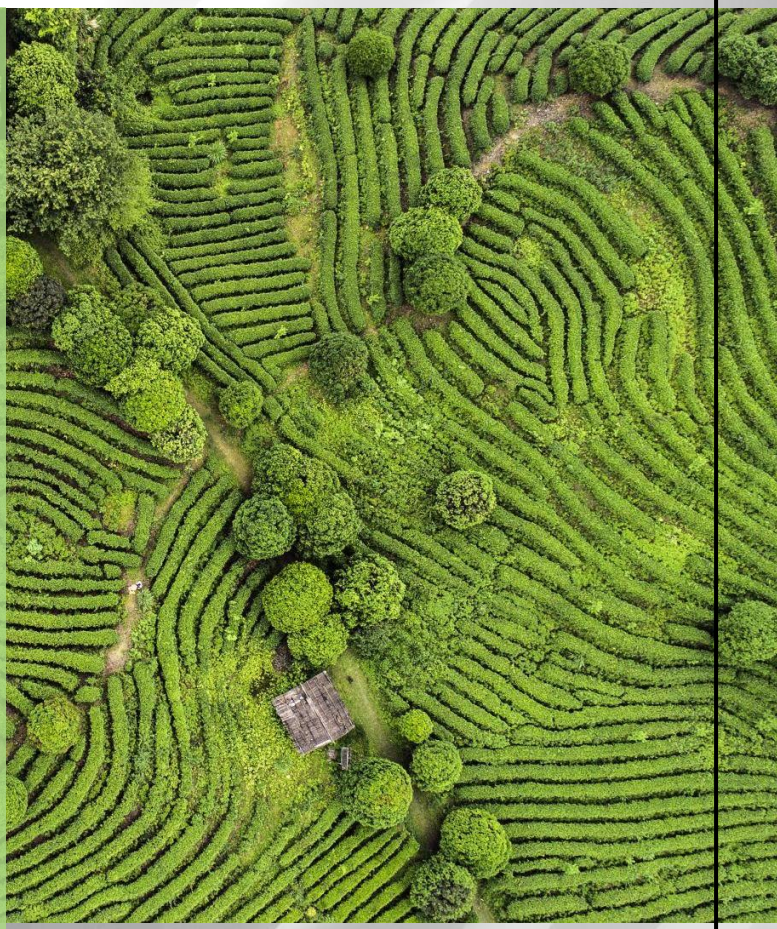
ASIA-PACIFIC NETWORK FOR GLOBAL CHANGE RESEARCH

FINAL REPORT

Bridging academic researchers and vulnerable island communities in the Philippines:

Enhancing capacities for climate and disaster risk management of low-income municipalities in Batanes, Philippines



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[1] EnP. refers to Environmental Planner, a registered and licensed professional specializing in the multidisciplinary planning and management of land and water resources, including urban and regional development, land use planning, environmental management, and the development of sustainable communities and ecosystems.

[2] For. refers to Forester, a registered and licensed professional specializing in the sustainable management of forest and forestland resources, including forest ecosystem management, biodiversity conservation, watershed management, and forest protection.

Asia-Pacific Network for Global Change Research (APN)

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1. Summary

The island municipalities of Batanes are recognised for their hazard-resilient local cultures, shaped by generations of adaptation to recurrent typhoons, strong winds and coastal hazards. As climate change intensifies existing hazards, science-based tools, data and training can complement Ivatan knowledge and practices and further strengthen local resilience. The project supported the coexistence of traditional and scientific knowledge in resilience building by implementing participatory capacity-building training and workshops on Geographic Information System (GIS), Climate and Disaster Risk Assessment (CDRA), probabilistic hazard risk assessment and science-based policy formulation and local development planning. The initiative applied a gender-equitable and socially inclusive (GESI) lens across all activities through a participatory approach, encouraging the involvement of stakeholders from different sectors and backgrounds in discussions on climate and disaster risks and the identification of locally appropriate policies and interventions.

The project adopted an experiential learning (learning-by-doing) approach consisting of three phases—Learn, Do, and Reflect—that enabled participants to acquire knowledge and data, apply them in practical settings, and synthesise insights through structured reflection. During the Learn phase, participants developed a foundational understanding of climate information, hazard characterisation, risk assessment concepts and GIS. In the Do phase, Local Government Units (LGUs) applied these concepts by developing exposure databases, assessing sensitivity and adaptive capacity and conducting CDRA. The Reflect phase provided a platform for refining results through multi-stakeholder discussions, enabling LGU representatives to contextualise CDRA findings within local development needs and priorities. Collectively, these processes strengthened local data and risk information systems, enhanced partnerships between scientists and communities, and generated risk-informed inputs for policy formulation and local development planning.

The project built on existing Ivatan knowledge and strengthened stakeholders' capacity to apply Sendai Framework principles in local planning. Training emphasised multi-hazard assessment and inclusive, science-based decision-making informed by traditional knowledge. The initiative facilitated knowledge exchange between academe and local communities through lectures, workshops, peer-to-peer mentoring sessions, consultations and validation sessions. These engagements demonstrated how scientific methods and traditional knowledge systems can complement one another, with local insights enriching data interpretation and validation of assessment results, while scientific tools supported the systematic collection, organisation and spatial analysis of risk information. The integration of these knowledge systems informed the identification of risk-sensitive policy interventions (RSPIs) and entry points for mainstreaming climate and disaster risks into local development plans, including the Comprehensive Land Use Plan (CLUP), Comprehensive Development Plan (CDP), Local Climate Change Action Plan (LCCAP) and other relevant municipal plans.

Overall, the project supported local capacity development for risk assessment, data management, and evidence-based planning through training LGU personnel in GIS and CDRA, completion of municipal-level risk assessments across six municipalities and assistance in updating existing land use maps. These activities reinforced collaboration between academic researchers, local governments and other stakeholders. The experience demonstrated a model for integrating diverse knowledge systems in climate and disaster risk management and provided a replicable approach for other vulnerable island and coastal communities seeking to enhance resilience through participatory and science-informed planning processes.

2. Objectives

Despite their well-known resilience, the island communities of Batanes remain highly exposed to natural hazards and the impacts of climate change. The project aimed to strengthen the resilience of the six municipalities of Batanes by enhancing local capacities for climate and disaster risk management and supporting risk-informed, inclusive, and evidence-based decision-making. Through a participatory approach, the project sought to complement existing Ivatan knowledge and practices with scientific methods and tools for risk assessment and local development planning.

Specifically, the project aimed to achieve the following objectives through the Learn, Do, and Reflect phases:

1. Learn: To enhance stakeholders' understanding of climate and disaster risks, climate change impacts, and relevant tools and frameworks for risk assessment and planning.

This phase aimed to strengthen stakeholders' knowledge of relevant policies and frameworks, data collection methods, and geospatial tools for risk assessment and planning. Through lectures, workshops, and knowledge-sharing activities, the project sought to introduce key concepts and methodologies while fostering an appreciation of the complementary roles of scientific knowledge and traditional Ivatan practices in building resilience.

2. Do: To strengthen stakeholders' capacity to apply participatory and evidence-based methodologies for climate and disaster risk assessment.

This phase aimed to equip stakeholders with the knowledge and technical skills necessary to assess hazards, exposure, vulnerability, climate change impacts, and associated risks across sectors. It sought to promote the use of local data, geospatial information, and technical tools to identify priority concerns, assess risks, and generate evidence-based information to support local planning and decision-making processes.

3. Reflect: To facilitate collaborative reflection and the identification of inclusive, gender-responsive, and locally appropriate strategies for climate and disaster risk management. This phase aimed to provide opportunities for stakeholders to reflect on assessment results, local experiences, and community priorities through consultations and collaborative discussions. These engagements were intended to foster a shared understanding of local risks and resilience capacities, encourage the exchange of perspectives across sectors and municipalities, and inform the identification of risk-

sensitive policy interventions and entry points for mainstreaming climate and disaster risk considerations into local development plans.

3. Outputs, Outcomes and Impacts

Outputs	Outcomes	Impacts
Phase 1: Learn 1.1. Signed Memorandum of Understanding 1.1. Workplan for the conduct of risk assessment 1.2. Compilation of local policies 1.3. Preliminary exposure database	Forge partnerships with the partner local governments through the Memorandum of Understanding. Through lectures, workshops, and consultations, stakeholders will gain an in-depth understanding of climate and disaster risks, relevant policies, data collection methods, and geospatial analysis.	Empowered and capacitated Batanes equipped with the knowledge, skills, and resources necessary to effectively address climate and disaster risks, leading to increased resilience and sustainability in the face of environmental challenges.
Phase 2: Do 2.1. Hazard inventory matrix 2.2. Summary of climate change projections 2.3. Risk assessment	Demonstrate methodologies for assessing natural hazards, climate change impacts, and associated risks to analyze potential consequences across various sectors.	
Phase 3: Reflect 3.1. RSPIs 3.2. Strategic entry points for mainstreaming risk findings into local plans 3.3. Symposium	Identify and prioritize decision areas, ensuring a holistic understanding of local risks through interactive exercises to formulate gender-equitable and socially inclusive climate and disaster risk management strategies.	

4. Key facts/figures

- 2 papers presented at international conferences (Appendix A)
- 15 early-career researchers trained and engaged in project activities (Appendix B)
- 10 initial meetings conducted to introduce the project and explore partnership with partners, including 7 LGUs, 2 Regional Line Agencies (RLA) and 1 National Government Agency (NGA) (Appendix C)
- 1 online project launch conducted to kick-off the project with the partners (Appendix D)
- 5 declarations of support received from Batanes LGUs

- 5 capacity-building workshops conducted, including two batches of GIS and CDRA training, a workshop on RSPIs, and a culminating symposium (Appendix E)
- 7 LGUs engaged: the Provincial Government of Batanes and six municipalities (Appendix F)
- 15 feature articles published on the Resilience Institute website
- 61 LGU personnel trained in GIS and CDRA, comprising 57 LGU personnel, 2 DILG personnel, 1 Department of Human Settlements and Urban Development (DHSUD) Region II personnel, and 1 National Museum of the Philippines – Batanes personnel (Appendix G)
- 2 Civil Society Organizations (CSOs) engaged
- 6 LGUs supported in conducting CDRAs
- 6 LGUs assisted in updating existing land use maps
- 3 RLAs engaged: Department of the Interior and Local Government (DILG) Region II attended all four workshops, DHSUD Region II attended two workshops, and Department of Environment and Natural Resources (DENR) Region II – Protected Area Management Office (PAMO) for the Batanes Protected Landscapes and Seascapes
- attended one workshop
- 2 NGAs engaged: the National Museum of the Philippines – Batanes attended two workshops, while the Climate Change Commission (CCC) attended one workshop

5. Publications

6. Media reports, videos and other digital content

1. Santiago, J. (2025, July 18). *Bridging traditions and science for climate resilience in the island communities of Batanes*. UP Resilience Institute. https://resilience.up.edu.ph/bridging-traditions-and-science-for-climate-resilience-in-the-island-communities-of-batanes/
2. Subijano, R. N. (2025, August 5). Engaging local stakeholders: Courtesy calls for bridging academic researchers and vulnerable island communities in the Philippines. UP Resilience Institute. https://resilience.up.edu.ph/courtesy-calls-in-batanes/
3. Sandoval, J. (2025, August 15). *Charting a safer future: UP RI NOAH Center empowers Batanes LGUs with tools for climate action*. UP Resilience Institute. https://resilience.up.edu.ph/charting-a-safer-future-up-ri-noah-center-empowers-batanes-lgus-with-tools-for-climate-action/
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5. Gabriel, K. A. & Tegelan, A. D. (2025, September 26). *Beyond the finish line: The Batanes Marathon and community resilience*. UP Resilience Institute. https://resilience.up.edu.ph/beyond-the-finish-line-the-batanes-marathon-and-community-resilience/

