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iCARE Innovation Fund

Early Warning and Decision Support System for Energy Infrastructure Resilience in the GBM Basin

Six Monthly Progress Report

Reporting period: Jan– June 2024

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Contents

1. Project Information

Project Title:	Early Warning and Decision Support System for Energy Infrastructure Resilience in the GBM Basin
Project Code:	WBCAR
Partner Organisation:	Think Blue Data Co., Ltd.
Reporting Period:	Jan 2024 - June 2024
Date of Submission:	25th July 2024
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Status of project progress in this reporting period	☐ Significant delay ☐ Delay X On Track
Report sign Off	X I have reviewed all the information provided for each section including number of beneficiaries. The information provided for each section of the report is complete. Name: Designation:

2.Summary of the Achievements

Output 1.1 Project Inception and Gap Analysis

As the initial step, we prepared an Inception Report that provided a comprehensive overview of the project. This report detailed the project's objectives to establish a shared understanding of the intended goals and outcomes. It also included details of reference DSS projects to offer context and benchmarks for our work. The report outlined the planned actions to be taken throughout the project, breaking these down into clearly defined phases. We conducted a thorough stakeholder analysis to understand the needs, interests, and influences of various stakeholders involved in or affected by the project.
We received a request for Disaster Management capacity building from the Department of Local Governance and Disaster Management, Ministry of Home Affairs. To ensure that our end results meet these requirements, we performed gap analysis. We have reviewed some of the existing platforms that are used by government decision makers. We have tried to understand the kind of data it offers and the different ways it presents the data to the users. The portals that we have reviewed have a common goal which is to be able to provide easy-to-understand "overview" Weather Forecasts.

Output 1.2 Decision Support System design and development

The main achievement of this output was providing access and training to government agencies (3 national, 22 sub-national) through a series of 5 workshops covering different disaster-related themes, organised in partnership with Bhutan's DLGDM, UNESCO and ADPC, and the participation of over 20 different resource experts from the UN, WTO, academic institutions and private companies (see Annex 3 for details). The participants as well as the resource experts were 30% female and 70% male.

We developed initial designs of the Decision Support System for discussion with key stakeholders, to gather requirements and feedback. The DSS builds on and extends the functionality of the Risk and Resilience Portal[1]. Some of the key features included in the design:

- Navigation over the geographical administrative levels (Dzongkhags and Gewogs) of Bhutan.
- Navigation over hazards. We included placeholder data in the designs for discussions about the key hazards to be included in the portal, and the types of data to be gathered, processed and displayed.
- Navigation over Knowledge Products. The Insights section contains a collection of "stories" that explain key information provided by the government accompanied with interactive maps and data. Examples given for discussion were alerts, disaster plans, publications, and an SDG tracker.
- Locally-created Content. National and sub-national stakeholders will be able to use the platform to share their content with other stakeholders. This section describes the design for importing new map layers.

We completed the first phase of the system development as per our initial architecture

[1] https://rrp.unescap.org/

design and UX/UI design[2].

Data preparation

In the first version of the DSS, we planned to include the regional data available from the UNESCAP Risk and Resilience Portal as well as some publicly available Bhutan specific datasets of images and CSVs. The identified datasets were transformed into map tiles and integrated into the application.

Workshop Series: Product launch and training

We conducted a series of workshops jointly with the Bhutan Ministry of Home Affairs, UNESCAP and Think Blue Data in mid-June 2024. This also served as the launch event for our Early Warning and Decision Support System for Bhutan. The workshops were targeted at policymakers and disaster management officials from the Department of Disaster Management (DDM) and the Department of Local Governance and Disaster Management (DLGDM).

The series of workshop sessions covered the following five themes :

1. Scenario Modelling for hazards
2. Climate Action for Disaster Risk Reduction- addressing links between DRR and CCA
3. Anticipatory Actions, Community-Based Disaster Risk Reduction, and Early Warning Systems
4. Disaster preparedness
5. Principles of Disaster Financing and loss and damage

User Testing

During the workshop series held in Bhutan, our DSS portal was introduced to the government officials in Bhutan. After several days of hands-on experience with the portal, we conducted on-site design user testing with the participants on the final day. Users were given 4 main tasks to complete, all of which went over our interface's basic navigation system.

