CARE | South Asia

8TH BI-ANNUAL PROGRESS REPORT

Project Number:
P171054

Project Title:
Climate Adaptation and Resilience for South Asia

Bank Approval Date:
12 May 2020

Effectiveness Date:
10 Jul 2020

Original Closing Date:
5 Aug 2025

Produced under the project Climate Adaptation and Resilience for South Asia, funded by the World Bank and co-implemented with the Asian Disaster Preparedness Center

RIMES

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ACRONYMS

ADPC	Asian Disaster Preparedness Center
ADVISE	Agro-Advisory System
AEZ	Agro-ecological Zone
AI	Artificial Intelligence
AITC	Agriculture Information and Training Center
AMISDP	Agro-Meteorological Information Systems Development Project
API	Application Programming Interface
AWD	Acute Watery Diarrhea
BACD	Balochistan Agriculture and Cooperatives Department
BAF	Bangladesh Air Force
BAMIS	Bangladesh Agro-Meteorological Information Service
BDP	Bangladesh Development Plan
BIPAD	Building Information Platform Against Disaster
BLRI	Bangladesh Livestock Research Institute
BMD	Bangladesh Meteorological Department
BRRI	Bangladesh Rice Research Institute
BWDB	Bangladesh Water Development Board
CAF	Climate Application Forum
CAP	Common Alerting Protocol
CDO	Chief District Officer
CE	Capacity Enhancement
CIPS	Chartered Institute of Procurement and Supply
CLIM-PLANNeD	Climate Informed Planning and Development DSS
CMIP	Coupled Model Intercomparison Project
CoP	Community of Practice
COVID	Corona Virus
CRS	Crop Reporting Service
CWG	Coordination Working Group
DAE	Department of Agricultural Extension
DAG	Directed Acyclic Graph
DAO	District Administration Office
DataEx	Data Exchange
DDM	Department of Disaster Management
DES	Double Exponential Smoothing
DHM	Department of Hydrology and Meteorology
DLS	Department of Livestock Services
DMC	Disaster Management Committee
DMG	Department of Mines and Geology
DNCC	Dhaka North City Corporation
DoE	Department of Environment
DoF	Department of Fisheries

DoLI	Department of Local Infrastructure
DoR	Department of Roads
DPWQCP	Directorate of Pest Warning and Quality Control of Pesticides
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSS	Decision Support System
E&S	Environment and Social
ECMWF	European Centre for Medium-Range Weather Forecasts
EM-DAT	Emergency Database
ENSO	El Nino Southern Oscillation
ESD	Environment and Social Development
ETCCDI	Expert Team on Climate Change Detection and Indices
ETL	Extract, Transform, Load
EWS	Early Warning System
FCDO	Foreign, Commonwealth and Development Office
FForum	Forecasters'
FFWC	Flood Forecasting and Warning Center
FloCAST	Flood Forecasting System
FMD	Foot and Mouth Disease
FMS	Financial Management Specialist
FSCC	Food Security and Climate Change
GCM	General Circulation Model
GDD	Growing Degree Days
GDP	Gross Domestic Product
GEDSI	Gender, Equality, Disability, and Social Inclusion
GEE	Google Earth Engine
GESU	Geo-Environment and Social Unit
GHG	Greenhouse Gas
GIDC	Government Integrated Data Center
GIS	Geographic Information System
GloFAS	Global Flood Awareness System
HEC-HMS	Hydrologic Engineering Center's Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HMIS	Highway Management Information System
IBF	Impact-based Forecasting
ICKM	Information, Communication, and Knowledge Management
ICT	Information, Communication, and Technology
IDA	International Development Association
IDP	Institutional Development Plan
IEDCR	Institute of Epidemiology, Disease Control and Research
IFRS	International Financial Reporting Standards
IITM	Indian Institute of Technology Madras
IMED	Implementation Monitoring and Evaluation Division

IOD	Indian Ocean Dipole
IRI	Intermediate Results Indicator
IRSA	Indus River System Authority
ISR	Implementation Status Reporting?
IT	Information Technology
IUFR	Interim Unaudited Financial Report
JSA	July August September
LDDP	Livestock and Dairy Development Project
MIS	Management Information System
MJO	Madden-Julian Oscillation
ML	Machine Learning
MoALD	Ministry of Agriculture and Livestock Department
MoCTCA	Ministry of Culture, Tourism and Civil Aviation
MODIS	Moderate Resolution Imaging Spectroradiometer
MoEF	Ministry of Environment and Forest
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MoF	Ministry of Finance
MoFAGA	Ministry of Federal Affairs and General Administration
MoFE	Ministry of Forests and Environment
MoHA	Ministry of Home Affairs
MoIAL	Ministry of Internal Affairs and Law
MoLE	Ministry of Labour and Employment
MoPDSI	Ministry of Planning, Development and Special Initiatives
MoU	Memorandum of Understanding
NAMIS	Nepal Agro-Meteorological Information Systems
NAP	National Adaption Plan
NARC	Nepal Agricultural Research Council
NASA	National Aeronautics and Space Administration
NAVIGATE	National Vehicular and Transport Resilience Gateway
NCHM	National Center for Hydrology and Meteorology
NCMRWF	National Centre for Medium Range Weather Forecasting
NDC	Nationally Determined Contribution
NDRRMA	National Disaster Risk Reduction and Management Authority
NDVI	Normalized Difference Vegetation Index
NGO	Non-Governmental Organization
NLAS	National Livestock Advisory System
NMHS	National Meteorological and Hydrological Services
NRCS	Nepal Red Cross Society
NWP	Numerical Weather Prediction
OBN	Observational Networks
OLAP	Online Analytical Processing
OSM	OpenStreetMap
PAD	Punjab Agriculture Department

PDO	Project Development Objective
pH	Potential of Hydrogen
PHP	Hypertext Processor
PIN	People in Need
PIU	Project Implementation Unit
PMBOK	Project Management Body of Knowledge
PMD	Pakistan Meteorology Department
PRINCE2	Projects In Controlled Environments
RDAS	Regional Resilience Data and Analytics Services
RIMES	Regional Integrated Early Warning System
RTI	RIMES Technical Inputs
RVI	Radar Vegetation Index
SAAO	Sub-Assistant Agricultural Office
SAC	SAARC Agriculture Centre
SAFFGS	South Asia Flood Forecasting System
SAHF	South Asia Hydromet Forum
SAR	South Asian Region
SESAME	Specialized Expert System for Agro-Meteorological Early Warning
SFP	Sectoral Focal Point
SID	Sindh Irrigation Department
SKHub	SAHF Knowledge Hub
SMS	Short Messaging Service
SoE	Statement of Expenditure
SOP	Standard Operating Protocol
SPI	Standardized Precipitation Index
SQL	Structured Query Language
STEP	Systematic Tracking of Exchanges in Procurement
SWM	Southwest Monsoon
THB	Thai Baht
ToR	Terms of Reference
ToT	Training of Trainers
TRIGRS	Transient Rainfall Infiltration and Grid-Based Regional Slope-Stability Analysis
TTL	Task Team Lead
TWG	Technical Working Group
UI/UX	User Interface/User Experience
UNRCO	United Nations Resident Coordinator's Office
USD	US Dollar
WAPDA	Water and Power Development Authority
WG	Working Group
WMO	World Meteorological Organization

CARE SOUTH ASIA

INTRODUCTION AND BASIC DATA		
Project Title	Climate Adaptation and Resilience for South Asia	
Project Development Objective (PDO)	To contribute to an enabling environment for climate-resilient policies and investments in select sectors and countries in South Asia	
Reporting Year	☐ 2020 ☐ 2021 ☐ 2022 ☐ 2023 ☒ 2024 ☐ 2025	
Reporting Semester	☒ 1st Semester ☐ 2nd Semester	
Country or Region	South Asia Region (Bangladesh, Nepal, Pakistan)	
Total estimate project cost (In Million US$)	39.5[1]	
Revised project cost (In Million US$)	-	
Project Components	Promoting Evidence-based Climate Smart Decision Making	**Cost US$ 10.00 M**
	Enhancing Policies, Standards and Capacities for Climate Resilient Development	**Cost US$ 24.00 M**
	Project Management and Specialized Support	**Cost US$ 5.50 M**

[1] Cost breakdown: 10.0 Million US$ allocated for Component 1 for which RIMES is responsible and 24.0 Million US$ allocated for Component 2 for which ADPC is responsible.

PDO Indicators by Objectives / Outcomes

Outcome Statement 1: Regional cooperation and information for climate resilience enhanced

Outcome Indicator 1.1: *Users in select sectors satisfied with access to data, information, and/or analytics in Regional Resilience Data and Analytics Services (RDAS) platform (Percentage)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	0.00	0.00	70.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	Assessment surveys are conducted to measure users' satisfaction on 3 aspects of RDAS development/operationalization, including i) co-development process, ii) system performance and utilization, and iii) products application and handholding support provided under the project. The final satisfaction rating will be available after completion of the third assessment.			

Outcome Indicator 1.2: *Users in select sectors satisfied with decision support systems and tools developed under the project (Percentage)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	0.00	75.74	70.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	Assessment surveys are conducted to measure users' satisfaction on 3 aspects of DSSs development/operationalization, including i) co-development process, ii) system performance and utilization, and iii) products application and handholding support provided under the project. The final satisfaction rating will be available after completion of the third assessment.			

Outcome Indicator 1.3: *Trainees in select sectors satisfied with training provided by RIMES under the project based on its relevance, coherence, effectiveness, impact, and sustainability (Percentage)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	0.00	87.59	70.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	A survey is conducted at the end of every training event. The average satisfaction rating under this indicator will be based on the latest trainings completed.			

Intermediate Results/ Outputs as per TOC

Output Indicator 1.1.1: *A regional-level resilience data and analytics services platform (RDAS) developed and accessible (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	3.00	4.00	5.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	RDAS is currently experimentally operational. Progress towards the target milestones (representing one point each) as per the results framework is as follows: 1. Completed: RDAS prototype has been completed in December 2021 2. Completed: RDAS user interface has been created and available in October 2022 3. Completed: RDAS has been experimentally operational since October 2022 4. Completed: RDAS has been connected to some DSSs, e.g., ADVISE Pakistan, NDRRMA DSS, etc. 5. In progress: RDAS is yet to be fully operational. RDAS CoPs are being conducted for guiding systems development. Additional regional datasets are being integrated into the system. RDAS is available at https://rdas.rimes.int			

Output Indicator 1.2.1: *Climate-informed decision-making tools and systems developed/ enhanced in focus countries (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	9.00	16.00	40.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	All DSSs are currently experimentally operational. Progress towards the target milestones (representing one point each) as per the results framework is as follows: 1. Completed: 8 prototypes have been completed, i.e., 2 in Bangladesh (NLAS & DSS for FFWC); 3 in Nepal (ADVISE, NAVIGATE, & DSS for NDRRMA); 3 in Pakistan (ADVISE for Punjab, ADVISE for Balochistan, & CLIM-PLANNeD) 2. Completed: 2 DSSs in Bangladesh (NLAS & DSS for FFWC), 3 DSSs in Nepal (ADVISE, NAVIGATE, & DSS for NDRRMA), and 3 DSSs Pakistan (ADVISE for Punjab and Balochistan, & CLIM-PLANNeD) are currently experimentally operational 3. In progress: All DSSs are expected to be fully operational by the end of December 2024 4. In progress: Beta version of mobile applications for ADVISE Punjab and ADVISE Balochistan are available for testing; mobile applications are expected to be developed by September 2024 5. In progress: DSSs/DSSs products are expected to be available and accessible to stakeholders by the end of September 2024.			

Output Indicator 1.2.1.a: *New climate-informed decision-making tools and systems developed (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	7.00	12.00	32.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	New DSSs: • **Bangladesh:** NLAS (DLS); available at https://nlas.dls.gov.bd/dashboard/home/ • **Nepal:** NAVIGATE (DoR); available at https://np-dor-test.rimes.int/ READY (NDRRMA); available at https://np-ready-test.rimes.int/ • **Pakistan:** CLIM-PLANNeD (MoPDSI); available at http://203.156.108.67:2080/ ADVISE (PAD); available at http://203.156.108.67:1080/ ADVISE (BACD); available at http://203.156.108.67:1180/ New Mobile Applications: • **Bangladesh:** BAMIS (DAE), NLAS (DLS) • **Nepal:** NAVIGATE (DoR), ADVISE (MoALD), READY (NDRRMA), • **Pakistan:** CLIM-PLANNeD (MoPDSI), ADVISE (PAD), ADVISE (BACD)			

Output Indicator 1.2.1.b: *Existing sectoral decision-making tools and systems enhanced (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	2.00	4.00	8.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	Existing DSSs: • **Bangladesh:** FFWC DSS (FFWC); available at http://ffwc.rimes.int/app/home/ • **Nepal:** NAMIS/ADVISE (MoALD); available at https://np-moald-staging.rimes.int/			

Output Indicator 1.2.2: *Gender-disaggregated data analytics developed that contributes to narrow the gender gap in climate change vulnerability (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	0.00	0.00	4.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	The following gender-disaggregated analytics will be developed by RIMES to track/monitor, over time, the involvement/participation of women and men in activities, including: • Participation in Capacity Building Activities by Gender			

	• Gender in Extension Services (for agriculture sector)/ Gender in Disaster Managers (disaster management sector) • Gender in Farming (for agriculture sector)/ Gender in Disaster Management Committee (disaster management sector) Gender disaggregated data, for Bangladesh (agriculture sector), Nepal (disaster management sector), and Pakistan (agriculture sectors in Punjab and Balochistan), will be collected through desk review/research, consultations in communities & sectoral institutions during trainings, etc.

Output Indicator 1.3.1: *Government officials trained by RIMES in targeted units/ departments to apply climate resilient standards and data analytics in policies, planning and investments (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	286.00	626.00	1,230.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	A total of 626 government officials were trained in Bangladesh, Nepal, Pakistan, and SAR from the start of the project until this reporting period; out of which, a total of 82 were female government officials.			

Output Indicator 1.3.1: *Government officials trained by RIMES in targeted units/ departments in Bangladesh to apply climate resilient standards and data analytics in policies, planning and investments (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	76.00	269.00	340.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	A total of 269 government officials were trained in Bangladesh since the start of the project, out of which, a total of 40 were female government officials. These include (i) monsoon CAF (4 female staff out of 32 government participants), 11 June 2023; (ii) winter CAF (7 female staff out of 44 government participants), 12 November 2023; (iii) training workshop on NLAS for core operational group of DLS (3 female staff out of 18 government participants), 29 April 2024; (iv) trainings on usage and utilization of kiosk devices for district and sub-district level officers at DAE (15 female staff out of 90 government participants), 5-16 May 2024; (v) workshop on agromet beneficiary data collection process for Union Assistant Agriculture Officers (4 female staff out of 52 government participants), 23 April to 12 May 2024; and (vi) monsoon CAF (7 female staff out of 33 government participants), 10 June 2024.			

Output Indicator 1.3.1: *Government officials trained by RIMES in targeted units/ departments in Nepal to apply climate resilient standards and data analytics in policies, planning and investments (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	0.00	123.00	340.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	A total of 123 government officials were trained in Nepal since the start of the project, out of which, a total of 16 were female government officials. These include (i) winter CAF at district-level (2 female staff out of 47 government participants), 20 February 2024; (ii) monsoon CAF at national-level (11 female staff out of 45 government participants), 13 May 2024; and (iii) monsoon CAF at province-level in Bagmati province (3 female staff out of 31 government participants), 12 June 2024.			

Output Indicator 1.3.1: *Government officials trained by RIMES in targeted units/ departments in Pakistan to apply climate resilient standards and data analytics in policies, planning and investments (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	183.00	183.00	330.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	A total of 183 government officials were trained, out of which, a total of 18 were female government officials. These include (i) monsoon CAF conducted on 15 June 2023 (11 female staff out of 83 government participants); (ii) winter CAF conducted on 6 December 2023 (6			

	female staff out of 72 government participants); (iii) training on ADVISE-BACD, from 30 October to 2 November 2023 (1 female staff out of 18 government participants); and (iv) training on ADVISE-PAD, from 25-27 November 2023 (10 government participants; no female staff participant)

Output Indicator 1.3.1: *Government officials trained by RIMES in targeted units/ departments in South Asia to apply climate resilient standards and data analytics in policies, planning and investments (Number)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	27.00	51.00	220.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	A total of 51 NMHS participants in SAR were trained, out of which, a total of 8 were female government officials. These include (i) training on RDAS on 29 November 2023 (7 female staff out of 27 government participants), (ii) weekly online Forecasters' Forum (10 government participants), (iii) training on ocean forecast customization from 20-24 May 2024 (8 NMHSs staff from Bangladesh, Maldives, and Sri Lanka); and (iv) DataEx Platform & ECMWF data extraction orientation on 24 June 2024 (1 female staff out of 6 DHM officials from Nepal).			

Output Indicator 1.3.1.a: *Women are trained among the staffs trained within targeted units/departments (Percentage)*

	Baseline	Actual Previous	Actual Current	End Target
Value	0.00	13.00	13.10	20.00
Date	12 May 2020	31 Dec 2023	30 Jun 2024	12 May 2025
Remarks	A total of 82 (13.10%) female government officials out of a total of 626 government officials were trained from the start of the project until this reporting period.			


PROGRESS
REPORT

Component 1: Promoting evidence-based climate-smart decision making
Outcome Statement 1: Regional cooperation and information for climate resilience enhanced

Outcome Indicator 1.1: *Users in select sectors satisfied with access to data, information, and/or analytics in Regional Resilience Data and Analytics Services (RDAS) platform (Percentage)*

Output Indicator 1.1.1: *A regional-level resilience data and analytics services platform (RDAS) developed and accessible (Number)*

Activities contributing to overall progress and achievement of outcome 1.1 and output 1.1.1 follows are elaborated below:

Activity 1.1.1 Develop the RDAS

Procurement

Mr. Nisar Ahmad and Mr. Amanuel Tsegaye (Full Stack Developers), Mr. Surajit Sinha (Climate Impacts Expert for Agriculture), Dr. Abdul Qayyum (Climate Impacts Expert for Planning), and Dr. Sudarsan Dey (Capacity Building Specialist) joined the team during this semester. Onboarding of remaining staff for RDAS enhancements/full development will be completed in July 2024.

Consultations

The WB ISR Mission, on 29 May 2024, reviewed the progress on the RDAS and recommended system enhancements, including integration of dynamic data (e.g. crop, soil, etc.) that could be linked to the DSSs, and the inclusion of Indian Ocean Dipole (IOD) and Madden-Julian Oscillation (MJO) as part of climate drivers in the El Nino impacts analytical tool.

Data collection, processing, and analysis

Work during this period focused on the data requirements for the Growing Degree Days (GDD) model. The model, for predicting/anticipating crops growth milestones, has been customized for Pakistan.

A key parameter of the model, the Normalized Difference Vegetation Index (NDVI), which provides information on crop health, is derived from the Moderate Resolution Imaging Spectroradiometer (MODIS). Images, with less than 20 percent cloud cover, are processed using the Google Earth Engine (GEE). The Radar Vegetation Index (RVI) from Synthetic Aperture Radar (SAR) images was explored to fill in the gaps owing to cloud cover in optical imagery.

Since the GDD model focuses on regions where agriculture is a prominent land use, identification of these areas was carried out using the Global Land Cover (GLC) data, aggregated at the tehsil level in Pakistan. Tehsils, where the agriculture area is greater than 20% of the total area are considered.

Crop production data on rice, wheat, cotton, and maize have been collected and processed for Punjab, Pakistan. These data are integrated into the *Analytics Pillar* for correlation analysis with other climate/sectoral impacts datasets.

Moreover, *Data Analysts* and *GIS Specialists* updated 14 datasets of the existing 212 datasets in the RDAS data repository. These datasets, including those updated, classified according to:

- Sector: environment (36), agriculture (65), water resources (32), disaster management (18), transport (15), economic (4), weather and climate (24), social (8), and admin (10).
- Coverage: global (155), regional (11) and national (46)
- Readiness of use: downloaded (139), External link (39), Google Earth Engine (34)
- Format: raster (117) and vector (52), other (34), and not specified (9)
- Source: World Bank (10), Universities (18), Government (10), Program/NGO (147), Data provider (17) and not specified (10).

Technical report on data collection/processing/analysis is detailed in Appendix 1.

RDAS Development

The RDAS landing page has been updated to simplify/streamline modules based on stakeholders' feedback during the RDAS training in November 2023. Moreover, the RDAS has been migrated and can be accessed through its new site at https://rdas.rimes.int.

Work on enhancing the RDAS is elaborated per the three pillars: (i) Data Pillar, (ii) Analytics Pillar, and (iii) Predictive Tools Pillar.

The *Data Pillar* has been enhanced to support a comprehensive workflow of data transformation and integration. Figure 1 illustrates how data moves from its initial unformatted state within a catalog to various end systems.

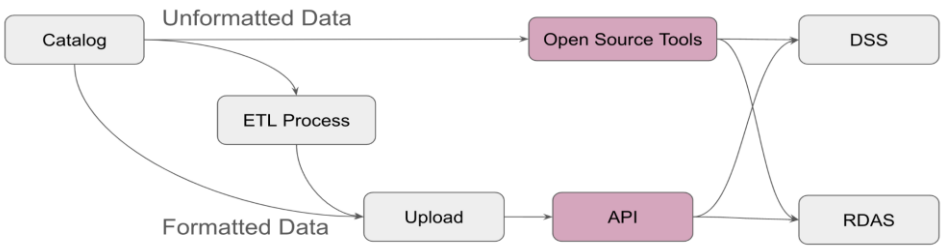

Figure 1. Data transformation and integration workflow for RDAS

The catalog is the starting point of the data, which holds both raw and unformatted data. It then follows an ETL Process (Extract, Transform and Load) which extracts the unformatted data from the catalog, transforms it into a usable format, and then loads the formatted data to the subsequent stage, for further processing.

The RDAS integrated a number of open-source tools to process unformatted data directly from the catalog. These tools perform various operations like data cleaning, data enrichment, and preliminary analyses. The processed or transformed data is then sent directly to the DSS or other RDAS pillars using the pre-built APIs from the open-source applications.

The use of the ETL process ensures data quality and consistency, while the deployment of open-source tools and APIs fosters flexibility and scalability within the data pipeline.

Work on the RDAS Data Pillar involved integration of (i) explore and chart view of data, including API for DSS integration, ii) minimum and maximum temperatures for SAR, obtained from Copernicus ERA5, which are required datasets for real time calculation of Growing Degree Days (GDD), among others, and iii) custom API for NDVI calculation and generation of clipped GeoTIFF files, per province and district of Pakistan, which are used in RDAS Predictive Tools.

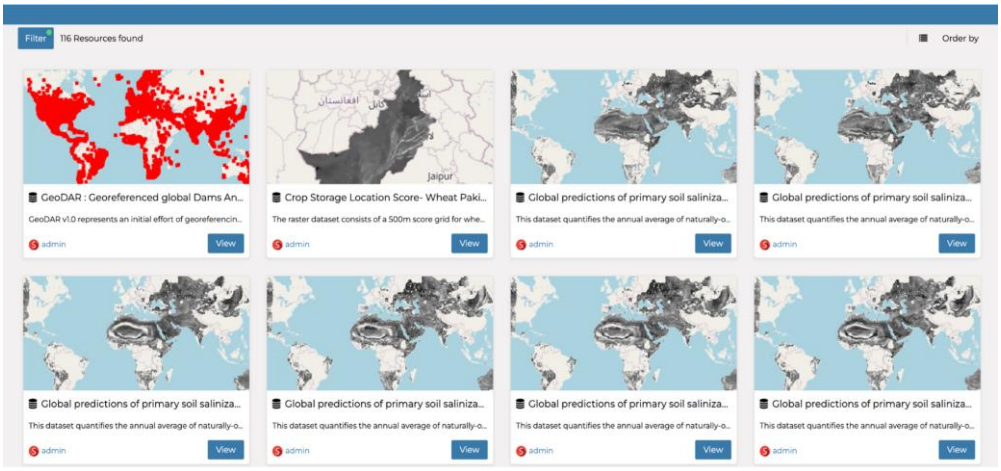

Figure 2. RDAS data repository

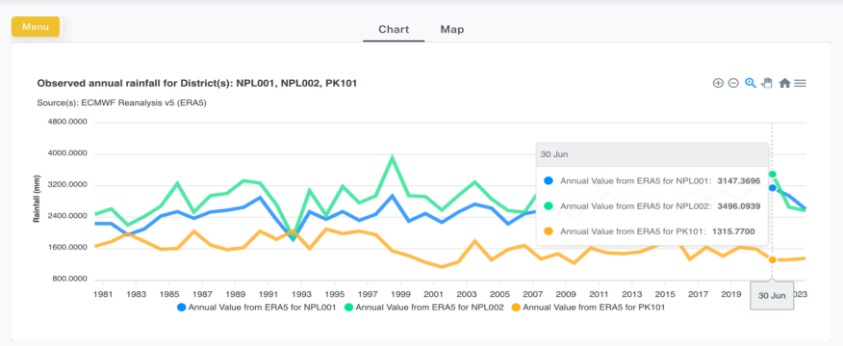

Figure 3. Comparative visualization of various datasets in the RDAS

Moreover, the El Nino, Climate and Agriculture Production analytical tool is currently embedded in the *RDAS Analytics Pillar*. The analyses in this pillar can utilize data directly from the RDAS Data Pillar or data uploaded by users.

