interpreted as “a focus on women,” the study of gender differences refers to the study of both men and women in relation to each other.

Groups: Represent a type of social capital such as membership in an organization; groups can serve to increase trust and reciprocity, enhance the ability to work together, grant access to opportunities, and act as informal safety nets. Groups may be formal or informal in nature.

Sex: Refers to the biological differences between men and women. It is distinct from “gender,” which refers to the socially-constructed differences between men and women.⁵

Shocks: Weather, disease, violent conflicts, theft, and even sudden policy changes represent potential shocks. Shocks can affect a wide area at a given time (so called covariate shocks, such as weather shocks or widespread food price increase), or could be specific to a household (death or illness of an income earner) or an individual (divorce or abandonment). The majority of the shocks listed here have a negative effect, but there are also positive shocks, as well as shocks which have both negative and positive effects for different people in a given household. For example, a drought that reduces crop yields on a broad scale and leads to higher prices can benefit the people who have irrigation and can still produce, or people who produce a particularly drought-resistant crop, via higher selling prices. Shocks may also have effects that go beyond their (economic) impacts on production or consumption, if such unforeseen events also affect social status, self-esteem, and leadership. For example, being divorced by one’s husband or being diagnosed with HIV/AIDS could lead to loss of social status in many contexts.

¹ United Nations Framework Convention on Climate Change. *Glossary of Climate Change Acronyms*. 2014. http://unfccc.int/essential_background/glossary/items/3666.php

² Gender Agriculture and Assets Project (GAAP). <http://gaap.ifpri.info/>

³ United States Environmental Protection Agency. *Glossary of Climate Change Terms*. 2013. <http://www.epa.gov/climatechange/glossary.html>

⁴ World Bank. *Defining gender*. 2013. <http://go.worldbank.org/ACY3GVBE70>

⁵ World Bank. *Defining gender*. 2013. <http://go.worldbank.org/ACY3GVBE70>

SECTION 2: CLIMATE CHANGE AND COLLECTIVE ACTION – QUALITATIVE METHODS

While commonly viewed as a method used to “flesh out” or contextualize quantitative findings, collecting qualitative data also provides a rich source of information in and of itself, giving researchers the opportunity to explore topics in greater depth than is feasible through surveys where answer choices are pre-set and constrained. It also allows for a more interactive conversation both amongst respondents in a group setting and also between the respondents and the interviewers. Qualitative data are generally captured for a smaller sample compared to quantitative data.

Like all tools, qualitative tools have both pros and cons. The benefits of using qualitative tools include the ability to capture details that may not be evident from numbers and statistics. In particular, with qualitative tools, respondents may be more able to express themselves and to discuss topics that are of importance to them, which is not possible in a pre-set quantitative survey. This flexibility also extends to the interviewer, who in a qualitative setting is more able to explore interesting issues that arise and that merit further discussion. While the greater detail and nuance that can be captured using qualitative tools is a benefit, it can also be a challenge, in that it yields a large amount of less-easily-analyzable data (i.e. transcripts of interviews, etc., that have to be coded before they can be analyzed either manually or using qualitative analysis software). This can make summarizing the information time-consuming and challenging. Another challenge to collecting good qualitative data is that doing so requires more highly-trained interviewers than does collecting quantitative data.

Below are some explanations of the various qualitative tools used in this research project, as well as links to papers that describe how the tools were used and the findings they yielded. This section of the toolkit is loosely based off of the qualitative methods section of a toolkit developed for the Gender, Agriculture, and Assets Project (GAAP)⁶ and also draws from methods papers and presentations given by IFPRI colleagues.

This research program used the following qualitative tools:

1. Focus Group Discussions (FGDs)/Participatory Rural Appraisal (PRA)

Focus Group Discussions (FGDs) consist of a group discussion of approximately 6 - 12 persons guided by a facilitator, during which

group members talk freely and spontaneously about certain guided topics. The purpose of FGDs is to obtain in-depth information on concepts, perceptions, and ideas of a group. FGDs can be useful to: (1) focus research and develop relevant research hypotheses by exploring in greater depth the problem to be investigated and its possible causes; (2) elicit perspectives of particular groups (e.g. women or men, young or old, wealthy or poor, different ethnic groups); (3) formulate appropriate questions for more structured, larger scale surveys; (4) help understand and solve unexpected problems in interventions and understand complex, underlying causes of phenomena; and (5) explore controversial topics.

This project used the PRA technique of FGDs in each of the four study countries, described in the cross-country synthesis by Aberman et al. (2015). PRA protocols were developed by IFPRI and then adapted and implemented by in-country partners. All FGDs were gender disaggregated and focused on the topics of climate signals and impacts, asset use in adaptation, adaptation approaches, and constraints to adaptation.

Benefits and challenges of using FGDs or PRAs:

- **Benefits:**
 - FGDs are cost- and time- efficient, because it is possible to cover more people in a shorter amount of time in comparison to individual interviews.
 - FGDs can be a safe space for discussion of sensitive issues and allow for early identification of important issues.
 - Discussions in FGDs can trigger ideas, recollections and opinions amongst respondents
 - FGDs can help identify underlying power or political structures that shape behavior that might not otherwise become known or understood.
- **Challenges:**
 - There may be less time to explore and probe causality and it is difficult link data back to individuals or households.
 - Louder individuals may dominate quieter ones and there may be problems associated with peer pressure.
 - FGDs may not be appropriate for sensitive topics.