Results Framework Indicators

The M&E document listed seven indicators, each accompanied by a detailed description of expected outcomes. For each indicator, specific numeric targets (e.g., number of people, organisations, knowledge products) were established in advance. Our efforts have been aligned with these indicators. Notably, our recent workshop series in Bhutan has significantly contributed to meeting a substantial portion of several indicator targets (see Annex 3).

[2] https://icare.thinkbluedata.org

3.Summary of Project Beneficiaries

- **Direct Project Beneficiaries:** During the workshop series we launched the Early Warning and Decision Support System for Bhutan. The events were attended by representatives from national government agencies, subnational government bodies and international organisations.
    - National level government agencies:
        - NCHM: Two representatives from NCHM attended four of the workshops (day 2 through day 5). These representatives were from Meteorological Service Division and Hydrology & Water Resources Services Division. They also conducted presentations during the training sessions.
        - DLGDM: Four representatives from the Disaster Preparedness Response Division from DLGDM attended the workshops series. The Chief Program Officer delivered the opening remarks.
    - Subnational government: Disaster management officials from the Department of Disaster Management from numerous Dzongkhags and Thromdes attended the workshop series. A total of 22 officials attended. Below is the list of all subnational government representatives who took part in the event:

1. Bumthang	9. Samdrup Jongkhar	17. Trashigang
2. Chhukha	10. Samdrup Jongkhar Thromde	18. Trashiyangtse
3. Gasa	11.Samtse	19. Trongsa
4. Haa	12. Sarpang	20. Tsirang
5. Lhuentse	13. Sarpang, Gelephu Thromde	21. Wangdue Phodrang
6. Mongar	14. Thimphu	22. Zhemgang
7. Paro	15. Thimphu, Lingzhi Dungkhag	
8. Pema Gatshel	16. Thimphu Thromde	

    - International Organisation:
        - For the workshop series, we coordinated our efforts with UNESCAP. They assisted in facilitating the training and helped us connect to several resource persons.
        - Karla Robin Hershey, Resident Coordinator of United Nations Bhutan gave the opening statements. Also, Ms. Tiziana Bonapace, Director, ICT and Disaster Risk Reduction Division, United Nations ESCAP delivered the key notes. Both expressed interest in further involvement with the project in the future.
- **Indirect Project Beneficiaries:** The Early Warning and Decision Support System is designed to benefit all residents of Bhutan who are at risk of hazards. Policy makers,

using the insights and data provided by the system, will be able to make more informed decisions regarding disaster prevention and mitigation strategies, and publish plans with more informative maps and data for the public to review. As a result, communities living in high-risk areas will experience improved safety and resilience, benefiting from proactive measures and targeted interventions based on reliable information provided by the system.

4.Performance Outcome Mapping

Table 2: Implementation progress as of 30th June 2024

Budget Line Item **Description**	**Approved budget (in US$)**	**Actual expenditure in US$**	**Target**	**Result/achievement**
			~~*3 papers planned for Year-1*~~	
Outcome 1:				
1.1 Energy Infrastructure Resilience Assessment Report for Bhutan	**4,920**	**4,725**		
1.1.1 Prepare Project Inception Report	2,680	2,477	1 report	1 report: Inception Report
1.1.2 Establish Community of Practice with key national and regional stakeholders	800	722	1 report	1 report: CoP strategy report, including stakeholder outreach and participation
1.1.3 Gather requirements and priorities from key stakeholders through interviews and virtual study tours / workshops	1,440	1,526	1 report	1 report: Summary report of interviews, case studies, gap analysis and draft requirements
1.2 EIR-DSS version 1.0 : Flood Prediction and Mitigation for Energy Infrastructure (online) shared with key stakeholders	**36,283**	**33,700**		

1.2.1 Maintain Community of Practice with key national and regional stakeholders	7,400	5,843	1 report	1 report: Quarterly summary reports of CoP activities and engagement
1.2.2 Prepare forecast and geospatial data	2,880	2,609	1 report	1 report: Summary report of climate forecast and geospatial data inputs and products
1.2.3 Iterative design and development of key online use-cases based on stakeholder priorities	19,000	5,135	1 report	1 report: Summary report of design, implementation and user feedback
1.2.4 Pilot-testing with designs and interactive prototypes with select stakeholders	960	1,018	1 report	1 report: Summary report of requirements and priorities from pilot-test sessions and feedback
1.2.5 Workshop 1.0: Launch of DSS for pilot-testing by key stakeholders from government, community, and regional partners	6,043	19,095[3]	1 report 1 workshop 1 software	1 report: Summary report of launch, pilot-testing, feedback and usage 5 workshops: *(see summary report)* 1 software: https://icare.thinkbluedata.org/
1.3 EIR-DSS version 1.5 : Drought Prediction and Mitigation for Energy	**19,040**	**15,231**		

[3] NOTE: We met with ADPC on 21 May to review the 5x increase in the scope of the workshop at the request of Bhutan DLGDM, and the expanded budget. ADPC agreed with the increase in the workshop budget and our proposal to adjust the budget later in the project as needed (such as hardware procurement).