The RDAS Analytics Pillar provides users a set of tools to enable analyses of time-series climate/sectoral datasets for identifying behavior patterns, and relationships between climate and sectoral parameters.

Work on this pillar focused on enhancements of the user interface and visualization tools, including, graphs, charts, geospatial maps, and model interpretation results that offer inferences/guidance to users, to ensure effective usage of the model/s; and enhanced capability of the tool to perform correlation analysis on multiple, interchangeable climate parameters such as crop production, rainfall, and El Nino. Two additional key climatic parameters, temperature fluctuations and their relationship with agricultural crop growth (GDD), were included, as these are crucial for understanding crop growth and agriculture production. These further aid in analyzing the impacts of El Niño on rainfall deviation, crop production, and others relevant. Moreover, the tool also integrates NDVI, for visualizing observed crop growth across different regions.

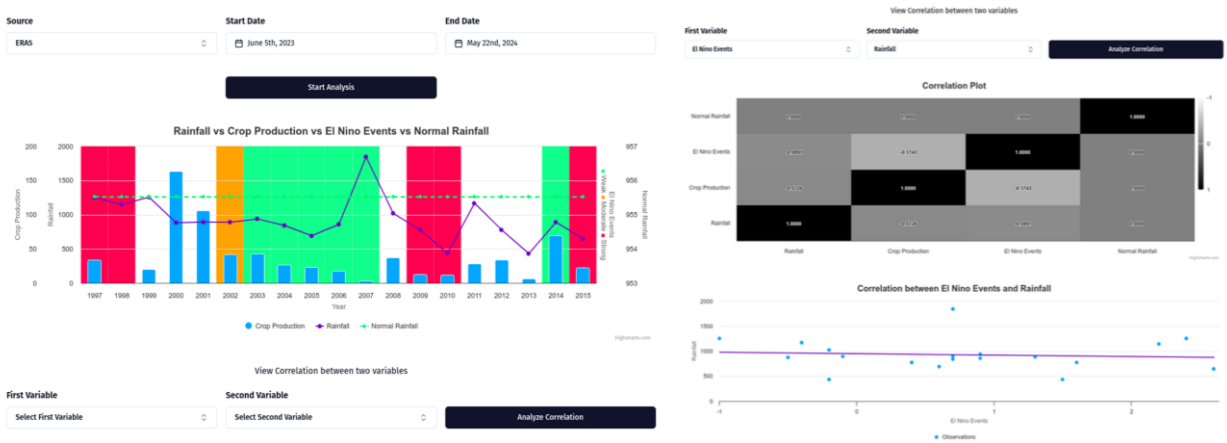

Figure 4. RDAS Analytical Tool for El Nino, Climate, and Crop Production: visualization (left) and correlation analysis (right)

Ongoing work involves the integration of various spatial tools for other climatic parameters that impact crop growth.

The *RDAS Predictive Tools Pillar* focuses on providing users with a set of tools for analyzing potential impacts of anticipated weather/climate phenomena per assessment of historical sectoral impacts, forecast data, and other prevailing conditions. Currently, the pillar has embedded 2 predictive tools, namely, (i) El Nino impacts on climate variability and crop production, and (ii) GDD/impact of high temperature on crop phenology/growth/yield. Several predictive models, ranging from simple regression to logistic regression models, have been incorporated into

the pillar, including automated analytics and visualization processes. The product includes preliminary analysis of the datasets, as well as performance metrics of the output model, visualization, and an interface to test the model.

Ongoing work explores the utilization/automation of complex models like random forest and time series analysis, and open-source crop simulation models.

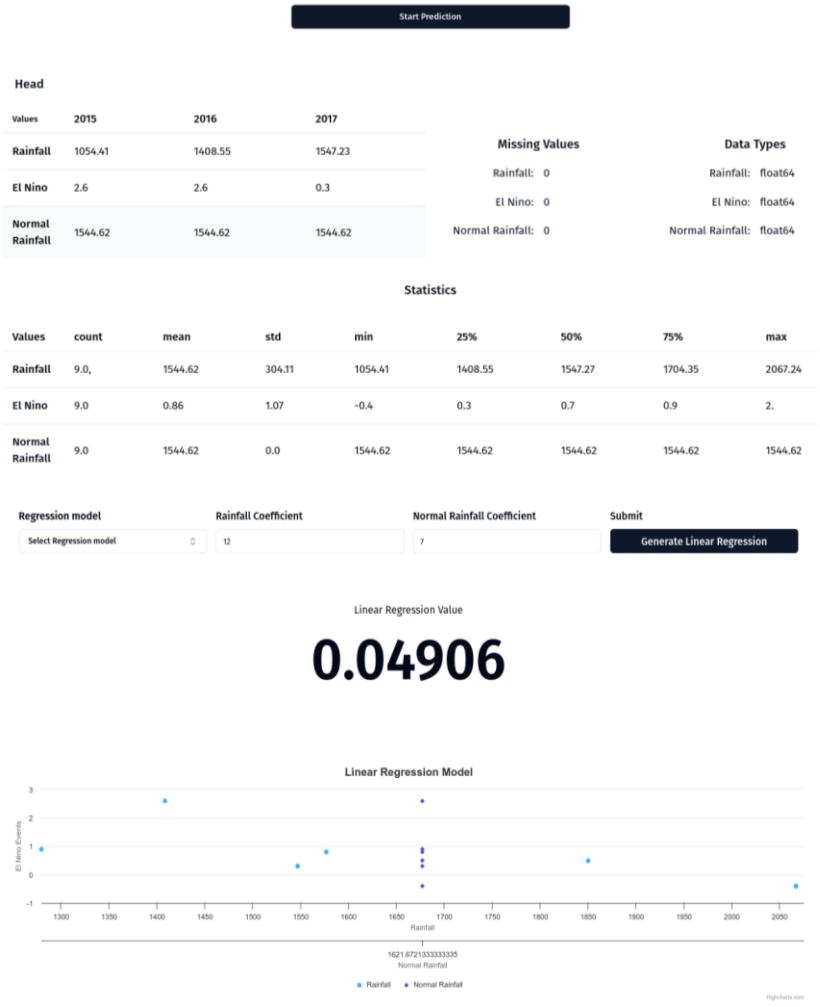

Figure 5. RDAS Predictive Tool for El Nino and Climate modeling using linear regression

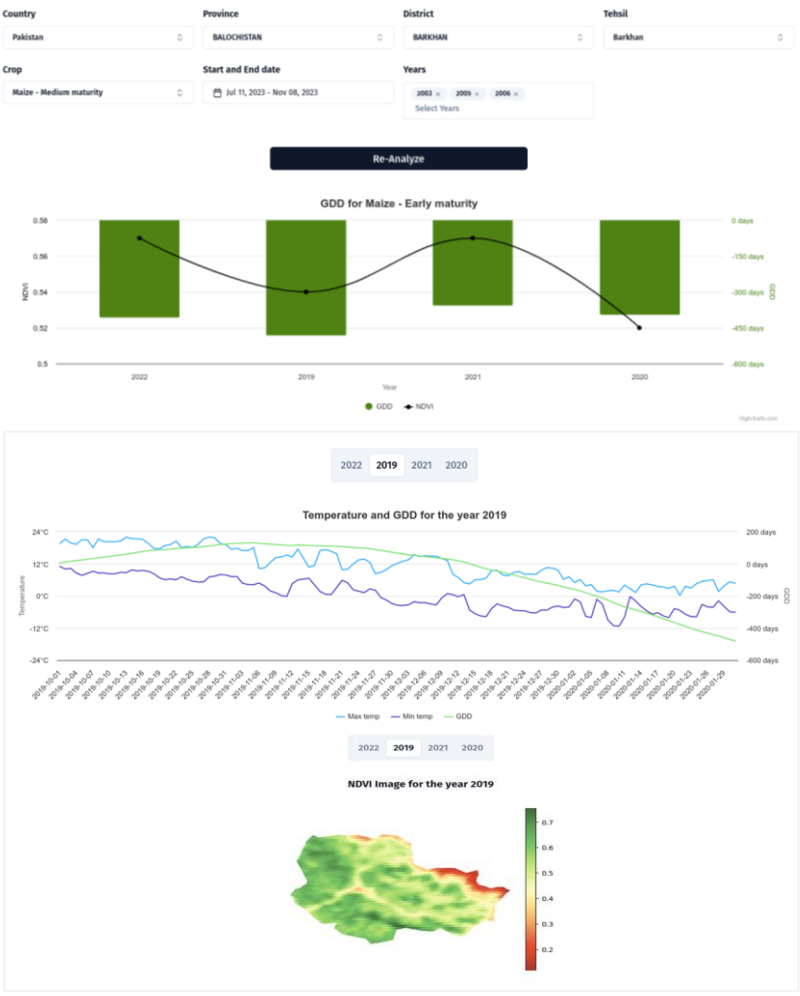

Figure 6. RDAS Predictive Tool for Growing Degree Days

The technical progress report on RDAS enhancement is in Appendix 2.

The system can be accessed through https://rdas.rimes.int.

Outcome Indicator 1.2: *Users in select sectors satisfied with decision support systems and tools developed under the project (Percentage)*

Output Indicator 1.2.1: *Climate-informed decision-making tools and systems developed/enhanced in focus countries (Number)*

Output Indicator 1.2.1a: *New climate-informed decision-making tools and systems developed (Number)*

Output Indicator 1.2.1b: *Existing sectoral decision-making tools and systems enhanced (Number)*

Output Indicator 1.2.2: *Gender-disaggregated data analytics developed that contributes to narrow the gender gap in climate change vulnerability (Number)*

Activities contributing to overall progress and achievement of outcome 1.2 and outputs 1.2.1 and 1.2.2 have been continuously undertaken. The national/sub-national DSSs, for climate-informing sectoral planning and decision-making, are expected to be fully operational by December 2024.

Milestones for DSSs development, under outputs 1.2.1, are as follows:

- DSSs experimentally operational by 30 June 2024
- Mobile applications completed by 30 November 2024
- DSSs deployed and fully operational by December 2024

RIMES is pursuing a co-development process with partner/recipient government institutions, to ensure the institutionalization of the DSSs and the capacity building of relevant staff (IT and domain experts), in partner/recipient government institutions, in operating and maintaining the DSSs, during and after project implementation.

Country- and activity-wise progress is provided in the following sections.

BANGLADESH

[BANGLADESH]

Procurement

In Bangladesh, Mr. Mohammad Monirul Islam (Country Coordinator), Dr. Ali Akbar (Climate Impacts Expert - Livestock), Mr. Abid Hasan (Administrative Assistant), Ms. Jessica Maria Gomes (Capacity Building Officer), and Mr. Md Mehmud Siddique (GIS Specialist) have been onboarded during this semester; onboarding of 1 Full Stack Developer and Data Visualization Expert will be completed in early July; hiring of additional staff, including, 2 Full Stack Developers for NLAS and FFWC, UI/UX Designer, Mobile Application Developer, Senior ICT Specialist and Senior Meteorologist for BMD will be completed by end of July.

Sectoral focal points

A total of 4 SFPs/IT focal points have been confirmed for Component 1 in Bangladesh. Table 1 identifies the SFPs in Bangladesh.

Table 1 List of sectoral focal points in Bangladesh as of 30 June 2024

Sector	Ministry/ Agency	Focal Point Details
Bangladesh		
Agriculture	**Department of Agricultural Extension (DAE)**	**Dr. Md. Shah Kamal Khan** Project Director, AMISDP
Livestock	**Department of Livestock Services (DLS)**	**Dr. Mohammad Shahadat Hossain** Upazila Livestock Officer, Planning and Evaluation Cell, DLS
Water	**Flood Forecasting and Warning Center (FFWC), Bangladesh Water Development Board (BWDB)**	**Engr. Sardar Udoy Raihan** Executive Engineer
Cross-cutting	**Bangladesh Meteorological Department (BMD)**	**Dr. Md. Shameem Hassan Bhuiyan** Meteorologist

Work Plan

Activities prioritized for Bangladesh under Component 1 are:

- *Support to the BAMIS of the DAE,* through i) development of mobile application for BAMIS, ii) development of web-based database of farmers, farmer leaders, extension workers, and local service providers, iii) development of monitoring system for agromet computer kiosks, iv) expansion of voice message dissemination, and v) demonstration of end-to-end agromet service delivery
- *Development of the NLAS of the DLS,* to generate the following key priority products: i) Special Decision Advisories for Extreme Events; ii) Monthly Decision Guidance for Livestock Production
- *Technical Support to FFWC,* through enhancement and transformation of its existing web portal into a DSS: i) Transboundary Water-level Monitoring; and (ii) Flash Flood Guidance for Forecasters.

Activity 1.2.1a
Support to BAMIS

Consultations

Meetings were carried out with relevant stakeholders in the agriculture sector during this reporting period. These include:

- Consultative meeting, on 20 March 2024, with Dr. Shah Kamal Khan and other government officials at Khamar Bari (DAE office), discussed the process of collecting multigroup beneficiary data in 4 pilot sub-districts in hazard hotspots: Sariakandi, Bogura (Monsoon Flood), Tahirpur, Sunamganj (Flash Flood), Tanore, Rajshahi (Drought), and Dacope, Khulna (Coastal Cyclone and Saline prone). Subsequent to this meeting, a total of 7,800 beneficiary data were collected by enumerators (Sub-Assistant Agricultural Officers) for validation and sharing with RIMES by the Upazila Agricultural Officer through the Agrometeorological Information System Development (AMIS) Project.
- The WB ISR Mission, on 29 May 2024, reviewed the progress of tools/activities to support BAMIS. A recommendation was made to include the farmers' bank account details in the database. RIMES informed that a mechanism to add such information can be integrated into the *Agromet Service Beneficiary Database Portal*.
- Consultative meeting, on 4 June 2024, with Dr. Shah Kamal Khan, BAMIS IT Engineer, and a consultant at Khamar Bari (DAE office), discussed about the server's required specification to ensure efficiency in BAMIS' operations.

Desk Review

Completed

Technical Review

Completed

User Needs Assessment

Completed

Tools Development

Work to support the development of tools for BAMIS, for this semester, are the following:

On agromet beneficiary database, i) extension of the farmers' beneficiary database to include other relevant stakeholders in the government, e.g., disaster management committee (DMC) members, local service providers, local journalists, community leaders, etc. to maximize the reach and application of agromet advisories, (ii)

digitization of 7,800 out of a target of 8,000 multi-group beneficiaries from 4 sub-districts in different hazard hotspots, Sariakandi, Bogura (Monsoon Flood), Tahirpur, Sunamganj (Flash Flood), Tanore, Rajshahi (Drought), and Dacope, Khulna (Coastal Cyclone and Saline-prone) as part of the primary data collection process, which include information on beneficiaries' name, gender, age, address, mobile number, (iii) integration of secondary sources, including, 32,813 DMC members' information from the Department of Disaster Management and 72,271 farmers' information from the Livestock and Dairy Development Project (LDDP) of DLS, into the database, (iv) removal of 1,175 inactive data from the initial 30,000 beneficiaries data provided by DAE, (v) ongoing enhancements to/updating of the database of the web-based application, *Agromet Service Beneficiary Database Portal,* and (vi) training of 52 Sub-Assistant Agriculture Officer from the 4 sub-districts on the agromet beneficiary data collection process, from April to May 2024.

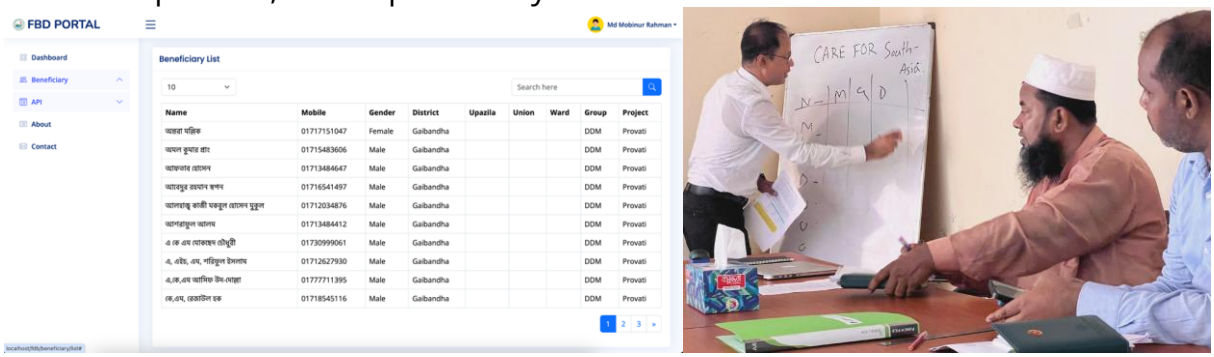

Figure 7. Farmers' Beneficiary Database Portal (left) and agromet beneficiary data collection training (right)

On Kiosk Monitoring System, (i) installation of the system by 109 out of 330 phone survey respondents; the system could not be installed by some respondents due to issues with the kiosk devices, (ii) flagging of kiosks that have issues or are not functioning to DAE, (iii) training of 90 DAE government officials from district and sub-district levels on the usage/utilization of the kiosk monitoring system in kiosk devices, in May 2024, and (iv) updating of the KMS application and publication to the Google Play Store, per feedback from training participants.

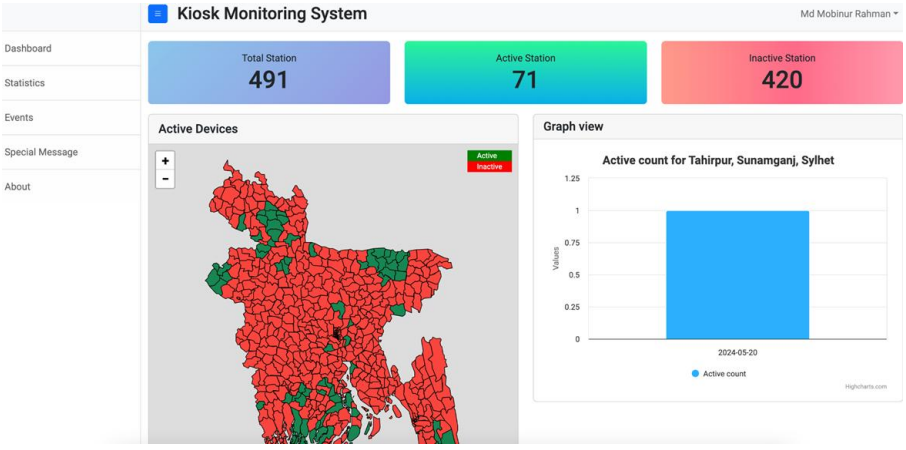

Figure 8. Status of kiosk devices in the Kiosk Monitoring System

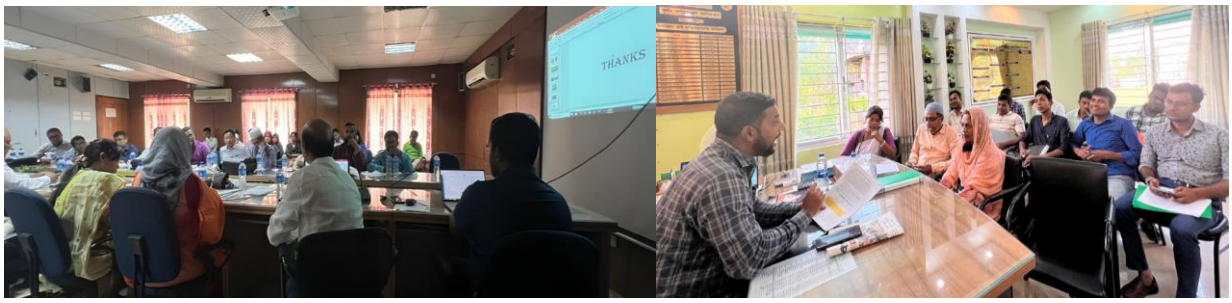

Figure 9. District and sub-district level training on Kiosk Monitoring System

Moreover, RIMES provided technical support to DAE in disseminating the Special Bulletin for Cyclone "Remal" by sending voice messages to 25,481 farmer beneficiaries; push notifications were sent to kiosks.

Refinements of DAE tools, per feedback from stakeholders, are ongoing. Development of the mobile application for BAMIS will commence with the onboarding of the mobile application developer, in July.

The web interface for farmers' database can be accessed through http://farmer.bdservers.site/.

The kiosk monitoring web app can be accessed through https://kms.bdservers.site/. The kiosk monitoring mobile app can be accessed through https://play.google.com/store/apps/details?id=com.saim.kms&pli=.

Activity 1.2.1b
Develop the NLAS

Consultations

In this semester, several meetings were organized with DLS and allied institutions in the livestock sector, including:

- Consultative meeting, on 6 March 2024, with DLS officials, Dr. Md. Reajul Huq, Director General, Dr. Moloy Kumar Shur, Director (Admin), and Dr. Mohammad Shahadat Hossain, Upazila Livestock Officer, Planning & Evaluation Cell, discussed the (i) formation of a core group at the national level consisting of 20 DLS officials from various areas of planning, epidemiology, and ICT, to oversee the operation of the NLAS and provide weather/climate forecast-based advisories, (ii) core group's roles and responsibilities, including, establishment/ implementation of NLAS operational protocols (e.g., advisory preparation, dissemination), regular monitoring and evaluation of the system's performance and functionality, facilitation of user training and support initiatives, and

collaboration with relevant stakeholders to continually enhance and expand the capabilities of the DSS, and (iii) plan for conducting the NLAS core group workshop.

- Participation of RIMES in the NAP EXPO 2024, from 22-25 April 2024, showcased/demonstrated the NLAS to various stakeholders and obtained feedback on potential enhancements.
- Consultative meeting, on 22 May 2024, with DLS officials, including Dr. Mohammad Bozlur Rahman, Director of Planning, and Dr. Mohammad Shahadat Hossain, Upazila Livestock Officer, Planning and Evaluation Cell, discussed the need assessment and training session for the NLAS in Rajshahi and Rangpur divisions, and requested the training of 170 field level officers in 2 divisions to get maximum benefit from the DSS

Figure 10. Demonstration of NLAS during the NAP EXPO 2024

Desk Review

Completed

Technical Review

No relevant systems currently in DLS or in allied institutions

User Needs Assessment

Completed

DSS Development

Work during this reporting period focused on the integration of NLAS into the DLS web domain, refinement of advisories, and review of the most suitable model for estimating weather/climate impacts to the livestock sector. The LivSim (Livestock Simulator) model has been selected for further evaluation and testing.

Further, voice messages associated with the heatwave alerts and advisories published by DLS in its website, have been disseminated to 72,271beneficiaries across 24 districts, in April 2024.