⁶ For more information on qualitative tools, their usefulness, and examples of their usage, see the GAAP Toolkit Methods section (<http://gaap.ifpri.info/files/2011/12/Section-2.pdf>)

Additional resources for FGDs and PRAs	
Protocol and guidelines	https://www.dropbox.com/s/bv9utnizu7pptomh/Generic.PRA.Protocol.v2.docx?dl=0 https://www.dropbox.com/s/tnl3q9jvb7a6bo5/Generic.PRA.guidelines.v2.docx?dl=0
Country specific protocols	Bangladesh: https://www.dropbox.com/s/bphu-zlid5uwe52h/Bangladesh%20PRA_protocol.docx?dl=0 Ethiopia: https://www.dropbox.com/s/kpat8rn4kpwzk6t/Donnelly_PRA%20Guidelines.docx?dl=0 and https://www.dropbox.com/s/pk6qyli3acr3nd/Donnelly_PRA%20Protocol.doc?dl=0 Kenya: https://www.dropbox.com/s/nbppv3xr64l5lq/Kenya-%20FGDs%20tool.docx?dl=0 Mali: https://www.dropbox.com/s/10bk7fml61erwp5/Protocol_guidelines_PRA_Mali.docx?dl=0
Sample publications using FGDs and PRAs	Aberman, N-L., Ali, S., Behrman, J., Bryan, E., Davis, P., Donnelly, A., Gathaara, V., Kone, D., Nganga, T., Ngugi, J., Okoba, B., Roncoli, C. 2015. Climate change adaptation, assets, and group-based approaches: gendered perceptions from Bangladesh, Ethiopia, Mali, and Kenya. IFPRI Discussion Paper, 01412. Available at: http://www.ifpri.org/sites/default/files/publications/ifpridp01412.pdf Davis, P., Ali, S. 2014. Exploring Local Perceptions of Climate Change Impact and Adaptation in Rural Bangladesh. IFPRI Discussion Paper 01322. http://www.ifpri.org/sites/default/files/publications/ifpridp01322.pdf

and used the data from both the KIIs and the FGDs to generate their results. Their paper includes the semi-structured interview checklist used for KIIs.

Benefits and challenges of using KIIs:

- **Benefits:**
 - Allows for a quick overview as well as in-depth discussion of key issues of interest
 - Individuals with key areas of expertise can fill gaps in other research findings from a project
- **Challenges:** It can be hard to identify the appropriate individuals for these interviews. It can be the case that those who are “gatekeepers” or holders of key information may also be those who are more powerful in a given community, and thus may not represent the majority. For example, rich key informants or male key informants may not be able to speak about the experience of poor individuals or women.

Additional resources for KIIs	
Protocols	See Appendix of: Davis, P., Ali, S. 2014. Exploring Local Perceptions of Climate Change Impact and Adaptation in Rural Bangladesh. IFPRI Discussion Paper 01322. http://www.ifpri.org/sites/default/files/publications/ifpridp01322.pdf
Information on KIIs used by this project	Davis, P., Ali, S. 2014. Exploring Local Perceptions of Climate Change Impact and Adaptation in Rural Bangladesh. IFPRI Discussion Paper 01322. http://www.ifpri.org/sites/default/files/publications/ifpridp01322.pdf Jolowicz, S. K. 2013. Rehabilitation of Communal Assets in Rural Ethiopia: Governance Challenges and the Role of Women. Master’s Thesis, Universitat Hohenheim.

2. Key informant interviews (KIIs)

Key informants are individuals that have specialized knowledge to share about a specific topic of interest. They are able to speak on behalf of a group and have an overview over issues that might otherwise be difficult to gather information on. They are usually interviewed individually with a semi-structured open-ended series of questions.

In their paper on Bangladesh, Davis and Ali (2014) conducted 30 KIIs with individuals in 7 different agroecological zones across Bangladesh to gather information on how climate-related trends and perceptions of climate change influence people’s lives. Individuals identified to be key informants were suggested by villagers as those who were knowledgeable about the local area and had completed some formal education. Two key informant interviews were conducted in each of 15 villages (one interview with a man and one with a woman). The authors also conducted male and female FGDs,

3. Net-Map

Net-Map is a participatory interview tool that was developed to understand complex government structures. It uses social network analysis, stakeholder mapping, and power mapping. It involves identifying different actors, pinpointing the links between different actors (advice, funding, etc.), and then imagining how much influence each actor has on a specific outcome. This allows for visualization of both formal and informal interactions that occur.

The synthesis paper by Aberman et al. (2015) compares the findings from the Net-Map process in each of the four countries. Before the research began, a stakeholder analysis was conducted in workshops in each of the four countries between 2011 and 2012. Part of this analysis involved Net-Map, during which respondents were asked to arrive at a group consensus on the following questions:

- What actors are involved in climate change adaptation?
- Who is giving advice to whom among these actors?
- How much influence does each actor have over improving the ability of farmers (and pastoralists or fishers) to adapt to climate impacts?
- What are the priorities and core activities of each of these actors in terms of climate change adaptation?