Infrastructure (online & app) shared with key stakeholders				
1.3.1 Maintain Community of Practice with key national and regional stakeholders	7,400	5,974	1 report	For delivery in Q3
1.3.2 Refine and extend forecast and geospatial data	2,880	3,053	1 report	For delivery in Q3
1.3.3 Iterative design and development of key mobile use-cases based on stakeholder priorities	7,000	5,187	1 report	For delivery in Q3
1.3.4 Pilot-testing with designs and interactive prototypes with select stakeholders	960	1,018	1 report	For delivery in Q3
Total	60,243	53,656		

5.Partnership

At the end of the June workshops, UN stakeholders facilitated a meeting with key persons from the National Center for Hydrology and Meteorology (NCHM) and Department of Local Governance & Disaster Management (DLGDM) with the following agreements.

Hosting Agreement

The discussion led to a verbal agreement that the Bhutan portal will be hosted by the Department of Govtech. NCHM has agreed to handle the portal management with the right support from DLGDM. This partnership ensures effective maintenance and management of the portal going forward. We are working with all parties to formalise this agreement.

Integration of existing data into the portal

DLGDM already has the disaster data on events, losses, and damages hosted in their Disaster Management Information System (DMIS) and NCHM has data on flood models. With the intention of expanding usability of the portal, discussions were held on how the existing data from NCHM and DLGDM can be integrated into the portal.

Proposed multi sectoral committee

The Director of NCHM suggested forming a committee involving stakeholders from agriculture, health, infrastructure, and environment sectors. The idea here is that these stakeholders would contribute sector-specific information to the portal, ensuring it offers comprehensive and actionable insights to strengthen climate and disaster resilience

6.Sustainability

We conducted a series of workshops jointly with the Bhutan Ministry of Home Affairs, UNESCAP and Think Blue Data in mid-June 2024. This also served as the launch event for our Early Warning and Decision Support System for Bhutan. The workshops were targeted at policymakers and disaster management officials from the Department of Disaster Management (DDM) and the Department of Local Governance and Disaster Management (DLGDM). The workshop series has proven to be a significant milestone in securing the project's long-term sustainability.

We had meetings with key persons from the NCHM and DLGDM with the following agreements/discussions:

- Bhutan portal will be hosted by the Department of Govtech.
- NCHM has agreed to handle the portal management with the right support from DLGDM.
- Integration of existing data (disaster data on events, losses, and damages from DLGDM and flood modes from NCHM) into the portal.
- The Director of NCHM suggested forming a committee involving stakeholders from agriculture, health, infrastructure, and environment sectors. This is to ensure contribution of sector-specific information to the portal.

UNESCAP is engaged in country-specific projects under the Asia Pacific Disaster Risk Network (APDRN) across various nations and will continue its focus on Bhutan for the next three years. We have partnered with UNESCAP for the workshop series and will maintain this collaborative effort going forward.

We are in the process of planning our CoP activities and will launch in the next workshop in August. We have created a list of topics for CoP activities based on feedback from stakeholders and will coordinate with DLGDM leadership to further prioritise and schedule CoP events.

We also propose extending the DSS platform with open source social platform[4] and videoconferencing[5] tools to support knowledge sharing. With these tools stakeholders will be able to interact, share experiences, and ideas in a shared space, fostering a sense of community. Additionally, it will serve as a platform for disseminating knowledge products.

