UVic Sustainability Scholars Program

Report on: Working for Watersheds

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Disclaimer

This report is a product of the UVic Sustainability Scholars Program, a partnership between UVic and various on- and off-campus organizations offering internship opportunities to graduate students working on sustainability-focused research projects that advance sustainability in the region. This project was conducted under the mentorship of Ms. Zita Botelho.

Territorial Acknowledgement

(Please use one that reflects the place where you conducted your work, research, or where you wrote the report. Something like: I acknowledge (or 'this author' acknowledges) that the work for this project took place on the unceded territory/ancestral lands of the [nation]). If your work was at or near UVic, you are welcome to use the standard UVic territorial acknowledgement (see below) and you are invited to expand and make it more meaningful.

I acknowledge and respect the lək̓ʷəŋən peoples on whose territory the university stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

Tasks Accomplished

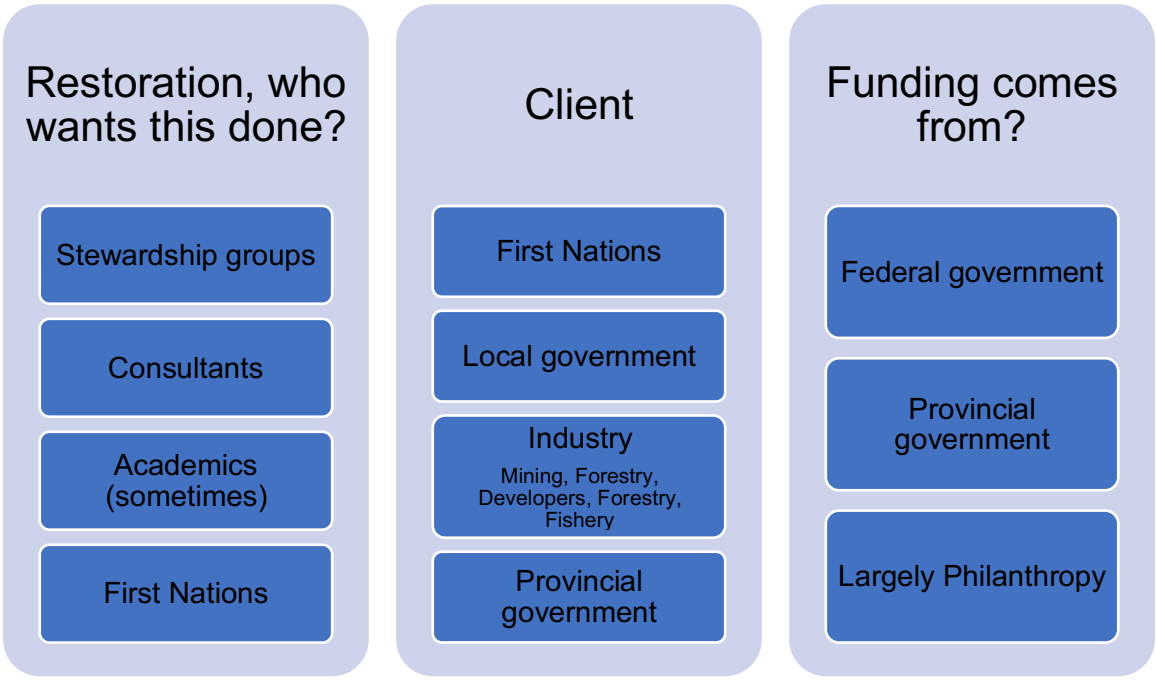
1. Created training and education inventory with list of institutions that provide courses or related training and certification useful for restoration.
2. Interviews with educators, restoration specialists, practitioners and employers including the background work required for this.
3. Partially contributed to the final report writing and recommendations.

I. Introduction

Introduction to WatershedsBC

WatershedsBC works to strengthen BC's watershed security by equipping & supporting local people and decision-makers with the knowledge, training, and networks needed to restore and secure watersheds. WatershedsBC is guided by a vision of watershed security and healthy waters, achieved through new approaches to watershed management and governance grounded in community values and local and Indigenous knowledge.