The results show, among other things, that networks in Ethiopia, Bangladesh and Kenya are highly centralized, while in Mali they are less so; that private sector actors play a prominent role in climate change adaptation discussions in Bangladesh and Kenya; and that multilateral organizations seem influential in Mali and Bangladesh.

The paper by Jolowicz (2013) used Net-Map in data collection, but modified it to account for the role of women in the program participation to rehabilitate communal land in Ethiopia. Specifically, when respondents noted actors, the gender of the actor was often noted, or the ratio of male and female members if it was an institution that was listed. Additionally, the role and influence of women in each organization was discussed.

Benefits and challenges of using Net-Map:

- **Benefits:** It is an efficient way to get an in-depth first impression of the government and other actors and their interlinkages related to a specific topic, which can then be used to guide further data gathering.
- **Challenges:**
 - It is important to bring together a range of actors to ensure that a representative topic network can be developed
 - Hierarchies and power structures between net-map participants might influence the final consensus results
 - May be challenging for some respondents, especially when dealing with abstract concepts like maps of stakeholders

Additional resources for Net Map	
Protocols	Project Net-Map interview guide. http://ebrary.ifpri.org/cdm/ref/collec-tion/p15738coll3/id/193
Information on BMZ projects using Net-Map	Aberman, N-L., Birner, R., Haglund, E., Ngigi, M., Ali, S., Okoba, B., Kone, D., Alemu, T. 2015. Understanding the policy landscape for climate change adaptation: a cross-country comparison using the Net-Map method. IFPRI Discussion Paper 01408. http://www.ifpri.org/sites/default/files/publications/ifpridp01408.pdf Jolowicz, S. K. 2013. Rehabilitation of Communal Assets in Rural Ethiopia: Governance Challenges and the Role of Women. Master's Thesis, Universitat Hohenheim.
Further reading on Net-Map	Schiffer, E., Waale, D. 2008. Tracing Power and Influence in Networks: Net-Map as a Tool for Research and Strategic Network Planning. IFPRI Discussion Paper 00772. http://www.ifpri.org/sites/default/files/publications/ifpridp00772.pdf

4. Knowledge, Attitude, and Practices (KAP) survey

KAP is a methodology that seeks to understand what people know about a specific topic, such as climate change adaptation, how they feel about this topic, and how people behave in regard to this topic. It can serve as a diagnostic tool to gain insight into the knowledge, capacities and perceptions of individuals and members of communities and organizations. It can also assess changes in knowledge, attitudes, and practices over time and can be a useful tool for planning and evaluation of projects, interventions, or quality of service delivery.

As illustrated by the Ragasa et al. (2013) study, KAP can be a useful tool to understand practitioners' knowledge and activities related to climate change; training needs related to planning, implementation and evaluation of climate change adaptation related programs; organizational issues restricting the effective implementation of climate change related activities; attitude and activities toward gender equality; and attitude and practices toward group-based approaches. The authors learned the following from their experience conducting the KAP study:

- Using electronic survey methods for a KAP study may be difficult; and will need to be supplemented by face-to-face interviews (or phone interviews).
- Substantial time needs to be spent on survey design, defining the survey population and the sampling plan.
- Given the different types of organizations being studied, it is very important to use disaggregated categories in analyzing the data to avoid over-generalization.
- While many indicators are reported in averages to show general patterns in knowledge, attitude and perception, it is also important to note and report outliers to better assist in targeting specific interventions to different sets of practitioners or types of organizations.

Benefits and challenges of using KAP surveys:

- **Benefits:**
 - This tool can identify knowledge gaps, cultural beliefs, or behavioral patterns that may facilitate understanding of training needs, capacity strengthening requirements, or organizational changes.
 - This tool can identify common information and attitudes, and to some extent, it can also identify factors influencing behavior that are not known to most people, reasons for their attitudes, and how and why people practice certain behaviors.
 - It can help understand gaps in perceptions and actual practice and identify the reasons for these gaps.
 - It is a useful tool in understanding attitudes toward and perceptions of organizations' operations and practices.

○ **Challenges:**

- This tool is more structured and less flexible than focus group or key informant interviews. The success of a KAP survey lies in the careful identification of indicators and measures of knowledge, capacity, activities, and perceptions that are relevant to the study objectives. Therefore, more time is needed to prepare and set up the study.
- It requires substantial time to understand the survey population and sampling plan compared to participatory or rapid rural appraisal tools.
- While the data collected is more thorough, large amounts of data can be more difficult to summarize. Collecting, analyzing, and writing about this type of qualitative data requires a greater amount of time and effort.