[4] Open Social community platform, https://www.getopensocial.com/

[5] Big Blue Button videoconferencing platform, https://bigbluebutton.org/

7.Communication and Knowledge Management

Table 3: Communication and Knowledge products activity and progress achieved

Related activity number	Communications Activity. Strategy/Tactic	Related communications or Knowledge product	Impact /Change perceived. Big or Small wins. Numbers (If any)
1.1.1	*Communication with stakeholders*	*Inception report*	*Refinement of objectives and priorities*
1.1.2	*Community of Practice strategy*	*CoP strategy report, including stakeholder outreach and participation*	*Initial networking with NCHM and DLGDM*
1.1.3	*Gap analysis, interviews*	*Summary report of interviews, case studies, gap analysis and draft requirements*	*Request for training from DLGDM with list of thematic areas*
1.2.1	*Community of Practice*	*Quarterly summary reports of CoP activities and engagement*	
1.2.2	*Interview / Data catalogue*	*Summary report of climate forecast and geospatial data inputs and products*	*Identification of data needs and availability*
1.2.3	*User testing (design)*	*Summary report of design, implementation and user feedback*	*Improvements to design before development*
1.2.4	*User testing (system)*	*Summary report of requirements and priorities from pilot-test sessions and feedback*	*Feedback for future improvements*
1.2.5	*Workshop / Training*	*1. Summary report of launch, pilot-testing, feedback and usage* *2. DSS version 1*	*Knowledge gained by participants in workshop themes and hands-on training* *Participant evaluations showed improvements in disaster knowledge themes and practical expertise with DSS / GIS*

8.Challenges and Risks

In these past months of the project, we encountered challenges along the way. We had encountered delays in receiving feedback from stakeholders to finalise the deliverable documents.

The budget for the training and DSS launch workshop scheduled for Q2 exceeded our initial estimates, necessitating adjustments to our procurement plan. As a result, we postponed the purchase of hardware to later in the year to allocate funds for the June workshop.

Planning and preparing for a multi day training session was a challenging task. Coordinating with various stakeholders, finalising the agenda items, identifying resource persons for different topics, arrangement of the logistics, planning of the financial aspects etc. took a lot of time and effort. Given that this training took place in Bhutan, where our company lacks a presence, we had to rely on the support of local resource persons. We are extremely grateful for all their help in the successful completion of all 5 workshops.

9.Lesson Learnt

Over the past few months, we have gained insight into the extensive planning required for conducting an onsite training session. This has highlighted the numerous logistical considerations, resource allocation, and coordination efforts needed to ensure smooth execution of the training.
Regarding the training sessions, we have gained understanding on structuring the sessions and determining optimal pace of the training to ensure better absorption from the participants. The hands-on and group activities were the most engaging, clearly demonstrating high levels of enthusiasm and eagerness to learn.
These learning will help to conduct much smoother and effective workshops in the future.
The workshop series has provided an excellent opportunity to introduce our portal to the disaster management officers, the actual end users. We believe it has been a crucial source of key stakeholders feedback. This exposure and evaluation will help shape our product and ensure end user satisfaction. Based on the feedback we have received and the insights we have gained, we will refocus our development efforts accordingly.

Additionally, in order to Maintain Community of Practice with key national and regional stakeholders we are reviewing the possibility to integrate a social networking platform with the Bhutan DSS. We have some prior experience on an open source Drupal based platform called Open Social that might be a good candidate for this implementation. This integration will enable stakeholders to interact, share experiences, and ideas in a shared space, fostering a sense of community. Additionally, it will serve as a platform for disseminating knowledge products.

Annex 1: Records of Events

1. Workshop Series Day 1. Scenario Modelling for hazards
2. Workshop Series Day 1. GIS hands-on training
3. Workshop Series Day 1. DSS hands-on training
4. Workshop Series Day 2. Climate Action for Disaster Risk Reduction- addressing links between DRR and CCA
5. Workshop Series Day 2. GIS hands-on training
6. Workshop Series Day 2. DSS hands-on training
7. Workshop Series Day 3. Anticipatory Actions, Community-Based Disaster Risk Reduction, and Early Warning Systems
8. Workshop Series Day 3. DSS hands-on training and group work
9. Workshop Series Day 4. Disaster preparedness
10. Workshop Series Day 4. DSS hands-on training and group work
11. Workshop Series Day 5. Principles of Disaster Financing and loss and damage
12. Workshop Series Day 5. DSS hands-on training and group work

Annex 2: Event reports/minutes, Learning documents, Knowledge products, Communication products or other documents

Annex 1: Output 1.1

Activity 1.1.1 Inception Report

Activity 1.1.2 CoP strategy report, including stakeholder outreach and participation

Activity 1.1.3 Summary report of interviews, case studies, gap analysis and draft requirements