6. Tegelan, A. D. (2025, October 14). *From trainers to learners: Reflections on resilience in Batanes*. UP Resilience Institute. https://resilience.up.edu.ph/from-trainers-to-learners-reflections-on-resilience-in-batanes/
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8. Esquivel, A. L. J. (2025, November 7). *Batanes: The landscape of resilience*. UP Resilience Institute. https://resilience.up.edu.ph/batanes-the-landscape-of-resilience/
9. Mandar, M. C. & Tegelan, A. D. (2025, December 5). *Learning by doing: A snapshot of how GIS training is shaping skills and confidence in Batanes LGUs*. UP Resilience Institute. https://resilience.up.edu.ph/learning-by-doing-a-snapshot-of-how-gis-training-is-shaping-skills-and-confidence-in-batanes-lgus/
10. Santiaguel, E. D. (2026, February 11). *Mapping for resilience: Batanes LGUs strengthen local planning through GIS*. UP Resilience Institute. https://resilience.up.edu.ph/mapping-for-resilience-batanes-lgus-strengthen-local-planning-through-gis/
11. Tegelan, A. D. (2026, April 28). From risk to action: Identifying risk-sensitive policy interventions and entry points for mainstreaming climate and disaster risk assessment into local plans. UP Resilience Institute. https://resilience.up.edu.ph/from-risk-to-action-identifying-risk-sensitive-policy-interventions-and-entry-points-for-mainstreaming-climate-and-disaster-risk-assessment-into-local-plans/
12. Tegelan, A. D. (2026, April 30). *Empowering Batanes by formulating results for lasting impacts: Strengthening risk-informed local planning*. UP Resilience Institute. https://resilience.up.edu.ph/empowering-batanes-by-formulating-results-for-lasting-impacts-strengthening-risk-informed-local-planning/
13. Esquivel, A. L. J. & Subijano, R. N. (2026, May 18). *Beyond metrics: Insights from the vulnerability assessment of Batanes municipalities*. UP Resilience Institute. https://resilience.up.edu.ph/beyond-metrics-insights-from-the-vulnerability-assessment-of-batanes-municipalities/
14. Mandar, M. C. & Santiaguel, E. D. (2026, June 8). *Multi-dimensional climate and disaster risk in Batanes: Insights from municipal-level assessments*. UP Resilience Institute. https://resilience.up.edu.ph/apn-batanes-riskassessment/
15. Tegelan, A. D. & Gabriel, K. A. (2026, June 10). *Batanes LGUs refine climate risk assessments through online CDRA validation sessions*. UP Resilience Institute. https://resilience.up.edu.ph/batanes-lgus-refine-climate-risk-assessments-through-online-cdra-validation-sessions/

7. Pull quotes

"The collaboration between our local expertise and scientific knowledge of the academic community is invaluable. It is about bridging or bringing together the wisdom of our elders with the insights of modern science, ensuring that our plans for the future are both grounded in our heritage and informed by the best available data."

– **Hon. Jonathan Enrique V. Nanud Jr.**
Mayor of the Municipality of Uyugan during a speech delivered at the online project launch, 28 March 2026

"This project, which is aligned to the development goals of the provincial government, empowers local government units of Batanes through enhanced capacities for climate and disaster risk management. This comes at a crucial time when global environment shifts demand to local adaptive strategies."

– **Ms. Melissa Gretchen C. Pama** Local Disaster Risk Reduction and Management Officer III of the Province of Batanes during a speech delivered at the online project launch
28 March 2026

"As we move from local leadership to the broader scientific and technical perspective, we are reminded that strengthening resilience requires not only experience on the ground, but also reliable data and participatory approaches."

– **Hon. Celso B. Batallones** Provincial Administrator of Batanes during hiswelcoming remarks at the Empowering Batanes by Formulating Results for Lasting Impacts Symposium
17 April 2026

"Resilience is not built in isolation. It is strengthened through collaboration, sharing of knowledge, and coordinated action. Risk assessment is not the end of the process, it is the foundation. The real value of these results lies in how they inform policies, plans, investments, projects, programs, and activities from land use planning and infrastructure development to preparedness and long-term adaptation strategies."

– **Dr. Alfredo Mahar Francisco A. Lagmay**
Executive Director of UP RI and Director of UP NOAH Center during his welcoming remarks at the Empowering Batanes by Formulating Results for Lasting Impacts Symposium
17 April 2026.

8. Acknowledgments

The project team extends its sincere gratitude to APN for its support of this initiative. We are deeply grateful to the Provincial Government of Batanes and the Municipalities of Basco, Mahatao, Ivana, Uyugan, Sabtang, and Itbayat for their commitment to the project, active participation in its activities, and generous sharing of local knowledge and experiences that helped ground the project in the Ivatan culture of resilience.

Gratitude is extended to the Batanes Provincial Disaster Risk Reduction and Management Office (PDRRMO), particularly Ms. Melissa Gretchen C. Pama, Mr. Darwin V. Alcazar, Mr. Ceasar Roldan A. Esdicul, Mr. Mark Giovanni Pajudpud, Mr. Joseph Anthony N. Baldovino, Mr. Jetrick Kyle D. Gordo, Ms. Aurelia A. Lagundino, Mr. John Wayne D. Estrella, and Ms. Abigail L. Alcazar, for their invaluable assistance in coordinating with local stakeholders, providing much-needed logistical support and resources, and sharing important insights into Batanes' disaster risk management practices and resilience landscape. We also acknowledge the NGAs, RLAs, and CSOs whose expertise, perspectives, and participation enriched the project's activities and outputs.

Our sincere appreciation is extended to the project experts who contributed their respective expertise throughout the implementation of this initiative: EnP. Jerico E. Mendoza for his expertise in geospatial analysis and flood hazard modelling, Dr. Juan M. Pulhin for his expertise in nature-based solutions, Atty. Mark Anthony M. Gamboa for his insights on policy and institutional frameworks, Dr. Mario R. Delos Reyes for his expertise in environmental management, EnP. Charlie Cabotaje for his contributions to resilience governance, EnP. Geoel Anthony Y. Esguerra for his technical expertise in CDRA, and Dr. Alfredo Mahar Francisco A. Lagmay for his leadership and expertise in probabilistic hazard assessment, disaster risk science, and geospatial analysis. Their distinct perspectives strengthened the project's analytical rigor and helped ensure that its outputs are scientifically grounded and relevant to local planning and policy.

We gratefully acknowledge the contributions of the University of the Philippines (UP) Nationwide Operational Hazards (UP NOAH) Center, the core component of UP RI, particularly its Hazard Assessment Team and Flood Modelling Component, for providing the hydrometeorological, geological, and volcanic probabilistic hazard assessments that served as critical inputs to the project's CDRAs. We likewise extend our sincere appreciation to the UP RI for its guidance in supporting local governments in strengthening disaster and climate resilience. We also acknowledge the Integrated Natural Resources and Environment Management (INREM) of the UPLB for its expertise and contributions to the project, particularly in environmental assessment, natural resource management, and climate-related research. Its interdisciplinary perspective complemented the project's hazard assessment and planning work and helped strengthen the integration of environmental and natural resource considerations into resilience planning for Batanes. A complete list of acknowledged individuals and institutions is presented below.

Project Experts

- Dr. Alfredo Mahar Francisco A. Lagmay, UP RI
- Dr. Juan M. Pulhin, UPLB-INREM
- Dr. Mario R. Delos Reyes, UP RI
- Atty. Mark Anthony M. Gamboa, EnP., UP RI
- EnP. Charlie E. Cabotaje, MS GISc, UP RI
- EnP. Jerico E. Mendoza, UP RI
- EnP. Geoel Anthony Y. Esguerra, UP-NCTS

UP RI-NOAH Center Flood Modelling Component

- Mr. Marc Anthony Moises, Senior Science Research Specialist
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UP RI-NOAH Center Hazard Assessment Team

- Ms. Audrei Anne B. Ybañez, Supervising Science Research Specialist
- Ms. Lea Victoria D. Serrano, Senior Science Research Specialist
- Mr. Alexis Bryan G. Rivera, Supervising Researcher
- Ms. Ada Beatrice F. Reyes, Junior Research Analyst
- Ms. Julian Marie Bernice M. Grageda, Junior Project Associate
- Mr. Cristan M. Malaiba, Junior Research Associate

UP RI-NOAH Center Planning Component

- Ms. Stephany Joy N. Ayo, Junior Research Assistant
- Mr. Fernando Jose G. Calvario, Junior Research Assistant

UP RI-NOAH Center Administrative Division

- Ms. Janette Pamaylaon, Administrative Officer IV
- Ms. Liezel M. Obrique, Junior Project Assistant

UPLB-INREM

- Mr. Kyle Vincent R. Singson, University Research Associate 1

LGUs

- Provincial Government of Batanes
- Municipal Government of Basco, Itbayat, Ivana, Mahatao, Sabtang, and Uyugan

RLAs

- DILG Region II
- DHSUD Region II
- DENR Region II – PAMO for the Batanes Protected Landscapes and Seascapes

NGAs

- National Museum of the Philippines – Batanes
- Climate Change Commission (CCC)

CSOs

- Mahatao Women's Association
- Mahatao Fishmen Association

9. Appendices

Appendix A: Abstracts Presented in Conferences
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Appendix C: Initial Meetings Photos
Appendix D: Project Launch Workshop Design and Photos
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Appendix F: List of Batanes LGUs Who Attended the Workshops
Appendix G: Number of Personnel Training by Institution at the GIS and CDRA Workshops
Appendix H: LGU Posters Presented During the Symposium

Appendix A: Abstracts Presented in Conferences

Paper Abstract 1: Oral Presentation at the 5th International Conference on Integrated Natural Resources and Environment Management, November 2025

Title: Climate and Disaster Risk Assessment of Island Communities in Batanes, Philippines
Joy T. Santiago, Jerico E. Mendoza, Arge Louise Joy S. Esquivel, April Dawn F. Tegelan, Ella Danielle Santiaguel, Marie Claire Mandar, Janiella Sandoval, Rysch Nae Subijano, Kristian Audri Gabriel, Mark Anthony M. Gamboa, Juan M. Pulhin, Alfredo Mahar Francisco A. Lagmay

The island communities of Batanes are widely recognized for their deeply rooted traditional knowledge and cultural resilience, which have historically enabled them to cope with and adapt to environmental challenges. However, despite these adaptive strengths, these communities face escalating exposure to climate-related hazards and extreme weather events. Strengthening local capacities through science-based approaches is therefore critical to enhancing adaptive strategies and ensuring long-term resilience.

This study applies the Climate and Disaster Risk Assessment (CDRA) framework prescribed by the Department of Human Settlements and Urban Development (DHSUD) to generate an evidence-based understanding of climate and disaster risks in Batanes. The CDRA is a structured, five-step process designed to facilitate systematic risk assessment at the local level. The first step, Data Collection and Organization, involves compiling and structuring essential climate and hazard data to characterize the local risk landscape. The second step, Scoping Potential Impacts, identifies possible consequences of climate change and hazards across sectors. The third step, Exposure Database Development, entails mapping and analyzing the distribution and attributes of exposure units. The fourth and central step, Risk Assessment, integrates outputs from previous stages to quantify risks and generate actionable risk matrices and maps. The final step involves Result Synthesis, which consolidates findings to inform planning and policy development.