Fig 1. Assessment of Watershed Restoration



Introduction to the Project

The project; Developing a Watershed Workforce in British Columbia: Identifying Effective Programs and Micro-Credentials included two primary components, 1. Identifying micro-credentials and 2. Conducting interviews with stakeholders.
This research seeks to reorient attention on the workforce requirement in working for watersheds and the economic significance of working for watersheds. It highlights the potential of watersheds to grow as an employer and contribute to the larger economy of the province.

Fig 2. Research Framework

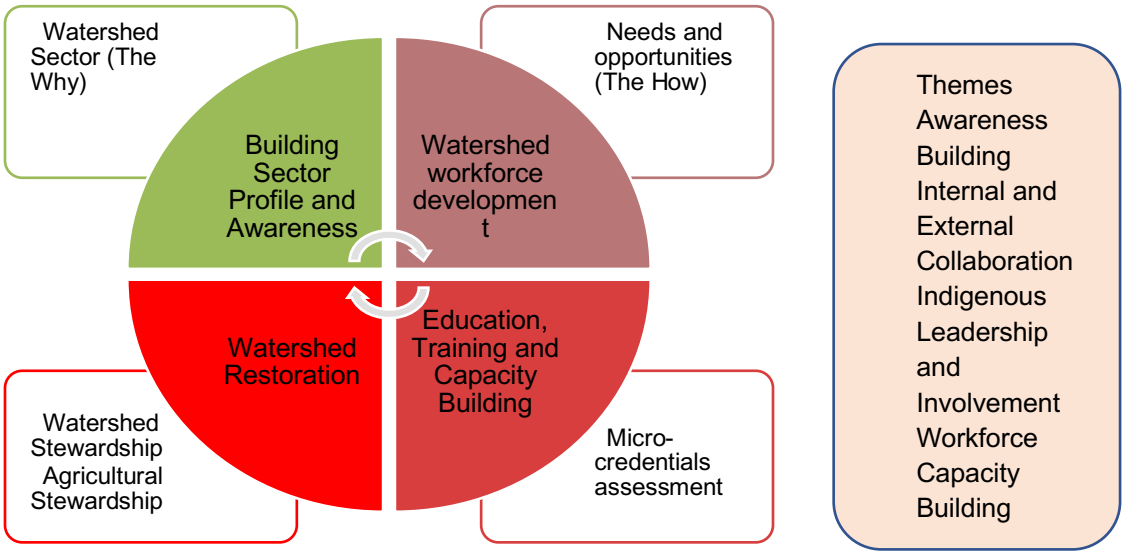
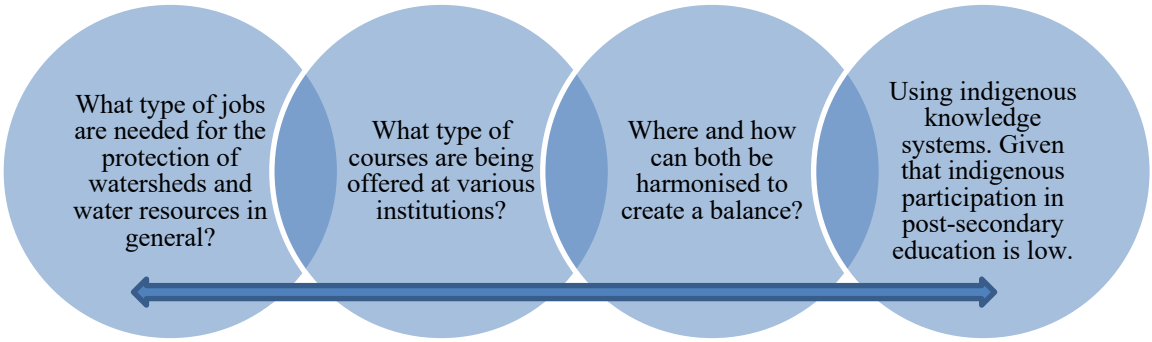


Fig 3. Assessment of Education Employment Continuum



II. Objectives

This research aims to identify the best programs and micro-credentials needed to develop a watershed workforce in British Columbia. The goal is to create a workforce that not only meets the ecological and environmental needs of watersheds but also provides robust employment and economic opportunities across the province.