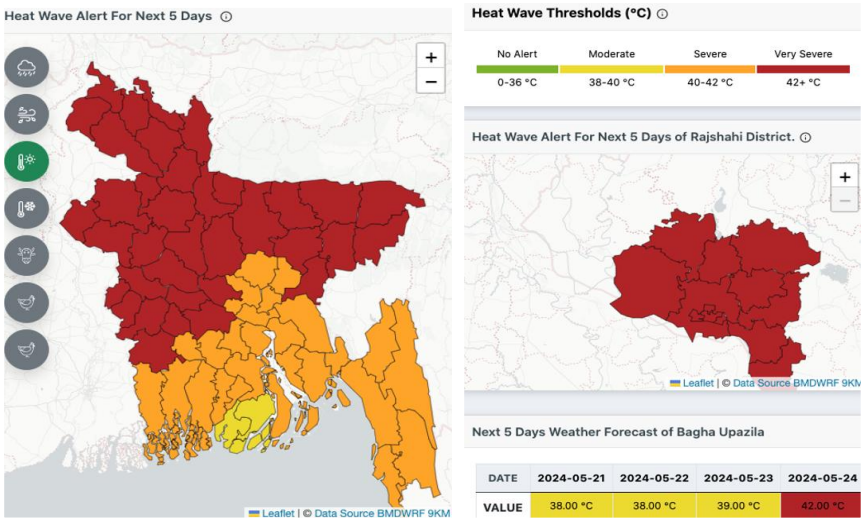

Figure 11. Heatwave alerts generated in NLAS in May 2024

Onward work for NLAS will focus on finalizing district-wise early warning and advisory bulletins; identification and integration of weather/climate-based thresholds/ models relevant to the livestock sector, into the DSS; implementation of a dynamic, date-wise alert system to enhance user experience and ensure timely notifications; and flood advisory template for livestock, designed to be activated by NLAS based on location-specific flood conditions.

The technical progress report on NLAS enhancement is in Appendix 3.

The system can be accessed through https://nlas.dls.gov.bd/dashboard/home or https://nlas-wb.rimes.int/.

Activity 1.2.1c
Technical Support to FFWC

Consultations

Consultations were carried out with FFWC and other stakeholders in the water sector, to guide the development of the DSS:

- Consultative meeting, on 16 January 2024, with FFWC officials, Engr. Sarder Udoy Raihan, Executive Engineer, Mr. Partho Protim Barua, Sub-Divisional Engineer, Mr. Mehadi Hasan, Assistant Engineer, and Mr. Sajol, Assistant Engineer, discussed (i) feedback on the enhanced modules for the Forecasters' Panel and identified priority products, (ii) enhancement of the feedback process/mechanism, and (iii) data availability issues and data sharing with third party stakeholders.

- Knowledge sharing with FFWC on AI/ML, on 13 February 2024, explored potential applications of AI/ML in FFWC DSS, obtained feedback on existing modules, and identified applications for FFWC DSS.

Figure 12. Interactive session with FFWC on AI/ML application in DSS

- Coordination meeting, on 29 February 2024, with FFWC officials and LOETECH (responsible for maintaining and operating FFWC data server), discussed individual work progress and agreed to resolve data acquisition issues in relation to the FFWC DSS. RIMES informed that data required for developing the DSS are not currently available within the existing data list, which presents a challenge on onward work; LOETECH assured swift action, committing to its immediate resolution. This proactive approach underscores both parties' dedication to overcoming obstacles and ensuring the project's successful progression.
- Consultative online meeting, on 20 April 2024, with FFWC officials discussed the progress of the DSS, obtained feedback and identified application for FFWC DSS.
- Coordination meeting, on 8 May 2024, with Muhammad Amirul Haq Bhuiya DG, BWDB, on the soft launching of the DSS.

Desk Review
Completed

Technical Review
Completed

User Needs Assessment
Completed

DSS Development
Per FFWC priority, work on the DSS' *Admin Panel* focused on (i) customization of user roles/access levels; (ii) incorporation of *Search & Filter* options, for quick lookups, faster updates, and increased efficiency; (iii) integration of an import/export mechanism, for manually importing files such as water level data, automated insertion of bulk files, and exporting database tables in various file formats; and (iv) integration of a feedback mechanism, for capturing users' perception of the system.

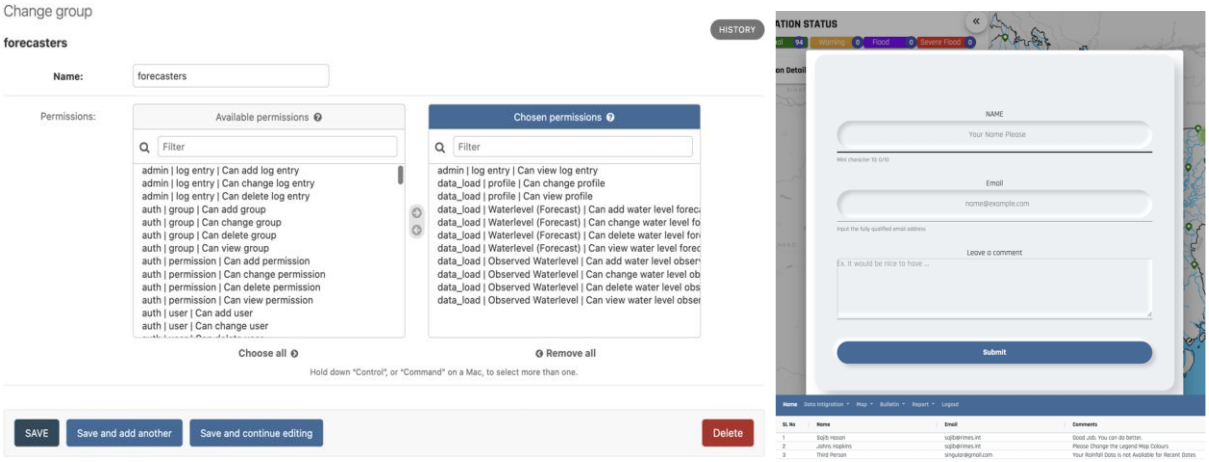

Figure 13. Admin Panel: user roles (left) and feedback mechanism (right)

Further enhancements to the *Forecasters' Panel,* include (i) integration of transboundary river data and generation/visualization of station-wise hourly-hydrographs, (ii) generation/visualization of automated rainfall distribution map using geospatial statistical methods from station-wise observed rainfall, (iii) development of flood vulnerability and exposure map (e.g., flood extent area, exposed people, affected cropland, affected urban areas), (iv) integration of deterministic/probabilistic flash flood forecasting models to generate/visualize short range (1-5 days) and medium range (1-10 days) forecast to enable timely flood impact assessment, (v) modification of flash flood prediction module based on rainfall-threshold in a basin, and (vi) server configuration for the FFWC portal.

Figure 14. Forecasters' Panel: basin-wise average rainfall (left) and hydrographs for short-range and medium-range flood forecast

Moreover, exploratory analysis has been conducted to find possible correlations between 4 upstream water stations, namely, Dhubri, Goalpara, Guwahati, and Pandu with the downstream Noonkhawa station, for applying ML techniques. Several prediction models have been applied on the dataset (i.e., 3 years of 3-hourly water level data of the selected stations) and results have been evaluated to find the best model.

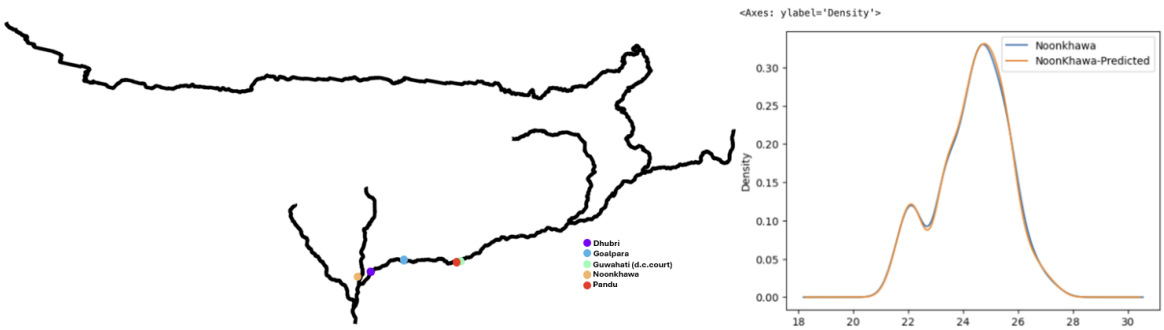

Figure 15. Predictive model based on analysis of correlations between upstream and downstream water level station data

Onward enhancement of FFWC's DSS will focus on enhancing the feedback module based on user requirements and integration of a module for reporting bugs, within the portal. Other recommendations by FFWC in January include integration of water level data for linked stations (upstream-to-downstream) along a river or basin and potential data synchronization from the FFWC server when users upload data into a folder.

The technical progress report on FFWC DSS enhancement is in Appendix 4.

The system can be accessed through http://ffwc.rimes.int/app/home.


NEPAL

[NEPAL]

Procurement

Several staff have been onboarded during this semester, including Dr. Mohan Bahadur Chand and Mr. Shankar Bhattarai, Climate Impacts Expert for DRM and Agriculture, respectively; Mr. Suman Baral (GIS Specialist); 4 full stack developers, Mr. Kaylin Khanal, Mr. Jitendra Singh, Mr. Sushan Shakya, and Mr. Saurav Bajracharya; Mr. Abhishek Shrestha (UI/UX Designer); and Mr. Anil Bhandari (Capacity Building Officer); onboarding process of 2 Project Assistants for Madhesh and Bagmati provinces, and 2 Mobile App Developers, will be completed in July.

Sectoral focal points

A total of 7 SFPs/IT focal points in Nepal has been confirmed for CARE Component 1. Table 2 provides the status of SFPs in Nepal.

Table 2 List of sectoral focal points in Nepal as of 30 June 2024

Sector	Ministry/ Agency	Focal Point Details
Nepal		
Agriculture	**Ministry of Agriculture and Livestock Department (MoALD)**	**Mr. Bishnu Hari Devkota** Senior Agriculture Extension Officer **Mr. Chet Bahadur Roka** Senior Statistician
Transport	**Department of Roads (DoR)**	**Mr. Kesab Prasad Ojha (SFP)** Unit Chief, HMIS-ICT and GESU **Mr. Supritam Raj Shrestha (IT)**
Disaster Risk Management	**National Disaster Risk Reduction and Management Authority (NDRRMA)**	**Mr. Rajendra Sharma (SFP)** Undersecretary (Technical) **Mr. Jyoti Khanal (IT)**
Cross-cutting	**Department of Hydrology and Meteorology (DHM)**	**Ms. Bibhuti Pokharel** Senior Divisional Meteorologist Chief- Climate Section

Work Plan

In Nepal, priority activities for DSS development under Component 1 are:

- *Development of the DSS for DoR,* also called, *National Vehicular and Transport Resilient Gateway (NAVIGATE),* to generate: i) Road Safety Alerts; ii) Road Closure/Maintenance Advisories; iii) Transport Resilience Options; and iv) Data Repository
- *Upgrading of the NAMIS/developing of Agro-Advisory System (ADVISE) for MoALD,* to include: i) 3-7 Days Decision Guidance; ii) Seasonal Decision Guidance; iii) Long-term Climate Adaptation, and vi) Data Repository
- *Development of the DSS for Multi-Hazard Early Warning* of the NDRRMA, to generate: i) Lightning Alerts; ii) Flash Flood Decision Guidance; iii) Forest Fire Alerts; and iv) Landslide Impact Forecasting

Activity 1.2.1d Developing the Climate-Resilient Road Operations and Infrastructure DSS

Consultations

Several meetings were carried out with stakeholders in the transport sector during this reporting period. These include:

- Consultative meeting, on 31 January 2024, with DoR officials, Mr. Sushil Babu Dhakal, Mr. Keshab Raj Ojha (CARE SFP), Mr. Bimal Shrestha, and Ms. Manda Panta, reviewed RIMES' proposed additional products designs and obtained feedback on potential products that can be developed per DoR's mandate. Key action points from the meeting: for DoR, (i) sharing of climate impacts data on transport systems, (ii) provision of inputs to the advisories templates, and (iii) sharing of updated SRN and bridge data for integration into the DSS; for RIMES, (i) demonstration of the enhanced DSS and (ii) sharing of updated server and smart screen specifications to DoR for evaluation, noting potential scaling up of modules to other districts.

Figure 16. Consultative meeting with DoR on 31 January 2024

- Consultative meeting, on 6 March 2024, with DoR officials, demonstrated the latest updates on NAVIGATE; proposed potential transport models/applications and advisories for integration into the DSS, including a road and bridge closure alert module and DOR dissemination process; and discussed data requirements and availability, and server and smart screen requirements. DoR informed that the DSS should focus on the national highway, as it is within their mandate; requested to proceed with integration of proposed modules and advisories templates based on DoR data, and agreed to provide impacts data for the last 5 years, including server access to RIMES.

Figure 17. Presentation of proposed transport modules for NAVIGATE on 6 March 2024

- Coordination meeting, on 29 April 2024, with Mr. Supritam Shreshta, DoR, Mr. Chet Bahadur Roka, MoALD, and DHM officials, Ms. Bhibuti Pokhrel, Mr. Shiva Nepal, Mr. Dinkar Kayastha, Mr. Sunil Pokhrel, Mr. Sangha Ratna Shakya, and Mr. Biraj Kandel demonstrated the DSSs, discussed areas for collaboration on data sharing to develop models for integration into the DSS, recommended to consider river cross sections for flood level that may affect roads and bridges, use of FFGS data for flash flood advisories, and requested RIMES to provide DHM with a request letter on data requirements/data sharing.
- Consultative meeting, on 19 June 2024, with DOR officials, presented progress/ updates on the DSS and the climate impacts data provided by DoR to RIMES; discussed data requirements from DHM, advisories to be generated for mobile application, and server requirements; and recommended sharing of the list of advisories to be generated in the DSS, for DoR's review. In addition, DoR expressed interest in the integration of the landslide model to the DSS, including advisories that can be generated from this.
- Consultative workshop, on 24 June 2024, with DoR officials, demonstrated the latest updates in NAVIGATE; and discussed system implementation and functionality issues, including communication, alert distribution, data limitation, maintenance work integration, and user compatibility. Key challenge identified is lack of digital data on bridge locations and subsidiary roads. Recommendations included enhancing communication through regular meetings, defining alert distribution protocols, digitizing bridge data, developing flexible access management, implementing road maintenance-specific alerts, and potential integration of SMS-based alert dissemination system.

Figure 18. Pre-SFP meeting (mini-workshop) at DOR on 24 June 2024

- SFPs meeting, on 27 June 2024, convened officially designated SFPs and other relevant stakeholders in DoR, MoALD, and NDRRMA, and allied government institutions, the World Bank, and RIMES. Key recommendations/feedback from stakeholders on NAVIGATE are (i) inclusion of dynamic analysis of landslide hazards, in addition to flash flood hazards, in road closure alerts, noting many road closures are associated with landslide events, (ii) ensure user-friendliness of the DSS, to facilitate easy access of local road information by commuters, (iii) implement a crowd-sourcing feature, including uploading of geotagged photos, for real-time updates on road closures; suggested to refer to NDRRMA's Volunteer Management System, for addressing validation challenges, (iv) broader alerts dissemination through SMS, social media, and local media, while considering cost-effectiveness for sustainable operations, (v) displaying of road closure information on highway boards and integration of NAVIGATE alerts in the NDRRMA DSS, to increase accessibility, (vi) engagement of provincial and local governments in onward work in NAVIGATE, with clear guidelines/processes for accessing and utilizing data/information, (vii) enhancement of collaboration between DoR, DoLI, and DHM, to enable inclusion of subsidiary and local roads into the DSS, and thus, enhance suggestions on alternative routes in the DSS; and allow dynamic and seamless integration of observation and forecast data, for better risk analysis on particular road networks, (viii) incorporation of analysis of climate/weather-based potential damages on roads/bridges infrastructures, for possible mitigation of such damages, and (ix) development of a users' guide/SoPs in using/maintaining the DSS.

Figure 19. Demonstration of NAVIGATE (left) and SFP providing feedback (right)

Desk Review
Completed

Technical Review
Completed

User Needs Assessment
Completed

DSS Development

Work for this reporting period include integration of (i) roads and bridges information from DoR, (ii) ECMWF rainfall forecast and SAsiaFFGS forecast, (iii) rainfall-based road safety alerts/advisories at district level, (iv) flash flood-specific alerts for SRN, (v) road and bridge closure alerts, (vi) road closure history, (vii) time-series analytics on registered vehicles, (viii) weather/climate impacts data, (ix) blackspot analysis.

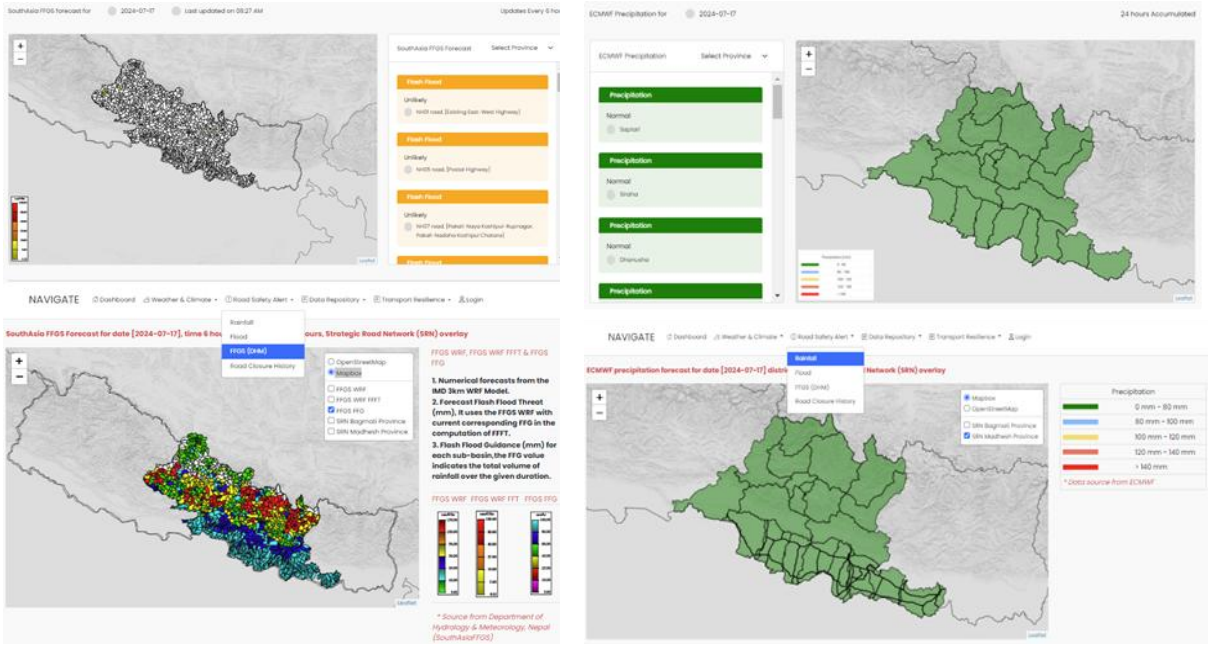

Figure 20. ECMWF rainfall forecast (left) and SAsiaFFGS forecast (right)

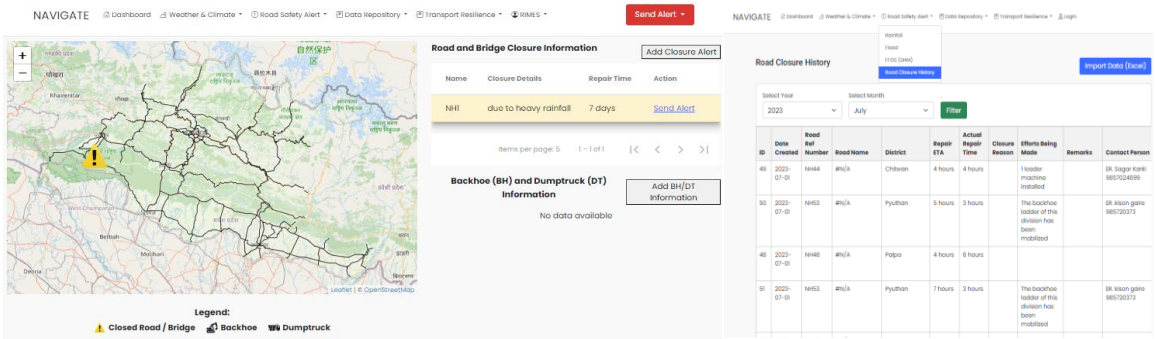

Figure 21. Road and Bridge Closure alert (left) and Road Closure History (right)

Figure 22. Data Repository: Registered Vehicles (left), Weather/Climate Impacts Data (middle), and Transport Resilience: Road Blackspot Map (right)

Onward improvements in NAVIGATE will focus on (i) enhancement of the user interface; (ii) integration of feedback from DoR (currently includes *Road Closure History Upload*); (iii) statistics/analytics for the uploaded *Road Closure Data* (including, but not limited to, monthly closure report, district-wise closure report, road-wise closure report, average time taken to solve the closure); (iv) research on potential use of climate impacts data to determine the impact on the road; (v) research on potential use/correlation of heavy rainfall with the *Road Closure History* data; (vi) identification of missing roads data in Bagmati and Madhesh Province; and (vii) validation of flash flood advisories.

The technical progress report on NAVIGATE enhancement is in Appendix 5.

The system for DoR can be accessed through https://np-dor-test.rimes.int.

Activity 1.2.1e Upgrading NAMIS

Consultations

The following consultation meetings have been pursued during this semester to guide the development of the DSS:

- Consultative meeting, on 31 January 2024 with officials from MoALD and allied institutions, Dr. Sanjeev Kumar Karna, Dr. Prakash Kumar Sanjel, Mr. Bishnu Hari Devkota (CARE SFP), Ms. Richa Shah, Mr. Dahal Prasad Pudasaini, Mr. Chet Bahadur Rokaya, and Mr. Lakshya Bahadur Chaudhary, discussed updates/feedback on ADVISE, its sustainability, security, server specifications, and handover plan; customization of impact-based advisories; status of data within NAMIS and development of a new DSS for MoALD that could be easily integrated into NAMIS or vice versa. Key action points for MoALD are (i) high-level internal discussion on the way forward for NAMIS/ADVISE, (ii) formation of a committee of at least 5-7 key experts to provide continuous inputs/guidance to DSS development, including NARC, AITC, DoA, DHM, DoIT, GIDC, etc., (iii) sharing of NAMIS technical documentation with RIMES, as and when retrieved by/available in MoALD, and (iv) official communication confirming development of a new/separate DSS, but which can easily be integrated into NAMIS or vice versa.

Figure 23. Consultative meeting with MoALD on 31 January 2024

- Consultative meeting, on 1 Feb 2024 with AITC, Dr. Sanjiv Pandit, to discuss on the data on livestock, which could be used for both RDAS and DSS. He also suggested to include epidemiological data in the DSS, if possible, geographical or district wise advisories generation.

Figure 24. Consultative meeting with AITC on 1 February 2024

- Consultative meeting, on 5 March 2024, with key officials from MoALD and allied institutions, Mr. Bishnu Hari Devkota, Mr. Chet Bahadur Roka, Mr. Rameshwor Rimal (NARC), Mr. Pratik Joshi, and Mr. Lakshya Chaudhary, reviewed updates/obtained feedback on ADVISE and NAMIS; discussed DSS features such as user roles/access especially for data entry, methods of dissemination to farmers, e.g., email, sms, apps notification; recommended implementation of agro-ecological-based rather than province-wise advisories, inclusion of filtering options for specific years/seasons/months when accessing crop coverage charts/data, incorporation of past events/ observations into home page, as the current system is showing only alerts for a week. Key action points for MoALD are (i) share official communication to RIMES to continue development of a new/separate DSS from NAMIS, (ii) officially inform RIMES on the formation of the technical working group, (iii) high-level meeting in April to present progress of the DSS and receive feedback, and (iv) share details on NAMIS, as and when retrieved.

Figure 25. Consultative meeting with MoALD and allied institutions on 5 March 2024

- Consultative meeting, on 29 March 2024, with Mr. Chet Bahadur Roka, Mr. Lakshya Chaudhary, discussed the NAMIS portal source code, server storage required for the DSS, and issues with data access from DHM. Recommendations from the meeting included development of an MOU between MoALD and DHM to address data access issues and sharing of reports, crop calender, and historical pests data by MoALD.
- Coordination meeting, on 29 April 2024, with Mr. Supritam Shreshta, DoR, Mr. Chet Bahadur Roka, MoALD, and DHM officials, Ms. Bhibuti Pokhrel, Mr. Shiva Nepal, Mr. Dinkar Kayastha, Mr. Sunil Pokhrel, Mr. Sangha Ratna Shakya, and Mr. Biraj Kandel presented updates to the DSSs, discussed collaboration on data sharing, and recommended to consider soil data from NARC/MoALD's survey department, inclusion of DHM technical team in MoALD's TWG, and official communication to DHM on the request for data.
- Consultative workshop, on June 25, 2024, with the TWG at MoALD, discussed progress of ADVISE, including system access, data management, content creation, and stakeholder engagement, as well as issues related to provision of access to municipalities, potential content duplication with existing systems, the need for value addition, integration of automated forecast data, geo-positioning for zone-specific advisories, and coordination with provincial governments. Recommendations included enhancing system functionality, improving content, establishing governance protocols, and ensuring effective stakeholder engagement. Strategic actions were proposed to facilitate adoption of ADVISE.

