

Innovation for Climate Adaptation and Resilience (iCARE)

Heylhi 2.0

Six Monthly Progress Report

Prepared by: Small Island Geographic Society

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1. Project Information

Project Title:	Heylhi 2.0
Project Code:	WBCAR
Partner Organisation:	Ministry of Climate Change, Environment, Energy, Dhiffushi Island Council, Vaikaradhoo Island Council, Water Solutions
Reporting Period:	January – June, 2024
Date of Submission:	25 th July 2024
Contact Name:	Shaadhoon Mohamed Haleem
Contact Position:	Administrative Manager
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Status of project progress in this reporting period	<input type="checkbox"/> Significant delay <input type="checkbox"/> Delay <input checked="" type="checkbox"/> On Track
Report sign Off	<p>(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.</p> <p>Name: Mohamed Bunyameen Designation: Project Coordinator</p>

2. Summary of the Achievements

The Heylhi 2.0 project has seen some significant achievements in the past 6 months of the project period. The Heylhi 2.0 application has been introduced to the island councils of HDh. Vaikaradhoo and K. Dhiffushi, detailing how the application aims to engage local communities in environmental monitoring, helping them to keep track of the changes to their coastline. Both Councils received the project very positively and are very eager to start of data collection works.

On January 25, 2024, we held a partners onboarding inception workshop at Mookai Hotel in Male', Maldives. This event brought together 38 participants, including key partners like the Ministry of Climate Change, Environment, and Energy (MoCCEE), as well as representatives from Vaikaradhoo and Dhiffushi Island Councils. Government officials, including the Special Envoy for Climate Change, attended alongside members from non-governmental organisations and the private sector. The workshop was a great opportunity for all stakeholders to discuss the possible challenges and risks that the project may face through implementation.

The Heylhi 2.0 app has undergone a major redesign to make it more user-friendly. We've upgraded the interface and redeveloped the entire app, adding new features such as tree planting, tracking tree loss, and incorporating drone images on request of the island councils. There's also a new virtual marker feature that helps users in areas where physical markers are not available.

Our partnership with the Ministry of Climate Change, Environment, and Energy has been beneficial. The Ministry has expressed their interest in using the Heylhi 2.0 mobile application in monitoring projects, which has led us to collaborate with international bodies such as the Japanese International Cooperation Agency (JICA). JICA is interested in using Heylhi 2.0 as a monitoring methodology for two of their project islands.

We have also partnered with the Maldives Space Research Organisation (MSRO). We have engaged a Citizen Science Coastal Consultant and they have agreed to share satellite imagery data with us, enhancing the accuracy of our measurements. Additionally, MSRO has also been engaged to provide data analysis training to project islands in September 2024.

The next steps will involve traveling to project islands in order to implement the data collection marker stands so that data collection can begin.

3. Summary of Project Beneficiaries

- **Direct Project Beneficiaries:**

Ministry of Climate Change, Environment, and Energy (MOCCEE): To provide data collection markers for their Endheri project in order to start beach monitoring. In addition, the data provided from these markers can be used to help make policy change and guide coastal management activities.

Japan International Cooperation Agency (JICA): Data collection markers to be set up in Laamu Atoll (L. Fonadoo) and Seenu Atoll (S. Meedhoo) in order to start collecting data for erosion, and flooding.

Dhiffushi and Vaikaradhoo Island Council: Data collection markers to be set up in their islands in order to start collecting data for erosion, and flooding. Introductory sessions have already been conducted in both islands and trainings will be conducted in the next few months in order to start beta testing Heylhi 2.0.

- **Indirect Project Beneficiaries:**

- **Ministry of Cities, Local government, and public work:** Data collected from Heylhi 2.0 will be available for use.
- **Local Government Authority (LGA):** Data collected from Heylhi 2.0 can be used in order to guide future island planning projects.
- **Resorts:** Data collection markets to be set up in resorts that are interested in implementing Heylhi 2.0
- **EIA Consultant companies:** Data collected from Heylhi 2.0 will be available for use.
- **Coastal engineering/ construction groups:** Data collection markers can be used by engineer/ construction groups for coastal monitoring projects.
- **Uinspire:** Data collected from Heylhi 2.0 will be available for use. Trainings can be provided for interested parties.
- **Association for Dhiffushi Development:** Data collection marker to be set up in order to monitor erosion and flooding.
- **Maldives Association of Tourism Industry (MATI):** Data collection markers can
- **Maldives National University (MNU):** Data collected from Heylhi 2.0 will be available for use. Trainings can be provided for interested parties.
- **Villa College Institute for Research and Innovation:** Data collected from Heylhi 2.0 will be available for use. Trainings can be provided for interested parties.
- **Maldives Institute of Technology (MIT):** Data collected from Heylhi 2.0 will be available for use. Trainings can be provided for interested parties.
- **Maldives Space Research Organization:** Consultant hired in order to provide support for data analysis and conduct trainings for data analysis. They will assist in providing satellite data imagery in order to conduct ground-truthing for the data collected from Heylhi 2.0.