The assessment covered six municipalities in Batanes—Basco, Ivana, Uyugan, Mahatao, Sabtang, and Itbayat—and focused on five key exposure units: population, natural resource-based production areas, urban use areas, critical point facilities, and lifeline utilities. Critical point facilities were assessed individually, while other exposure units were analyzed at the barangay level.

Findings from the CDRA offer a robust basis for anticipatory and informed decision-making. The results support the development of localized, data-driven strategies that enhance resilience, reduce vulnerabilities, and inform sustainable land use planning, infrastructure development, and policy formulation tailored to the unique context of small island communities.

Paper Abstract 2: Oral Presentation at the 2026 Asia Oceania Geosciences Society Conference, August 2026

Title: Bridging Tradition and Science: A Multi-dimensional Vulnerability Assessment of Small Island Communities in Batanes, Philippines

Authors: Joy Santiago, Jerico Mendoza, Arge Louise Joy Esquivel, April Dawn Tegelan, Julius Obrique, Ella Danielle Santiaguel, Marie Claire mandar, Janiella Sandoval, Rysch Nae Subijano, Kristian Audri Gabriel, Alfredo Mahar Francisco Lagmay

The Philippines is consistently ranked among the most disaster-prone countries in the world, with its archipelagic geography exposing communities to recurrent typhoons, flooding, earthquakes, and volcanic activity. Within this national landscape of risk, the island province of Batanes—situated at the northernmost tip of the country—presents a compelling paradox: despite extreme hazard exposure, it demonstrates remarkably low vulnerability. This study draws from quantitative vulnerability assessments and qualitative reflections grounded in fieldwork and participatory dialogues with local communities to better understand this phenomenon. The findings highlight that the adaptive capacity of the Ivatan people is deeply rooted in their cultural practices and everyday life. Traditional knowledge, exemplified by typhoon-resistant stone houses and cogon roofing, is complemented by collective systems of solidarity such as the “adopt-a-neighbor” arrangements that ensure shelter and mutual support during disasters. These practices are actively reinforced by governance structures that prioritize participatory decision-making, disaster preparedness, and the integration of indigenous wisdom into formal adaptation planning. Importantly, resilience in Batanes is not static but evolving, shaped by the balance between preserving cultural heritage and embracing scientific innovation. Batanes illustrates how resilience is lived and sustained through cultural continuity, community cohesion, and adaptive governance. Its experience demonstrates that vulnerability reduction depends on the strength of social systems and local knowledge as much as on material resources. These insights offer a replicable model for other coastal and island communities confronting multiple hazards and the escalating impacts of climate change, underscoring the importance of bridging indigenous practices with scientific approaches to build adaptive and enduring resilience.

Appendix B: List of Names of Early-Career Researchers Involved in the Project

1. EnP. Arge Louise Joy S. Esquivel, Supervising Science Research Specialist, UP RI
2. Ms. April Dawn F. Tegelan, Senior Science Research Specialist, UP RI
3. EnP. Ella Danielle C. Santiaguel, Junior Project Officer, UP RI
4. EnP. Marie Claire P. Mandar, Science Research Specialist II, UP RI
5. For. Rysch Nae S. Subijano, Junior Project Officer, UP RI
6. For. Janiella A. Sandoval, Junior Project Officer, UP RI
7. Engr. Kristian Audri D. Gabriel, Junior Project Officer, UP RI
8. Ms. Lea Victoria D. Serrano, Senior Science Research Specialist, UP RI
9. Mr. Alexis Bryan G. Rivera, Supervising Researcher, UP RI
10. Ms. Ada Beatrice F. Reyes, Junior Research Analyst, UP RI
11. Ms. Julian Marie Bernice M. Grageda, Junior Project Associate, UP RI
12. Mr. Cristan M. Malaiba, Junior Research Associate, UP RI
13. Mr. Kyle Vincent R. Singson, University Research Associate 1, UPLB-INREM
14. Ms. Stephany Joy N. Ayo, Junior Research Assistant, UP RI
15. Mr. Fernando Jose G. Calvario, Junior Research Assistant, UP RI

Appendix C: Initial Meetings Photos

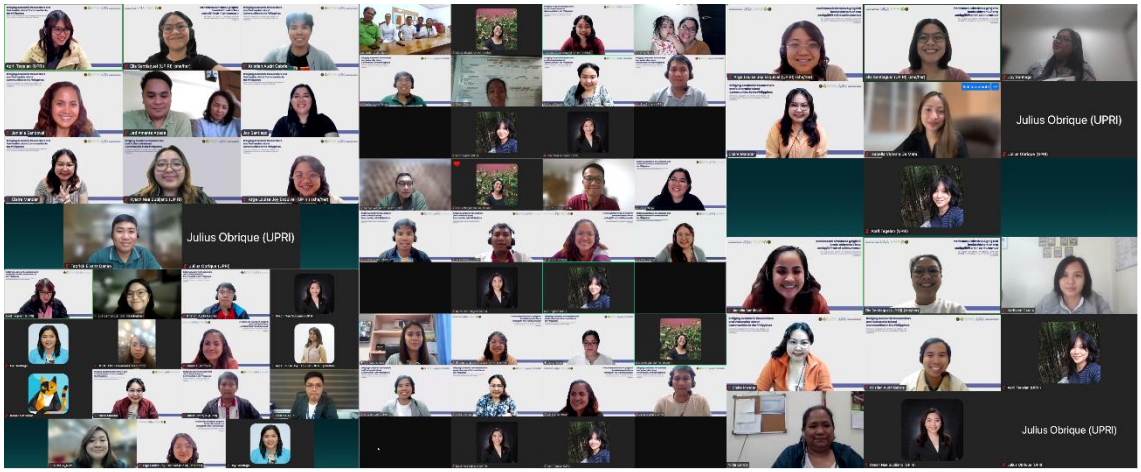


Figure 1. Participants during the online initial meetings.

The following is a list of the LGUs and the dates of the initial meetings conducted:

1. Municipality of Basco - 6 February 2025
2. Municipality of Itbayat - 17 February 2025
3. Municipality of Ivana – 3 March 2025
4. Municipality of Mahatao - 21 February 2025
5. Municipality of Sabtang - 4 February 2025
6. Municipality of Uyugan - 4 February 2025
7. Batanes PDRRMO - 7 March 2025
8. DHSUD Region II - 10 March 2025
9. DILG Region II - 2 April 2025
10. National Museum of the Philippines – Batanes - 25 March 2025

Appendix D: Project Launch Workshop Design and Photos

Project Launch Activity Design
28 March 2025 | 9:00 AM – 12:00 PM | Online via Zoom

Background

The island communities of Batanes, Philippines, are known for their resilient culture. However, they face significant exposure to climate-related risks and extreme events. Despite the traditional knowledge and practices that have helped them withstand environmental challenges, these communities remain vulnerable to the adverse impacts of climate-induced hazards. The project aims to further build resilience in the province by fostering collaboration between the academic community and local stakeholders across the Provincial Government of Batanes and its six municipalities.

The project is designed to set the stage for traditional and scientific knowledge to co-exist in resilience building through a participatory planning approach that will cover areas such as probabilistic hazard assessment and Climate and Disaster Risk Assessment (CDRA). Outputs from these activities will support the local development planning processes of the provincial and municipal Local Government Units (LGUs) to ensure risk-informed plans and activities. By emphasizing gender equality and social inclusion, the initiative will reflect diverse perspectives throughout all phases of the project. Activities will include lectures, workshops, and consultations designed to equip stakeholders with the necessary skills to understand and manage risks effectively.

To mark the start of the project, and foster rapport and collaboration among partners, a project launch shall be conducted. This activity, overall, aims to provide partners with an overview of the project objectives and activities. Through fostering collaboration among academe, LGUs, and communities, this initiative is expected to create a collaborative environment for knowledge exchange, leading to sustainable development practices that address the pressing challenges posed by climate change.

Objectives

The objectives of this activity are the following:

- To introduce the project concept, along with its goals, objectives and significance to partners and relevant stakeholders;
- To present the project roadmap including the timeline, major milestones, and emphasize its commitment to inclusivity;
- To outline opportunities for involvement; and
- To create a space for stakeholder networking and interaction through an open forum session.

Zoom Credentials

UP RI will host the project launch activity virtually through the Zoom platform. Expected participants are advised to join using the credentials provided to ensure smooth access to the event.

Important Note: Please make sure that your email account is registered with Zoom to avoid any access issues. For instructions on how to register your email address, you can watch this tutorial.

Meeting ID: 937 6122 1672
Passcode: APNBatanes
Link: https://up-edu.zoom.us/j/93761221672?pwd=Dy1wbvA8zxmIGFz2GC8QugxdoGvL4B.1

Expected Participants

The expected resource speaker/attendees/participants for this workshop are the following:

- Heads and representatives of the Provincial Government of Batanes;
- Heads and representatives from the following LGUs:
  - The Municipality of Basco
  - The Municipality of Itbayat
  - The Municipality of Ivana
  - The Municipality of Mahatao
  - The Municipality of Sabtang
  - The Municipality of Uyugan
- Heads and representatives of relevant Regional Line (RLA) and National Government Agencies (NGAs);
- Heads and representatives from Civil Society Organizations (CSOs) and people organizations (POs)

Requirements

The participants must have the following for the online activity set up:

- A laptop or computer
- A webcam or HD webcam – built-in or USB plug-in
- A speaker and microphone – built-in or USB plug-in or wireless bluetooth
- Stable internet connection – broadband wired or wireless (3G or 4G/LTE)
- Keyboard and mouse – built-in, USB plug-in, or wireless bluetooth

Provisional Agenda

Time		Activity	Person/Office Responsible
Start	End		
9:00 AM	9:15 AM	Opening of the Zoom Meeting for the participants to enter	UP RI, LGUs and stakeholders
9:15 AM	9:25 AM	Opening ceremony	UP RI
9:25 AM	9:55 AM	Welcome remarks from UP RI	UP RI
9:55 AM	10:05 AM	Introduction to the project	UP RI
10:05 AM	10:25 AM	Presentation of the project methodology and workplan	UP RI
10:25 AM	10:30 AM	Message from the Provincial Government of Batanes	Provincial Government of Batanes
10:30 AM	10:35 AM	Message from the Municipality of Basco	Basco LGU
10:35 AM	10:40 AM	Message from the Municipality of Itbayat	Itbayat LGU
10:40 AM	10:45 AM	Message from the Municipality of Ivana	Ivana LGU
10:45 AM	10:50 AM	Message from the Municipality of Mahatao	Mahatao LGU
10:50 AM	10:55 AM	Message from the Municipality of Sabtang	Sabtang LGU
10:55 AM	11:00 AM	Message from the Municipality of Uyugan	Uyugan LGU

Time		Activity	Person/Office Responsible
Start	End		
11:00 AM	11:15 AM	Message from RLAs and NGAs	RLAs/NGAs
11:15 AM	11:30 AM	Message from Partners/Stakeholders	Partners/Stakeholders
11:30 AM	11:35 AM	Discussion of next steps (GIS training and workshop 1)	UP RI
11: 35 AM	11:55 AM	Open forum	All
11:55 AM	11:57 AM	Photo Ops	UP RI
11:57 AM	12:00 PM	Closing remarks from UP RI	UP RI
-	12:00 PM	End of program	UP RI