Figure 26. Pre-SFP meeting with TWG at MOALD on 25 June 2024

- SFPs meeting, on 27 June 2024, convened officially designated SFPs and other relevant stakeholders in DoR, MoALD, and NDRRMA, and allied government institutions, the World Bank, and RIMES. Key recommendations/feedback from stakeholders on ADVISE are (i) tailoring of advisories to agro-ecological zones rather than political boundaries, (ii) integration of farmers' database developed by MoALD into the DSS, for more targeted advisories generation via SMS, (iii) displaying of DSS information in public spaces such as palika offices and agricultural markets, to increase accessibility, (iv) localization of the DSS/DSS products during its experimental phase, (v) collaboration with research institutes, to take advantage of available researches for enhancing crop-specific interventions/advisories, (vi) validation of advisories by respective/relevant organizations, to serve as reference for insurance companies when dealing with claims, (vii) inter-country learning/knowledge sharing in improving the DSS, (viii) updates on the retrieval of NAMIS and potential integration of other features available in NAMIS into the DSS, (ix) cross-partnerships among and between government institutions, for data/experiences/expertise sharing, and enhancing the DSS/DSS products, (x) enhancement of collaboration between MoALD, DHM, and other relevant institutions, (xi) development of a users' guide/SoPs in using/maintaining the DSS.

Figure 27. Demonstration of ADVISE (left) and feedback from the agriculture sector (right)

Desk Review
Completed

Technical Review
Completed

User Needs Assessment
Completed

DSS Development
Work for this reporting period include integration of (i) configurable advisory for specific pest, and for specific province and/or district; (ii) alert generations for pests

and crops thresholds; (iii) development of GDD model for cropping calendar; (iv) *Data Repository* for crops, cropping coverage, pests, crop-threshold; and (v) user management/ access control and emailing system.

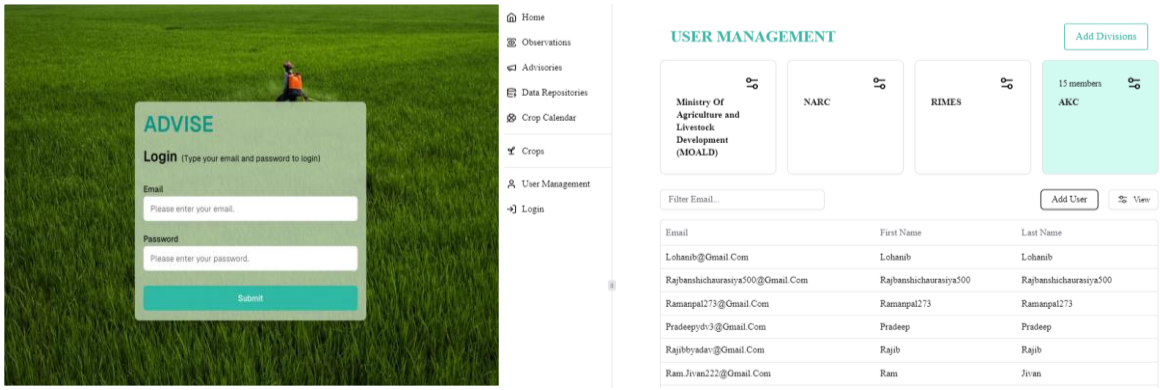

Figure 28. ADVISE login panel(left) and user management/access control management (right)

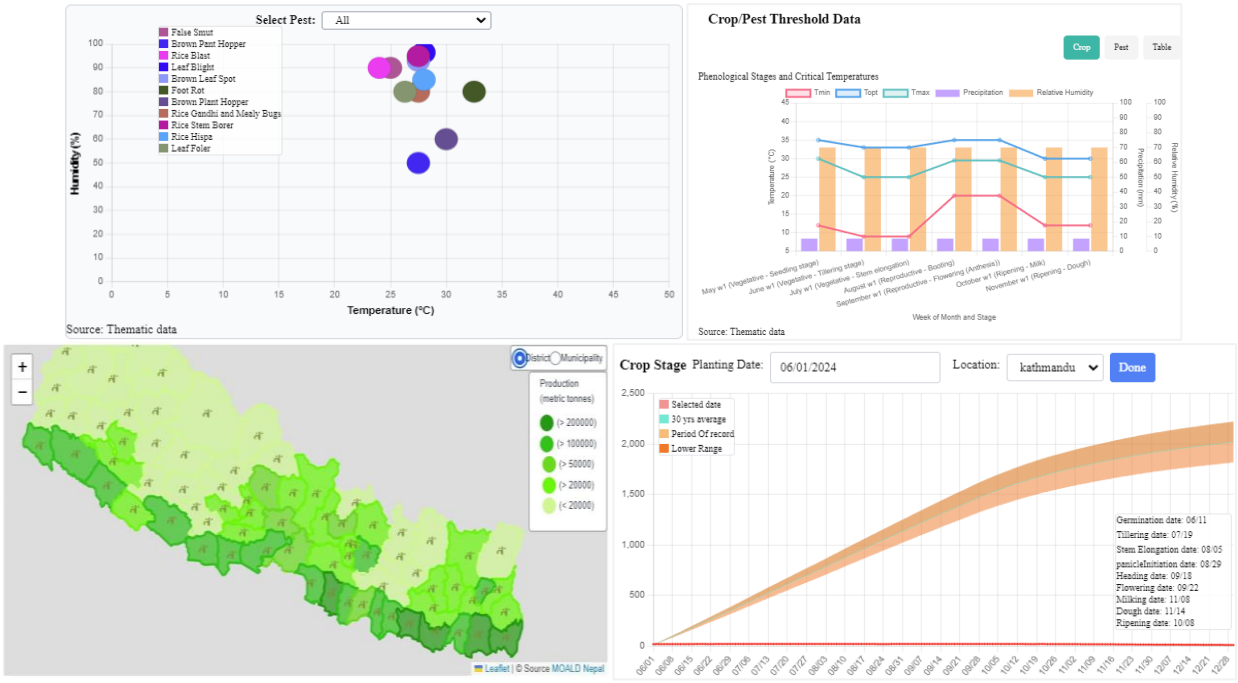

Figure 29. Data Repository: Pest Threshold (top left), Phenological Stages and Critical Temperatures (top right), Crop Production map (bottom left), and Growing Degree Days chart (bottom right)

Crop Threshold

CROP ID	TEMPERATURE MIN	TEMPERATURE MAX	TEMPERATURE OPT	RELATIVEHUMIDITY	PRECIPITATION	STAGE	ACTIONS
paddy	12-13	25-30	35	70-80	8.6	Seedling stage	
paddy	9-16	20-25	33	70-80	8.6	Tillering stage	
paddy	9-16	20-25	33	70-80	8.6	Stem elongation	

Figure 30. Crop-weather threshold for rice

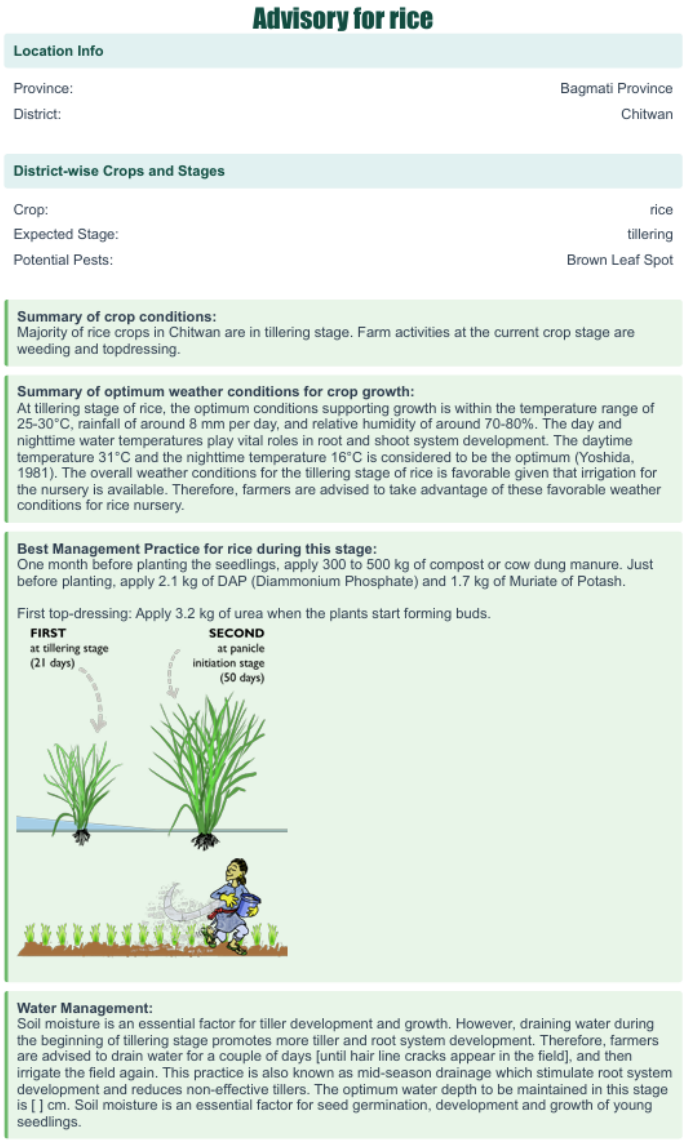

Figure 31. Generation of Crop-specific advisories

Onward work for ADVISE will focus on user interface enhancements, per stakeholder feedback/requirements, (ii) validation of data sources used in the system, (iii) improvement of data visualization and language localization of advisories, and (iv) enhancement in dissemination of advisories.

The technical progress report on ADVISE enhancement is in Appendix 6.

The system can be accessed through https://np-moald-staging.rimes.int/

Activity 1.2.1f
Developing the DSS for Multi-Hazard Early Warning

Consultations

The following are the highlights from the various review/consultations undertaken with NDRRMA, for this semester:

- Consultative meeting, on 2 February 2024, with NDRRMA officials, Mr. Anil Pokhrel, Chief Executive, Mr. Rajenda Sharma, Undersecretary and CARE SFP, and Mr. Jyoti Khanal, IT focal point, discussed data assessment outcomes/recommendations and sharing of BIPAD data with RIMES. Key action points for NDRRMA are (i) sharing of risk assessment guidelines, (ii) sharing of data from BIPAD, and (iii) meeting with DHM on data sharing; for RIMES, (i) sharing of revised data assessment report incorporating comments from NDRRMA, including a checklist of ideal datasets for BIPAD, (ii) integration of relevant Gender Equality, Disability, and Social Inclusion (GEDSI) details into the advisories, (iii) discussion with People in Need (PIN) regarding availability of landslide thresholds and other relevant data, and (iv) sharing of server and smart screen specifications, for review of NDRRMA.

Figure 32. Consultative meeting with NDRRMA on 2 February 2024

- Consultative meeting, on 7 March 2024, with Mr. Rajendra Sharma, Mr. Jyoti Khanal, Mr. Anil Kumar Mandal, and Mr. Sachin, reviewed progress of and obtained feedback on further development of the DSS, discussed datasets in BIPAD, and recommended stationing of RIMES developers at NDRMMA, for effective communication of requirements and easy access to BIPAD. Key action points for RIMES are (i) sharing of revised data assessment report, (ii) potential integration of OSM and census data into the DSS, (iii) identification of models

for flash flood, landslide, and risk analysis, (iv) development of advisory template for NDRRMA's review.

Figure 33. Consultative meeting with NDRRMA on 7 March 2024

- Consultative meeting, on 19 April 2024, with SFPs, presented the overall progress on DSS development, and discussed updates on flash flood modeling and data needed from DHM. NDRRMA submitted a request letter to DHM, following the meeting, to address data requirements.
- Consultative meeting, on 19 June 2024, with NDRRMA team, including the new Joint Secretary, Mr. Arjun Prasad Bam, elaborated on the latest updates on the DSS. Recommendations from NDRRMA include (i) detailed demonstration of the system to all the staffs, (ii) capacity building activities for the operation of the DSS, including a request for a training on lightning protection, and (iii) potential scaling up of the DSS modules to other parts of the country.

Figure 34. Consultative meeting with NDRRMA on 19 June 2024

- Consultative meeting, on 26 June 2024, with NDRRMA officials, presented updates on DSS development and highlighted the need to host the system in a government domain, which NDRRMA will further discuss with GIDC and share with RIMES. Key discussion points during the meeting included the need for updated household data, concerns on data acquisition and quality control capabilities of local authorities, and standardization of hazard icons.

Suggestions for improvement included prioritizing data updates, enhancing local data collection capacity, aligning visual elements with the BIPAD portal, standardizing terminology, and establishing a regular review process.

- SFPs meeting, on 27 June 2024, convened officially designated SFPs and other relevant stakeholders in DoR, MoALD, and NDRRMA, and allied government institutions, the World Bank, and RIMES. Key recommendations/feedback from stakeholders on READY are (i) use of social media platforms for alerts and advisories dissemination, (ii) integration of palika-level information and refinement of advisories to be more user-friendly, (iii) DSS products to provide value-addition to data/information from relevant systems and institutions, i.e., integration of insights for decision-making, particularly for local governments, into the DSS information on lightning, forest fire, and flash floods, among others, (iv) conduct local visits in pilot areas to validate/obtain local insights on how to refine/further customize DSS alerts/information, (v) implementation of the Common Alerting Protocol (CAP) should be undertaken through DHM, given the protocols/processes in the utilization of CAP, (vi) provision of access to NAVIGATE and ADVISE alerts to NDRRMA, to enhance reach and impacts of such alerts, (vii) development of a common interface for all 3 DSSs, (viii) ensure a simple design and accessibility to all end-users, particularly local governments with limited technical expertise, (ix) ensure flexibility of the DSS to integrate and customize other hazards and risks in the future, (x) complementarity of the DSS with DHM's existing 13-hazard alert system without duplication or conflicting information, (xi) strengthening of engagement with government officials to firm-up and validate data/information products from the DSS, (xii) cross-partnerships among and between government institutions, for data/experiences/expertise sharing and enhancing the DSS/DSS products, and (xiii) development of a users' guide/SoPs in using/maintaining the DSS.

Figure 35. NDRRMA stakeholders providing feedback on READY

Desk Review

Completed

Technical Review

Completed

User Needs Assessment

Completed

DSS Development

During this reporting period, work on the NDRRMA DSS involved i) integration of forest fire outlook from Ministry of Forest and Environment (MoFE), ii) exploration of various lightning forecast sources and integration of one of them in the DSS, (iii) integration of South Asia Flash Flood Guidance System (SAsiaFFGS) for a pilot municipality, iv) development and integration of Transient Rainfall Infiltration and Grid-Based Regional Slope-Stability Analysis (TRIGRS) model for landslide hazard mapping of a pilot district/municipality, v) development of evacuation routes module and household clusters module, and vi) dissemination of email alerts.

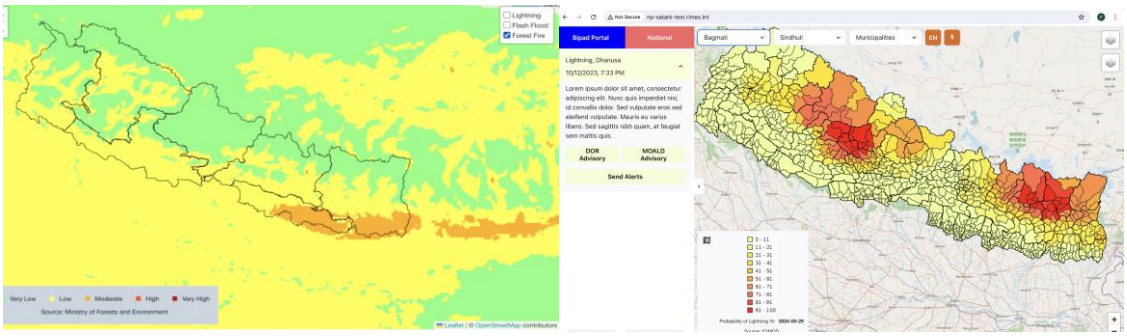

Figure 36. Forest Fire Alerts module (left) and Lightning Alerts module (right)

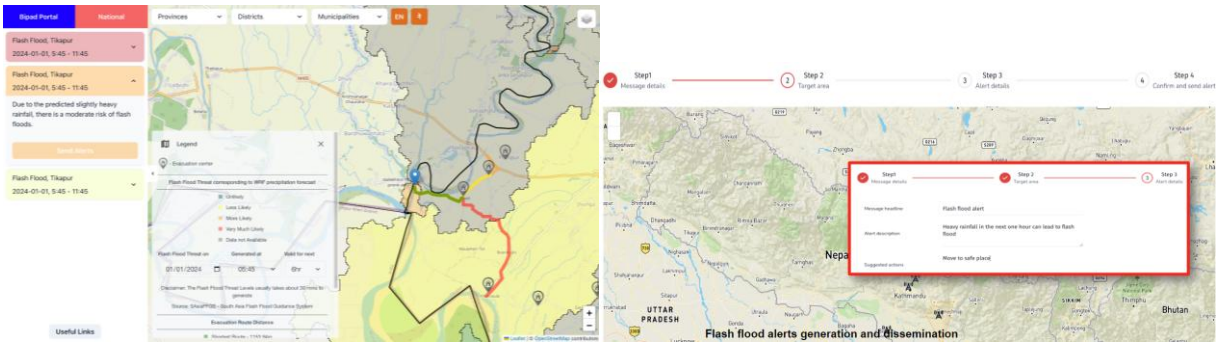

Figure 37. Flash Flood Alerts module: evacuation routes (left) and alerts generation and dissemination (right)

Planned enhancements for READY will involve (i) user interface enhancements, per feedback and requirements of NDRRMA, (ii) validation of data sources used in the system, (iii) exploration of other data sources, especially for lightning, for integration into the system, (iv) integration of available exposure and vulnerability data from National Statistics Office, and (v) integration of social media platforms for alert and advisory dissemination.

The technical progress report on READY enhancement is in Appendix 7.

The system can be accessed through https://np-ready-test.rimes.int/


PAKISTAN

[PAKISTAN]

Procurement

A total of 9 staff joined the Pakistan team during this semester, including Dr. Ishfaq Ahmad and Mr. Imran Inam, Climate Impacts Experts for Agriculture in Punjab and Balochistan, respectively; full stack developers, Mr. Kamran Danish, Mr. Tayyab Jan, Mr. Muddassir Manzoor, Mr. Asif Ullah, 2 mobile application developers, Mr. Muhammad Luqman and Mr. Syed Raza Abbas; and Ms. Sehrish Ayub (Capacity Building Officer); onboarding process for National Advisor, 2 Full Stack Developers, Data Visualization Expert, UI / UX Designer, and Project Assistant, will be completed in July.

Sectoral focal points

A total of 4 SFPs for Pakistan have been confirmed for Component 1.

Table 3 provides the status of SFPs in Pakistan.

Table 3 List of sectoral focal points in Pakistan as of 30 June 2024

Sector	Ministry/ Agency	Focal Point Details
Pakistan		
Planning *(Convener of SFP in Pakistan)*	**Ministry of Planning, Development and Special Initiatives (MoPDSI)**	**Mr. Yasir Gul** Assistant Chief, Planning
Agriculture	**Punjab Agriculture Department (PAD)**	**Mr. Asif Hameed Quereshi** Chief, Planning and Evaluation Cell
	Balochistan Agriculture and Cooperatives Department (BACD)	**Mr. Juma Khan Tareen** Director Plant Protection Agriculture, Agriculture Research Institute Quetta
Cross-cutting	**Pakistan Meteorological Department (PMD)**	**Mr. Mahr Sahidzad Khan** Director General

Work Plan

DSS development work will focus on the planning sector at the Federal level, and agriculture sectors in Punjab and Balochistan, for Pakistan. Priority activities for Component 1 are:

- *Development of the Climate-Informed Planning DSS,* to generate key products for MoPDSI: i) Crop Suitability to Observed Climate Trends and Projected Future Climate; ii) Cleaning and Greening the Transport Sector; and iii) Data and Analytics for Hazard Impacts
- *Development of the SESAME for Punjab,* to generate key products for PAD: i) 3-10 Days Decision Guidance for PAD, PAD Extension Service, and farmers; ii) Monthly/Seasonal Decision Guidance for PAD, PAD Extension Services, and farmers; and iv) Long-term Adaptation Options for PAD. Key crops identified for Punjab are cotton and rice.
- *Development of SESAME for Balochistan,* to generate key products for BACD: i) 7-Days Decision Guidance; and ii) 7-Days Guidance for Decision Makers in BACD. Key crops identified for Balochistan are apple, tomato, olive and dates.

Activity 1.2.1g Developing Climate-Informed Planning DSS

Consultations

The following meetings have been pursued during this period to guide the development of the DSS:

- Consultative meeting, on 28 March 2024, with MoPDSI officials, Ms. Nadia Rehman, Member FSCC, Mr. Jawad Rabbani, Chief, Mr. Yasir Gul, Assistant Chief Planning, and Mr. Bilal Khalid, WB Pakistan TTL, discussed the progress and planned onward work of CLIM-PLANNeD, updates on the ADVISE DSSs for PAD and BACD, and nomination of domain experts/focal points for transport, and planning and development. MoPDSI recommended the (i) streamlining of focus of CLIM-PLANNeD to its Agro-Suitability module, to provide guidance to MoPDSI and other relevant ministries/departments in prioritizing suitable crops in future time slices, (ii) inclusion of pulses and oilseeds in addition to the identified priority crops of wheat, rice, maize, and cotton, and consideration of seasonality (Rabi and Kharif) for maximum effectiveness, in modeling crop suitability, (iii) enhancement of scope of the Cleaning and Greening Transport module to include cost of cleaning and greening the country's transport sector and identification of potential areas for harnessing clean/green transport systems and associated facilities, (iv) integration of a tool for assessing targets vis-à-vis the Government of Pakistan's Nationally Determined Contribution (NDC), relevant to carbon emissions, (v) integration of weather/climate impacts/damages data repository, for deriving thresholds, (vi) use of proxy data, where data is not available, and (vii) linkage of advisories disseminated from ADVISE to CLIM-PLANNeD, for coordination of efforts, including integration of integration of analytics of the number of advisories generated/disseminated, for regular monitoring of DSSs operationalization. Key action points for MoPSI are (i) following up on official requests for data with relevant ministries/departments, and (ii) provision of required documentation and processes for handover of CLIM-PLANNeD and its server to MoPDSI; for RIMES provision of (i) technical and user manuals and trainings, following the handover, and (ii) technical troubleshooting support for ADVISE, as needed, post-CARE, to ensure its continued operationalization and sustainability.

Figure 38. Consultative meeting with MoPDSI on 28 March 2024

- Consultative meeting, on 5 July 2024, with Dr. Anwaar Ahmed, Agriculture Expert at MoPDSI, and Mr. Yasir Gul, elaborated the current features of the DSS and discussed mechanisms for reviewing its products (e.g., monthly review meetings/feedback), access to the system, capacity building of IT staff for maintaining the system, and requirements for system handover, which will involve submission of an official communication to MoPDSI, and organizing an academic conference towards the latter part of the year on climate change impacts on agriculture.

Desk Review
Completed

Technical Review
No relevant systems currently in MoPDSI or in allied institutions

User Needs Assessment
Completed

DSS Development
The following modules were developed during this semester: (i) Agro-Suitability Pro, (ii) Green Transport, (iii) Data and Analytics, and (iv) Resources.

The **Agro-Suitability Pro** module provides users a dynamic tool for analyzing/ assessing suitability of crops in various areas in Pakistan, per climate, soil, crop and water availability parameters. In addition to priority crops identified for analysis, i.e., wheat, rice, maize, and cotton, the tool is expected to integrate pulses and oilseeds, per stakeholder recommendations, during the next phase of development. Work on this module focused on (i) integration of crop suitability model, (ii) processing of model data requirements, (iii) visualization of crop suitability layers, overlaying the overall crop suitability, along with its analysis parameters (e.g., temperature, water requirement, soil pH, soil root depth) in raster format, and district-wise crop suitability in vector format, and (iv) development/ integration of templates for crop

suitability outlook, to provide guidance to farmers on the most appropriate crop to cultivate, per district.