4. Performance Outcome Mapping Table 2: Implementation progress as of 30th June 2024

Description	Approved budget (US\$)	Actual expenditure (US\$)	Target	Result/achievement
Output 1.1: Heylhi App is upscaled and ready for use				
Activity 1.1.1: Redesign user interface	28,556.25	14,922.50	New user interface for Heylhi 2.0 designed	Redesign of UI completed
Activity 1.1.2: Develop new features and back-end	26,086.25	1,211.25	New features added and back-end	New features developed; erosion, flooding, vegetation removal, drone images and rooting for 'raajje'
Activity 1.1.3: Make Heylhi app available on Android and iPhone	13,556.25	726.75	Heylhi 2.0 available for users	APK for Android available and Apple store publication in progress
Output 1.2: Sites developed for data collection using Heylhi app				
Activity 1.2.1: Survey new islands (drone mapping and shoreline to identify locations to put photo markers and prepare base map of islands)	29,666.25	4,072.09	Survey reports: Locations for photo markers and number of markers identified in each island	All planned surveys completed
Activity 1.2.2: Design and make upgraded data collection markers (redesign photo marker stands, adding set-up for trail cameras in 2 locations)	29,666.25	80.75	Marker designs completed and markers fabrication in progress	Redesign marker, working with contractor for fabrication
Activity 1.2.3: Set up markers in the islands	29,666.25	80.75	Markers set up in islands	Final marker points received from MOCCEE/JICA, ready for installation
Output 1.3: Capacity developed for data collection using Heylhi App and data collection is started				
Activity 1.3.1: Train selected people from sites to collect data using Heylhi app	14,046.25	80.75	Training material and training report	Training materials being developed
Output 1.4: Ongoing data collection				
Activity 1.4.1: Ongoing data collection	6,056.25		Data collection for training and analysis	Planned to start in July
Output 2.1: Capacity developed to produce useful outputs for island development and policy making				

Description	Approved budget (US\$)	Actual expenditure (US\$)	Target	Result/achievement
Activity 2.1.1: Identify possible outputs, who will benefit from these and how can they use the outputs - workshops with MECCT and stakeholders	6,056.25	1,502.58	Workshop reports and matrix of data output needs of stakeholders	Beneficiaries identified during inception workshop and End User Output Preliminary report completed. Activity completed
Activity 2.1.2: Develop, optimize, and test MATLAB/Python scripts to analyse data collected through the Heylhi app	6,056.25		Data collection codes and programmes	Planned to start in July
Activity 2.1.3: Training to analyse data	8,436.25		Training workshop and training materials; SIGS, MECCT, local university students trained to analyse backend data	Activity planned to start once data collection from Heylhi app is started
Activity 2.1.4: Analyse data	6,056.25		Preliminary data analysis report	Planned to start in July
Output 2.2: Outputs generated from Heylhi app data is shared with stakeholders				
Activity 2.2.1: Prepare outputs (knowledge product i.e., reports, trend graphs)	8,556.25	80.75	Trend graphs, reports, and outputs produced	Flyers were distributed to the islands through field visit
Output 2.3: Knowledge products created through Heylhi project shared with stakeholder				
Activity 2.3.1: Share outputs generated with project stakeholders	14,166.25		Preliminary reports and outputs and continued periodic reporting schedule	Planned to submit in Jan 2024
Output 2.4 Events participated to disseminate Heylhi app information to the public				
Activity 2.4.1: Present at conferences & publish papers	14,816.25	80.75	"Research reports and conference presentation	
Output 2.5 Stakeholders engaged through public events				
Activity 2.5.1: Share information about Heylhi to Government, Councils, resorts, research communities	8,556.25	1,413.13	Video presentations to relevant Ministries, Councils, resorts and other interested parties	38 participants in the Inception workshop
Total	250,000	24,252.02		

5. Partnership

Partnerships have been made with the island council of HDh. Vaikaradhoo and K. Dhiffushi to carry out the activities of Heylhi 2.0. Our team will be training a selected amount of staff from each of the island councils and community members in order to start collecting data. Through these activities, awareness regarding Heylhi 2.0 app and erosion and flooding will also be disseminated to the public through information workshops.