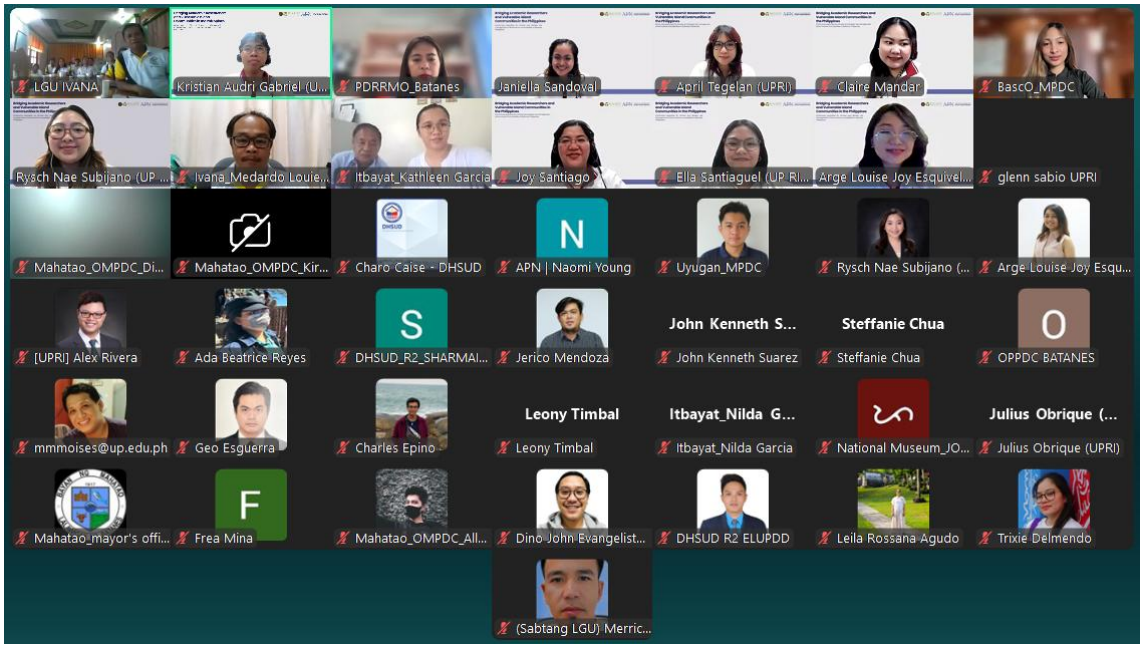


Figure 2. Participants during the online Project Launch event.

Appendix E: Capacity Building Workshop Designs

The project conducted capacity-building workshops on GIS and CDRA in two batches to accommodate representatives from the participating municipalities of Batanes. The first batch was held in Basco, Batanes, on 19–23 May 2025, followed by the second batch at the UP RI, Quezon City, on 14–18 July 2025. These workshops aimed to strengthen participants' technical capacities in geospatial data collection, management, and analysis, as well as the application of CDRA methodologies to support risk-informed local planning. Through lectures, hands-on exercises, and participatory activities, participants were introduced to scientific tools and approaches that complement local knowledge and existing disaster risk management practices. The training sessions were subsequently complemented by a workshop on the identification of RSPIs and a culminating symposium in April 2026, which provided opportunities to discuss assessment findings, identify planning implications, and facilitate knowledge exchange among participating local governments and stakeholders.

Capacity-building Workshop 1: GIS Workshop
Geographic Information System (GIS) Workshop
Workshop Design
19 - 21 May 2025 | 8:30 AM - 4:30 PM | Municipality of Basco

Background

The island communities of Batanes, Philippines, are known for their resilient culture. However, they face significant exposure to climate-related risks and extreme events. Despite the traditional knowledge and practices that have helped them withstand environmental challenges, these communities remain vulnerable to the adverse impacts of climate-induced hazards. The project aims to further build resilience in the province by fostering collaboration between the academic community and local stakeholders across the Provincial Government of Batanes and its six municipalities.

The project is designed to set the stage for traditional and scientific knowledge to co-exist in resilience building through a participatory planning approach that will cover areas such as probabilistic hazard assessment and Climate and Disaster Risk Assessment (CDRA). Outputs from these activities will support the local development planning processes of the provincial and municipal Local Government Units (LGUs) to ensure risk-informed plans and activities. By emphasizing gender equality and social inclusion, the initiative will reflect diverse perspectives throughout all phases of the project.

As part of the initiative to build climate resilience in the island communities of Batanes, **Workshop 1 will focus on enhancing the capacity of local stakeholders in the use of Geographic Information System (GIS) as a foundational tool for CDRA**. GIS is an organized system that brings together computer hardware, software, spatial data, and skilled personnel to visualize, analyze, and interpret geographically referenced information. Its application allows users to identify spatial patterns, relationships, and trends—creating practical, reliable databases that can inform data-driven decision-making and support collective planning efforts.

Objectives

The objectives of this activity are the following:

1. Equip stakeholders with foundational and applied GIS skills for spatial analysis.
2. Strengthen participants’ abilities in gathering, processing, and managing spatial data.

3. Enhance participants' capacity to perform spatial analysis to identify geographic patterns and generate insights.
4. Improve skills in producing clear, accurate, and informative maps to support data-driven decision-making.

Expected Participants

The expected attendees/participants for this workshop are the following:

- ✓ Five representatives of the Provincial Government of Batanes;
- ✓ Five representatives from each of the six municipal LGUs:
  - The Municipality of Basco
  - The Municipality of Itbayat
  - The Municipality of Ivana
  - The Municipality of Mahatao
  - The Municipality of Sabtang
  - The Municipality of Uyugan

Qualifications

It is requested that the participants have the following skills and knowledge for the workshop:

- ✓ Basic computer skills;
- ✓ Familiarity with GIS software (ArcGIS, Quantum GIS (QGIS), Global Mapper, etc.) is an advantage; and
- ✓ Experience in comprehensive land use planning, climate change adaptation, and disaster risk management is an advantage.

Equipment requirements

The following are needed for the GIS workshop:

- Computer or Laptop for each participant
  - Central processing unit (CPU) speed: 2.8 GHz or higher; Hyper-threading or Multicore recommended
  - Processor: Intel Core i5 or higher
  - Memory/random-access memory (RAM): 16 GB minimum; Disk space: greater than 100 GB
  - Video/graphics adaptor: 64 MB RAM minimum, 256 MB RAM or higher recommended; NVIDIA, ATI, and Intel chipsets supported.
- Internet connection
- Computer mouse
- A laptop with QGIS and Google Earth Pro installed

Provisional Agenda

Time		Activity
Start	End	
Day 1 (19 May 2025)		
8:30 AM	9:00 AM	Registration
9:00 AM	9:30 AM	Preliminaries
9:30 AM	9:35 AM	Photo Ops
9:35 AM	9:50 AM	GIS Pretest
9:50 AM	10:10 AM	Lecture 1: Introduction to GIS
10:10 AM	11:00 AM	Activity 1: Getting Started with GIS
11:00 AM	11:20 AM	Lecture 2: Spatial Data
11:20 AM	12:00 PM	Activity 2: Feature Extraction using Google Earth
12:00 PM	1:00 PM	Lunch Break
1:00 PM	2:20 PM	Continuation of Activity 2: Feature Extraction using Google Earth
2:20 PM	2:40 PM	Lecture 3: Map Projections and Georeferencing
2:40 PM	4:20 PM	Activity 3: Georeferencing Raster Map Images
4:20 PM	4:30 PM	Open Forum, Wrap Up, and Ways Forward
Day 2 (20 May 2025)		
8:30 AM	9:00 AM	Registration
9:00 AM	9:30 AM	Recap of Day 1
9:30 AM	9:50 AM	Lecture 4: Data Collection
9:50 AM	11:40 AM	Activity 4: Field survey using the Global Positioning System (GPS) (collection of GPS points)
11:40 AM	12:00 PM	Lecture 5: Land Use Mapping
12:00 PM	1:00 PM	Lunch Break
1:00 PM	2:30 PM	Activity 5: Land Use Mapping using GIS
2:30 PM	2:50 PM	Lecture 6: Exposure Units
2:50 PM	4:20 PM	Activity 6: Extraction of Exposure Data from Land Use Map using QGIS
4:20 PM	4:30 PM	Open Forum, Wrap Up, and Ways Forward
Day 3 (21 May 2025)		
8:30 AM	9:00 AM	Registration
9:00 AM	9:30 AM	Recap of Day 2
9:30 AM	9:50 AM	Lecture 7: Map Layout
9:50 AM	12:00 PM	Activity 7: Creating a Map Layout using QGIS
12:00 PM	1:00 PM	Lunch Break
1:00 PM	3:15 PM	Continuation of Activity 7: Creating a Map Layout using QGIS
3:15 PM	3:45 PM	Map Presentation
3:45 PM	4:00 PM	GIS Post Test
4:00 PM	4:15 PM	Open Forum and Awarding of Certificates
4:15 PM	4:30 PM	Wrap Up and Closing Remarks

Capacity-building Workshop 2-3: CDRA Workshop

Enhancing Skills in Multi-scenario, Multi-hazard Assessment and Climate and Disaster Risk Assessment Workshop Design

22 - 23 May 2025 | 8:30 AM - 4:30 PM | Municipality of Basco, Batanes

Background

The island communities of Batanes, Philippines, are known for their resilient culture. However, they face significant exposure to climate-related risks and extreme events. Despite the traditional knowledge and practices that have helped them withstand environmental challenges, these communities remain vulnerable to the adverse impacts of climate-induced hazards. The project aims to further build resilience in the province by fostering collaboration between the academic community and local stakeholders across the Provincial Government of Batanes and its six municipalities.

The project is designed to set the stage for traditional and scientific knowledge to co-exist in resilience building through a participatory planning approach that will cover areas such as probabilistic hazard assessment and Climate and Disaster Risk Assessment (CDRA). Outputs from these activities will support the local development planning processes of the provincial and municipal Local Government Units (LGUs) to ensure risk-informed plans and activities. By emphasizing gender equality and social inclusion, the initiative will reflect diverse perspectives throughout all phases of the project.

As a key component of this initiative, **Workshop 2: Enhancing Skills in Multi-Scenario, Multi-Hazard Assessment and CDRA will focus on strengthening the capacity of local stakeholders in conducting multi-scenario, multi-hazard assessments CDRA.** The two-day workshop will include lectures and interactive **sessions on hazard and policy mapping, climate change projections, and risk assessment methodologies.** Through participatory activities such as hazard inventory matrices, impact chain diagrams, and the development of exposure databases, the workshop will guide stakeholders in gathering and analyzing data to support local development planning.

Objectives

The objectives of this activity are the following:

1. Strengthen the capacity of local stakeholders in conducting multi-scenario, multi-hazard assessments and CDRA.
2. Enhance understanding of climate and hazard information, including relevant national and local policies on climate change adaptation and disaster risk reduction and management.
3. Introduce practical tools and methods for scoping potential impacts of hazards, interpreting climate change projections, and assessing risks through participatory planning approaches.
4. Guide the development of key outputs, such as hazard and policy inventory matrices, impact chain diagrams, exposure databases, and preliminary climate risk assessment tables.