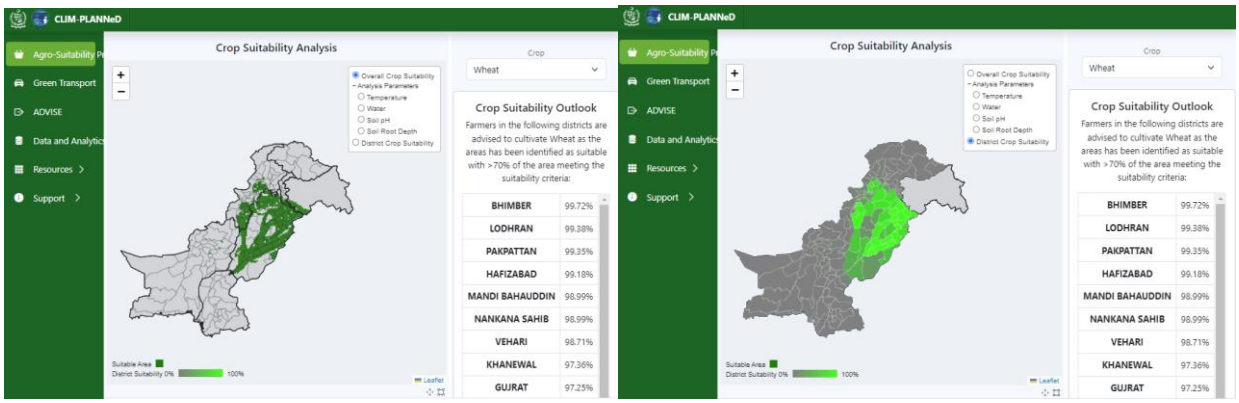

Figure 39. Agro-Suitability Pro module featuring overall crop suitability (left) and district-wise crop suitability (right) in Pakistan

Ongoing work/enhancements to this module will focus on (i) integration of climate projections data in 5-year time slices using CMIP6, and (ii) integration of pulses and oilseeds, per feedback from stakeholders.

The **Green Transport** module takes stock of carbon emissions from land vehicles and assesses carbon emissions in various time slices in the future given different carbon mitigation measures. Work on this module included (i) integration of the double exponential smoothing (DES) model, for modeling future carbon emissions, (ii) processing of model data requirements, (iii) graphical visualization of model outputs, and (iv) development/integration of templates for carbon emissions outlook, to provide guidance to stakeholders in the transport sector on potential interventions to take.

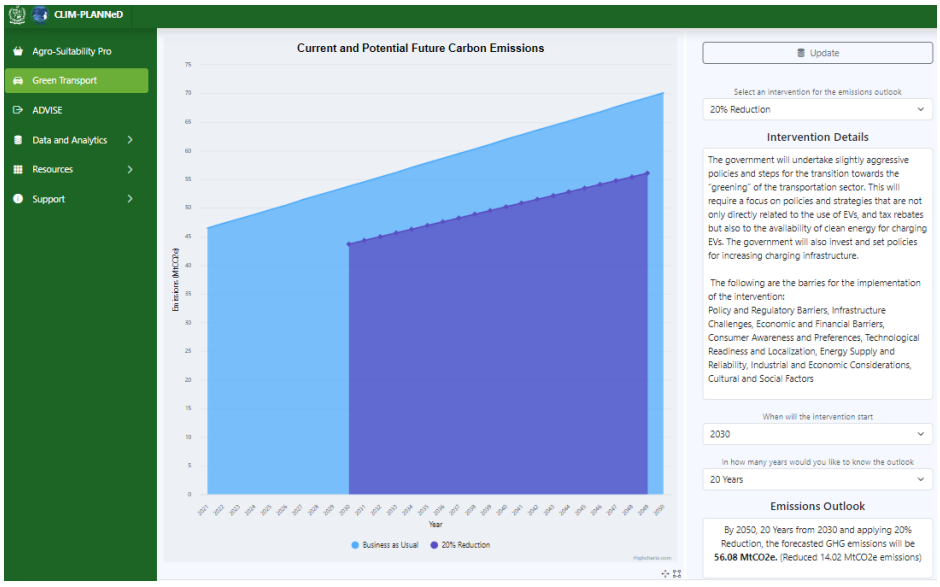

Figure 40. Green Transport module featuring business as usual vs. 20% reduction of carbon emissions scenarios, including intervention details and emissions outlook from year 2030 to 2049

The **Data and Analytics** module provides insights on the historical climate events and disasters which affected Pakistan since 1950. Due to limited availability of event-specific hazard/disaster information in the country, the module utilized datasets from the Emergency Events Database (EM-DAT). Work on this module involved (i) processing/disaggregation of climatological, hydrological, and meteorological datasets at district/province/country-levels, (ii) spatial/graphical visualization of data/analytics, in terms of total number/frequency of hazard/s, casualty per hazard/s, economic impacts per hazard/s, disaggregated at district/ province/country levels. Further enhancements/refinements to this module are being undertaken until the end of this year.

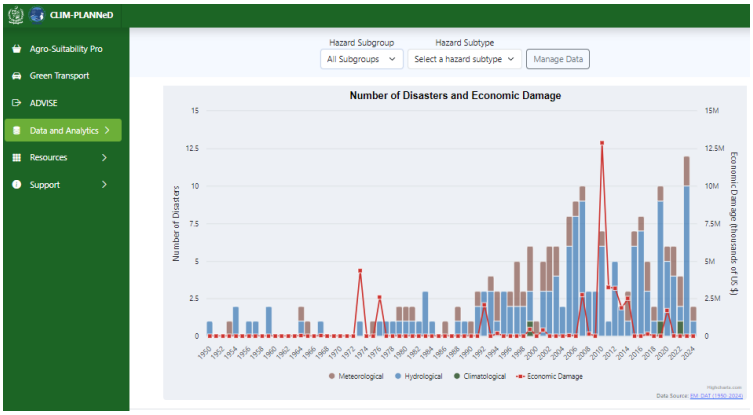

Figure 41. Analytics on Numbers of Disasters vs. Economic Damage

The module will enable MoPDSI staff to dynamically record hazard events and their impacts, as these events happen, and impacts/damages are recorded. Diligent integration of data on hazard events and their impacts will enable MoPDSI and other stakeholder institutions in Pakistan to track these hazards and their impacts, analyze correlations and patterns, and use these to anticipate weather/climate-related impacts/damages in the future.

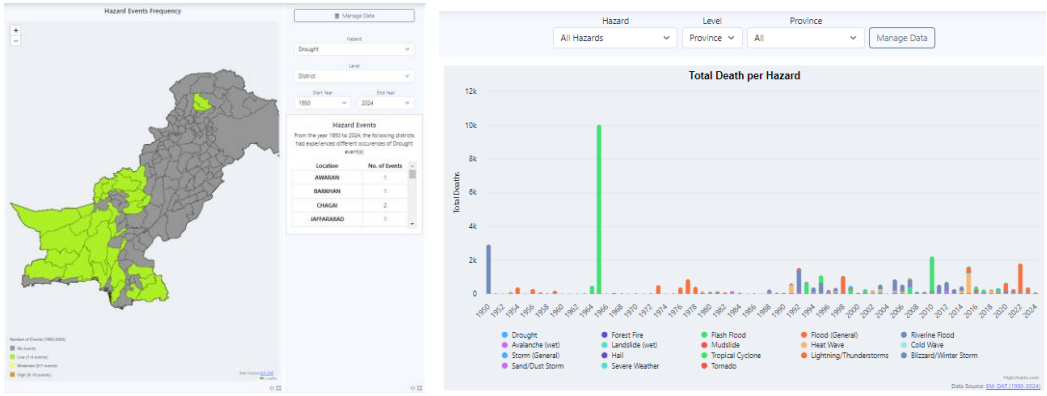

Figure 42. Analytics on district-wise hazard frequency (left) and casualty per hazard (right)

The **Resources** module features hosting and linkage of supplemental content to the DSS, including *Technical Papers* and *Projects,* which can be easily accessed, downloaded, or shared. Work done on this module involved (i)

processing/disaggregation of projects into key categories, (ii) integration of a tool for storing relevant research papers, disaggregated per sector, (iii) integration of a tool for categorizing projects, disaggregated per search as well as project analytics.

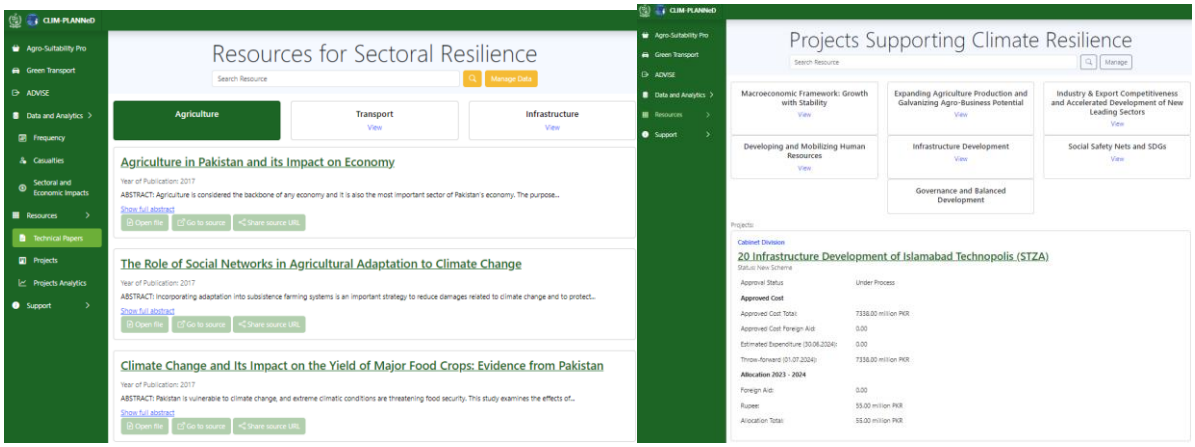

Figure 43. Technical Papers module (left) and Project module (right)

Figure 44. Project Analytics: Number of Projects per Division (left), Total Approved Project Cost per Category (middle), and Number of Projects per Cost Range (right)

The technical progress report on CLIM-PLANNeD enhancement is in Appendix 8.

The system can be accessed via *http://203.156.108.67:2080/.*

Activity 1.2.1h
Developing SESAME for Punjab

Consultations

Meetings were undertaken with relevant stakeholders in the agriculture sector in Punjab. These include:

- Consultative meetings, from 21-26 March, with officials from PAD, Mr. Adnan Mukhtar, Assistant Chief Planning and Evaluation and CARE SFP, Dr. Mirza Waseem Abbas, Deputy Director, Dr. Sabeen Fatimah, and Assistant Director of Plant Protection, Dr. Abdul Qayyum, DG CRS, discussed updates and received feedback on ADVISE development, data availability per confirmation of CRS and

Directorate of Pest Warning and Quality Control of Pesticides (DPWQCP), confirmation on DSS hosting by the Directorate of Extension Services, with a module/tool for pest forecasting dedicated to the DPWQCP.

Figure 45. Consultative meetings with PAD on 21 March (left) and CRS on 25 March (right)

Figure 46. Consultative meetings with DPWQCP on 25 March (left) and Extension Service and farmer leaders on 26 March (right)

- Consultative meeting, from 13 May 2024, with PAD officials, Mr. Adnan Mukhtar, Assistant Chief Planning and Evaluation, Mr. Haroon Ghani, Director of Agriculture-Plant Protection, Dr. Sabeen Fatimah, and Assistant Director of Plant Protection, discussed the current status and planned enhancements for ADVISE, including acquisition/integration of data from PAD, CRS, and plant protection, finalization of draft advisory, integration of ECMWF data in addition to PMD data for continuity, sustainability considerations following system handover, and use of proxy data where data availability is limited, particularly, for historical crop damage data. Key action points for PAD are (i) provision of requisite datasets, such as, historical crop data, crop monitoring map, cropping patterns zonation, irrigated/non-irrigated areas, historical crop damage datasets, and (ii) review of advisories by nominated PAD domain experts and forwarding to relevant department for dissemination via WhatsApp group of PAD; for RIMES, (i) provision of technical trainings and user manuals following handover of ADVISE, and (ii) detailed demonstration during the planned SFPs meeting.

Desk Review
Completed

Technical Review
Completed

User Needs Assessment
Completed

DSS Development

DSS development work for this period is detailed per module: (i) Observation and Latest Forecast, (ii) 3 Days Advisory, (iii) Monthly Advisory and Seasonal Advisory, (iv) Data Repository, (v) Resources, and (vi) Crop Resilience.

The **Observation** and **Latest Forecast** modules provide information on observed rainfall, maximum and minimum temperatures, for the latest day, past 7 days, and past 30 days; and 3-day forecast on rainfall, maximum and minimum temperatures, respectively. Work on this module involved (i) processing of geospatial data, such as, administrative boundary, (ii) integration of observation data from PMD via API, (iii) integration of 3-day forecast from PMD via API, (iv) integration of ECMWF forecast, as an alternative source of forecast data, (v) tabular, graphical, and spatial visualization of observation and forecast data.

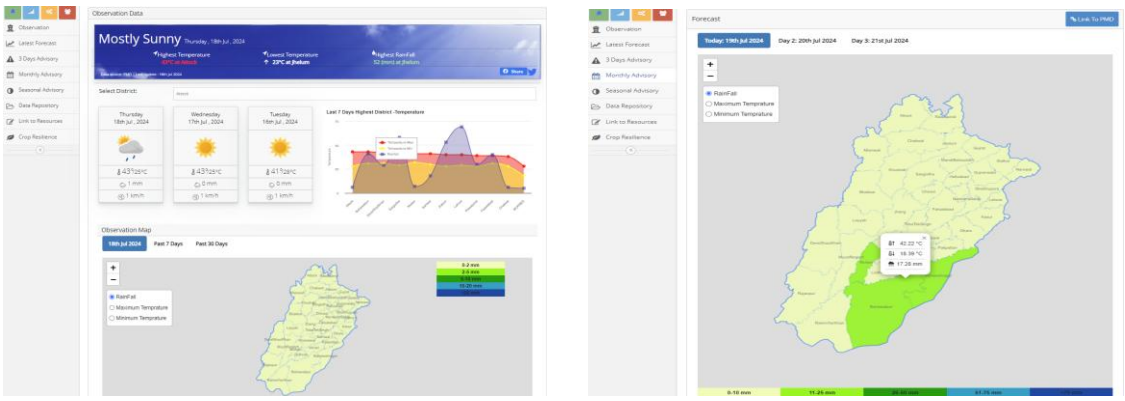

Figure 47. Observation module (left) and Latest Forecast module (right) in ADVISE for Punjab

The **3 Days Advisory** module generates and disseminates district-level crop advisories, with information on district-wise crops and crop stages, observed ground conditions, optimum weather conditions for crop growth, 3-day weather forecast conditions, and crop productivity management measures, including pest management measures and irrigation management, based on the 3-day forecast of rainfall, humidity, maximum and minimum temperatures. Work on this module included (i) integration of geospatial data, such as administrative boundary, (ii) preparation of templates for data input and crop advisories, (iii) integration of weather/crop thresholds for rice, wheat, cotton, and maize, (iv) integration of 3-day

forecast data from the *Latest Forecast* module in ADVISE, (iv) development of advisory module to get inputs on crop activities and observed crop condition using the data inputs template, (v) development of a mechanism/model for automated generation and disseminating advisories based on the advisory template, and (vi) visualization of advisory map.

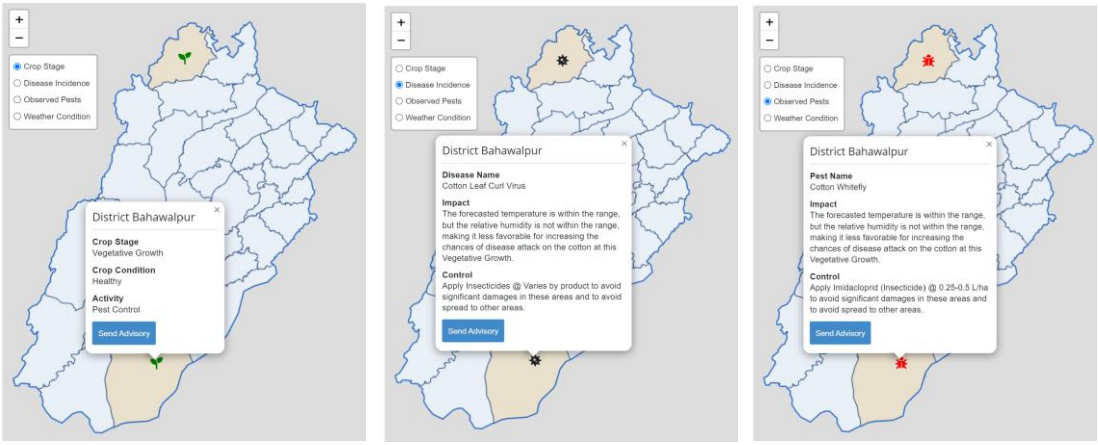

Figure 48. Advisory map: Crop Stage (left), Disease Incidence (middle), and Observed Pests (right) in ADVISE for Punjab

Generate Advisory — Send Advisory

District-wise Crops and Stages

District:	Bahawalpur
Crop:	cotton
Crop Stage:	Vegetative Growth
Crop Disease:	Cotton Leaf Curl Virus

Observed Crops, Environment Conditions, Requirements

Crop activities:	Pest Control
Crop Condition:	Healthy
Observed water resources:	Canal
Observed pest conditions:	Cotton Whitefly

Summary of crop condition
cotton is mostly in Vegetative Growth stage in Bahawalpur. Farmers activities at the current crop stages are Pest Control. cotton is observed to be Healthy, especially in Bahawalpur district. While cotton is generally Healthy, Cotton Whitefly(Bemisia tabaci) have been observed in a number of tehsils in Bahawalpur district.

Summary of optimum weather conditions for crop growth
At this stage of cotton, the optimum conditions supporting growth is within the temperature range of 25°C to 35°C, rainfall of 1mm to 1.5mm per day, and relative humidity around 60% to 70%.

Three Days Forecast Weather Conditions

Date	Max Temp(°C)	Min Temp(°C)	Rainfall(mm)	Humidity(%)
2024-07-02	34.81	19.64	0.00	23.08
2024-07-03	46.42	18.60	1.00	33.66
2024-07-04	37.46	30.56	2.72	71.78

Crop productivity management measures

Crop management measures
The temperature for the next 3 days is anticipated to be within the optimum temperature most conducive for Vegetative Growth.

Pest management measures
Cotton Whitefly should be immediately treated in Bahawalpur by apply Imidacloprid (Insecticide) @ 0.25-0.5 L/ha to avoid significant damages in these areas and to avoid spread to other areas.

Irrigation management
Water is critical at this stage of cotton growth to maximize Vegetative Growth. The expected rainfall in the next three days is 1.24mm. However, the crop requires 403.14mm of irrigation water while total available water is 183.86 at this stage in district Bahawalpur.There is sufficient soil moisture at this stage, so irrigation is not needed.

Figure 49. Generation of 3-day crop advisory for cotton in ADVISE for Punjab

The **Monthly Advisory** and **Seasonal Advisory** modules generate and disseminate monthly and seasonal advisories via WhatsApp.

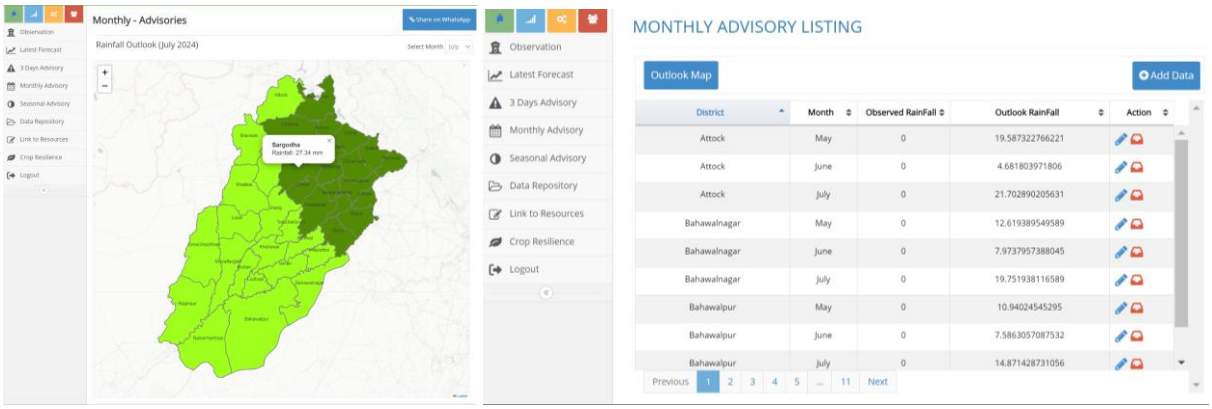

Figure 50. Monthly advisory listing for May, June, July (left) and Rainfall Outlook map for July 2024 (right) in ADVISE for Punjab

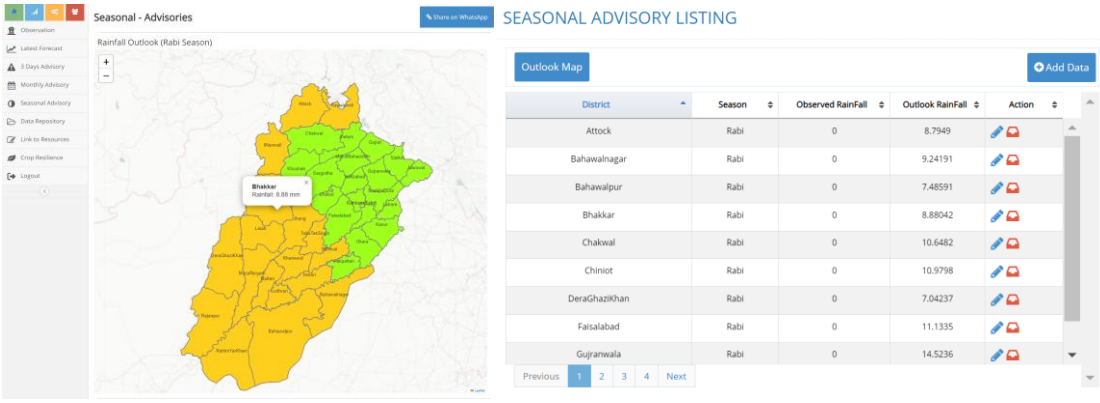

Figure 51. Seasonal advisory listing for Rabi season (left) and Rainfall Outlook map for Rabi season (right) in ADVISE for Punjab

The **Data Repository** module provides 4 key analytics tools, namely, (i) *Annual Crop Data*, which provides historical information/analytics on trends of rainfall, temperature, crop area, crop production, and crop yield, (ii) *Pests Data*, which provides time-series information/analytics on pest infestation for specific crops, (iii) *Weather/Climate Impacts*, which provides time-series information/analytics on climate impacts/damage to different crops, disaggregated per crop stage, and (iv) *Crop/Weather Thresholds*, which stores rainfall and temperature thresholds for different crops. Work on this module focused on development of the *Annual Crop Data* tool, which involved (i) processing/disaggregation of historical crop information (e.g., area, production, yield) per district, for rice, wheat, cotton, and maize, from 1990 to 2021 (data from CRS), (ii) processing/disaggregation of time-series observation data on rainfall and temperature from PMD, (iii) dynamic overlay/analysis of time-series climate and crops data, for any selected crop/period/district, (iv) dynamic analytics of total crop production, for any selected crop/period, (iv) dynamic side-by-side comparison of crop production, rainfall, and temperature, for any given crop/period, including percentage and indicator for change (increase/decrease), and (v) dynamic analytics of crop summary, indicating percentage of land used for

cultivation, for any selected season/period, including information on districts where such crops have been cultivated.