1. Assess Current Workforce Needs: Identify the current and future skill requirements for the watershed workforce in BC.
2. Identify Existing Programs: Review existing educational and training programs related to watershed management in BC and elsewhere.
3. Evaluate Micro-Credentials: Determine the value and applicability of micro-credentials in filling skill gaps.
4. Develop Recommendations: Propose a set of programs and micro-credentials that can effectively develop the watershed workforce

Importance of the Project:
Water although central to life, is one of the most neglected resources. Similarly, watersheds that are crucial to storing underground water that in turn ensures long-term availability of water to humans and other species. However, watersheds are affected by climate change as well as decades of industrial activity and resource extraction from mining and forestry. Reports in 2021 showed the acute shortage of water and drought across BC. In November 2021, metro-Vancouver was cut off from the rest of Canada due to mudslides in that swept away highways, destroyed homes and killed five people. There are increasing numbers of seasons with too much water and too little water is being recorded with alarming results and detrimental impacts on lives and property. This project provides important insights on current workforce needs to support and preserve watersheds. This report also aims to show gaps and provide recommendations that will help set a pathway for addressing existing gaps in order to protect watersheds and at the same time creating jobs and supporting the economy for sustainable future.

Research Questions:
1. What are the specific skills and knowledge areas needed for a watershed workforce in BC?
2. Which existing educational programs (degree programs, certifications, workshops) are relevant to watershed management?
3. What are the emerging trends and technologies in watershed management that should be incorporated into training programs?
4. How can micro-credentials complement traditional education and training to meet workforce needs?
5. What are the barriers to implementing these programs and micro-credentials, and how can they be overcome?