Expected Participants

The expected resource speaker/attendees/participants for this workshop are the following:

- Five representatives of the Provincial Government of Batanes;

- Five representatives from representatives from the following LGUs:
    - The Municipality of Basco
    - The Municipality of Itbayat
    - The Municipality of Ivana
    - The Municipality of Mahatao
    - The Municipality of Sabtang
    - The Municipality of Uyugan
- Two representatives from relevant National Government Agencies (NGAs):
    - Department of Human Settlements and Urban Development (DHSUD) Region II
    - Department of the Interior and Local Government (DILG) Region II
    - National Museum of the Philippines - Batanes

Requirements

The participants must have the following for the event:

- A laptop or computer
- Internet

Data Request

The participants are requested to bring the following:

- List or copies of local ordinances related to climate change adaptation – disaster risk reduction (CCA-DRR)
- Existing Land Use data preferably in shapefile format
- Record or timeline of disasters that affected the LGUs
- Existing CDRA report and matrices, Local Climate Change Action Plan (LCCAP), and Local Disaster Risk Reduction and Management Plan (LDRRMP)

Provisional Agenda

Time		Activity	Person/Office Responsible
Start	End		
Day 1 (22 May 2025)			
8:30 AM	9:00 AM	Registration	UP RI
9:00 AM	9:25 AM	Preliminaries	UP RI
9:25 AM	9:30 AM	Photo Ops	UP RI
9:30 AM	10:00 AM	Introduction to CDRA	DHSUD Region II
10:00 AM	11:00 AM	Lecture 1: Collecting and Analyzing Climate and Hazard Information and Policies	Dr. Juan M. Pulhin EnP. Charlie E. Cabotaje
11:00 AM	12:00 PM	Activity 1: Hazard and Policy Inventory Matrices	UP RI
12:00 PM	1:00 PM	Lunch	UP RI
1:00 PM	2:00 PM	Lecture 2: Scoping Potential Impacts	DILG Region II
2:00 PM	3:30 PM	Activity 2: Impact Chain Diagram	UP RI
3:30 PM	4:00 PM	Output Presentation	UP RI
4:00 PM	4:30 PM	Wrap Up	UP RI
Day 2 (23 May 2025)			
8:30 AM	9:00 AM	Registration	UP RI

Time		Activity	Person/Office Responsible
Start	End		
9:00 AM	9:30 AM	Preliminaries	UP RI
9:30 AM	10:30 AM	Lecture 3: Exposure Units and Exposure Database	UP RI
10:30 AM	12:00 PM	Activity 3: Development of Exposure Database	UP RI
12:00 PM	1:00 PM	Lunch	UP RI
1:00 PM	2:00 PM	Lecture 4: Risk Assessment	UP RI
2:00 PM	4:00 PM	Activity 4: Climate Risk Assessment (CRA) Table	UP RI
4:00 PM	4:30 PM	Honoring the Past, Safeguarding the Future	National Museum - Batanes
4:30 PM	4:35 PM	Closing Remarks	UP RI

Capacity-building Workshop 4: RSPI Workshop

Identifying Risk-sensitive Policy Interventions (RSPIs) and Entry Points for Mainstreaming Climate and Disaster Risk Assessment into Local Plans Workshop Design
14 April 2026 | 8:30 AM – 5:00 PM | Venue: PPDO Conference Hall, Basco, Batanes

Background

The island communities of Batanes, Philippines, are widely recognized for their resilient culture, yet they continue to face increasing risks from climate change and extreme events. While local governments have made strides in integrating climate and disaster risk considerations into development planning, gaps remain in translating risk information into concrete, risk-sensitive policies and actionable interventions. Strengthening the ability of local stakeholders to identify appropriate policy entry points is therefore essential to ensuring that development gains are protected and sustained.

The project seeks to address this gap by strengthening collaboration between academic institutions and local stakeholders across the Provincial Government of Batanes and its six municipalities. By linking scientific risk information with local governance processes, the initiative supports the mainstreaming of Climate and Disaster Risk Assessment results into key local plans. This approach enables LGUs to move beyond risk assessment toward informed decision-making and policy formulation.

As part of this effort, the workshop titled **Identifying Risk-Sensitive Policy Interventions (RSPIs) and Entry Points for Mainstreaming Climate and Disaster Risks into Local Plans** will focus on enhancing the capacity of local stakeholders to translate risk and vulnerability information into policy-relevant actions. The workshop will include a combination of lectures and facilitated activities designed to guide local stakeholders from understanding community-level risk to identifying concrete, risk-informed actions for local planning. It will begin with the presentation and validation of the Climate and Disasters Risk Assessment (CDRA) results to establish a shared evidence base. Participants will then engage in an interactive exercise to identify priority decision areas based on the presented risk information.

Objectives

The objectives of this activity are the following:

1. Strengthen the capacity of local stakeholders to translate climate and disaster risk information into risk-sensitive policies and interventions.
2. Identify key entry points for mainstreaming climate and disaster risks into local planning and governance processes.
3. Assess gaps and opportunities in existing local plans and policies in addressing climate and disaster risks.
4. Formulate context-specific, risk-sensitive policy recommendations that can be integrated into local development plans.

Expected Participants

The expected resource speaker/attendees/participants for this workshop are the following:

- Five representatives of the Provincial Government of Batanes;
- Five representatives from each of the six municipal LGUs:
    - The Municipality of Basco
    - The Municipality of Itbayat
    - The Municipality of Ivana
    - The Municipality of Mahatao
    - The Municipality of Sabtang
    - The Municipality of Uyugan

Requirements

The participants must have the following for the event:

- A laptop or computer
- Internet

Data Request

The participants are requested to bring the following:

- List or copies of local ordinances related to climate change adaptation – disaster risk reduction (CCA-DRR)
- CDRA results

Provisional Agenda

Time		Activity	Person/Office Responsible
Start	End		
Day 1 (14 April 2026)			
8:30 AM	9:00 AM	Registration	UP RI
9:00 AM	9:20 AM	Preliminaries	UP RI / Provincial Gov't of Batanes
9:20 AM	9:30 AM	Photo Ops	UP RI
9:30 AM	10:00 AM	Workshop Objectives	UP RI
10:00 AM	11:45 AM	Lecture 1: Presentation of CDRA results	UP RI
11:45 AM	12:00 PM	Activity 1: Validation of Risk Assessment Results	Participants
12:00 PM	1:00 PM	Lunch	UP RI
1:00 PM	1:45 PM	Lecture 2: Unpacking Risk: From Hazards to Real-World Implications	UP RI

Time		Activity	Person/Office Responsible
Start	End		
1:45 PM	3:00 PM	Activity 2: Technical Findings, Implications, Interventions	Participants
3:00 PM	3:30 PM	Lecture 3: Mapping Major Decision Areas (MDAs) and Risk Management Options	UP RI
3:30 PM	4:30 PM	Activity 3: Mapping MDAs and Risk Management Options	Participants
4:30 PM	5:00 PM	Closing Remarks	Provincial Gov't of Batanes

Capacity-building Workshop 5: Symposium

Empowering Batanes by Formulating Results for Lasting Impacts Symposium Design
17 April 2026 | 8:30 AM – 4:30 PM | Venue: PPDO Conference Hall, Basco, Batanes

Background

The Province of Batanes has made significant progress in advancing climate- and risk-informed development through the conduct of Climate and Disaster Risk Assessments (CDRAs) and Risk-Sensitive Policy Interventions (RSPI) across its Local Government Units (LGUs). To maximize the value of these outputs, there is a need for a structured platform that enables validation, refinement, and integration of results at both the local and provincial levels.

The Empowering Batanes by Formulating Results for Lasting Impacts Symposium is a one-day knowledge-sharing and validation activity designed to showcase and strengthen LGU-level CDRA and RSPI outputs. Through a combination of plenary presentations and an exhibit-style format, LGUs will present key findings, receive technical feedback, and engage in peer learning. Dedicated booths will allow participants to review detailed outputs, including reports and maps, while selected technical presentations will provide province-wide and comparative insights.

The symposium aims to enhance the technical quality, coherence, and usability of CDRA and RSPI results, ensuring that these outputs effectively inform planning, investment programming, and resilience-building efforts across Batanes.

Objectives

The objectives of this activity are the following:

1. Present and validate LGU-level CDRA and RSPI results through structured plenary discussions and technical feedback.
2. Enhance the quality and usability of CDRA and RSPI outputs by incorporating peer review and expert inputs.
3. Promote cross-LGU learning and provincial-level integration of climate and risk information through comparative analysis and shared knowledge.
4. Strengthen the application of CDRA and RSPI results in planning and investment programming for resilient and sustainable local development in Batanes.

Expected Participants

The expected resource speaker/attendees/participants for this workshop are the following:

- Five representatives from the Provincial Government of Batanes;
- Five representatives from representatives from the following LGUs:
    - The Municipality of Basco
    - The Municipality of Itbayat
    - The Municipality of Ivana
    - The Municipality of Mahatao
    - The Municipality of Sabtang
    - The Municipality of Uyugan
- Representatives from the following Regional Line Agencies:
- Representatives from the Asia Pacific Network for Global Change (APN);
- Representatives from the Climate Change Commission;
- Representatives from other relevant government agencies

Requirements

The participants must have the following for the event:

- A laptop or computer
- Internet

Data Request

The LGU participants are requested to bring the following:

- CDRA and RSPI Poster

Provisional Agenda

Time		Activity	Person/Office Responsible
Start	End		
Day 1 (17 April 2026)			
8:30 AM	9:00 AM	Registration	UP RI
9:00 AM	9:10 AM	Welcome Remarks	UP RI / CCC
9:10 AM	9:20 AM	Overview of Symposium Objectives and Flow	UP RI
9:20 AM	9:30 AM	Photo Ops	UP RI
9:30 AM	10:15 AM	LGU Presentations of CDRA and RSPI Results	LGUs
10:15 AM	10:30 AM	Break	
10:30 AM	11:00 AM	LGU Presentations of CDRA and RSPI Results	LGUs
11:00 AM	11:45 AM	CDRA Synthesis and Comparative Analysis Panel Session	RLAs
11:45 AM	12:45 PM	Lunch	UP RI
12:45 PM	1:15 PM	Leveraging Nature: Using Nature-based Solutions to Address Climate Risks	UP RI
1:15 PM	2:45 PM	Booth Session and Technical Exchange (Posters, Maps, CDRA Reports per LGU)	LGUs
2:45 PM	3:45 PM	Synthesis and Key Feedback Panel Session	UP RI

Time		Activity	Person/Office Responsible
Start	End		
3:45 PM	4:15 PM	Mainstreaming climate change adaptation – disaster risk reduction (CCA-DRR) into Local Development Planning	UP RI
4:15 PM	4:30 PM	Closing Remarks	Provincial Gov't of Batanes

Appendix F: List of Batanes LGUs Who Attended the Workshops



Figure 3. Representatives from the Municipality of Basco with their UP RI Coordinator, Ms. Marie Claire P. Mandar, EnP., during the RSPI workshop.



Figure 4. Representatives from the Municipality of Itbayat with their UP RI Coordinator, Ms. Janiella A. Sandoval, RPF., during the RSPI workshop.



Figure 5. Representatives from the Municipality of Ivana with their UP RI Coordinator, Ms. Arge Louise Joy S. Esquivel, EnP., during the RSPI workshop.



Figure 6. Representatives from the Municipality of Mahatao with their UP RI Coordinator, Ms. Rysch Nae S. Subijano, RPF., during the RSPI workshop.



Figure 7. Representatives from the Municipality of Sabtang with their UP RI Coordinator, Engr. Kristian Audri D. Gabriel., during the RSPI workshop.



Figure 8. Representatives from the Municipality of Uyugan with their UP RI Coordinator, Ms. Ella Danielle C. Santiaguel, EnP., during the RSPI workshop.



Figure 9. Representatives from the Provincial Government of Batanes and UP RI during a courtesy call.