Additional resources for KAP	
Questionnaires	KAP questionnaire: http://ebrary.ifpri.org/cdm/ref/collection/p15738coll3/id/191
More information on KAP results from this project	Ragasa, C., Sun, Y., Bryan, E., Abate, C., Alemu, A., Keita, M.N. 2013. Organizational and Institutional Issues in Climate Change Adaptation and Risk Management. IFPRI Discussion Paper 01279. http://www.ifpri.org/sites/default/files/publications/ifpridp01279.pdf

SECTION 3: GENDER, CLIMATE CHANGE AND COLLECTIVE ACTION - QUANTITATIVE METHODS

Quantitative tools are designed to collect data that can be analyzed using mathematical or statistical techniques to discern patterns and relationships between variables in the populations of interest. The most common kind of quantitative tool is a household or individual survey, which is most often standardized and has fixed response options. These can be nested within experimental methods or games, but are often fielded independently and analyzed using statistical or econometric techniques using statistical packages for data analysis, such as STATA or SPSS. Quantitative data can be very useful for impact evaluations, to determine changes over time and attribute them to specific interventions. Quantitative data can also be used for project monitoring and evaluation (M&E) and to track performance of an intervention.

Quantitative methods have both pros and cons. The benefits of using quantitative tools include their ability to capture sufficiently large sample sizes so that data can be representative of the populations of interest (this is more likely to be the case with surveys than with experimental methods), as well as their ability to be analyzed using econometric techniques that allow to infer causality (though this is also a con as causality can be challenging to attribute). Additionally, secondary quantitative data may already be available in the area of interest, meaning that researchers may not need to collect primary data or at least may be able to build on previous data collection efforts. As with the qualitative tools described above, some of the benefits of quantitative tools can also be downsides. One of the major cons of quantitative data is that because the data collection tool tends to be standardized and often relies upon pre-coded answers, this makes it more challenging to understand the context and particular nuances in the data.

Below are some explanations of the various quantitative tools used in the gender, collective action and climate change project, as well as links to papers that describe how the tools were used and the findings they yielded. This section of the toolkit is loosely based off of the quantitative methods section of a toolkit developed for the Gender, Agriculture, and Assets Project (GAAP) 7 and also draws from methods papers and presentations given by IFPRI colleagues.

The gender, climate change and collective asset project used the following quantitative tools and methods:

1. Econometric analysis of effects of climate shocks using household surveys

Many large-sample, multi-topic datasets can be used to analyze the effects of external or averse events, such as climate change or climate variability, on asset holdings or on other outcomes experienced by individuals within households—not only women and

men, but also children. Several of the papers produced as a part of this project used large-sample datasets to estimate these effects, including data collected from household surveys and weather data from scientific institutions. A variety of datasets can be used, as this project demonstrates, and the important point is not what dataset(s) is used, but how the data is used to discern the impacts of climate shocks on individuals.

A critical issue is using a measure of climatic shocks that is “exogenous” to the characteristics of those reporting the shocks. It is possible, for example, that wealthier individuals would be more likely to report that a flood caused damage to their houses and other assets, because they had those assets to begin with. This is called “respondent bias.” A solution would be to match the observations in the data set to existing information on weather events, such as those obtained from rainfall stations and meteorological agencies. This solution would work if the degree of spatial aggregation and timing of the rainfall and meteorological data corresponds to the spatial units and recall period of the survey. If the recall period and the existing rainfall or other data do not match, another solution could be to use community averages of shock reports, rather than individual shock reports. With the increase in the number of geo-referenced household surveys, and the increasing availability of meteorological data, future studies will be better able to make use of more exogenously measured climatic shocks. Other studies have used propensity score matching to match shock-affected households to others that are otherwise similar, except for the experience of the shock. Since it would be technically impossible to randomly assign climate shocks to households, this provides another way to estimate the impact of the shock on affected households.

Dillon and Gill’s (2014) paper illustrates the use of rainfall and meteorological data to measure the effects of climate variability in Mali. They pair climatic data with household data collected for a panel household dataset. They examine the effect of climatic variability, measured using rainfall and degree day deviations from historical trends (days that the temperature exceeds optimal conditions), farm assets, and access to irrigation technology on total production and marketed surpluses of men and women. They find that climate variability in the form of increased deviations from mean degree days has a significant negative effect on men’s production frontiers, but no effect on women’s production frontier. However, higher degree day deviations from historical means have a significant negative effect on both men’s and women’s marketed surplus frontiers, but for women this effect varies by land size. This is consistent with women’s crop choices and seasonality of production. In the dry agricultural season, women only produce on small gardens with access to a water source. As women increase land size, they are more exposed to the effects of degree day variability.

⁷ For more information on quantitative tools, their usefulness, and examples of their usage, see the GAAP Toolkit Methods section (<http://gaap.ifpri.info/files/2011/12/Section-2.pdf>). However, the GAAP toolkit is primarily geared towards Monitoring and Evaluation (M&E) and impact evaluation for projects on gender and assets, so may not be directly applicable to all climate change projects.

Rakib and Matz (2014) use self-reported weather shocks to investigate the effects of different external, adverse climatic events in Bangladesh on the asset holdings of household heads, those of their wives, and on joint holdings. Using a panel dataset with detailed information on asset holdings, as well as self-reported climatic shocks, they used ordinary least squares (OLS) regressions with household fixed effects to account for time-invariant unobserved characteristics of households that might be correlated with both the exposure to shocks and asset holdings. In the second round of the survey, the researchers intentionally added a variety of questions on gender and assets to strengthen the focus on these topics, and also asked respondents about their asset ownership and idiosyncratic shocks retrospectively.

