

Location	Sichuan province, China
Contractor	Rijkswaterstaat, Ministry of Water Resources, PR China
Partner	Alterra
Period	2007

Scope of the project

Alterra has jointly with WaterWatch submitted a proposal entitled 'Drought Monitoring and Prediction by Remote Sensing over China'. One of the unresolved issues that needs clarification before funding is the determination of the cost / benefits of having a Drought Monitoring system in place in China based on remote sensing technologies. The objective is the assessment of the possible alleviation of damage if drought information is earlier in hand, and also with more spatial detail than what is feasible from conventional detection methods of drought.

Study approach

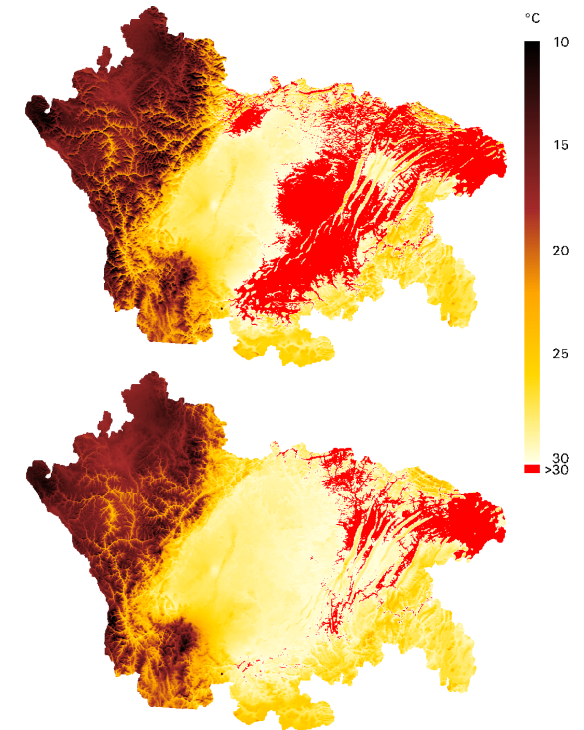
The assessment of the costs and benefits of using the drought system will be based on the Sichuan and Chongqing drought of 2006. Satellite remote sensing technologies provide spatially distributed measurements of process parameters that causes drought such as clouds, precipitation and surface temperatures. Satellites can also measure response to low inflow in terms of soil moisture, EvapoTranspiration (ET) and biomass production. Satellite images can assist in: (1) quantifying processes that are not routinely measured by the public authorities, (2) detect deviations from 'normal' values earlier due to high frequency repetitive measurements, and (3) describe the spatial extent and variation of the anomalies.

Results

The total damage caused by the Sichuan-Chongqing drought is approximately 85 billion RMB, or € 8.5 billion. The investment costs in the Alterra-WaterWatch technology is € 1,2. The key question is whether the damage could have been alleviated when water shortage was reported earlier or the distribution of water shortage was known better. Several actions could have been implemented with better information on developing drought and could have resulted in a total financial gain of RMB 5.3 billion, or EURO 530 million.

Conclusions

The pilot study encompasses an area with a tremendous economic activity, both in industries and in agriculture. This analysis have indicated that the combination of cloud cover, rainfall anomalies, soil moisture conditions and temperature anomalies from satellite data are helpful to gain at least 2 weeks of time in alarming the situation and start rescue operations. The information on biomass production in relation to the water stress coefficient has been of vital importance to assess the damage in the rural areas; food, feed and wood production losses could be estimated in this manner. The costs of the drought detection and monitoring system (RMB 12 million) are only a small fraction of the reduction in the damage that could be realistically achieved (RMB 5.3 billion).



Mean monthly air temperature in July (upper) and August (lower) 2006 modelled with MeteoLook and 32 routine weather station data