Meeting and partnering with Japan International Cooperation Agency (JICA) has enabled us to identify their needs for the project as well as the additional 2 islands that are to be part of Heylhi 2.0. We are also currently working closely with their engineering and technical team.

Maldives Space Research Organization (MSRO) partnership with Dr. Nashwan and assistance from CoastSnap is allowing us to use satellite imagery to collect data for Heylhi 2.0. This allows us to perform ground truthing which will improve future data collection and analysis.

Our team also met with the Endheri Project team by Ministry of Climate Change, Environment, and Energy (MOCCEE), who are interested in participating in community engagement activities in Laamu Atoll. They have requested us to provide training on using the Heylhi 2.0 application in the islands of Laamu which will be carried out in August 2024.

6. Sustainability

The continued success of the Heylhi 2.0 mobile application depends greatly on people using it regularly, which will help gather lots of important data. To encourage more people to use the app, especially young students, a fun and engaging tree planting module has been added. In addition, drone imagery has also been added at the request of Island Councils who would benefit from this feature. Schools are a big focus, and efforts are being made to get the Ministry involved to ensure students participate actively. This not only makes the app more useful but also helps educate the younger generation about the environment. Meanwhile, the SIGS team is working on detailed plans to manage the app's development and usage. The Heylhi 2.0 app can be used as a key tool in tracking and overseeing various environmental projects. By keeping track of progress and involving the community, the app is set to play a crucial role in long-term environmental care and awareness.

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)
Activity 2.5.1	Heylhi 2.0 Inception Event post (25/01/2024)	Instagram Post: https://www.instagram.com/p/C2hFli4RZUX/?img_index=1	Total 1216 views
Activity 2.5.1	Citizen Science Information post (11/02/2024)	Instagram Post: https://www.instagram.com/p/C3NAwC_rI_P/?img_index=1	Total 1430 views
Activity 2.5.1	Heylhi 2.0 Implemetation Begins post (29/02/2024)	Instagram Post: https://www.instagram.com/p/C37Xb13OBnH/	Total 1959 views
Activity 2.5.1	Information Flyer (English and Dhivehi)	Flyer attached in annex	Shared to Councils, Partners, and Community Members

8. Challenges and Risks

The project encountered several unexpected delays. Initially, stakeholder engagements were postponed due to the annual school holidays. In February, field visits for survey purposes had to be rushed as it needed completion before Ramadan. March and April posed difficulties in arranging meetings during Ramadan and further unexpected delays in confirming islands with Japanese International Cooperation Agency (JICA) due to Ramadan and election holidays.

In May, conducting baseline survey in Dhiffushi faced setbacks as the field visit was frequently postponed due to severe weather events. In June, verifying of marker spots for the islands allocated by Ministry of Environment, Energy and Climate Change had been a challenge due to delay in confirmation of the final islands for coastal protection projects. In order to overcome these challenges, we completed project related desk work to ensure project milestones were achieved.

During the Heylhi 2.0 application development, difficulty in using a new framework and language was presented as it was the first time we are using Firebase backend. Along with this, uploading the application on app store has been challenging due to the extensive formalities required.

9. Lesson Learnt

In order to ensure project's success by encouraging organizations to collectively use the application, engagement of stakeholders within in the project itself is vital.

During the meeting with Dhiffushi island council, community members suggested dissemination of flyers regarding the project can drive the application engagement. Technical advisory committee and consultants provided multidisciplinary advice to ensure project is steering in the right direction.

In terms of app development, there have been a few issues we have faced. Firebase plan needs to be upgraded, as the push notification feature is not available on the current tier. This feature has had to be on standby.

A recent FlutterFlow update introduced the debug panel feature, and since then queries have been extremely slow in test mode. This is inconvenient as test mode allows you to quickly see changes as you make them, without having to rebuild the app every time. Since test mode is unusable for the time being, the app has to be built every single time you want to see your changes, which takes several minutes every single time. This has made iteration and testing difficult.

The project had to be debugged after a FlutterFlow update caused breaking changes that were related to some dependencies being updated. This means that custom code had to be rewritten. Difficulties with translating Flutter code for the EXIF extraction to work with FlutterFlow, due to differences in the data types used.