Quisumbing, Kumar, and Behrman (2011) use a similar method, but estimate changes in men's and women's asset holdings in Bangladesh and Uganda as a function of baseline asset levels, self-reported individual shocks, and community averages of climatic shocks. The data came from two rounds of a survey that fell before and after the global increase in food prices in 2007-2008, allowing the authors to examine gendered impacts of the food price shocks in two very different cultural contexts.

Benefits and challenges of using this methodology:

- **Benefits:**
 - Climate shocks may serve as a natural experiment that mimics a randomized experiment, allowing researchers to measure the impact on households and individuals via comparison of households and individuals that did not experience the event.
 - Panel household survey data allows researchers to track climate change impacts over time within households to understand, for instance, changes in asset holdings and vulnerability levels over time.
- **Challenges:**
 - It is challenging to ensure that climate shocks are exogenous to respondent characteristics.
 - May be prone to "respondent bias."
 - It can be difficult to attribute causality.

Additional resources for econometric analysis of effects of climate shocks using household surveys

Questionnaires used:	Bangladesh Climate Change Adaptation Survey (BCCAS), Round II. Available at: http://ebrary.ifpri.org/cdm/singleitem/collection/p15738coll3/id/139/rec/1 Kenya Climate Change Adaptation Survey, Round II. Available at: http://ebrary.ifpri.org/cdm/ref/collection/p15738coll3/id/192
Datasets	Links to datasets will be added here as they become available online.
Project papers using large datasets to measure the effects of climate shocks	Rakib, M., Matz, J.A. 2014. The Impact of Shocks on Gender-differentiated Asset Dynamics in Bangladesh. IFPRI Discussion Paper 01356. http://www.ifpri.org/sites/default/files/publications/ifpridp01356.pdf Quisumbing, A.R., Kumar, N., Behrman, J. 2011. Do shocks affect men's and women's assets differently? A review of literature and new evidence from Bangladesh and Uganda. IFPRI Discussion Paper 01113. http://www.ifpri.org/publication/do-shocks-affect-mens-and-women-s-assets-differently Dillon, A., Gill, J. 2014. Gender, Farm Assets, and the Role of Climate Variability on Production Possibilities. Unpublished report. See related policy note in: http://www.ifpri.org/sites/default/files/publications/gcc_pn2014.pdf

2. Experimental methods using randomized control trials

Experimental methods are used to evaluate the impact of an intervention and/or to examine the impact of different intervention designs or variations in treatments on a target population. Also known as randomized control trials (RCTs), a key feature of this impact evaluation design is the random assignment of treatment and control observations. If the program was randomly assigned to beneficiaries (that is, if out of a pool of eligible households, households that receive the program are randomly selected), then it is reasonable to assume that non-recipients are, on average, very similar to what program recipients would be like in the absence of the program. Therefore, the impact of the program can be inferred by comparing the outcomes of program recipients and program non-recipients after the program is in place. An econometric method called "differences-in-differences" can also be used, if both pre-program and post-program data are available for both groups, to account for any pre-program and time-invariant differences between the two groups.

This method can be used to analyze specific interventions or a specific design of a project to help different stakeholders adapt to or mitigate climate variability. For example, Beaman and Dillon (2014) used this method to analyze the effect of social network char-

acteristics and gender on the diffusion of information about an agricultural technology; specifically composting. Composting is not only important to long-term soil fertility and productivity, but also provides a farm level investment that can mitigate the effects of climatic risk and support adaptation to long-term climate change. Villages were randomly assigned to be among one of three treatments. Two treatments used social network characteristics to determine who would receive calendars explaining the composting method while the third treatment randomly distributed this information within the village. The two social network characteristics used were degree and betweenness. Degree measures the number of links to whom one node (i.e. person) is connected. Betweenness is a measure of the share of shortest paths from all pairs of nodes in the network that are connected to that household. Degree potentially measures connectivity of the households, while betweenness is one social network characteristic capturing influence within networks. They find that while aggregate knowledge is increased in villages where the socially most-connected individuals are targeted, women, who are, on average, less likely to receive the information are particularly disadvantaged in villages with high levels of betweenness, implying that socially isolated members of the community may not benefit if champions are targeted for training on climate-smart technologies.

Benefits and challenges of using RCTs:

- **Benefits**
 - With a randomly-assigned group of non-recipients to be used for the proxy measure, analysis is straightforward.
 - Due to the clean design, randomization is often considered the “gold standard” of study design for impact evaluation.
- **Challenges**
 - Randomization is often difficult to implement, due to political, social, and ethical considerations.
 - RCTs are often expensive to conduct.
 - Often randomization is only feasible in small-scale pilots and/or over a short term, in which case replicability or up-scaling of the results might not be assured.
 - For large-scale programs targeted at particular types of households, it is often infeasible to randomly hold out some households with the targeted characteristics to not receive the program.

For more information on project papers using RCTs see:
Beaman, L., Dillon, A. 2014. Diffusion of Agricultural Technologies Within Social Networks: Evidence from Composting in Mali. Unpublished report.