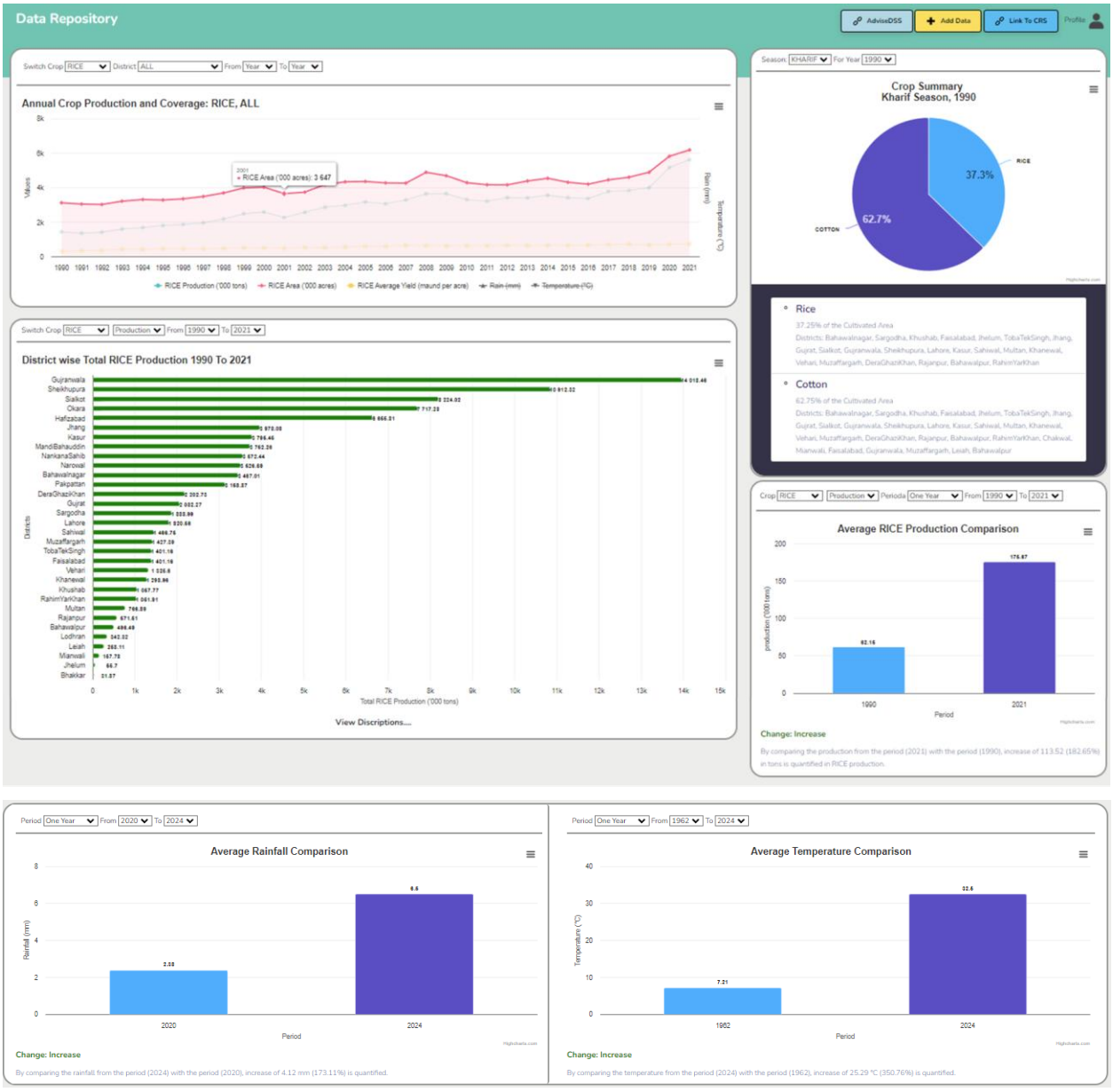

Figure 52. Data and Analytics in ADVISE for Punjab

The **Resources** module provides access to useful documents and applications relevant to the ADVISE stakeholders. Work on this module included integration of tools for accessing, uploading, downloading, archiving, and sharing (i) research publications/ documents, (ii) websites, (iii) applications, and (iv) good practices in climate applications, crop monitoring, among others.

Figure 53. Resources module featuring good practices in crop monitoring in ADVISE for Punjab

The **Crop Resilience** module directs users to CLIM-PLANNeD's Agro-Suitability Pro module.

Moreover, a mobile application for ADVISE has been developed for Android devices. Work on this application involved (i) development of a registration and login page, (ii) integration of the 3-day forecast module from the DSS via API and its visualization, (iii) integration of the advisory module from the DSS via API and its visualization, and (iv) development of a feedback module for reporting actual ground observation by extension officials.

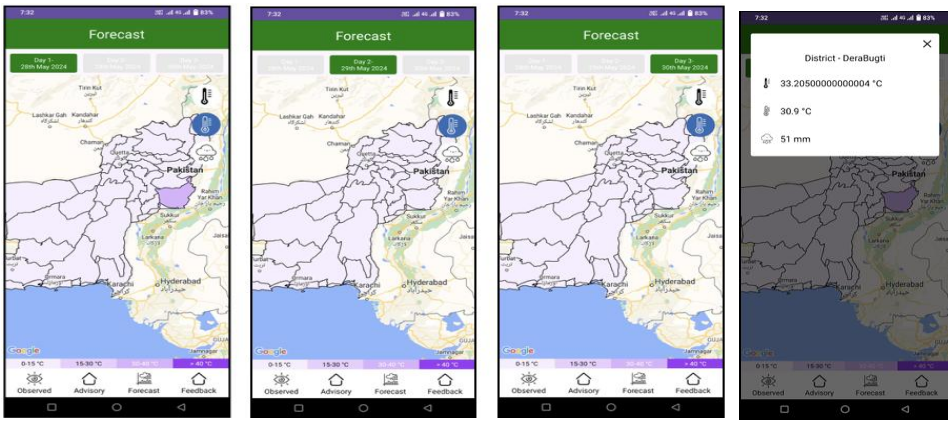

Figure 54. 3-day forecast of minimum temperature for Punjab

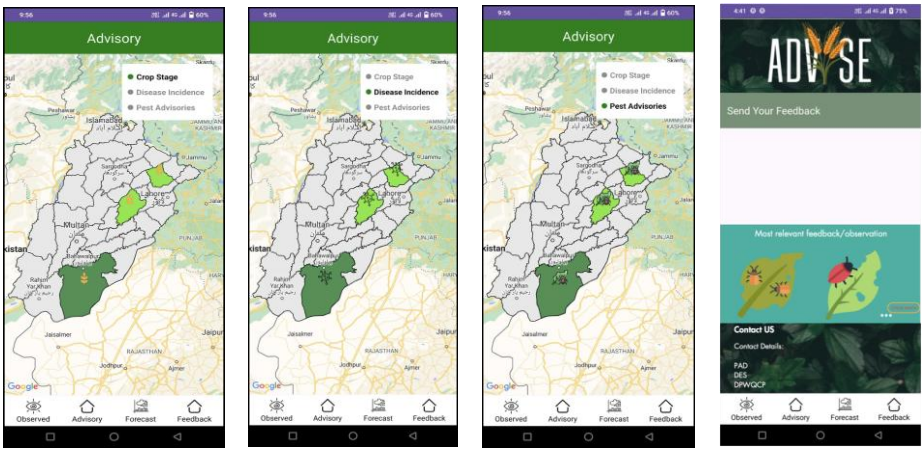

Figure 55. Advisory on crop stage, disease incidence, and pests (left) and feedback module (right) for Punjab

Onward work planned for next semester will focus on (i) provision of server administration and deployment support for newly developed modules, (ii) one login API integration, (iii) integration of functionality to change password, (iv) integration of updates to the *Data Repository*, including *Pests Data*, *Weather/Climate Impacts*, and *Crop/Weather Thresholds*, (v) development of import option tool for uploading crop and weather/climate data, and (vi) testing of DSS products and full operationalization of the DSS.

The technical progress report on ADVISE Punjab enhancement is in Appendix 9.

The DSS for Punjab can be accessed via http://203.156.108.67:1080/.

Activity 1.2.1i Developing SESAME for Balochistan

Consultations

The following are the highlights from meeting with the agriculture sector, in Balochistan, during this reporting period:

- Consultative meeting, on 16 May 2024, with officials from BACD and allied institutions, Mr. Juma Khan Tareen, DG Research and CARE SFP, Mr. Ahmad Khan Buzdar, DG CRS, Mr. Nasir Hameed, Director of CRS, Mr. Abdul Karim Jaffer, Director of Agriculture Extension Information, and Mr. Sohail Iqbal, Research Officer at ARI, presented the progress of DSS development, discussed data requirements and templates, strategies for improving data sharing, streamlining data collection processes, and strengthening data governance, and the need for nomination of relevant domain experts from BACD, for assisting with data provision, review, and guidance on the DSS. Key action points for BACD are (i) formation of a new technical and domain expert group, including up to 6 officials, to review the DSS, integrate advisories, and oversee dissemination, (ii) prioritization of 2 main crops that represent more than 1 agro-ecological zone and have complete data, (iii) share data collected for LIMS with RIMES; for RIMES, (i) share data templates provided by PAD, and (ii) facilitate the connection between BACD CRS and PAD officials to enhance inter-provincial coordination and cooperation.

Desk Review

Completed

Technical Review

No relevant systems currently in MoPDSI or in allied institutions

User Needs Assessment

Completed

DSS Development

Similar work has been completed on ADVISE for Balochistan, during this period, for the following modules (i) Observation and Latest Forecast, (ii) 3 Days Advisory for tomato, apple, olives, and dates, (iii) Monthly Advisory and Seasonal Advisory, (iv) Resources, and (v) Crop Resilience.

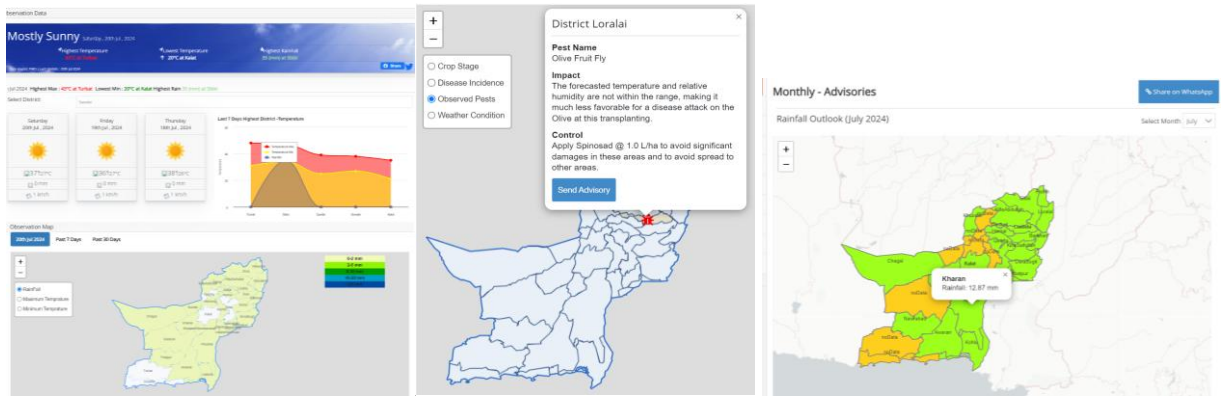

Figure 56. Observation module (left), Advisory map for Observed Pests (middle), and Monthly Advisory map (right) for ADVISE in Balochistan

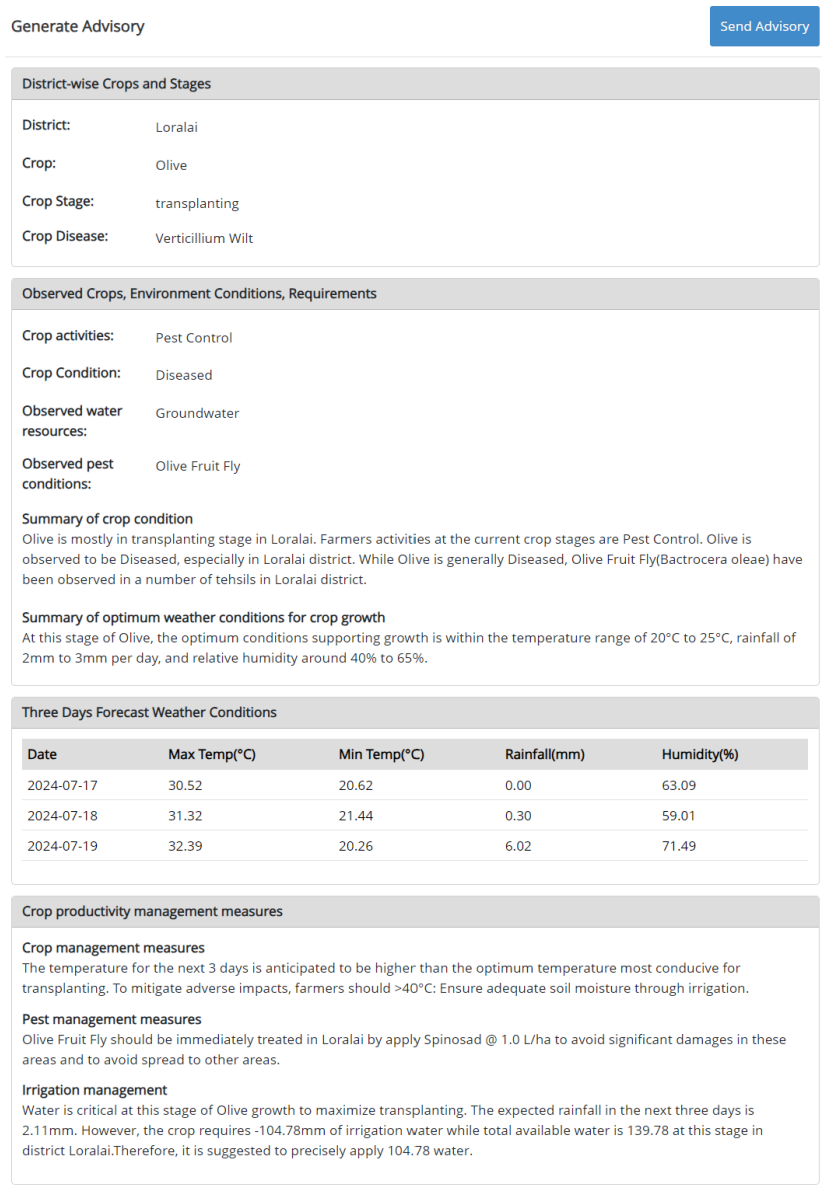

Figure 57. Generation of 3-day crop advisory for olives in ADVISE for Balochistan

Onward work planned for next semester will focus on enhancements to existing modules and integration of updates to the *Data Repository*, including Annual Crop Data, *Pests Data*, *Weather/Climate Impacts*, and *Crop/Weather Thresholds* for tomato, apple, olives, and dates.

The technical progress report on ADVISE Balochistan enhancement is in Appendix 10.

The DSS for Balochistan can be accessed via http://203.156.108.67:1180/ .

Activity 1.2.2
Facilitating Use of DSSs in Sectors

The national-level SFPs meeting conducted in Nepal, on 27 June 2024, convened officially designated SFPs in DoR, MoALD, and NDRRMA, and other relevant stakeholders from these and allied government institutions, the World Bank, and RIMES. The meeting shared/reviewed the overall project implementation progress, experiences, and challenges met; presented a work plan for the remainder of the project implementation timeline; demonstrated the latest version of the RDAS, READY for NDRRMA, NAVIGATE for DoR, and ADVISE for MoALD; obtained stakeholders insights/feedback/recommendations on the system usability; firmed up approaches/strategies for full systems operationalization by the end of 2024; and confirmed key action points for implementation.

Figure 58. SFP meeting in Nepal on 27 June 2024

National-level SFPs in Bangladesh and Pakistan are scheduled in July.

Outcome Indicator 1.3: *Trainees in select sectors satisfied with training provided by RIMES under the project based on its relevance, coherence, effectiveness, impact, and sustainability (Percentage)*

Output Indicator 1.3.1b: *At least 1,650 Government officials trained in targeted units/departments to apply climate resilient standards and data analytics in policies, planning, and investments (Number)*

Output Indicator 1.3.1.a: *At least 50% women are trained among the staffs trained within targeted units/departments (Percentage)*

Activities contributing to overall progress and achievement of outcome 1.3 are provided below.

Activity 1.3.1 Stakeholder Engagement to Facilitate Uptake of Climate Information

Climate Application Forums

The 3rd Climate Application Forum (CAF) in Bangladesh was organized on 10 June 2024. A total of 54 stakeholders and representatives, including 33 officials from 14 government organizations and research institutes from the agriculture, livestock, fisheries, water, environment, health, hydromet, aviation, defense, disaster management and local government sectors (i.e., BAF, BLRI, BMD, BRRI, DAE, DDM, DLS, DNCC, DoE, DoF, FFWC/BWDB, IEDCR, MoEF, SAC); 4 members from 4 development partners, 11 representatives from 10 non-government organizations, and 6 journalists from 5 media agencies participated in the forum.

Highlights from the CAF in Bangladesh are provided below:

- Forum sessions analyzed performances of BMD and FFWC forecasts during the last season, presented seasonal and sub-seasonal climate outlook for the current Southwest Monsoon, shared experiences from the field, and demonstrated the CARE DSSs/DSSs products. Per advice from BMD, rainfall forecast for July, August, and September (JAS) is expected to be above normal over the Northern and some Northeastern, Central, Western, Eastern, and Southeastern regions; while temperature (JAS) is expected to be above normal over the whole country.
- Experts, researchers, scientists, and officials took part in a group exercise to recommend sector-specific advisories based on seasonal forecasts for the agriculture, livestock, fisheries, water resources, health (disease control and prevention), and urban planning sectors. Expected impacts in some sectors, included, (i) water sector: normal flooding in Brahmaputra Basin and short-term inundation in Meghna Basin, (ii) health sector: presence of vector-borne diseases (e.g., dengue, chikungunyea, malaria), waterborne diseases (e.g.,cholera, hepatitis A/E, typhoid fever, AWD), heat stress, snake bite, leptospirosis, fungal infection and helminthiasis, (iii) livestock sector: heat stress, disease outbreak, feed scarcity, feed spoilage and selling of livestock,

and (iv) urban planning sector: waterlogging or road blockage due to fallen trees, and heatwave, which negatively affect health and livelihood.

- As an outcome of the CAF, a Seasonal Outlook/Monsoon Outlook (for July-August-September) with sector-specific seasonal advisories and guidance for decision makers has been prepared based on forum recommendations and circulated among relevant stakeholders.
- Moreover, Mr. Md. Abdul Haye Sarker, District Relief and Rehabilitation Officer, Department of Disaster Management, Kurigram, shared his experience in utilizing seasonal forecast-based advisories in the field. He highlighted the effectiveness of short-term localized forecasts and advisories received through voice messages from RIMES in deciding the timing of applying fertilizer for crops. He appreciated the knowledge gained during the forum on the potential for above-normal rainfall conditions during this season, and thus, possible flooding, which could help in planning for the entire monsoon season. In this regard, he would discuss/recommend to the District Disaster Management Committee taking anticipatory actions and proactive measures to mitigate potential disaster impacts on the marginalized communities.
- Upon request from the discussants, the representative from United Nations Resident Coordinator's Office (UNRCO) consented to providing forecast-based advisories to the humanitarian sector after discussing with the sector stakeholders.

Figure 59. Feedback from CAF participants (left) and presentation on sector-specific advisories based on seasonal forecast for the urban planning sector (right)

Figure 60. Participants of the 3rd CAF in Bangladesh held on 10 June 2024

Detailed report, of the CAF in Bangladesh, is provided in Appendix 11.

In Nepal, 3 CAFs have been conducted: at district level on 20 February 2024, at national level on 13 May 2024, and at provincial level on 12 June 2024. The forums reviewed the previous season's forecast performances, assessed the climate outlook for the current season, and discussed potential impacts and preparedness measures.

The district-level CAF held in Sindhupalchowk District, Bagmati Province, brought together a total of 57 participants from different sectors, including 47 government officials from DHM, NDRRMA, Nepal Army, Nepal Police, education sector, health sector, local government, development organizations, NGOs, and the media.

Below are key takeaways from the district-level CAF:

- Mr. Sudarsan Humagain, Meteorologist, DHM, discussed seasonal analysis, climate variability and change, and challenges in forecasting, while Mr. Govinda Kumar Jha, Meteorologist, DHM, highlighted weather services, forecast communication, and the process and impact of IBF. Both presentations emphasized the importance of early warning systems, the need for policies at the local level, and challenges faced due to limited resources. The presentations also discussed forecast types, climate drivers, weather stations, the practical issues in meteorological forecasting systems, and future plans of DHM.
- Mr. Ravindra Acharya, Under-secretary of NDRRMA, presented the importance of establishing a robust Early Warning System (EWS) through effective communication channels, strengthening of the EWS through trainings, and the crucial roles of stakeholders in disaster preparedness and response during the monsoon season and other seasons, underscoring the high casualty experienced during the cold waves in Madhesh province. Key points highlighted government provisions on disaster management, effective forecasting for crop harvesting to mitigate hydrometeorological disasters, proactive utilization of disaster funds, capacity building of communities and stakeholders, interlinkages between different tiers of government in disaster risk reduction efforts, impact of climate change in hilly and mountainous regions, and availability of monthly data on cold waves in the DRR portal.
- Ms. Durga Bajgai, Chief of the district health office, delivered a presentation focusing on activities conducted during the winter to mitigate the impacts of cold waves, such as, awareness campaigns and media outreach, provision of special support to vulnerable groups, development of preparedness and response plans, and promotion of vaccination. Emphasis was placed on personal behaviors during cold seasons to prevent cold waves and respiratory illnesses. Regarding an inquiry on preparedness and response plan for mega-disaster scenarios, Ms. Bajgai responded that the district health office has developed plans for such scenarios, including pandemics like COVID-19.
- Dr. Amar Deep Kumar Shah, a medical officer, delivered the presentation on the district hospital's efforts on formulating a plan for the cold season and initiatives

targeting vulnerable groups during the winter season such as awareness raising on pneumonia and respiratory ailments, facilitating stakeholder interactions, providing counseling, dispensing early medication for individuals with chronic illnesses, establishing case management protocols for emergencies, forming an emergency rapid response team for potential disasters and uncertainties, and implementing waste management and water purification measures. The hospital devised an emergency preparedness plan and integrated it within its operations.

- In his closing remarks, Mr. Jhakka Prasad Acharya, DDMC chair and CDO of Sindhupalchok, emphasized the importance of coordination/collaboration in DRR and climate change efforts and the need for widespread awareness and education on DRR and climate information at all levels of society. Key takeaways/recommendations included stockpiling of search and rescue materials, replication of successful projects in vulnerable areas by NGOs, knowledge-sharing workshops, significant roles and responsibilities of local governments in DRR and EWS, resettlement of vulnerable communities, expediting of reconstruction efforts, and prioritization of budgeting and programming for DRR and climate change-related programs in municipalities and regions.
- Key recommendations of the forum are (i) inclusive engagement at the local level, that is, conduct similar events at the community and municipal levels to ensure that dissemination of climate information and preparedness strategies reaches the most vulnerable populations, and (ii) schedule the forums before the onset of critical seasons, such as, pre-monsoon and pre-winter, to enhance impacts of the forums.

Figure 61. District-level CAF in Nepal held on 20 February 2024

Detailed report, of the district-level CAF in Nepal, is provided in Appendix 12.

The national-level CAF held in Kathmandu convened a total of 68 participants, including 45 government officials from DHM, MoEWRI, NDRRMA, MoFAGA, DMG, NRCS, MoHA, MoCTCA, NARC, MoEW, Nepal Army, development organizations, NGOs, and the media, among others.

