



Climate Services for Resilient Development (CSRD) in South Asia

Climate Services for Resilient Development (CSRD) is a global partnership that connects climate and environmental science with data streams to generate decision support tools and training for decision-makers in developing countries. Translating complex climate information into easy to understand actionable formats to spread awareness in the form of climate services is core to CSRD's mission. CSRD works across South Asia (with emphasis on Bangladesh), the Horn of Africa (Ethiopia), and in South America (Colombia) to generate and provide timely and useful climate information, decision tools and services. In South Asia, CSRD focusses the development, supply and adaptation of agricultural climate services to reduce vulnerability by increasing resiliency in smallholder farming systems, which is strategically aligned with the Global Framework for Climate Services.



Strategic alignment



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



The CSRD consortium in South Asia is led by the International Maize and Wheat Improvement Center (CIMMYT) in partnership with the Bangladesh Meteorological Department (BMD), Bangladesh Department of Agricultural Extension (DAE), Bangladesh Agricultural Research Council (BARC), Bangladesh Agricultural Research Institute (BARI), International Center for Integrated Mountain Development (ICIMOD), International Institute for Climate and Society (IRI), University de Passo Fundo (UPF), and the University of Rhode Island (URI). This partnership provides strength and technical expertise to develop relevant climate products to assure the access of farmers and other stakeholders to relevant information for a better-informed decision making to increase resilience to climate-related risks. The partnership also works to assure that climate information can be conveyed in ways that are decision-relevant to farmers and stakeholders in agricultural value chains.

The CSRD Approach in Bangladesh and South Asia

CSRD's core objectives are to prepare farmers, extension services, and agricultural policy makers by providing actionable climate information and crop management advisories to increase the resilience of smallholder farming communities to risks to agricultural production.

Some of our activities focus on:

Updating agro-meteorological information for major food and income staples in Bangladesh using farmer decision making frameworks

This activity focusses on identifying critical farm management decisions that could result in increasingly resilient agricultural productivity outcomes through the incorporation of climate services. Examples of climatic factors that influence farm management and crop performance include the risk of encountering drought or flooding, the timing and intensity of predicted rainfall, and the probability of extreme heat, among others. These factors influence the decisions farmers make with respect to crop and livestock management, including but not limited to choice of crop species and variety, when to sow, fertilize, irrigate or harvest, in addition to key pest and disease management decisions. This activity therefore investigates the relative importance of climatic information compared to other biophysical and socioeconomic factors, to identify ways to communicate relevant meteorological information in support of farming communities.



Presenting meteorological forecasts that are relevant to the decisions farmers make on a daily basis can help to reduce climate related risks and increase resilience in South Asia's farming systems.

Photo: Timothy J. Krupnik

Climate services capacity development for a more resilient future

The usefulness of climate services in agriculture is dependent on the accuracy of

weather forecasting. This activity focusses on scientific exchanges between BMD, DAE, URI, and IRI, and seeks to increase the skill of meteorological forecasts, and to render them in easy to understand formats for farmers and agricultural decision makers. Key focus areas include the improvement of crop specific risk-mapping heat stress, cold stress, dry-spells, and heavy rainfall and storm events that can damage crops. This activity also seeks to develop appropriate training and technical materials on climate services for extension services and farmers.

Development of an ITC platform for meteorologically integrated irrigation management services

The Program for Advanced Numerical Irrigation (PANI) is a mobile smart phone based application developed by CIMMYT that provides farmers and irrigation pump owners with irrigation recommendations for specific fields one week ahead of time. Under CSRD, we are working to upgrade PANI so that it can make use of forecasted and downscaled precipitation data that will be generated to provide field-specific and regional irrigation scheduling recommendations in Bangladesh and South Asia.

Spatially explicit and meteorologically driven wheat blast (*Magnaporthe oryzae* *Triticum*) disease risk assessments

For the first time ever outside South America, wheat blast disease (*Magnaporthe oryzae* *Triticum* (MoT)) was detected on over 15,000 hectares in Bangladesh in 2016. The fungal disease caused rapid and in some cases complete yield loss. Blast's initial outbreak had a significant and negative impact on wheat production in southern Bangladesh in 2017. Media have also reported that blast has spread beyond Bangladesh's borders. This work stream responds requests made by Bangladesh's Ministry of Agriculture to develop an early warning system for wheat blast outbreaks. CSRD is working with Brazil's Universidad de Passo Fundo (UPF) to adapt previously validated wheat blast forecasting model to South Asian climatic conditions, and to train extension services in its use. This activity will result in both decision support tools and advisories to assist in rational and integrated disease management in South Asia.



CSRD partners are forecasting drought risk and producing easy to understand messages in the form of crop choice and management advisories for farmers. Photo: Faisal Mueen Qamer

Regional drought forecasting and early warning systems utilizing earth observation data

The USAID supported SERVIR-Hindu Kush Himalaya (HKH) program of ICIMOD aims to increase use of earth observation information and geospatial technologies for

environmental management, and to improve resilience to climate change. Through this program, which is aligned with CSRD, a regional effort is ongoing to establish new drought monitoring and early warning systems by incorporating suitable earth observation datasets and linking them with local cropping systems and meteorological data. The decision support products developed through ICIMOD-HKH-CSRD collaboration will be utilized by both national meteorological agencies and institutions involved in Bangladesh, Nepal, and Afghanistan to provide farmers and agricultural planners advanced information and advisories to overcome drought.

STEMPEDIA: *Stemphylium* blight disease forecasting and early warning system to reduce risk for lentil farmers



Stemphylium blight disease forecasting and early warning systems can reduce risk for lentil farmers.
Photo: Ranak Martin

Lentil *Stemphylium* blight is a fungal disease threatening the sustainable production of lentil in South Asia. This activity builds on efforts conducted in Bangladesh to develop a preliminary weather-based model to predict *Stemphylium*, called 'Stempedia'. Through CSRD, the model is being validated, adapted, and refined in Bangladesh, India, and in Nepal, where lentil is a key income generating and nutritional crop for smallholder farmers. Work is also underway to incorporate extended range forecasts into the model, to develop a robust early warning system that can be

used to more effectively advise farmers when and where *Stemphylium* outbreaks may occur, and how to control the disease.

Increasing policy maker, agro-metrological services, extension, and farmer awareness of agro-meteorological forecasts and decision support tools, with the support of all partners

CSRD focusses not just on the development, testing, refinement, and implementation of climate services. The project also endeavors to create awareness of the importance of climate services among the public. Trainings, media events, and round-table discussions for relevant stakeholder organizations, including government, civil society groups, and NGOs, are a key part of our work in South Asia.

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