3. Econometric analysis of the impact of interventions

Although randomized controlled trials have increasingly become known as the “gold standard” for impact evaluation, there are conditions under which it is not possible to randomize an intervention

(see below). In some situations, such as the examination of medium- to longer-term impacts of interventions, the baseline data set might have a wealth of information on households, but might not have been initially designed as part of a randomized evaluation. In this case, it might still be useful using these data sets to track medium- and longer-term impacts. Quisumbing and Kumar (2014) use data from three rounds of the Ethiopian Rural Household Survey (1997, 2004, 2009) to examine the medium-term impact of the community-based land registration effort, which began in 2003 and strengthened tenure security for both male and female farmers, on the adoption of soil conservation technologies (SCTs) and tree planting. Because land certification was practically universal by the time of the 2009 survey, the authors do not find significant effects of land certification on the adoption of SCTs and tree planting. However, they find that gender gaps in land rights knowledge affects the adoption of SCTs and tree planting, suggesting that efforts to improve legal literacy would help to increase the adoption of such climate-smart agricultural practices.

Benefits and challenges of conducting an econometric analysis of the impact of interventions:

- **Benefits:**
 - Useful for situations where using an RCT is not possible.
 - Useful for informing policy design or understanding gaps in effectiveness.
- **Challenges:** May not be the best tool for tracking short-term impacts; it is better used to track medium and long-term impacts.

For more information on project papers using econometric analysis of the impact of interventions see: Quisumbing, A.R., and Kumar, N. 2014. Land Rights Knowledge and Conservation in Rural Ethiopia: Mind the Gender Gap. IFPRI Discussion Paper 01386. <http://www.ifpri.org/sites/default/files/publications/ifpridp01386.pdf>

4. Experimental methods using experimental games

Experimental games provide a controlled environment in which researchers can test very specific questions and get at issues that may not be captured well in a standard survey, such as risk preferences. The issue of climate change – including perceptions of climate change and ideas about whether/how to adapt – can be closely tied to risk and other personal preferences, making experimental games an appropriate method to use.

For example, in their paper, Clarke and Kumar (forthcoming) use a field experiment to elicit participant’s willingness-to-pay for index-based insurance in rural Bangladesh. Each randomly-selected participant was presented with a choice of six lotteries, from which they could pick alternatives ranging from safe to an increasingly higher payoff, but with higher variance around that payoff. The authors find that there is no significant difference between men and women in the probability of buying insurance, though women are more likely

to take up insurance on low probability events. This may be attributed to women facing higher liquidity constraints.

Benefits and challenges of using experimental games:

- **Benefits:**
 - Allows researchers to test very specific questions on a single topic
 - Supports exploration on topics related to perceptions and on topics that the individual or household is not yet familiar with, such as insurance, that might be difficult to elicit through standard survey tools
- **Challenges:**
 - A downside of experimental games is the challenge of being able to generalize findings to a broader context – the findings may be relevant only to the context of the game.
 - Games are hypothetical, so the extent to which their findings can be generalized to the real world is unclear
 - May require more training for enumerators unfamiliar with this method

For more information on project papers using experimental methods

see: Clarke, D.J. and Kumar, N. 2015. Microinsurance decisions: gendered evidence from rural Bangladesh. IFPRI Discussion Paper, forthcoming

PROJECT RESOURCES

Project website:

<http://womenandclimate.ifpri.info/>

This website houses the project for “Enhancing Women’s Assets to Manage Risk under Climate Change: Potential for Group-Based Approaches.” This page includes resources such as project objectives and updates, publications, event details, blog posts, and links to additional resources.

Policy Notes:

<http://www.ifpri.org/publication/enhancing-women-s-assets-manage-risk-under-climate-change>

A series of policy notes were developed drawing on research conducted as part of this project. The notes in this collection explore how to protect or strengthen women’s control over critical assets, including natural resources and social capital. These notes also examine the potential for innovative and group-based approaches to increase women’s assets and strengthen their risk-management capabilities in the context of climate change. The key findings of many of the papers listed below can be found in these notes.

Papers:

Aberman, N.L., R. Birner, E. Haglund, M. Ngigi, S. Ali, B. Okoba, D. Koné, and T. Alemu. 2015. Understanding the policy landscape for climate change adaptation: a cross-country comparison using the Net-Map method. IFPRI Discussion Paper, 01408. Washington DC: IFPRI. Available at: <http://www.ifpri.org/sites/default/files/publications/ifpridp01408.pdf>

Aberman, N.L., S. Ali, J. Behrman, E. Bryan, P. Davis, A. Donnelly, V. Gathaara, D. Kone, T. Nganga, J. Ngugi, B. Okoba, and C. Roncoli. 2015. Climate change adaptation, assets and group-based approaches: gendered perceptions from Bangladesh, Ethiopia, Mali and Kenya. IFPRI Discussion Paper, 01412. Washington DC: IFPRI. Available at: <http://www.ifpri.org/sites/default/files/publications/ifpridp01412.pdf>