Highlights of the national-level CAF are:

- Mr. Sudarshan Humagain, Meteorologist, DHM presented an analysis of expected rainfall and temperature patterns during the monsoon months from June to September 2024. Per analysis, most parts of the country are likely to experience above-normal rainfall, with a probability ranging from 30% to 55%, while northwestern parts of Sudurpashchim Pradesh, southeastern Bagmati Pradesh, central Madhesh Pradesh, and central to mid-western Koshi Pradesh, are expected to receive normal rainfall, with a35% to 45% probability. Regarding maximum temperature, the outlook suggests that most areas of Nepal will likely experience above-normal maximum temperatures, with a probability of 35% to 65%. However, the western parts of Karnali Pradesh, central Gandaki Pradesh, and northeastern Koshi Pradesh may experience normal maximum temperatures, with a 35-45% probability. Similarly, above-normal minimum temperatures are expected across most of Nepal, with a probability of 35% to 65%. At the same time, some areas of Sudurpashchim Pradesh, Gandaki Pradesh, and Bagmati Pradesh may experience normal minimum temperatures, with a 35-45% probability.
- Ms. Bibhuti Pokharel, Senior Divisional Meteorologist, DHM, discussed limitations and challenges in seasonal forecasting. She elaborated on the variability of rainfall distribution within the monsoon season. Significant variations in the amount and timing of rainfall across different months can be expected even though the overall monsoon outlook suggests normal or above normal rainfall. Key highlights included the need to enhance network of observation stations, particularly in high-altitude regions, to reduce data gaps; develop advanced forecasting techniques that incorporate climate change impacts and reduce uncertainties in long-term predictions; strengthen collaboration with regional/international organizations to provide access to advanced forecasting tools, training, and expertise; and engage stakeholders from different sectors to utilize seasonal outlooks for effective decision making and risks management.
- Mr. Rameshwar Rimal, Technical Officer, Agrometerology, NARC, presented the challenges faced by the agricultural sector, such as, dependence on monsoon rainfall, low irrigation coverage, vulnerability to climate change impacts, low adoption of available technologies, labor shortages, and insufficient prioritization of agricultural research. He underscored the importance of seasonal outlook in selecting appropriate crops and varieties, adjusting sowing and harvesting times, developing adaptation strategies, and planning for necessary inputs; and noting climate-resilient crop varieties developed by NARC, including drought-tolerant, submergence-tolerant, and cold-tolerant rice varieties as well as heat-tolerant and rainfed wheat varieties, that can help

farmers cope with the adverse impacts of climate variability and extreme weather events. Key recommendations are (i) long-lead time outlooks with higher spatial resolution and quantitative forecasts to improve agricultural planning and decision making, and (ii) specific information on monsoon onset and withdrawal dates, breaks in monsoon rain, and heavy rainfall events.

- Dr. Dijan Bhattrai, Spokesperson, NDRRMA, highlighted that most global disasters between 1990 and 2022 were hydrometeorological, with floods and storms being the most frequent, and which resulted in significant casualties and affected families in Nepal, from 2011 to 2022. He noted the Monsoon Preparedness and Response Plan prepared by NDRRMA that is updated based on the latest monsoon outlook; utilization of tools such as the IBF dashboard in BIPAD; gaps in disaster management, including the non-objective disaster risk assessment, lack of coordination between risk assessment and preparedness, inadequate and untimely management of resources for response, and inability of thematic committees to be fully self-driven; need for quality weather and flood forecasts; activation of the CAP and IBF; and collaborative work through a monsoon preparedness and response center.
- Dr. Sagar Dahal, Chief, Disease Surveillance and Research Section, Ministry of Health and Population, presented the impacts of rising temperatures, fluctuating precipitation, and extreme weather events on various diseases' seasonal and temporal trends, citing that dengue and scrub typhus cases increase with a drop in mean temperature and precipitation, while malaria cases rise with maximum rainfall and precipitation; a one degree increase in average temperature leads to 4.39% increase in diarrheal instances and a one centimeter increase in rainfall results in a 0.28% rise in incidence of diarrheal diseases; cold waves account for 45-50 deaths per year in 15-23 Terai districts in Nepal. A key requirement of the sector is availability of continuous, real-time weather/climate data on temperature, precipitation, and relative humidity, to understand impacts of extreme weather events on human health, predict spread of diseases, and develop effective adaptation strategies.
- Key recommendations of the forum are (i) enhancement of the monsoon outlook through regular updates, more detailed information on the timing and intensity of rainfall, development of extended forecasts (10-30 days) and medium-range forecasts (3-10) to enhance application of the outlook, and enhancement of rainfall accuracy; (ii) strengthening of institutional collaboration, particularly between DHM and local governments to expand the reach of the outlook; (iii) capacity building and information dissemination; (iv) establishment of working groups to address specific challenges, such as forecast accuracy, improving information dissemination, and promoting capacity building at the local level; (v) development of a framework for monitoring and evaluating the effectiveness of the monsoon outlook's application across various sectors; and (vi) regional collaboration and knowledge sharing opportunities to address common challenges and promote

best practices in utilizing the monsoon outlook for preparedness and risk reduction.

Figure 62. National-level CAF in Nepal held on 13 May 2024

Detailed report, of the national-level CAF in Nepal, is provided in Appendix 13.

The provincial-level CAF held in Hetauda of Bagmati Province convened a total of 35 participants, including 31 government officials from DHM, MoIAL, PIN, DAO, MoALD, MoLE, NDRRMA, Nepal Army, National Investigation, among others; and development organizations, NGOs, and the media.

Key points from the provincial-level CAF include:

- Mr. Shiva Prasad Nepal, Senior Divisional Meteorologist, DHM, shared the synopsis of the 2023 monsoon season and the updated 2024 monsoon outlook, and highlighted that there is a 35-55% probability of above normal precipitation in most parts of the country, with some areas likely to experience normal rainfall, while most regions expect the maximum and minimum temperatures to be above normal.
- Mr. Rabita Karki, Disaster Focal Person, MoIAL, Bagmati Province delivered a presentation on the current state of disaster risk management, constitutional and legal provisions, institutional arrangements, and roles and responsibilities of various ministries and agencies in disaster management, including the ministry's efforts in formulating disaster management laws, establishing provincial warehouses and emergency operations centers, procurement and distribution of relief materials, community awareness programs, and capacity building training.
- Mr. Yuvaraj Bhandari, Officer, NDRRMA, presented the Monsoon Preparedness and Response National Work Plan 2081 (2024), highlighting the past trends of monsoon-related disasters and the damages caused in the previous year, underscoring the potential for the current monsoon to affect around 1.8 million people and 412,000 households, with 83,000 households being directly impacted and 18,000 households requiring rescue and relief; and the establishment of a monsoon preparedness and response command center for coordination and overall management.

- Guidance for stakeholders in the following sectors were provided based on DHM's seasonal outlook: (i) for agriculture sector, to focus on implementing programs to provide timely information about seeds to farmers, developing/ distributing flood-tolerant paddy varieties in coordination with NARC, construction of dams near river banks, and prioritize data/information collection and resource management, through the DSS; (ii) for the District Administration Offices, to develop a pre-monsoon preparedness and response action plan for 2024, outlining roles and responsibilities of agencies; collaborate with the District Disaster Management Committee and stakeholders; regular public awareness about the DSS through news, articles, and discussion programs; provision of free SMS facilities to mobile providers, and include weather forecast information in mobile ringtones to reach citizens; (iii) for health sector, to form a disaster action committee with authority to plan activities during the disaster state in the hospital, orientation of staff roles and responsibilities for such state, get updates from the DSS, and incorporate data on past disasters into the hospital disaster preparedness and response plan manual.

Figure 63. Provincial-level CAF in Nepal held on 12 June 2024

Detailed report, of the provincial-level CAF in Nepal, is provided in Appendix 14.

The 3rd CAF in Pakistan is scheduled on 2 July 2024.

Demonstration of Climate Information Application in Communities

In-county training of trainers (ToT) will be completed by August 2024 while demonstration of climate information application in communities are expected to be completed within the first week of September 2024. These will be followed by a series of knowledge and experience sharing events, at the provincial level, from October 2024 to February 2025.

The Capacity Building Framework for CARE Component 1 has been prepared to address the training needs of stakeholders from the government sectors/institutions and local communities. The framework identified various training types that can be conducted, such as workshops for national-level officials, technical training for data personnel, and hands-on demonstrations for community members. In addition to

the training curricula, manuals/guidelines have been prepared to cater to training needs, including the ToT lesson plan, training modules for select sectors, modules on understanding RDAS and DSSs, and a framework for training needs assessment.

Capacity building/ training framework for Component 1 is provided in Appendix 15.

Activity 1.3.2
Regional and National Trainings

Training of recipient institutions in using RDAS and its products

RIMES is organizing a training on RDAS/RDAS products in July 2024, which will be physically held in the countries and linked virtually in the region. Further, RIMES targets to convene the RDAS Community of Practice (CoP) by August 2024.

Training of recipient institutions in DSSs operations and maintenance

The Training Workshop on National Livestock Advisory System (NLAS) for Core Operational Group of DLS, on 29 April 2024, capacitated 18 core group members from various sections of the Department of Livestock Services including planning, epidemiology, and information and communication technology (ICT) on the operation and application of the NLAS/NLAS products. The training aimed to enhance livestock management and effectiveness through equipping relevant staff with the necessary knowledge and skills to understand/interpret weather and climate information and operationalize NLAS, for providing timely advisories and adaptation guidance for the livestock sector. Key recommendations from the training include (i) integration of livestock disease, demand, production, and methane emissions into the DSS, (ii) development of a comprehensive plan for implementing the NLAS, incorporating insights and recommendations from the workshop, (iii) establishment of mechanisms for monitoring and evaluating NLAS performance, (iv) extension of capacity building efforts to district-wise field-level training of 170 offices in Rajshahi and Rangpur districts, and (v) engagement of DLS experts in trainings on advisory generation.

Figure 64. Training Workshop on NLAS for Core Operational Group of DLS

Figure 65. Chief Guest Dr. Md. Reajul Huq, Director General, Department of Livestock Services delivering opening remarks during the NLAS Training Workshop Meeting

Training report on NLAS is in Appendix 16.

Trainings of recipient institutions in the operation and maintenance of DSSs are scheduled from August to September 2024, with subsequent sessions planned for December 2024 and January 2025 for relevant domain and IT focal points/officials from Bangladesh (DLS, FFWC), Nepal (DoR, MoALD, NDRRMA) and Pakistan (MOPDSI, PAD, BACD).

Training of recipient institutions in DSSs products application

Trainings of recipient institutions in the utilization and application of DSS products are scheduled back-to-back with trainings on DSSs operations and maintenance from August to September 2024, with subsequent sessions planned for December 2024 and January 2025 for relevant domain focal points/officials from Bangladesh (DLS, FFWC), Nepal (DoR, MoALD, NDRRMA) and Pakistan (MOPDSI, PAD, BACD).

Activity 1.3.3
Iterative Enhancement of the Hydromet Services

SAHF Annual Conferences

The South Asia Hydromet Forum (SAHF) IV, held in Colombo, Sri Lanka, from 6-8 February 2024, brought together over 200 key stakeholders from governments, regional organizations, the private sector, and academia to enhance collaboration on hydrometeorological services in South Asia. The forum focused on building a regional observation network, advancing regional prediction and analytics, strengthening service delivery, and empowering communities to make informed decisions. The event resulted in a declaration emphasizing the need for stronger regional collaboration and coordination, and reaffirmed the commitment to implement people-oriented, impact-based, multi-hazard early warning systems. SAHF IV was led by the World Bank and supported by UK Met Office, RIMES, WMO, and the UK FCDO.

Figure 66. SAHF IV Annual Conference, Colombo, Sri Lanka

While SAHF IV was funded by the World Bank from sources external to CARE, the outcomes thereof fed into SAHF's onward direction.

Facilitating the continuity of the Forecasters' Forum

Continuation of the weekly FForums, under CARE, was initiated in April 2023. A total of 64 weekly sessions, involving operational forecasters from NMHSs in the region, have been completed since the FForums integration into CARE.

On 25 January 2024, during the SAHF FForum, a special session was held to review the Southwest Monsoon 2023 performance over South Asia. The meeting aimed to evaluate the monsoon's regional impact and the associated extremes. Participants assessed the usefulness of the products shared during FForum sessions in detecting

and providing early warnings for these monsoon-related extremes. The session facilitated a comprehensive analysis of the monsoon's behavior and effectiveness of the forecasting tools used throughout the season.

On 22 February 2024, the first special lecture of the SAHF FForum series was conducted, focusing on the impacts of El Niño-Southern Oscillation (ENSO), ocean warming, and their influence on the South Asian monsoon. Dr. Roxy Mathew Koll from the Indian Institute of Tropical Meteorology led the session, highlighting the importance of understanding these climatic interactions to improve seasonal forecasts and develop effective adaptation strategies.

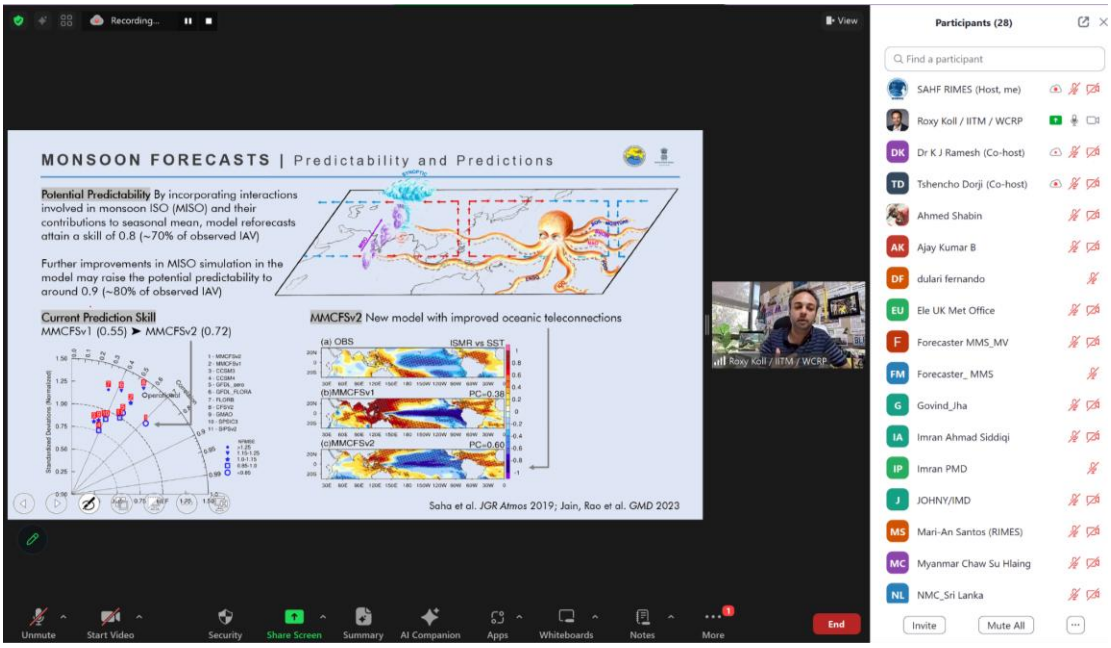

Figure 67. First lecture series of SAHF FForum on ENSO, ocean warming and monsoon

On 27 May 2024, a special session of the SAHF FForum was convened to discuss Cyclonic Storm "REMAL" and its impact on the monsoon season, with a primary focus on the Bay of Bengal. The session included detailed analyses of predicted weather patterns, model performance, and rainfall forecasts. The discussions highlighted the importance of monitoring extreme weather events to mitigate disaster risks, with specific attention to potential flooding in various regions. The session also addressed monsoon strength, historical cyclone trajectories, and ongoing updates for the affected areas, ensuring a collaborative approach to weather forecasting and disaster preparedness.

A regional training workshop for the SAHF FForum is scheduled from 29-31 July 2024 in Bangkok, Thailand. The workshop will aim to strengthen networking among operational forecasters from SAHF NMHSs and explore emerging technologies for extreme weather forecasting and monitoring. Key objectives include training on advanced forecasting tools utilizing AI and ML, sharing best practices, and enhancing regional communication. The workshop will introduce new forecasting tools,

improve the application of regional and global products, and develop a strategy for sustaining the FForum. Experts from NCMRWF, INCOIS, RIMES, and additional international specialists will lead the sessions.

The mid-season review of SWM 2024 and the annual review of SWM 2024 is planned for August 2024 and January 2025, respectively.

Detailed progress report, of the FForum, is in Appendix 17.

Supporting priority areas of the hydromet service delivery

SAHF Country Consultation (Bhutan)

The consultation meeting between the SAHF team and the National Centre for Hydrology and Meteorology (NCHM) in Bhutan took place on 20 March 2024. The consultation focused on identifying priority areas within the SAHF thematic areas - IBF, NWP, OBN and CE for implementation. IBF emerged as a priority for Bhutan, with plans for collaboration to identify pilot sites and hazard databases. Challenges like sustaining observational networks and capacity-building were discussed, with proposals for training programs and regional collaboration.

Figure 68. Country consultation at NCHM, Bhutan

SAHF Hydrology WG Initiation Meeting

The SAHF Hydrology WG initiation meeting was held on 23 April 2024. The meeting focused on refining the WG Terms of Reference (ToR) and addressing hydrological challenges, with an emphasis on strengthening linkages between meteorology and hydrology. WG members shared insights into their countries' challenges and initiatives, highlighting the need for capacity building and regional collaboration. Proposed activities included technical sessions for WG and developing a comprehensive Working Paper.

Training on Customization of Ocean Forecast Products

The Training on Customization of Ocean Forecast Products was held from 20-24 May 2024, in Hyderabad, India, jointly organized by INCOIS and the SAHF-CARE for South Asia Project. This initiative aimed to enhance the capacity of SAHF coastal member

countries—Bangladesh, Maldives, and Sri Lanka—in customizing ocean forecast products to address maritime challenges. The training focused on bridging knowledge gaps, improving operational capabilities, and fostering regional collaboration among NMHS professionals. Participants included 8 mid-career professionals from NMHSs of Bangladesh, Maldives, and Sri Lanka. The event emphasized practical applications, hands-on experience, and preparedness for advanced ocean forecasting, aligning with the CARE Project's goals of promoting climate-smart decision-making and resilience in the region.

Figure 69. Training on Customization of Ocean Forecast Products, International Training Centre for Operational Oceanography (ITCOocean), INCOIS, Hyderabad, India

Training report on customization of ocean forecast products is in Appendix 18.

DataEx Platform and ECMWF Data Extraction Orientation

On 24 June 2024, an orientation/training on the DataEx platform and ECMWF data extraction was conducted for officials from the Department of Hydrology and Meteorology (DHM), Nepal. DHM identified a need to enhance its capabilities in extracting and utilizing data from the DataEx platform, particularly focusing on ECMWF data. The orientation/training aimed to provide a comprehensive introduction to the tools and methods required to effectively download and use this data for DHM's operational needs. Six mid-career professionals participated in the orientation/training and gained practical knowledge and confidence in using the platform, and addressing key issues such as data privacy, quality control, and forecast accuracy. Proposed next steps include follow up hands-on training for DHM officials utilizing data from the DataEx platform.

Training on Forecast Interpretation and Verification

In collaboration with the National Centre for Medium Range Weather Forecasting (NCMRWF), India, a training on forecast interpretation and verification is planned in September 2024. The training will aim to strengthen the capabilities of NMHSs in South Asia by focusing on interpreting multi-model and multi-scale numerical weather prediction (NWP) products, implementing verification schemes to improve forecast reliability, and understanding real-time satellite data for monitoring severe weather phenomena. Expected outcomes include improved operational forecasting skills and enhanced verification of NWP products among participants from SAHF member countries, including experts from the NWP divisions and SAHF NWP WG members.

SAHF IBF WG Meeting

The SAHF IBF WG Meeting is scheduled for 31 July 2024 in Bangkok, Thailand. The meeting will facilitate dialogue between operational forecasters and IBF WG members to anticipate sector-specific impacts, develop customized Decision Support Tools (DSSs), and foster collaboration among stakeholders for effective IBF implementation. The meeting will happen alongside the regional training for the FForum, integrating insights to enhance the capacity of NMHSs.

Annual Assessment of NMHSs Capacities and Gaps

The annual assessment of capacity and gaps in NMHSs of Bangladesh and Pakistan will be planned and conducted in the following semester.

Facilitating Strategic Plans and Decision for the SAHF

The fourth Executive Council meeting will be held back-to-back with the CARE regional workshop in February 2025.

Component 3: Project Management and Implementation Support

Activities for this semester involved finalization of the Institutional Development Plan (IDP); restructuring of project results framework, streamlining of procurement plan, workplan and budget for the remainder of the project; completion and submission of requisite financial documents such as IUFR for the semester ending December 2023 and SoEs; continuing enhancement of the PMIS; coordination with ADPC on relevant work; and documentation, monitoring, and reporting of key project accomplishments.

Activity 3.1
Enhancement of HR, procurement, and finance systems

Procurement

Completed

Workplan

An institutional capacity building workshop was organized from February to May 2024 to finalize RIMES' IDP 2024-2030, which lays down RIMES' strategies and actions over the next six years for capacity building. The document provided elaboration on (i) RIMES' work focus and program development, future direction, ongoing improvements, and its strengths and weaknesses, (ii) RIMES' strategic goal and objectives for the period 2024-2030, strategies for more responsive service delivery, meaningful stakeholder engagement, advanced technological solutions, international-standard financial management and procurement systems, efficient project management, impactful communication, and intentional professional development, (iii) risks to realizing the IDP's strategic goal and objectives, measures to mitigate these risks, and institutional arrangements for risk monitoring and management, (iv) actions needed to achieve the strategic goal and objectives, with timeframes and implementers, (v) process for implementing the Action Plan, institutional arrangements, and funding mechanism, and (vi) processes of monitoring, review, and reporting of progress made in implementing the IDP.

The IDP is planned to be implemented in 3 phases: (i) Phase 1 (2024-27), foundation setting and capacity development, with focus on RIMES Program Unit restructuring and strengthening of RIMES' technical expertise/infrastructure, procurement, finance, human resource, and project management systems, (ii) Phase 2 (2028-29), innovation and expansion, with focus on scaling up of/integration of new technologies and innovations in RIMES' digital tools and expansion of collaborations with global research and scientific institutions, and (iii) Phase 3 (2030), sustainability and continuous improvement, with focus on evaluation and enhancement of the organizational structure and operational systems, and institutionalization of sustainable funding models.

Overall feedback and recommendations from the World Bank, following RIMES' submission of the IDP in May 2024, are to (i) prioritize/streamline reforms with the highest impacts, (ii) reorganize the document to be more user-friendly, (iii) incorporate more details on finance strategy, information security, likelihood and impact of risks, results framework, and (iv) include benchmarks for measuring

progress in improving financial management, procurement, and project management functions, such as, International Financial Reporting Standards (IFRS) for financial management, Chartered Institute of Procurement and Supplies (CIPS) for procurement, and PMBOK or Prince2 for project management.

During the ISR mission in May 2024, the World Bank indicated that the requirement related to the IDP, per legal covenant, has been cleared with the submission of the IDP document.

Activity 3.2
Project Implementation support, documentation, monitoring, evaluation, and reporting

Coordination

Ongoing support and guidance from project stakeholders and the World Bank during this reporting period were facilitated through the following activities:

- ISR mission, from 24-31 May 2024, reviewed the project implementation progress and project performance against the results framework; reassessed/ streamlined remaining project activities, budget, and procurement plan due to implementation delays and lack of progress on results indicators which are designed to be achieved at the end of the project; recommended fast-tracking of systems development and implementation of trainings by mid-September; completion of all pending procurement activities, including onboarding of consultants by the end of July 2024; and agreed to submit a restructuring letter by the end of June 2024.
- SFPs meeting in Nepal, on 27 June 2024, reviewed progress of DSSs development and other key activities, obtained feedback and recommendations on the DSSs and workplan for the remainder of the implementation period, firmed up approaches/strategies for full operationalization of DSSs/tools by the end of 2024, and agreed/confirmed action points for implementation.
- Monthly CWG meetings with ADPC and monthly meetings with ADPC and the World Bank country team/s discussed areas of complementarity, issues/ challenges/bottleneck areas in project implementation, and data/information sharing, as relevant.

Documentation

Accomplishments, from 1 January to 30 June 2024, are provided below:

Activity	Accomplishments/Updates
Annual Procurement Plan	Latest version submitted to, and approved by, the Bank on 25 June 2024
Documentation of regular meetings to monitor the status of project implementation and streamline national, regional, and IAs coordination	● CWG Meetings ● RIMES PIU Meetings
Reports on the details and status of coordination and progress of project activities	● 5 Regional and country-specific activity reports ○ 5 meeting reports (CAF in Bangladesh, 3 CAFs in Nepal, Forecasters' Forum) ● 2 Project Documents: ○ 1 bi-annual report: January to June 2024 ○ 1 document on methodology for calculating PDO and IR indicators for Component 1 ● 10 Technical Reports ○ 1 data collection, processing, and analysis report ○ 1 RDAS progress report ○ 8 DSSs progress reports ● 3 Training Reports (NLAS, SAHF) ○ 1 capacity building framework ○ 1 NLAS training report ○ 1 SAHF training report
Financial Reports	● 2 Statement of Expenditures Reports ○ 7th SoE ○ 8th SoE ● IUFR ending December 2023

ICKM

For this reporting period, activities related to ICKM focused on documentation/publication of project activities on the CARE Component 1 Facebook platform (https://www.facebook.com/careforsouthasia) and the existing website (careforsouthasia.info), which includes the Climate Application Forums held in Bangladesh and Nepal and the training on the utilization of the NLAS in Bangladesh; preparation of publication materials and other visibility materials for various events, among others; dissemination of the first issue of the CONNECT digest through email to stakeholders; and development of the new CARE website. Onboarding of the Graphics Designer, Mr. Doulat Baig, and CARE Website Developer, Mr. Ahsan Gul, was completed in April 2024.