Annex 2: Output 1.2

Activity 1.2.1 Quarterly summary reports of CoP activities and engagement

Activity 1.2.2 Summary report of climate forecast and geospatial data inputs and products

Activity 1.2.3 Summary report of design, implementation and user feedback

Activity 1.2.4 Summary report of requirements and priorities from pilot-test sessions and feedback

Activity 1.2.5 Summary report of launch, pilot-testing, feedback and usage

Annex 3: Result Framework

PDO Indicator Description: 1. Government agencies and Citizens who have access to climate-resilient solutions tested under the project (Number)			
	Actual (Previous)	**Actual (This activity)**	**End Target**
Value	0	**# of Gov Agencies** *UNIQUE*: Gov: 3 Sub-national Gov: 22 *TOTAL (x # 5 sessions):* Gov/Natl: 13 Gov/SubNtl: 1 110 **# of Citizens** **Sex**/M: 91 Sex/F: 39	Gov: 3 Sub-national Gov: 12 Cit: 500
Date	31 May 2024	30 June 2024	15 Jan 2025
Comments	See Annex 1 Evidence of Indicators		

	Actual (Previous)	Actual (This activity)		End Target
Output Indicator Description: 2. Number of people trained (in person) (by sex, country, topic, year, participant category)				
Value	0	**Sex**/M: Sex/F: **Country**/Bhutan: **Topic**/Session 1: Topic/Session 2: Topic/Session 3: Topic/Session 4: Topic/Session 5: **Year**/2024: **Cat**/Gov/Natl: Cat/Gov/SubNtl:	91 39 130 26 26 26 26 26 130 20 110	48
Date	31 May 2024		30 June 2024	15 Jan 2025
Comments	5 day training conducted in Bhutan			

	Actual (Previous)	Actual (This activity)		End Target
Output Indicator Description: 4. Number of knowledge products provided (by type of product, theme, country)				
Value	3	**Type**/Software: Type/Presentation: **Theme**/Session 1: Theme/Session 2: Theme/Session 3: Theme/Session 4: Theme/Session 5: Theme/SW Training: **Country**/Bhutan:	5 14 3 1 6 2 2 5 19	6
Date	31 May 2024		30 June 2024	15 Jan 2025
Comments	Knowledge Products shared during workshops in Bhutan			

	Actual (Previous)	Actual (This activity)		End Target
Output Indicator Description: 5. Number of people / organisations provided with knowledge products (by recipient category, type of knowledge product, country, theme)				
Value	0	**# of People** / Organizations /**Cat**/Gov/Natl: /Cat/Gov/Subnatl: /**Type**/Software: /Type/Presentation: /**Country**/Bhutan: /**Theme**/Session 1: /Theme/Session 2: /Theme/Session 3: /Theme/Session 4: /Theme/Session 5: /Theme/SW:	**494/467** 76/49 418/418 130/123 364/344 494/467 78/69 26/25 156/150 52/50 52/50 130/123	People: 500 Organizations: 64
Date	31 May 2024	30 June 2024		15 Jan 2025
Comments	Knowledge Products shared during workshops in Bhutan			

	Actual (Previous)	Actual (This activity)		End Target
Output Indicator Description: 6. Number of events supported (by type, year, theme, country)				
Value	1	**Type**/Workshop: Type/Training: Type/AAR: **Year**/2024: **Theme**/Session 1: Theme/Session 2: Theme/Session 3: Theme/Session 4: Theme/Session 5: Theme/SW Training: **Country**/Bhutan:	5 7 5 **17** 2 2 2 2 2 7 **17**	53
Date	31 May 2024	30 June 2024		15 Jan 2025
Comments	Workshops held in Bhutan			

	Actual (Previous)	Actual (This activity)	End Target
Output Indicator Description: 7. Number of people participating in supported events (by participant category, sex, year, theme, country)			
Value	23	**Sex**/M: 310 Sex/F: 132 **Country**/Bhutan: **442** **Topic**/Session 1: 52 Topic/Session 2: 52 Topic/Session 3: 52 Topic/Session 4: 52 Topic/Session 5: 52 Topic/Software Training: 182 **Year**/2024: **442** **Cat**/Gov/Natl: 68 Cat/Gov/SubNtl: 374	205
Date	31 May 2024	30 June 2024	15 Jan 2025
Comments	Participants at the workshops in Bhutan		

Annex 4: Evidence of Indicators

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