Bryan, E. and J. Behrman. 2013. Community-based adaptation to climate change: a theoretical framework, overview of key issues and discussion of gender differentiated priorities and participation. CAPRI Working Paper, 109. Available at: <http://www.capri.cgiar.org/wp/capriwp109.asp>

Davis, P, and S. Ali. 2013. Exploring local perceptions of climate-change impact and adaptation in rural Bangladesh. IFPRI Discussion Paper 1322. Washington DC: IFPRI. Available at: <http://www.ifpri.org/sites/default/files/publications/ifpridp01322.pdf>

Goh, A.H.X. 2012. A literature review of the gender-differentiated impacts of climate change on women’s and men’s assets and well-being in developing countries. CAPRI Working Paper, 106. Available at: <http://www.capri.cgiar.org/wp/capriwp106.asp>

Ragasa, C., Y. Sun, E. Bryan, C. Abate, A. Alemu and M. Namori Keita. 2013. Organizational and institutional issues in climate change adaptation and risk management. Insights from practitioners’ survey in Bangladesh, Ethiopia, Kenya and Mali. IFPRI Discussion Paper 1279. Washington DC: IFPRI. Available at: <http://www.ifpri.org/sites/default/files/publications/ifpridp01279.pdf>

A. Gender, assets, and climate variability and change

Dillon, A. and J. Gill. 2014. Gender, Farm Assets, and the Role of Climate Variability on Production Possibilities. Unpublished.

Elias, H. and T. Alemu. Climate Shocks, Livestock Assets and Consumption Dynamics: Panel Data Evidence from Rural Ethiopia. Unpublished.

Quisumbing, A.R. and N. Kumar. 2014. Land rights knowledge and conservation in rural Ethiopia: Mind the gender gap. Available at: <http://www.ifpri.org/publication/land-rights-knowledge-and-conservation-rural-ethiopia>

Quisumbing, A., N. Kumar, and J. Behrman. 2011. Do Shocks Affect Men’s and Women’s Assets Differently? Evidence from Bangladesh and Uganda. IFPRI Discussion Paper, 1113. Washington, DC: IFPRI. Available at: <http://www.ifpri.org/publication/do-shocks-affect-men-s-and-women-s-assets-differently>

Rakib, M. and J. Matz. 2014. Impact of shocks on gender differentiated asset dynamics in Bangladesh. IFPRI Discussion Paper, 1356. Washington, DC: IFPRI. Available at: <http://www.ifpri.org/sites/default/files/publications/ifpridp01356.pdf>

Ngigi, M., U. Mueller, and R. Birner. The impact of multiple shocks on household assets and poverty in rural Kenya. Unpublished.

B. Scope for group-based approaches to manage climate risks faced by men and women

Aberman, N. Assessing the governance of community-based adaptation: mapping gender-focused initiatives in rural Kenya. Unpublished.

Aberman, N. Women’s engagement in climate change adaptation: Perceptions of power and knowledge in Western Kenya. Unpublished.

Beaman, L. and A. Dillon. 2014. Diffusion of Agricultural Technologies within Social Networks: Evidence from Composting in Mali. Unpublished.

Kumar, N and D. Clarke. Microinsurance Decisions: Evidence from Bangladesh. IFPRI Discussion Paper, forthcoming, Washington, DC: IFPRI.

Ngigi, M., U. Mueller, and R. Birner. Farmers' intrinsic values for adopting climate-smart practices in Kenya: empirical evidence from a means-end chain analysis. Unpublished.

Ngigi, M., U. Mueller, and R. Birner. Gender, social capital and climate change adaptation: Empirical evidence from an intra-household analysis in Kenya. Unpublished.

Rakib M. and J. Matz. Protecting Assets and Enhancing Welfare: The Potential of Gender-Differentiated Group-Based Approaches. Unpublished.

Rakib, M. and J. Matz. Farmers' adaptation strategies to climate change shocks in crop and livestock in Bangladesh. Paper available at:

Presentations/videos/interviews:

- Presentation by Regina Birner for the event, "Partnering for Impact: IFPRI-European Research Collaboration for Improved Food and Nutrition Security" held in Brussels on November 25, 2013. <https://www.youtube.com/watch?v=I00-iVYTWSY>
- Narrated presentation on "Gender, Climate Change, and Collective Action," by Claudia Ringler, Quinn Bernier, and Elizabeth Bryan. Available at: <https://www.youtube.com/watch?v=FfOs4gOVRyg&feature=youtu.be>
- COP Side event video: <http://vimeo.com/113628088>
- GLF symposium video: <http://www.landscapes.org/gender-resilience-across-landscape-latin-america-africa-asia/>
- Ruth Meinzen-Dick interview: <https://soundcloud.com/radiofranceinternationale/rural-african-female-farmers-need-to-be-included-in-climate-change-information>

Popular Press: Op-ed by Claudia Ringler on climate change and rural women in Outreach magazine: <http://www.stakeholderforum.org/sf/outreach/index.php/219-cop20/cop20-day5-forests-food-ag/11798-cop20-day5-negotiators-consider-role-rural-women>

OTHER RESOURCES

PIM website: <http://www.pim.cgiar.org/>

The CGIAR Research Program on Policies, Institutions and Markets (PIM) is a program of applied research led by the International Food Policy Research Institute (IFPRI), which focuses on how policies, institutions and markets can be improved to help smallholder farmers and poor consumers live better lives. PIM conducts strategic gender research on selected topics, and also develops and applies new tools and methods to enhance work on gender in all other research areas (flagship projects).