Appendix G: Number of Personnel Training by Institution at the GIS and CDRA Workshops

The following table presents the distribution of personnel who participated in the GIS and CDRA training sessions conducted in Basco, Batanes, on 19-23 May 2025 and at UP Diliman, Quezon City, on 14–18 July 2025. A total of 60 participant attendances were recorded across the training sessions, representing personnel from participating local government units and government agencies. The figures reflect cumulative attendance, as different personnel may have represented the same office across sessions, while some individuals may have participated in multiple sessions and were therefore counted more than once.

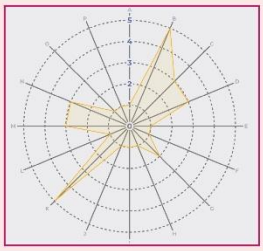
Office	Number of Personnel Trained	Office/s Represented
Municipality of Basco	8	Municipal Disaster Risk Reduction and Management Office (MDRRMO), Municipal Planning and Development Office (MPDO), Municipal Engineering Office (MEO), Municipal Assessor's Office, and Municipal Agriculture Office
Municipality of Itbayat	5	MDRRMO, MPDO, and Municipal Assessor's Office
Municipality of Ivana	7	MDRRMO, MPDO, MEO, Municipal Social Welfare and Development Office (MSWDO), and Mayor's Office
Municipality of Mahatao	6	MDRRMO, MPDO, Mayor's Office
Municipality of Sabtang	9	MDRRMO, MPDO, MSWDO, MEO, Municipal Agriculture Office, Municipal Assessor's Office, Mayor's Office, and Tourism Section
Municipality of Uyugan	8	Mayor's Office, MDRRMO, MPDO, MEO, Municipal Agriculture Office, and Municipal Assessor's Office
Provincial Government of Batanes	14	PDRRMO, Provincial Planning and Development Office (PPDO), and Operations and Warning Section
DILG	2	Operations Performance and Capability Development Section
DHSUD	1	Planning and Development Section
National Museum of the Philippines – Batanes	1	Museum and Operations Services Section
Total	61	N/A

Appendix H: LGU Posters Presented During the Symposium

POPULATION AT RISK: FLOOD AND LANDSLIDE HAZARDS IN BASCO, BATANES

SENSITIVITY INDICATORS

Population	
A	Percentage of households that are living in unsafe/unserviced houses or danger areas
B	Percentage of households living in dwelling units made from light materials or salvaged/recycled materials
C	Percentage of young dependents (< 5 years old)
D	Percentage of old dependents (> 65 years old)
E	Percentage of persons with disabilities (mental and physical)
F	Percentage of persons with chronic diseases
G	Percentage of households below the poverty threshold
H	Percentage of the population who are malnourished
I	Percentage of the population who are unable to read or write
J	Percentage of the population who are unemployed or without permanent source of income
K	Percentage of the population who belong to indigenous groups
L	Percentage of the population who are prisoners
M	Percentage of the population who do not have their own homes
N	Percentage of the population who do not have their own land
O	Percentage of the population who are solo parents
P	Percentage of women who are pregnant

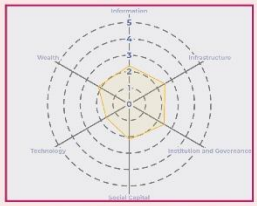


Basco's population is highly sensitive in housing and land ownership, and moderately sensitive in poverty and health.



ADAPTIVE CAPACITY

Information	Institution and Governance	Wealth	Social Capital
Presence of Alternative Livelihood System (ALS) program in the municipality	Status of the municipality's relocation plan	Percentage of the people with capacity and willingness to retrofit or relocate	Percentage of the municipal population who benefit from government livelihood programs
Residents aged 15-64 in the municipality that receive CCA-DRR training	Availability of alternative sites or buildings in case existing structures in exposure units are damaged (e.g., temporary market site)	Percentage of the people enrolled in PhilHealth	Access to livelihood programs
Percentage of population with access to CCA-DRR information (e.g., evacuation protocols, local hazards, climate data)	Availability of updated DRRM plan and inclusion of exposure unit in the plan	Percentage of the population receiving benefits from the 4Ps (Pantawid Pamilyang Pilipino Program) and other similar government programs	Participation of women, youth, elderly, persons with disabilities, and other vulnerable groups in LDRRMP development
Percentage of exposure units that participated in disaster preparedness drills and Search and Rescue (SAR)	Availability of updated contingency plan and inclusion of exposure unit in the plan	Government capacity to invest in CCA-DRR projects	Availability of CCA-DRR volunteers providing services to exposure units
Availability of LGU data and/or maps showing hazards and affected areas within the exposure unit	Availability and condition of updated public service continuity plan	Access to financial assistance before a disaster	Existence of partnerships among residents, property owners in urban areas, farmers, etc., and private sector managing critical facilities and lifeline utilities for CCA/DRR
Technology	Availability of updated pre-emptive evacuation plan and inclusion of exposure unit in the plan	Access to financial assistance during a disaster	**Infrastructure**
Presence of supplies and equipment for emergency and climate response	Existence of zoning policies or structural design standards to reduce hazard impacts	Access to financial assistance after a disaster (Yes/No)	Percentage of households using resilient design
Availability of early warning devices per exposure unit	Existence of DRRM Office in Municipality	Percentage of municipal budget allocated for CCA-DRR projects	Availability and condition of alternative routes if main routes are blocked
Percentage of population reached by early warning system information	Sangunniang Bayan committee o lupon na ang pangunahing tungkulin ay para sa CCA-DRR	Availability of financial support sources (e.g., loans, grants)	Availability and condition of alternative water sources in case of disruption to main water supply
Availability of studies or tools that support LGU capacity for CCA-DRR	I-rate kung gaano kasapat ang bilang at kakayahan ng mga tauhan ng LGU para sa CCA-DRR	Percentage of exposure units with insurance coverage against hazards; specify type or name of insurance	Availability and condition of alternative electricity sources in case of disruption
Availability of communication equipment/devices during disasters			Percentage of exposure units with access to evacuation centers



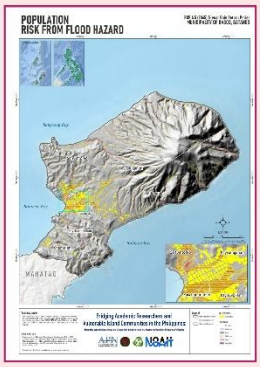
Adaptive capacity covers six dimensions, where lower scores mean higher capacity

In Basco, the population has high to very high adaptive capacity.

RISK ASSESSMENT AND POLICY INTERVENTIONS

Risk Level / Hazard	Baseline			RCP 4.5 (2030)			RCP 4.5 (2065)			RCP 4.5 (2099)			RCP 8.5 (2030)			RCP 8.5 (2065)			RCP 8.5 (2099)		
	5	25	100	5	25	100	5	25	100	5	25	100	5	25	100	5	25	100	5	25	100
Population																					
Flood																					
Very High	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High	4	2	0	4	2	0	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1
Moderate	1	4	5	1	4	5	1	4	5	1	4	5	1	4	5	1	4	5	1	4	5
Low	1	0	1	1	0	1	1	0	1	0	0	1	0	0	1	0	0	1	0	0	1
Very Low	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No Risk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landslide																					
Very High	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moderate	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Low	5	5	2	5	5	2	5	5	2	5	5	2	5	5	2	5	5	2	5	5	2
Very Low	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3
No Risk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Flood risk remains consistently moderate to high with several exposed elements, while landslide risk is generally low with only minimal areas reaching moderate levels.







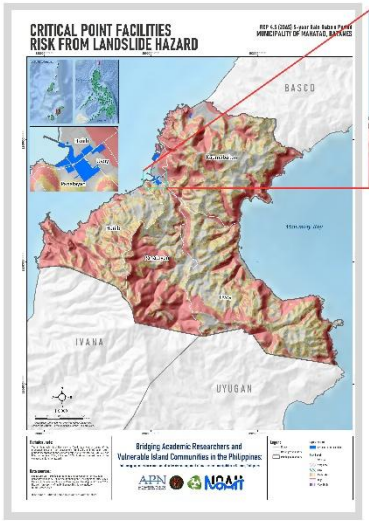
Landslides present an indirect but significant risk to the population, as the main water source is located in a highly landslide-prone area, potentially compromising access to water in the event of slope failure

	MAJOR DECISION AREA	POLICY INTERVENTIONS
MDA 1	Settlement along Vargas Street, Malayu Area, Brgy. San Antonio	Construction/Improvement of flood wall
MDA 2	Chavuan Area, Brgy. San Antonio	Improve drainage systems; Clear waterways; Integration of allocated area for cultivation of reeds in the CLUP as source of planting material in the establishment of hedgerows
MDA 3	Yasyas Area, Brgy. Kaychanarianan	Improve drainage systems; Clear waterways;Implementation of solid waste management
MDA 4	Along National Road, Brgy. Chanarian	Improvement of sea wall; Installation of EWS; Establishment of public address system
MDA 5	Provincial road to Chadpidan, Malayuluy Area, Brgy. San Antonio	Construction of retaining wall
MDA 6	Vunung Area, Boulder Bay, Brgy. San Joaquin	Construction of sea wall
MDA 7	Mt. Iraya Water System	Rerouting of water pipelines



Prepared by: Team Basco (Isabella Victoria De Mata, Carlito L. Cari, Engr. Ray Kenneth T. Gammad, Carol I. Naquita, Analee Estoy, Therece May B. Consina, Joseph Anthony Baldovino)

LANDSLIDE RISK ASSESSMENT OF CRITICAL POINT FACILITIES IN MAHATAO, BATANES





EXPOSURE UNIT

Critical Point Facilities

RISK LEVEL

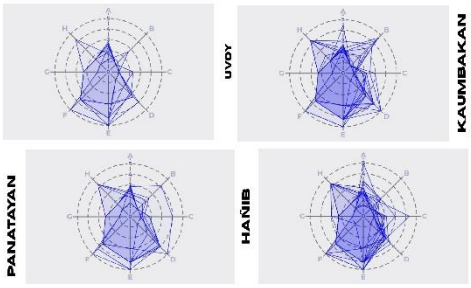
No Risk
Very Low
Low
Moderate
High
Very High

HAZARD INVENTORY MATRIX
(Landslide-related)

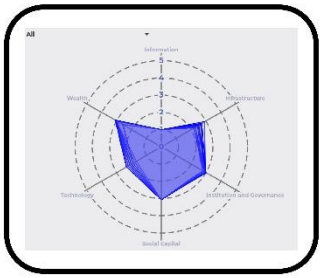
Barangay	Hazards		
	Rain Induced Landslide	Ground Shaking	Liquefaction
Hanib	Low - High	Intensity IV - VI	Low - Moderate
Kaumbakan	Low - High	Intensity IV - VI	Low - Moderate
Panatayan	Low - High	Intensity IV - VI	Low
Uvoy	Low - High	Intensity IV - VI	Low