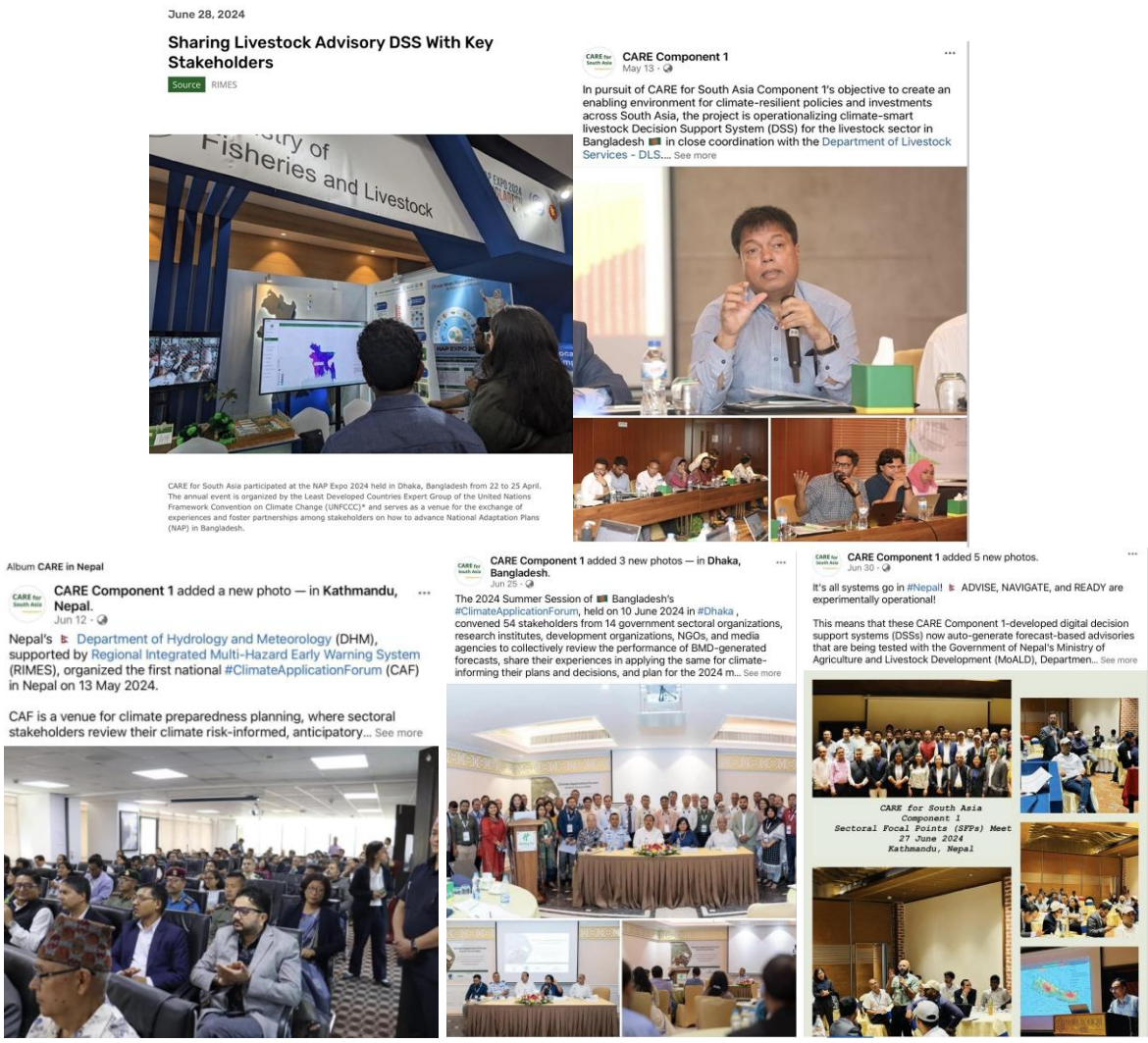

Figure 70. Publicity on past and upcoming CARE activities as seen on the CARE Component 1 Facebook page and website

Procurement

- **Staffing.** Around 9 regional staffs and 16 country staffs (Bangladesh [7], Nepal [4], and Pakistan [5]) are expected to be onboarded within July.

  As of June 2024, the project has 73 staffs, viz.:

  - **PIU Staff (22/30): Regional:** Project Director, Project Coordinator, Finance Management Officer, Project Accountant, Procurement Specialist, Procurement Officer, 4 Administrative Assistants, ESD Specialist, ICKM Specialist, and M&E Specialist; **National:** 3 Country Program Leads, Country Coordinator (Bangladesh), National Adviser (Pakistan), Project Associate (Pakistan), and 3 Administrative Assistants.
    Staff for onboarding next semester are: **Regional:** Finance Management Specialist, Financial Audit, Content Management Specialist, External Project Evaluation Specialist, consultant for Conferences, Events Coordination and Video Production; **National:** 3 Project Assistants (Nepal and Pakistan).

- **Climate Applications Team (16/17):** **Regional:** 3 Climate Impacts Expert (Agriculture/Planning and Finance/Transport), NWP Expert, 2 IBF Specialists, Data Analyst (Regional); **National:** 3 GIS Specialists, Climate Impacts Expert (Livestock, Bangladesh), Climate Impacts Expert (DRM, Nepal), 3 Climate Impacts Expert (Agriculture, Nepal and Pakistan), and Transport Expert (Pakistan).
  Staff for onboarding next semester: Senior Meteorologist, BMD (Bangladesh)

- **Capacity Development Team (5/5):** **Regional:** Training Coordinator and Capacity Building Specialist; **National:** 3 Capacity Building Officers.

- **System Development Team (30/46):** Data Management Expert, Geospatial Data and Programming Expert, Systems Development Expert, 12 Full Stack Developers, Graphic Designer, and Web Developer; **National:** 2 IT/Full Stack Developers (Bangladesh and Nepal), 8 Full Stack Developers (Bangladesh, Nepal, and Pakistan), UI/UX Designer (Nepal), and 2 Mobile App Developers (Pakistan).
  Staff for onboarding next semester are: **Regional:** AI/ML Expert, UI/UX Designer, Data Visualization Expert, and Web Developer, **National:** 1 IT/Full Stack Developer (Pakistan), 3 Full Stack Developers (Bangladesh and Pakistan), 2 UI/UX Designers (Bangladesh and Pakistan), 2 Data Visualization Experts (Bangladesh and Pakistan), 3 Mobile App Developers (Bangladesh and Nepal), and Senior ICT Specialist, BMD (Bangladesh).

- **Office.** The regional office and country offices in Bangladesh, Nepal, and Pakistan are in place. Procurement of additional office furniture and equipment in the region/countries has been completed.
- **Procurement of Goods.** **Regional:** Physical servers for RDAS and project MIS are under implementation; **National:** IT Equipment and physical servers in Bangladesh, Nepal, and Pakistan are under implementation.
- **Mission.** The ISR mission meeting, on 27 May 2024, reviewed the procurement progress. The mission underscored the delays in procurement and discussed issues in STEP's contract management module. Key recommendations from the meeting are (i) downgrading of qualifications or increasing the scope of work and budget of existing staff to cover for positions where availability of candidates is limited, (ii) justification to be provided to the Bank for the change in server specifications, from cloud to physical server, (iii) sharing of procurement activities via excel, in case issues in STEP persist, and (iv) deadline for onboarding new staff is set to end of July 2024.

Budget and Finance

- **Budget, Disbursement and Expenditure.** The USD 860,183 disbursement was made to RIMES in 2024 (Jan to June 2024). Actual expenditure from 1 Jan to 30 June 2024 covered staff and consultant salaries, local travel and meeting costs, operating expenses, e.g., office rental and utilities, stationery, and consumables.

- **Reporting.** RIMES submitted the 7th SoE on 2 April 2024 (USD 447,255); 8th SoE (USD 412,928) on 27 June 2024; and 7th IUFR ending December 2023 on 21 February 2024. The audited financial statement for the Year 2023 will be submitted before 31 August 2024.

- **Mission.** The ISR mission on 29 May 2024 reviewed the FM progress including key agreed actions, per the Management Letter released by the World Bank on 12 December 2023. The following actions have been undertaken during this semester, per requirements in the Management Letter: (i) improved records management by updating the bank book, advance register, and fixed assets register, (ii) completed the modification of the MIS/SunSystem, (iii) improved budget monitoring and budget revision processes (i.e., a committee has been formed consisting of the Project Director, finance, procurement, and administrative staff relevant to budget monitoring/revision, which meets every 10th of the month to monitor, review, and prepare monthly budget/financial monitoring reports), (iv) expedited documentation of expenditures (USD 325,000) paid from the RIMES account, (v) explored bank options for reducing bank transaction charges (i.e., provide a swift order to deduct only the bank charge from the THB DA bank account with a minimum fee of around USD 65), and (vi) completed recruitment of the ESD Specialist; FMS expected to onboard in July.

Advance Register

Advance Details						Advance Adjust/ Liquidation/ Acquital Details						
1	2	3	4	5	6	7	8	9	10	11	12	13
S. No.	Name of Recipient	Purpose/Descriptions for Advance	Voucher Number	Date	Advance given	Clearance date (Due)	Clearance date (Actual)	Voucher Number	Amount Adjusted	Balance Amount	Refund to Cashier	Outstanding Advance
1	RAIHANUL HAQUE KHAN	Advance for Technical Working group for meeting	[redacted]	11-08-23	1,601.09	10-09-23				1,601.09		1,601.09
2	PUJA SHAKYA	Advance for Nepal Office Operation	[redacted]	16-08-23	2,000.00	17-09-23				2,000.00		2,000.00
3	WARISA KHAJABNAK	Advance request for per-diem for workshop	[redacted]	01-09-23	3,754.55	01-10-23				3,754.55		3,754.55
4	Kangsadan Wongsakun	Advance for Petty Cash (Thailand)	[redacted]	11-07-23	1,000.00	10-08-23				1,000.00		1,000.00
5	PHILIP CHRISTIAN ZUNIGA	Advance for Meeting with the stakeholder	[redacted]	16-06-23	759.96	16-07-23	31-07-23	[redacted]	759.96	-		-
		Total	>>>>>>>	>>>>>>>	9,115.60				759.96	8,355.64	-	8,355.64

Detail of Total Fixed Assets

Country Wise Break-up		Software	Computer, Laptop, Hard Disk etc.					Total
			2020	2021	2022	2023	2024	
1	RIMES Office	31,741.10	57,209.61	16,251.79	-	989.61	8,398.36	114,590.46
2	Bangladesh	1,461.00		9,856.00	-	2,558.25	-	13,875.25
3	Nepal	836.00		6,106.95	-	3,888.61	-	10,831.56
4	Pakistan	560.00		8,725.00	-	4,025.40	-	13,310.40
	Total (Country-wise)	34,598.10	57,209.61	40,939.74	-	11,461.87	8,398.36	152,607.67

Figure 71. Improvement of record management practices by updating the advance register (left) and fixed assets register (right)

Environment and Social Management

The ISR mission on 24 May 2024, organized by the Bank's E&S team, reviewed ongoing/planned user engagement activities and their potential risks, which remain low; and provided a brief discussion/refresher on stakeholder engagement, E&S risk classification requirements, and E&S risks and impacts associated with technical assistance. No complaints or grievances were reported during this period. Mr. Navaraj Pokharel, ESD Specialist, onboarded in February 2024.

Monitoring, Reporting and Evaluation

- **M&E system.** Monthly PIU, CWG, consultation with stakeholders, either bilaterally or through TWG/SFP meetings; WB ISR meetings; monthly progress and meeting reports; system development reports; are some of the mechanisms/tools during this period for monitoring, evaluating, and reporting progress of key activities and implementation strategies, to ensure the project is on track, key indicators are achieved per the agreed timelines, project implementation bottlenecks/challenges are addressed timely, and systems development is responding to stakeholders' feedback and requirements. Enhancements to the MIS, to optimize efficiency of operations/processes, are regularly implemented.

- **ISR Mission.** A series of meetings on IDP, finance management, procurement, E&S, and project implementation undertaken with the World Bank task team during the ISR mission from 24 to 31 May 2024, reviewed project implementation progress and performance against results indicators; updated on key agreed actions, per the Management Letter communicated by the Bank on 12 December 2023; identified key challenges/bottlenecks in implementation and provided guidance. As results indicators are designed to be achieved only at the end of the project, hence, the limited progress on the results indicators, the mission recommended to reprioritize/streamline remaining activities and budget and to expedite prioritized activities, by the middle of September, to achieve 50% completion of all PDO and IR indicators by 30 September 2024. The ISR mission highlighted key actions to be taken including (i) completion of all pending procurement of consultancies and goods by 31 July 2024; (ii) achievement of 50% completion of all PDO and IR indicators by 30 September 2024; (iii) submission of a restructuring request to the Bank by 30 June 2024, including a request for partial cancellation of IDA grant funds owing to savings, adjustment to the results framework, and rationalized training schedule.

  Results Framework. Proposed adjustments to the results framework, following the Bank's advice to restructure/reprioritize project activities and budget, were minimal and mostly related to a reduction in the number of participants trained under Component 1. From the initial target of 1,650 participants trained by RIMES during the restructuring in March 2023, a

reduction to 1,230 participants has been proposed. The proposed reduction in the number of participants is due to the exclusion, by the Bank, of the participants external to the government system in reporting this indicator. Details are provided below:

- RDAS trainings/CoP: removal of 190 participants from the originally proposed 350 which includes research institutions/academe/development organizations from regional offices and countries in South Asia. The proposed reduced 160 participants represent 15 participants each in Bangladesh, Nepal, and Pakistan for each event/activity, for a total of 3 activities planned per country within the year, in addition to participants already trained in November 2023
- Training on climate information application in communities: removal of 200 community participants
- Trainings of NMHSs: removal of 40 participants from the originally proposed 90 which was initially planned to be conducted physically in the 3 focus countries, but which is now being planned for physical meetings at the regional level including 8 countries in South Asia. The remaining 50 participants represent 16 participants in a training planned in August, 5 participants from each of the 5 TWG meetings (WG: Observational Network, Capacity Enhancement, Impact-based Forecasting, Numerical Weather Prediction, and Hydrology), in addition to participants already trained in May 2024
- Forecasters' Forum: The proposed additional 10 participants will come from NMHSs in 8 SAR countries

Moreover, RIMES also proposed to reduce the percentage of female participation among the staffs trained within the targeted units/departments to 15%, as it is challenging for Component 1 to achieve the earlier target of 50%, due to limited female government officials working in the institutions we are engaging.

- **PDO Satisfaction Rating.** A methodology for measuring stakeholders' satisfaction of the RDAS and DSSs, under Component 1, was developed by RIMES; while a methodology for measuring the satisfaction ratings of trainings conducted under both Components 1 and 2 was jointly developed by RIMES and ADPC. Standardized survey questionnaires and processes of calculating the ratings, to assess the relevance, coherence, effectiveness, impact, and sustainability of project interventions are utilized/followed to ensure uniformity in measurement.

A detailed methodology for calculating satisfaction ratings of PDOs is provided in Appendix 19.

Activity 3.3
External audit and evaluation

Audit for the fiscal year 2023 (1 January to 31 December 2023) shall commence following onboarding of the consulting firm.

FINANCIAL PROGRESS

2. Financial Progress

Cost category-wise financial summary from project start until June 2024

Cost Category	Project Budget	Expenditure						Remaining budget (as of 1 Jun 24)	Commitments	Unutilized Budget	Pending Activities	Pending Procurement	Anticipated contract renewals	Potential Savings
		2020	2021	2022	2023	Jan-Jun '24	Project start until Jun '24							
Individual Consultants (INC)	5,745,134	40,880	413,202	313,214	499,682	89,533	1,771,702	3,973,432	892,617	**3,080,815**		613,600	301,047	**2,166,168**
Consulting Firms (COF)	489,790	-	-	16,393	88,337	-	104,731	385,059	-	**385,059**		53,000		**332,059**
Non-consulting services	-			-		-	-	-	-	**-**				**-**
Goods (GOO)	813,689	27,233	77,969	25,235	11,517	-	210,973	602,716	40,805	**561,911**		639,000		**- 77,089**
Training (TRN)	803,985	-	-	-	99,966	552	232,868	571,117	3,720	**567,397**	615,450			**- 48,053**
Operating Costs (IOC)	1,208,955	22,373	70,133	89,889	152,455	13,806	473,243	735,712	95,557	**640,155**	419,149			**221,006**
PIU Staff	1,338,447	103,867	144,037	169,371	254,694	24,844	896,331	442,116	315,392	**126,723**		70,000	14,822	**41,901**
RTI Staff	1,600,000	175,670	251,559	233,945	296,915	25,115	1,229,756	370,244	317,413	**52,831**		-	44,659	**8,172**
Total	**12,000,000**	**370,023**	**956,900**	**848,047**	**1,403,566**	**153,849**	**4,919,603**	**7,080,397**	**1,665,504**	**5,414,892**	**1,034,599**	**1,375,600**	**360,528**	**2,644,165**

OTHER PROGRESS AREAS

3. Risks and Assumptions

Risk Category	Risk Level		
	Rating at Approval	Previous Rating	Current Rating
Political and Governance	Substantial	Substantial	Substantial
Macroeconomic	Low	Low	Low
Sector Strategies and Policies	Moderate	Moderate	Moderate
Technical Design of Project	Moderate	Substantial	Substantial
Institutional Capacity for Implementation and Sustainability	Moderate	Substantial	Substantial
Fiduciary	Substantial	Substantial	Substantial
Environment and Social	Moderate	Moderate	Moderate
Stakeholders	Substantial	Substantial	Substantial
Overall	Moderate	Substantial	Substantial

4. Performance Issues

Check key reasons for shortfalls in output delivery, output quality and Development Objective Achievement

☐	Country project team performance	☐	PIU performance
☒	Difficulties in inter-agency coordination	☐	Inadequate cost estimates
☐	Lack of implementing partner commitment/ ownership	☐	Inadequate project design
☐	Implementing agency policy changes	☐	Funding shortfall
☐	Budget processing (revision/ disbursement, etc.) delays	☒	Unexpected change in external environment
☐	Community/ political opposition	☒	HR difficulties (recruitment, contracts)
☐	Others		

5. Issues and Actions

ISSUES	ACTIONS
Delays in the procurement of project staff	To address the delays in procurement of project staff, RIMES explored options to widen the reach of REoIs/advertisements. Among the challenges in the placement of project staff is also owning to the uniqueness of the staff that are required in CARE Component 1. For example, most of the IT experts/full stack developers in the market have experience in building websites and are not adroit in dealing with scientific datasets and/or modeling, among others. To address the gap, RIMES trained IT experts/full stack developers in the requisite skills required in systems development in CARE Component 1. Very close guidance was also required from the PIU during the initial months of onboarding the experts.
Data access and integration	In cases where there are a) sensitivities in data sharing from partner government institutions and/or b) the process for sharing data is taking time, RIMES addressed the issue by making available, in RDAS, datasets that are available from regional/global centers. These datasets are then connected to the DSSs. For example, ECMWF reanalysis data (historical climate data) was integrated in RDAS and a tool for extracting observation datasets, up to the district level

	in relevant countries, has been implemented. Proxy data, obtained from various studies/literatures, were further used to fill sectoral data gaps.
Domain experts in climate impacts in various sectors represent a very slim percentage of the market	Highly skilled domain experts in climate impacts in various sectors, with operational experience in climate applications, are a rare commodity in the market. The PIU has to closely work with the domain experts onboarded to steer their work towards the requirements in CARE Component 1.

6. Integration of Cross-cutting Issues

The integration of data from various institutions is crucial in any work on DSS development/analysis of weather/climate impacts. As has been apparent in Bangladesh, Nepal, and Pakistan, the dynamic integration of datasets from government institutions is still a novel/nascent context. Government institutions need to go through bureaucratic processes in order to share datasets with other government institutions. In many instances, data are not diligently archived/curated in institutions. RIMES strategy to address this is imbedding, within the DSSs, a data repository/data and analytics modules to enable to store datasets digitally and analyze such datasets with flexibility.

For sustainability, policies supporting dynamic data gathering, curating, and sharing have to be advocated at the highest echelons of government to shift government institutions behavior on data availability and co-development processes involving these datasets.

7. Stakeholders Participation and Involvement

For enhancing stakeholders' participation and involvement, RIMES has pursued monthly meetings with institutional focal points and other relevant officials in partner government institutions on a cyclical process of presenting progress on the DSSs and obtaining feedback on onward development. In Nepal, CARE Component 1 project staff are working, at least once weekly, with partner government officials in their offices for deeper co-development process.

8. Compliance with Safeguard, Procurement, Financial Management

There are no issues on Safeguard to be reported during this semester.

On Procurement, RIMES has addressed gaps identified by the Bank as part of the procurement review during the ISR mission.

On Financial Management, RIMES/CARE Component 1 PIU assembled a committee, out of CARE Component 1's various staff, to regularly update its financial analysis, meanwhile that the FMS is yet to be onboarded.

9. Lessons Learned

Context and implementing environment	
Project strategy and design	The project design, from the beginning of the project until the restructuring in May 2023, has the PDO indicators at the end of the project. As rightly pointed out by the Bank during the recent ISR mission, tracking the project progress is more efficient with the PDO indicators calendared to be ticked prior to project end.

	The frontloading of the PDO indicators, as agreed with the Bank during the ISR mission, requires significant adjustments from the CARE Component 1 Team in RIMES. It also brings forward significant learnings on onward project implementation (and onward strategies and designs of similar projects).
Advocacy, communications, and capacity building	
Gender inclusion	
Implementation and institutional arrangements	
Any other areas	

10. Planned Activities for Next Semester

Sub-component 1.1: Expanding SAR RDAS

- RDAS full system development: data, analytics, and predictive tools

Sub-component 1.2: Strengthening national level sectoral DSSs

- DSS development: development/refinement of experimental products
- SFP national meetings

Sub-component 1.3: Supporting climate-informed decision-making and scaling up SAHF

- Climate Application Forums
- Demonstration of climate information application in communities
- SAHF annual conference
- Facilitating the continuity of the Forecasters Forum
- Supporting priority areas of the hydromet service
- Annual assessment of NMHSs capacities and gaps

Component 3: Project management and implementation support

- Enhancement of HR, procurement and finance systems
- Documentation, dissemination/ knowledge-sharing
- Project implementation support, monitoring, evaluation, and reporting
- Financial audit for Year 2023

11.Appendices

1. Technical progress report on data collection, processing and analysis
2. Technical progress report on RDAS development/enhancement
3. Technical progress report on NLAS development/enhancement, Bangladesh
4. Technical progress report on FFWC DSS development/enhancement, Bangladesh
5. Technical progress report on NAVIGATE development/enhancement, Nepal
6. Technical progress report on ADVISE development/enhancement, Nepal
7. Technical progress report on READY development/enhancement, Nepal
8. Technical progress report on CLIM-PLANNeD development/enhancement, Pakistan
9. Technical progress report on ADVISE development/enhancement, Punjab, Pakistan
10. Technical progress report on ADVISE development/enhancement, Balochistan, Pakistan
11. Meeting report on Climate Application Forum in Bangladesh
12. Meeting report on District-level Climate Application Forum in Nepal
13. Meeting report on National-level Climate Application Forum in Nepal
14. Meeting report on Provincial-level Climate Application Forum in Nepal
15. Capacity building framework for Component 1
16. Training report on NLAS
17. Report on Forecasters' Forum
18. Training report on Customization of Ocean Forecast Products
19. Methodology for calculating PDO and IR indicators for Component 1
20. Procurement Plan as of 30 June 2024

RIMES

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Produced under the project Climate Adaptation and Resilience for South Asia, funded by the World Bank and co-implemented with the Asian Disaster Preparedness Center