Information on EPICC in India

Climate

EPICC will work with a wide range of climate data, from historic (in-situ measurements, remote sensing products, reanalysis) to medium-range (seasonal) predictions and long-term projections. Climate outputs for expert and non-expert users will be produced in order to support local capacities in meteorological services and to decision makers. TERI aims to provide new knowledge and information at sub-regional scales over India with particular focus on extreme events. In addition, the project aims to provide the stakeholders with a statistical, long-term forecast of the onset (40 days in advance) and withdrawal (70 days in advance) of the Indian Summer Monsoon for the central part of India. In collaboration with the German Meteorological Service (DWD, Deutscher Wetterdienst), the applicability of forecasts of the German Climate Forecast System (GCFS) for customized seasonal predictions across different sectors (climate, hydrology, agriculture) will be tested and developed. These outputs will be implemented into new or existing internet based platforms.

Water

The goal of the hydrological work in EPICC is to support national and local policy- and decision-makers, by analyzing and quantifying impacts of long-term climate change and short-term climate variability on water resources in Godavari River, India. Driven by user demands, data and information from weather forecast, medium-range predictions and long-term climate scenarios will be developed, processed and provided in a user-friendly format and can be fed into available hydrological models. The work will have a strong link to the Climate Work Package (WP), which is focusing on monsoon prediction and generation of seasonal forecasts. The PIK's hydrological and water resources model system (SWIM) is proposed to be adapted and implemented for the watershed of Godavari River, where the date of monsoon on/offset prediction is delivered by the Climate WP. The SWIM model system allows to test short- and medium-term forecasts and predictions as well as long-term scenarios for their impacts on hydrology and water resources and the water-energy-food nexus, taking into account irrigational infrastructure development, water management (reservoirs, hydropower), crop growth and changing water demands in agriculture, energy and other sectors. Besides the joint development of action-oriented knowledge by scientists and other stakeholders, capacity building at different levels will be central to EPICC, for example through longer research stays of experts in Tanzania and Germany (2 to 3 months).

Agriculture

Within the EPICC project, it is proposed to supplement the existing agricultural information systems by agricultural crop risk assessments for changing climate conditions and extreme weather events. These assessments will be developed and implemented in close cooperation with local, national and international experts and other stakeholders from the private and public sectors and civil society. Our work will focus on staple crops in India. For this purpose, we make use of process-based crop models, semi-empirical modeling frameworks and combine them with satellite remote sensing earth observation data. EPICC aims to provide quantitative information of crop yields and crop failures incurred by weather events either in the immediate aftermath or even before the occurrence of such an event. The information might enable farmers – informed e.g. by ministries and farmers' associations – to adjust their agronomic

management practices in order to minimize the scope of weather-related crop losses and to increase their capacity to cope with climate risks. In particular, crop insurance schemes might be qualified using our results.

Migration

This EPICC component proposes to analyse how climate change impacts on water and agriculture shape existing rural-urban migration dynamics as well as potential conflicts. The results are intended to support political decision-making processes for adaptation planning. While certain communities have a long history of internal migration as means of either livelihood diversification or risk management, climate impacts on agriculture and water may have an important bearing on human mobility. The rural populations, especially those dependent on subsistence agriculture, or those working as farm labourers and living below poverty line are particularly vulnerable to these impacts. The proposed research will include empirical case studies on different forms of either mobility, or inability to move (trapped populations) in the context of climate impacts. It will examine how environmental hazards affect people's livelihoods and will investigate the factors and mechanisms leading to either migration or non-migration. The research conducted will aim at co-producing knowledge by working with partner institutions in India to better understand the nexus between climate change and migration.

Data Visualization

For capacity building within the EPICC project, we will provide and evaluate several visual climate services integrating climate, climate impact and seasonal forecast visualization modules. The idea is to provide custom-tailored interactive climate data information to multiple stakeholder groups and end users such as farmers. In addition, we will develop visual exploration tools for local climate impact scientists to better understand ensembles of regional climate and climate impact projects. In particular, we will apply and enhance interactive state-of-the-art visualization techniques for exploration and communication of heterogeneous migration and seasonal prediction data. The visualizations can be of many types, such as GIS maps, line charts, pie charts, bar graphs, and scatter plots. The applications to be developed will be data visualization based online portals and/or mobile apps.