CCAFS website: <http://ccafs.cgiar.org/>

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a collaboration of all 15 CGIAR research centers led by the International Center for Tropical Agriculture (CIAT). This initiative seeks to address the challenges of climate change and associated impacts on food security and through enhanced agricultural practices, policies, and measures through strategic research collaborations. The program includes 5 themes of research relating to climate change, including a specific topic on Gender and Equity. Under this research theme, CCAFS has completed a gender and climate change manual which will provide a research guide on how gender and other factors influence climate adaptation and mitigation

GAAP Toolkit: <http://gaap.ifpri.info/gender-and-assets-toolkit/>

The Gender & Assets Toolkit, developed by the Gender, Agriculture, & Assets Project (GAAP) of IFPRI and ILRI, was created to assist researchers and practitioners in collecting, measuring, and analyzing gender and assets data quantitatively and qualitatively. It is designed to be a practical tool for researchers who may be unfamiliar with using mixed methods for data collection and analysis in this field. The toolkit is intended to be a living document that will continue to be developed throughout the course of the project.

CAPRI Sourcebook: <http://www.capri.cgiar.org/sourcebook.asp>

The Program for Collective Action and Property Rights (CAPRI) is an inter-center initiative of CGIAR designed to promote research on the formation and effectiveness of voluntary, community-level organizations in relation to natural resource management. The CAPRI Sourcebook, titled "Resources, Rights, and Cooperation," compiles lessons learned from 15 years of the program's international research experience. The objective of the sourcebook is to build the capacity of research and development organizations to recognize the importance and relevance of CAPRI concepts, and to apply the lessons and methods from CAPRI research to their work. Chapter 7 highlights a conceptual framework and practical guidance on the topic of Gender, Collective Action and Property Rights.

Women's Empowerment in Agriculture Index (WEAI):

<http://feedthefuture.gov/lp/womens-empowerment-agriculture-index>

The Women's Empowerment in Agriculture Index (WEAI) is the first-ever measure to directly capture women's empowerment and inclusion levels in the agricultural sector. Developed by USAID, the International Food Policy Research Institute, and the Oxford Poverty and Human Development Initiative, this tool tracks women's engagement in agriculture in five areas: production, resources, income, leadership, and time use. Unlike any other tool, it also measures women's empowerment relative to men within their households, providing a more robust understanding of gender dynamics within households and communities. Results of the pilot phase can be found at: <http://www.ifpri.org/publications/results/taxonomy%3A7055>

Global Gender and Climate Alliance (GGCA): <http://www.gender-climate.org/Publications/>

The Global Gender and Climate Alliance (GGCA) was launched at the United Nations Climate Change Conference in 2007. It acts as an advocacy platform aimed at ensuring that climate change policies, decision making, and initiatives at the global, regional, and national levels are gender-responsive. Its members include over 70 international NGOs, as well as several UN agencies. The alliance seeks to build capacity for gender-responsive climate change policies, strategies, and programs by creating and compiling tools, information, methodologies, and training resources. The GGCA also developed the "[Training Manual on Gender and Climate Change](#)," available in 4 languages.

Training Guide on Gender and Climate Change Research in Agriculture and Food Security for Rural Development:

<http://www.fao.org/docrep/018/i3385e/i3385e.pdf>

This guide, available in English, French, and Spanish, provides users with resources and participatory action research tools for collecting, analyzing and sharing gender-sensitive information about agricultural communities, households, and individuals facing climate shocks. It targets agricultural development professionals who use field-based research methods to engage with households and communities for mitigating climate risks. The guide was developed in partnership with the Mitigation of Climate Change in Agriculture (MICCA) Programme, FAO, and CCAFS.

Gender and Environment Website of the IUCN: International Union for Conservation of Nature: <http://www.genderandenvironment.org/generoyambiente.org/index.php/en/>

The Gender and Environment website is a project of the International Union for Conservation of Nature (IUCN). The IUCN, also a member of the GGCA steering committee, has included gender in its conservation and environmental work for over 12 years. It has developed several sector-specific gender tools and promotes gender mainstreaming in a variety of UN agencies. Some useful resources under their Knowledge Center page include the [Environment and Gender Index \(EGI\)](#), national action plans for gender and climate change for 12 countries, publications to guide strategic national and regional decision making, and other commissioned publications.

BRIDGE Cutting Edge Pack on Gender and Climate Change: <http://www.bridge.ids.ac.uk/bridge-publications/cutting-edge-packs/gender-and-climate-change>

BRIDGE is a research and information program of the Institute for Development Studies (IDS) that seeks to make gender knowledge accessible through the development and communication of relevant and diverse information. The Cutting Edge Pack publication provides a comprehensive analysis of gender and climate change, including recommendations for researchers, NGOs, donors, and national and international policymakers. The Supporting Resources Collection provides a summary of key texts, conceptual papers, tools, cases studies, and contacts of organizations working in this field.