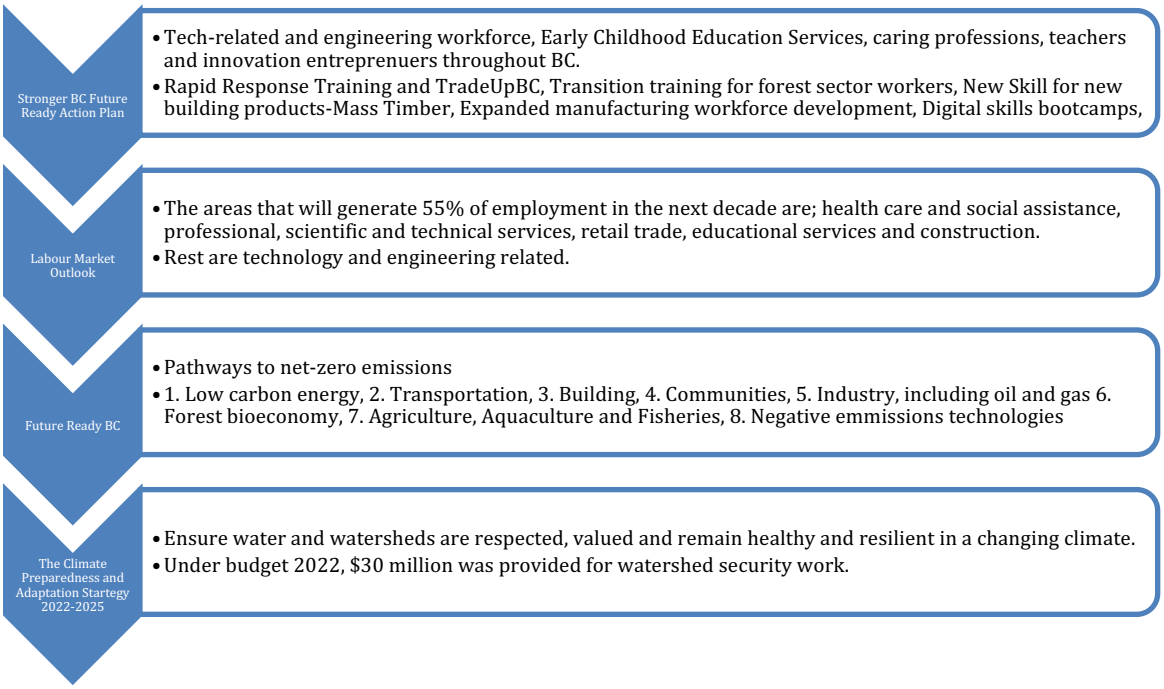
III. Literature Review

The Watershed Restoration Program was initiated in BC under the Provincial Forest Renewal Plan in 1994 with the main purpose of; Restoring, protecting and maintaining fisheries, aquatic and forest resources adversely impacted by logging-related activities that would otherwise require several decades to recover naturally. Provide community-based training, employment, and watershed stewardship opportunities throughout the province. Provide a mechanism to bridge historical forest harvesting practices and the new standards established by the Forest Practices Code, thus diversifying jobs in the forest sector (Slaney & Martin, 1997; Keely & Walters, 1994). This provincial government initiative was aimed at accelerating the restoration of logging impacted watersheds. The Program was designed to rehabilitate local impact sites within logged watersheds, and therefore also identified the requirement of a multi-disciplinary approach (Keely & Walters, 1994). The impacts on watershed and the need for restoration have been identified for three decades, however, their still remains a significant gap in knowledge and practice of watershed restoration.

Although watershed restoration was identified as necessary almost three decades ago, the attention provided throughout the years have not remained consistent. Two important reports published in 2021 and 2022 by Delphi Group on developing roadmap for working for watersheds reflects both, the importance and economic significance of watershed restoration. However, these reports have highlighted some persistent gaps such as: the need for collaboration between different stakeholders as well levels of government, barriers to participation of indigenous leaders and the need for workforce with capacity and skills. Academic institutions, non-profits, employers and practitioners recognize the need for multi-disciplinary approach. Micro-credentials have been identified as central to catering to those seeking to change and upgrade their profession.

Micro-credentials therefore are being offered across a spectrum of subjects across various academic and non-academic institutions. The Ministry of Advanced Education and Skills Training has designed a Micro-credential Framework for the BC's Post-secondary Education System. In its conceptualization of modality, it is diverse and flexible to accommodate students with different needs as well as recognizes the need for the framework to adapt to the evolving labor needs. Micro-credentials framework has been designed with the objective of meeting the needs of a changing economy and workforce. As per the framework, micro-credentials provide another option for post-secondary institutions to further support the upskilling and reskilling of British Columbians for in-demand occupations. The labour market outlook 2023 projects the following as the areas that will generate 55% of employment in the next decade, they are: healthcare and social assistance, Professional, scientific and technical services, Retail trade, Educational services and Construction.

Fig 4. Priority in Education and Training As per various strategic programs



III. Methodology

In order to understand what constitutes working for watersheds, a wide scoping of literature and qualitative interviews was used. In-depth interviews were conducted with participants from educational institutions, restoration practitioners and not-for-profit working for watersheds restoration. Semi-structured interview guide was used to conduct 10 interviews via zoom. In order to ensure reliability of data, interviews were recorded in audio and visual form. Along with this zoom auto transcribe was used to transcribe data which was later cleaned and carefully reviewed by the interviewer to avoid any inconsistencies generated by auto-transcribe. An informed verbal consent was sought from each participant before recording the interview. Recording the interview makes it easier to generate verbatim, making the analysis more effective. Participants were selected through purposive sampling based on their expertise, which directly aligned with the research objectives. This methodology is particularly suited to the study, as it aims to deepen the understanding of the specific issue of identifying the needs of the current and future workforce in watershed restoration.

For data analysis, NVIVO software was used for coding. A codebook was developed based on key factors highlighted by the interview participants that aligned with the study's objectives. This was followed by a thematic analysis, where themes were manually created by considering the codes in relation to the study's objectives. A rigorous refining of the thematic analysis was followed by revisiting the codes and themes, ensuring they are comprehensive and accurately reflect the data through sharing and discussing within the research team. The data was shared with the participants to ensure the accuracy of representation of the participant's views.

IV. Findings and Discussion

The Key themes identified through the research are:

1. Workforce Status and Challenges includes: Employee retention, Coming back to restoration after the private sector, Hiring Workforce, Challenges faced by restoration workers, Permits and policy related Challenges.
2. Education and Training Status and Recommendations includes: Need for in-field and on-the-job training, Leadership in restoration education, Suggestions for innovative training approaches, Investment in training workforce, Type of training current workforce have, Avenues of improvement in training, Training requirement for Indigenous communities, Importance and investment in micro-credentials, Restoration education and decision-making.
3. Resources and Funding include: Funding
4. Enabling Environment for Restoration Workers and Educators; this includes Career pathway/ options in restoration/Scale or workforce required and scale of restoration work needed,