Annex 1: Records of Events

- Key partners meeting with Ministry of Climate Change, Environment and Energy on 11th January 2024
- Key partners meeting with K. Dhiffushi Council and Hdh. Vaikaradhoo Council on 15th January 2024
- Inception event on 21th January 2024
- Meeting with K. Dhiffushi Island Council on 19th February 2024
- Meeting with Community members of K. Dhiffushi on 19th February 2024
- Meeting with Women's Development Committee and Guesthouse owners on 19th February 2024
- Technical Assistance Committee Meeting on 29th February 2023
- Meeting with Hdh. Vaikaradhoo, WDC and NGO on 6th March 2024
- Drone mapping of Hdh. Vaikaradhoo
- Quarterly progress review meeting on 22nd April 2024
- Meeting with Citizen Science Coastal Consultant on 20th May 2024
- Trip to K. Dhiffushi to conduct baseline survey and drone mapping on 11th June 2024

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

Event Reports/Minutes

- Key partners meeting with Ministry of Climate Change, Environment and Energy
- Key partners meeting with K. Dhiffushi Council and Hdh. Vaikaradhoo Council
- Inception event report
- Meeting with K. Dhiffushi Island Council
- Meeting with Community members of K. Dhiffushi
- Meeting with Women's Development Committee and Guesthouse owners
- Technical Assistance Committee Meeting
- Meeting with Hdh. Vaikaradhoo, WDC and NGO
- Meeting with Citizen Science Coastal Consultant

Learning Documents

- Dhiffushi field visit report
- Vaikaradhoo field visit report
- Marker review report
- Heylhi 2.0 App Progress Report
- Baseline report

Knowledge Product

- Drone mapping of Hdh. Vaikaradhoo
- Drone mapping of K. Dhiffushi

Communication Product

- Flyers

Other Documents

- Inception Event Photos
- Photos from Dhiffushi Field Visit 19022024
- Photos from Vaikaradhoo Field Visit 06032024
- Photos from Dhiffushi Field Visit 11032024
- Heylhi 2.0 Application Update

Annex 3:Results Framework

PDO Indicator Description: Government agencies and Citizens who have access to climate-resilient solutions tested under the project (Number)		
	Current Value	End Target
Government Agencies	0	8
Male Citizen	0	75
Female Citizen	0	75
Date	30 June 2024	15 January 2025
Comments		
Outcome 1 Indicator Description: Upscale existing mobile application and coastal erosion and flooding data is being collected		
Value	0	6
Date	30 June 2024	15 January 2025
Comments		
Output 1.1 Indicator Description: Number of people access to Heylhi app		
Value	0	150
Date	30 June 2024	15 January 2025
Comments		
Output 1.2 Indicator Description: Number of sites (islands) with access to data collection facilities		

Value	1	6
Date	30 June 2024	15 January 2025
Comments		
Output 1.3 Indicator Description: Number of people trained		
Value	0	50
Date	30 June 2024	15 January 2025
Comments		
Output 1.4 Indicator Description: Number of uploads/entries per month per island		
Value	0	10
Date	30 June 2024	15 January 2025
Comments		
Outcome 2 Indicator Description: Capacity developed to analyse data in Maldives and government agencies, local councils, and citizens using outputs from Heylhi 2.0 data		
Value	0	6
Date	30 June 2024	15 January 2025
Comments		
Output 2.1 Indicator Description: Number of people trained (in person) (by sex, country, topic, year, participant category)		
Value	0	20

Date	30 June 2024	15 January 2025
Comments		
Output 2.2 Indicator Description: Number of knowledge products provided (by type of product, theme, country)		
Value	2	5
Date	30 June 2024	15 January 2025
Comments		
Output 2.3 Indicator Description: Number of people / organisations provided with knowledge products (by recipient category, type of knowledge product, country, theme)		
Value	0	150
Date	30 June 2024	15 January 2025
Comments		
Output 2.4 Indicator Description: Number of events supported (by type, year, theme, country)		
Value	1	3
Date	30 June 2024	15 January 2025
Comments		
Output 2.5 Indicator Description: Number of people participating in supported events (by participant category, sex, year, theme, country)		
Value	38	80
Date	30 June 2024	15 January 2025

Comments		
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Annex 4: Support Letter by Governments/Organizations

[1.Support Letter by Dhiffushi Council.pdf](#)

[2.Support Letter by Japan International Cooperation Agency \(JICA\).pdf](#)

[3.Support Letter by Ministry of Climate Change Environment and Energy.pdf](#)