VULNERABILITY

Sensitivity



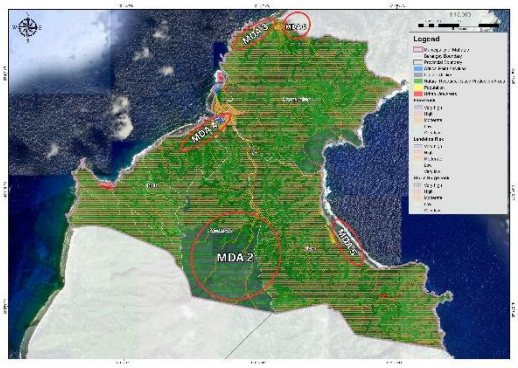
Adaptive Capacity

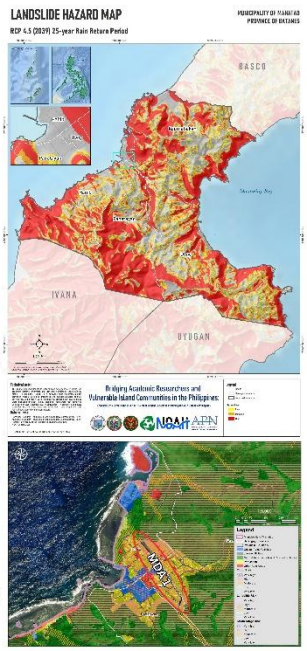


RISK SUMMARIES

Risk Level / Hazard	Baseline			RCP 4.5 (2039)			RCP 4.5 (2065)			RCP 4.5 (2099)		
	5	25	100	5	25	100	5	25	100	5	25	100
Very High	0	0	0	0	0	0	0	0	0	0	0	0
High	16	21	20	16	21	20	17	21	20	17	21	20
Moderate	1	4	5	1	4	5	1	4	5	2	4	5
Low	3	4	4	5	4	4	5	4	4	4	4	4
Very Low	0	0	0	0	0	0	0	0	0	0	0	0
No Risk	22	22	22	22	22	22	22	22	22	22	22	22

	RCP 4.5 (2099)			RCP 8.5 (2039)			RCP 8.5 (2065)			RCP 8.5 (2099)		
	5	25	100	5	25	100	5	25	100	5	25	100
	0	0	0	0	0	0	0	0	0	0	0	0
	17	21	20	17	21	20	17	21	20	17	21	20
	2	4	5	2	4	5	2	4	5	2	4	5
	4	4	4	4	4	4	4	4	4	4	4	4
	0	0	0	0	0	0	0	0	0	0	0	0
	22	22	22	22	22	22	22	22	22	22	22	22





Major Decision Areas (MDAs)		Policy Interventions
MDA 1	Moreno St., Brgy. Uvoy; Along Aguinaldo & Roxas St., Brgy. Hañib	• Construction & improvement of flood control structures • Establishment & installation of early warning system • Adopting of zoning easement
MDA 2	Brgy. Panatayan	• Construction of slope protection structures • Zoning & no development zones • Reforestation
MDA 3	Brgy. Kaumbakan	• Construction of slope protection structures • Zoning & no development zones • Reforestation
MDA 4	Brgy. Hañib	• Construction of seawall structures • Strict of implementation of land use & zoning policies • Establishment of early warning system
MDA 5	Sitio Diura, Brgy. Uvoy	• Construction of seawall structures • Strict of implementation of land use & zoning policies • Establishment of early warning system
MDA 6	Sitio Sungahan along national road, Brgy. Kaumbakan	• Construction of seawall structures • Strict of implementation of land use & zoning policies • Establishment of early warning system

RISK TO RESILIENCE

EMPOWERING SABTANG THROUGH CDRA

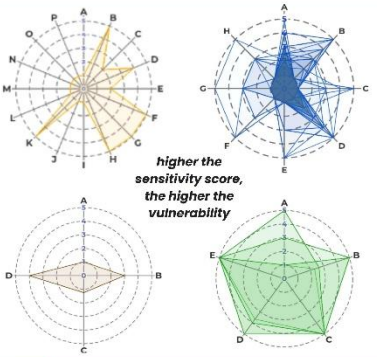
SENSITIVITY INDICATORS

Population	
A	% households in high-risk/unauthorized areas
B	% households in light-material housing
C	% Young dependents (<5)
D	% Elderly dependents (>65)
E	No. of populations with disabilities
F	No. of populations with chronic illnesses
G	No. of households below poverty line
H	No. of malnourished populations
I	No. of illiterate population
J	No. of employed/unstable workers
K	No. of indigenous population
L	No. of tourists
M	No. of populations without home ownership
N	No. of populations without land ownership
O	No. of living in poor/informal folds
P	No. of pregnant women

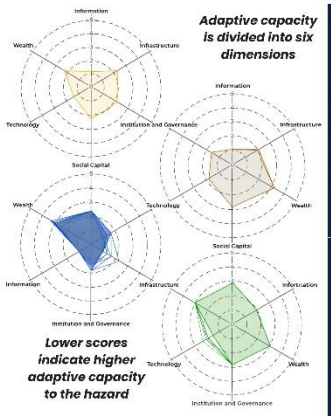
Life Line Utilities	
A	Foundational materials used in the infrastructure
B	Condition of the infrastructure
C	Year constructed
D	Resilient design

Critical Point Facilities	
A	Condition of CPFs
B	Percentage of CPF made from light materials
C	Percentage of CPF not allowed for use
D	Year constructed
E	Resilient design
F	Building permit
G	Building occupancy permit
H	Fire safety inspection certificate

Natural Resource-based Production Areas	
A	Farming, fisheries, or forest-y-dependent livelihoods
B	Percentage of NRPA not utilizing sustainable production techniques
C	Percentage of NRPA without access to irrigation
D	Percentage of NRPA w/o/t out water impounding
E	Percentage of NRPA not employing sustainable technologies



ADAPTIVE CAPACITY INDICATORS



Indicators	POP	LLU	CPF	NRPA
Status of relocation plan				
Availability of CCA-DRR volunteers				
Facility complies with minimum public health standards				
Availability of alternative livelihoods				
Updated DRRM plan				
Updated contingency plan				
Public service continuity plan				
Pre-emptive evacuation plan				
Zoning guides/Structural standards for risk reduction				
Presence of DRRM Office				
CCA-DRR committee in barangays				
Adequacy of LGU CCA-DRR personnel				
% of Population benefiting from 4Ps/other programs				
Sufficiency of funding for infrastructure				
% of facility occupants trained in Search and Rescue				
% of exposure unit with alternative livelihoods				
% of Population eligible for relocation				
% of Population enrolled in PhilHealth				
Government capacity for CCA-DRR projects				
Access to pre-disaster financial aid				
Access to during disaster financial aid				
Access to post disaster financial aid				
% of municipal budget for CCA-DRR				
Availability of financial support				
Exposure units with hazard insurance				

Indicators	POP	LLU	CPF	NRPA
Information				
Presence of Alternative Livelihood System (ALS) program				
Youth (15-24) with CCA-DRR training				
% of exposure units that participated in drill and SAT				
% of exposure unit with access to CCA-DRR information access				
Availability of LGU hazard mapping				
% of population benefiting from flood hazard programs				
Social Capital				
Access to livelihood programs				
Vulnerable group participation in LLMDRMC				
Availability of CCA-DRR volunteers				
CCA-DRR partnerships across sectors				
Infrastructure				
Implementation of regular/preventive maintenance				
% of exposure unit benefiting from flood control, early warning, and redundant utility systems				
% of office/areas protected by hazard mitigation structures/measures				
Exposure unit/s and resilient design				
Access to evacuation centers				
Alternative routes				
Alternative water sources				
Alternative power sources				
Facility has backup power/generator				
Electrical resilient design				
Technology				
% of NRPA using sustainable/climate-smart agriculture practices				
Disaster communication equipment				
Emergency/climate response supplies and equipment				
Availability of early warning devices				
Exposure unit reached by early warnings				
Availability of CCA-DRR studies/data				

Population show a low capacity scores, while CPF and Lifeline Utilities have relatively median scores and NRPA have the highest scores. Overall, all exposure units are relatively concentrated toward the center, indicating stronger capacity across dimensions.

RISK ASSESSMENT



Sabtang Port was affected during Typhoon Julian (2024) and was later damaged by Typhoon Kiko (2026).





Barangay Sumnanga experienced severe flooding during typhoons and prolonged rainfall events.





A landslide occurred in Barangay Chavayan, isolating the barangay for two months.



LEGEND

Flood Risk	Landslide Risk	Storm Surge Risk
Very high	Very high	Very high
High	High	High
Moderate	Moderate	Moderate
Low	Low	Low
Very low	Very low	Very low

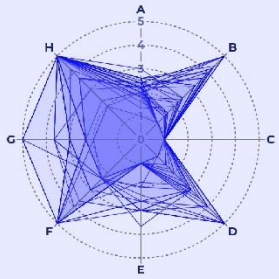
RISK SENSITIVE POLICY INTERVENSIONS

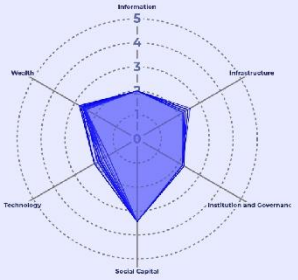
Major Decision Areas (MDAs)	Policy Interventions
MDA 1 (Sumananga Poblacion, and Duvek Bay)	• Reconstruction of retaining wall and box culvert • Passed a resolution requesting Exemption for regulating dredging activities • Construction of seawall • Construction of boat garage facility
MDA 2 (Nakanmuan)	• Construction of Slope Protection • Construction of new access road
MDA 3 (Takey - Malakdang, and San Vicente Port - Sinakan)	• Desilting of Port Entrance and Rehabilitation of break water • Construction of retaining wall
MDA 4 (Chavayan)	• Passed a Resolution requesting exemption for blasting (road widening) • Construction of new access roads



RISK ASSESSMENT OF CRITICAL POINT FACILITIES IN UYUGAN, BATANES

VULNERABILITY ASSESSMENT





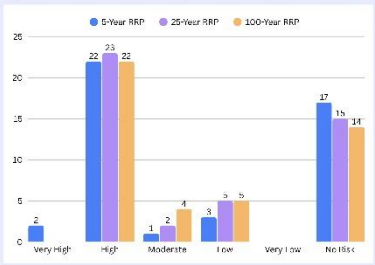
Senstivity Indicators	
A	Condition of CPFs
B	Percentage of CPF made from light materials
C	Percentage of CPF not allowed for use
D	Year constructed
E	Is the CPF using resilient design?
F	Does the CPF have a building permit?
G	Does the CPF have a building occupancy permit?
H	Does the CPF have a fire safety inspection certificate

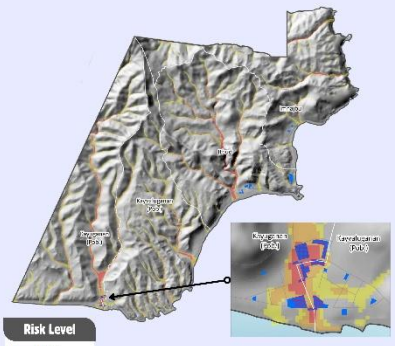
Adaptive Capacity Dimensions	
Information	Availability and use of DRR-related information.
Infrastructure	Availability of tools and systems for warning and response.
Institution & Governance	Strength of policies, plans, and institutional capacity.
Social Capital	Financial capacity to prepare, respond, and recover.
Technology	Community participation and partnerships in DRR.
Wealth	Availability and resilience of critical facilities and systems.