The findings indicate a myriad of challenges that confront the watershed restoration as a field especially vis-a-vis developing workforce to work in the sector. The major constraint however lay at the policy and planning at the provincial level that does not assign watershed restoration that same level of importance as some of the other aspects of technological advancement and net zero emission. While watershed restoration is an important aspect of nature and environmental conservation and is central to survival of various species of plants and animals. The practitioners in the field pointed out the lack of a dedicated pathway for working for watersheds and the inability to incorporate it into the broader economic plan of the province. This resonates with the broader frameworks in place at the provincial level that lack focus on watershed restoration. As per the ClimateReadyBC, BC will experience more droughts and water scarcity in the years to come. However, the only place where watersheds protection finds space is; The Climate Preparedness and Adaptation Strategy 2022-25, that prioritizes protecting and maintaining healthy watersheds under its pathways and actions and building resilience. Under pathway 3 resilient species and ecosystems, the strategy highlights the importance of watersheds in maintaining thriving ecology.

The CleanBC Roadmap to 2030 on the other hand is the plan to achieve 100% of emissions target while building a cleaner economy that benefits everyone. It includes a range of accelerated and expanded actions across eight pathways for achieving net zero emissions that includes:

1. Low Carbon Energy 2. Transportation 3. Buildings 4. Communities 5. Industry, including Oil and Gas 6. Forest Bioeconomy 7. Agriculture, Aquaculture and Fisheries 8. Negative Emissions Technologies.

The high-level policy frameworks that impact planning and execution of micro-credentials catering to watershed restoration are: Stronger BC Future Ready Action Plan, Labour Market Outlook, ClimateReadyBC and The Climate Preparedness and Adaptation Strategy. These documents outline exclusive focus, out of which only The Climate Preparedness and Adaptation Strategy has allocated a budget for Watershed. Watershed protection and restoration do not find particular focus in any of the other major plans above. The labour market outlook 2023 projects the following as the areas that will generate 55% of employment in the next decade, they are: healthcare and social assistance, Professional, scientific and technical services, Retail trade, Educational services and Construction which does not include watershed as one of the sectors. The

interview participants provided examples from the neighboring states in the USA where they have been able to develop watershed restoration into an income and employment generating field that BC lags behind in developing.

The current policies on environmental sustainability is largely focused on net zero emissions as per SDG target for 2030, that shifts focus to industrial waste management, efficient infrastructure development, etc. This marginalizes environmental concerns particularly related to water preservation and conservation at large and watershed conservation in particular.

Secondly, there seems to be a greater focus on advancing technologies. The paradigm of the development economy and priorities for future development emphasized in the document can be ascribed to a "technological fix". There are large investments in the sectors advancing technological development which can be seen within post-secondary institutions as well. While technological advancement can be argued to be an important sector, what this has done is made for an ecosystem where the watershed sector needs to fit itself within the larger paradigm of "technological fix" to leverage skills and human resources to work for the watersheds.

These are also some of the reasons why watershed restoration does not make for a desired field for the pursuit of career in the long run. Although a scalar need for continued restoration work and requirement of a workforce is identified by the restoration practitioners and employers, currently due to culmination of factors spanning from limited funding, lack of sector specific policies and prioritization, watershed restoration is rather marginalized for employment seekers in the broader environmental restoration sector.

Sector specific training and education particularly geared towards working for watershed restoration is limited. Academic institutions offer comprehensive courses on ecological restoration such as University of Victoria, UBC and BCIT.

Permits, regulations, policies and processes are a challenge faced by all organizations irrespective of their nature and type. Funding availability in general was not reported as a challenge in itself as much as the flexibility to use the funding in the best suited manner for the project requirements and the timing of funding allocation that conflicts with the timing of the project implementation window.

Indigenous organizations face challenges as the new regulation mandating formal training and certification, knowledge gained through practice is rendered invalid.

Academic Institutes face challenges related leadership, continuity of funding, lack of collaboration and burnouts and stress by the professionals and academics that try to take initiatives.

Academic Institutions are providing full-degree courses at undergraduate and graduate level on ecological restoration and environmental sciences. Some like UBC-O are also taking initiative for introducing micro-credentials that target watershed related training and facilitate transition and upgradation for people willing to work in watershed restoration or environmental restoration. Some other institutions like UVic have this aspect covered through continuing studies programs. UVic also has a restoration club that provides overall project management training along with decision-making skills through the restoration club. A gap here is most students that are trained in

the program work towards assessment rather than actual restoration. However, most restoration practitioners highlight that there is a profound need for people trained to work in the field and do the actual restoration work. BCIT has been catering to micro-credentials for a longer period of time but is challenged and facing stagnation in terms of innovation due to funding constraints and lack of leadership.