RISK ASSESSMENT

FLOODING

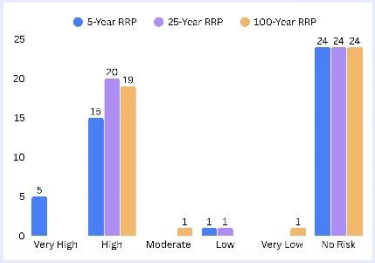
Figure 1. CPF Flood Risk Levels (RCP 4.5 2099)

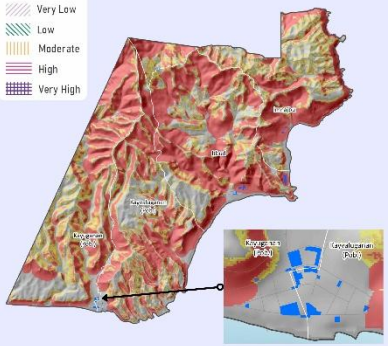




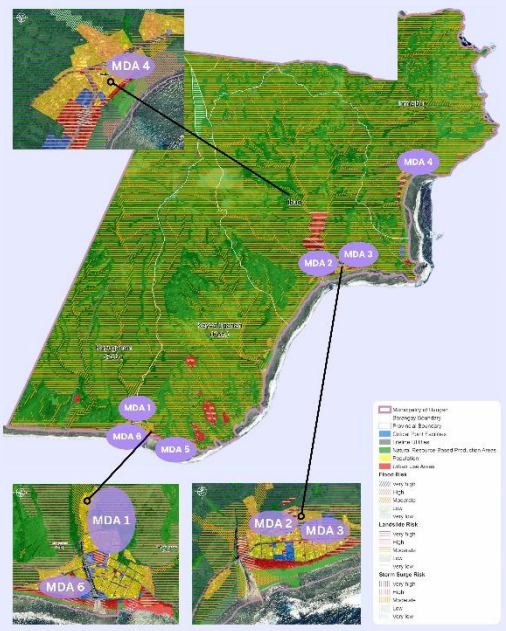
LANDSLIDE

Figure 2. CPF Landslide Risk Levels (RCP 4.5 2099)





RISK SENSITIVE POLICY INTERVENTIONS

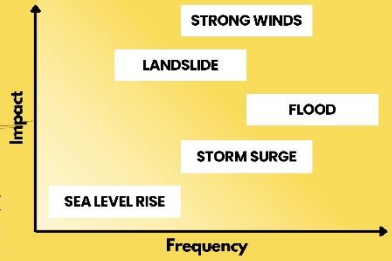


MAJOR DECISION AREA (MDA)		POLICY INTERVENTIONS
MDA 1	Hortiz St., Kahampuay FMR, Sitio Kahampuay (Agriculture Areal, San Antonino De Florencia Church, Sitio Kahampuay (Residential Areal, Hortiz St. (Residential	Improving the drainage system, dredging of Aksung, providing assistance for home development, proposing the enactment of ordinances to promote the adoption of modern resilient Ivatan house design, and conducting capacity development training.
MDA 2	Itbud Evacuation Area	Improving the drainage system, dredging of Aksung and construction of alternative evacuation area.
MDA 3	Barangay Itbud	Strict Zoning Administration and Enforcement, Conduct of Capacity development training, construction of retaining wall, and installation of rock netting
MDA 4	Barangay Imnajbu	Strict enforcement of zoning regulations, conducting capacity development training, constructing a retaining wall, and installing rock netting.
MDA 5	Uyugan Evacuation Area	Construction of a retaining wall and installation of rock netting
MDA 6	Diversion Road-Uyugan Centro	Construction/Rehabilitation of seawall

In collaboration with

One Ivana: Climate and Disaster Risk Assessment for Resilient Local Development

Strong winds pose significant risk across residential, agriculture, and toursim sectors.



Strong winds have the most significant impacts but occur less frequently than flooding. Landslides affect agriculture, lifeline utilities, and water sources. Flooding is the most frequent hazard but is primarily confined to residential areas near creeks. Storm surge impacts are limited to coastal exposure units, such as roads and the fish landing center. Sea level rise is the least frequent hazard and has the lowest level of impact.

LANDSLIDE



Rock netting installed in a landslide-prone area in Brgy. San Vicente

FLOOD



A concreted creek in Ivana overflows during prolonged rainfall events

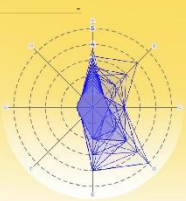
STORM SURGE



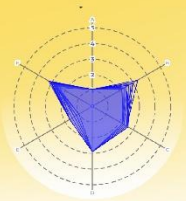
Fish Landing Center in Ivana sustained damage due to storm surge

VULNERABILITY ASSESSMENT RESULTS

CPF	
A	Condition of facilities
B	Using light-weight construction materials
C	Structures in need of repair or condemned
D	Year of construction
E	Structures and facilities not using resilient building design
F	No building permit
G	No building occupancy permit
H	No Fire Safety Inspection Certificate



CPF	
A	Information
B	Infrastructure
C	Institution and Governance
D	Social Capital
E	Technology
F	Wealth



RISK ASSESSMENT RESULTS

Population has the highest risk from flooding. In contrast, natural resource-based production areas have the highest risk from landslides. Meanwhile, lifeline utilities have the highest risk from storm surge with sea level rise.

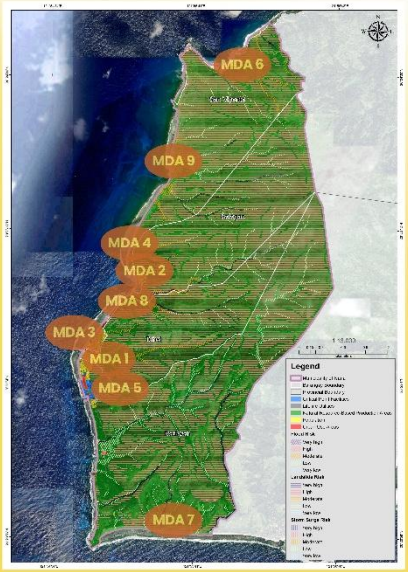




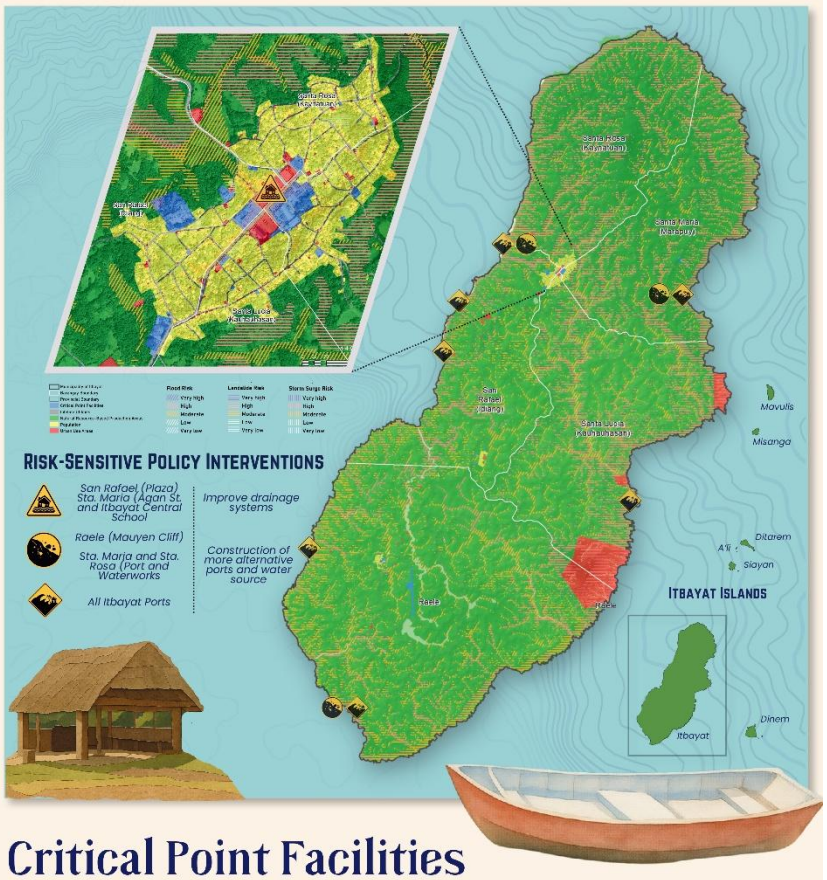


RISK SENSTIVE POLICY INTERVENTIONS

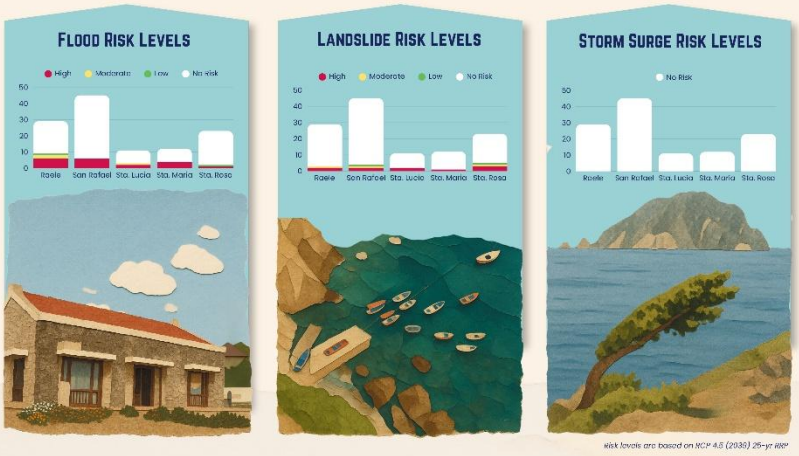
MAJOR DECISION AREA		POLICY INTERVENTIONS
MDA 1	Edmund St. between Bersana St. and Calatraba St., Diversion Rd., between Villamor St. and Valones St., and Adalla St.	Drainage improvement and Policy requiring regular pruning of trees near waterways
MDA 2	San Vicente Creek	Drainage improvement and Policy requiring regular pruning of trees near waterways
MDA 3	Salagao and Tuhel Creeks	Construction of flood control and Policy requiring regular pruning of trees near waterways
MDA 4	Chararakuhan, Brgy. San Vicente	Expansion and enhancement of rock netting
MDA 5	Ivana National High School in Tangayen Hill	Construction of retaining wall
MDA 6	Ahao Water Tank, Brgy. San Vicente	Planting of arius trees around the water source as natural windbreaker
MDA 7	Sitio Savit, Brgy. Radiwan	Construction of seawall lined with coconut tree planting
MDA 8	Sitio Sangalapan, Brgy. Salagao	Construction of seawall lined with coconut tree planting
MDA 9	Vatang National Road	Construction of seawall lined with coconut tree planting



Multi-Hazard Risk Assessment in the MUNICIPALITY OF ITBAYAT, BATANES

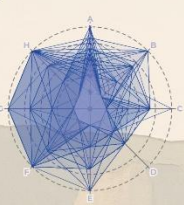


Critical Point Facilities



Risk levels are based on RCP 4.5 (2035) 25-yr IRP

Vulnerability Assessment



SENSITIVITY

- A Condition of facilities
- B Using light-weight construction materials
- C Structures in need of repair or condemned
- D Year of construction
- E Structures and facilities not using resilient building design
- F No building permit
- G No building occupancy permit
- H No Fire Safety Inspection Certificate

ADAPTIVE CAPACITY

- ***Information***: *Access to CCA-DRR information is generally adequate, with varying levels of participation and practical application across communities.*
- ***Infrastructure***: *Existing infrastructure supports daily functions and provides a foundation for managing hazard impacts.*
- ***Institution and Governance***: *Key plans and institutional structures are established, guiding coordination and decision-making for CCA-DRR.*
- ***Social Capital***: *Strong community networks enable cooperation and collective action during disaster situations.*
- ***Wealth***: *Financial capacity supports basic coping and recovery among households and the local government.*
- ***Technology***: *Available technologies contribute to risk monitoring and response, though their use differs across areas.*