Not-for-profit are investing in on-the-job training to train professionals that have a holistic training beyond classroom and theoretical training to work towards watershed restoration. However, such intuitions lack continuous funding, resources and manpower to support on-the-job training.

Retention of indigenous guardians for stewardship is a challenge because they are not financially supported enough, especially communities where everything including groceries needs to be flown in. They are also left struggling for health benefits. There is a high level of burnout due to the multiple different roles and responsibilities the guardians undertake. They are associated with up to 12 organizations at the same time and this changes yearly. When they are given the Stewardship Technician Training, they are often snapped away by resource extraction industries as they can offer full-time work with work benefits. Since they are laid off during off-season, they have concerns about putting food in their kid's mouth. Speaking about Stewardship directors, there is a higher level of retention there, however, they are sitting on a lot of government tables, government to government discussion tables, negotiations, they need a wide array of skills, and it is a high stress and high-stake job. There is a high turnover at the level of stewardship director too.

C. Recommendations

1. Facilitate the collaboration between academic institutions but also between not-for-profit organisations working for restoration with academic institutions and develop a collaborative co-op/internship for students interested in pursuing a career in restoration.
2. Make policies that adequately support the restoration sector to develop into a field that offers stable career options and generates more jobs. Washington, for example, has a wetland mitigation policy that requires a certain amount of offsetting for a wetland that has generated an economy in Washington, where people take training to measure the functions of wetlands and understand them. This policy is basically driving jobs. Because those people are assessing where they're going to be putting the wetlands, are they going to be restoring these wetlands? so part of the funding model, not all of it, but some of it can be tied into proponent driven projects as well where there's clear, transparent requirements that if you impact a wetland, you're going to have to be doing this work. There are people taking this training.
3. Programs like The 2 Day Challenge at BCIT should be provided with required support and resources. This program brought in architectural students, engineering students for ecological restoration and watershed management. That team of students would go to the Chickama center in Squamish which would present a challenge. The team had to come up with a plan to engage the community to restore and tackle related challenges. This also had a finance person from business on the team because how much projects cost is really important. So ecological restoration and probably watershed management, is not just one person's job. So, this would be an initiative to take into consideration if an organization would take on something like that for students.

4. An extensive study should be done on the successful models from across the border in the USA and other provinces in Canada and make a plan accordingly for BC.

- **Policy and practice recommendations for concerned authorities.**

1. Draft a measure to formally recognize and accredit experience gained through practical, field-based work, making it equivalent to educational training. This measure aims to enhance the capacity for Indigenous stewardship by valuing and validating the expertise acquired through hands-on stewardship activities.
2. Improvement in Water Sustainability Act with inclusion of watershed as an important aspect.
3. Improvement/ updating of the government website with resources and manuals for watershed restoration.
4. Set clear demarcation between organizations working for protecting watersheds and industries that cause damage to watersheds and develop separate processes of obtaining approvals for both.
5. Work towards developing a dedicated pathway for working for watersheds. This includes assigning due recognition and inclusion of watershed restoration into a broader environmental protection strategy of the province that further ties into the stronger BC strategic plan.
6. Develop a multi-stakeholder engagement platform for academics, practitioners, employers and policymakers.

VI. Conclusion

Watersheds despite being an important aspect within environmental sustainability, is rather marginalized within policy priorities. This research highlights some of the major challenges faced by practitioners, academics and employers in watersheds and provides recommendation based on interviews conducted and literature review. As part of this research a training inventory is also created that lists training opportunities (both academic and non-academic) for those seeking to change their area of work to help protect watersheds.

B. Limitations of the Study

Only 10 qualitative interviews were conducted with academics, restoration specialists and practitioners. Therefore, this report is limited only to studying and analyzing gaps and challenges faced by organizations in developing workforce for watershed restoration. This report does not study the broader field of watersheds or watershed management. While the views shared by research participants are incorporated in the report in a comprehensive and unbiased manner, this report does not include views from policy makers and political leaders.

VII. References

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