

OVERSEAS WORK

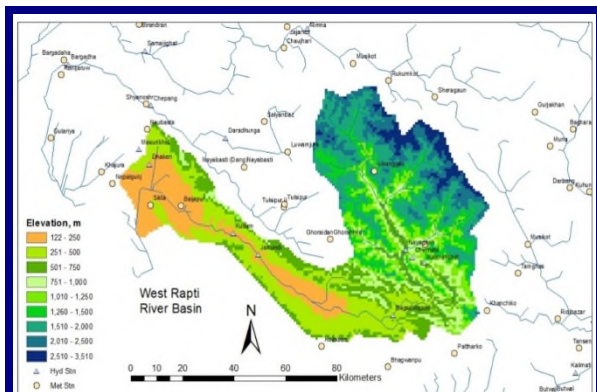
Nepal

Building Resilience to Climate-Related Hazards (BRCH) project

Nepal is one of nine countries participating in the global Pilot Program for Climate Resilience (PPCR) financed by the Climate Investment Funds. One study funded by the World Bank under this programme is the BRCH project which aims to raise the technical and institutional capabilities of the Department of Hydrology and Meteorology. In addition to major procurement programmes of new instruments, equipment and staff training, there is a strong emphasis on improving weather forecasts and real-time flood forecasting and early warning systems, to those populations most at risk in the country.

The main technical support to the BRCH project is provided through a System Integrator (SI) consultancy. This was led by the Finnish Meteorological Institute as it was felt that meteorological services in Nepal were currently significantly weaker than those involving hydrology. However, significant financial and technical support to the hydrology section of the department was provided by Frank Farquharson, the sole hydrologist involved within the SI team. One of his main contributions was preparation of the Terms of Reference for a pilot study to provide real-time flood forecasting and early warning systems for the West Rapti and Koshi river basins.

The West Rapti is one of the major rivers in the mid-western region of Nepal. The catchment area of the study basin is 6,500 km².

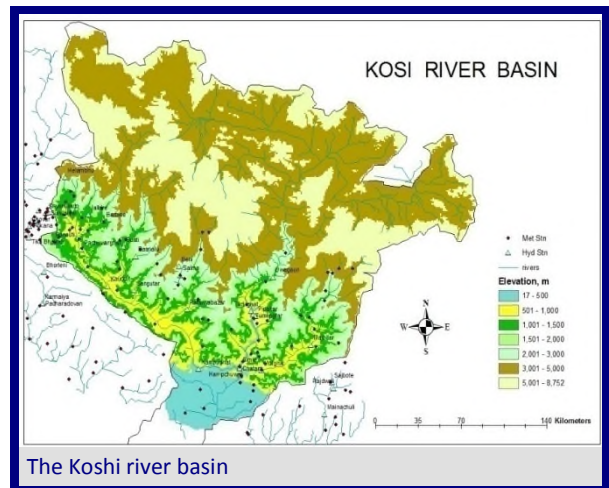


The West Rapti river basin

The river originates from the middle mountains of Nepal, then enters the lowlands and finally drains to the Ghaghra (Karnali) river, a tributary of the Ganges in India. It has several tributaries, of which the main two are the Mari and Jhimruk rivers.

Over the past decade there have been numerous floods, resulting in some 30 fatalities, typically several hundred injuries and extensive damage to properties and crops.

The Koshi is the major river in the eastern region of Nepal. The catchment area of the study basin is 54,100 km². The upper catchment of the river system lies in the Tibet Autonomous Region of China. Most of the flow in the river originates from the High Himalayas, and Mount Everest, the highest peak in the world, lies near the middle of the basin.



The Koshi river basin

Three major tributaries, Sun Koshi from the West, Arun from the North and Tamur from the East meet at Tribeni, close to the border with India. From this location the river flows across the low lying plains to join the Ganges.

As with the West Rapti, flooding is a frequent recurring problem with up to 10-20 fatalities in most years and very significant damage to property and crops.

The flood warning systems, provided under the BRCH project, will benefit from both major improvements in real-time rainfall and river flow monitoring throughout the basins and also markedly improved weather forecasts. The project is ongoing with consultants now implementing the real-time flood forecasting and warning systems.

Somaliland

Design and construction of Hamboweene Dam

WRA completed the hydrological design for another CONSER-WRA dam in 2015 near the village of Hamboweene in Somaliland. This formed part of hydrological support for the CONSER design-and-build program, leading to commissioning in March 2017.



Visit by Somaliland president on day of dam inauguration

The dam provides a new source of supply for livestock in a water-scarce area, and was tested and filled during the Gu [March-May rainy season]. With foundation in basalt, the dam consists of a concrete ogee overflow weir designed to pass 0.5 PMF up to 4,000 m³/s.



Hamboweene Dam full after the 2016-17 rains

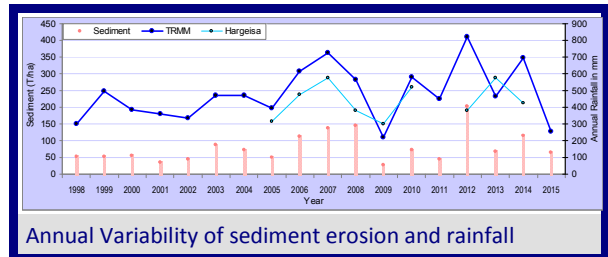
Part of the studies focused on erosion modelling using GLEAMS and GIS to predict the accumulation of sediment at the dam, and the results were used to design a suite of gabion breaker walls upstream of the main reservoir.

The average rate of erosion in the Hamboweene catchment is 65.7 m³/yr/km² based on present land-use conditions. This is at the upper limit of the Walling-Webb findings and lower end of UAE experience.



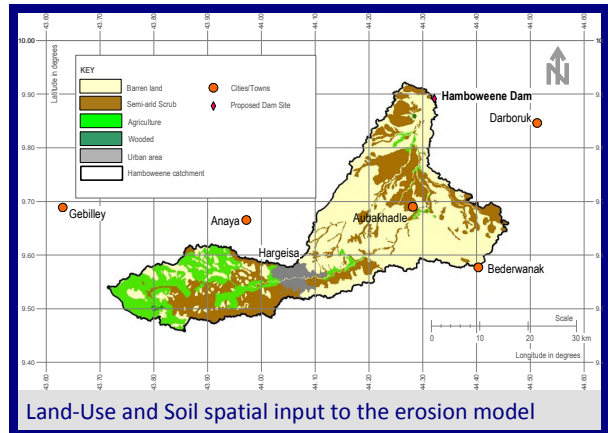
Gabion sediment breakers upstream of the main reservoir

The rate of sedimentation has significant annual variability but would likely fill the reservoir storage of 680 MI in 8 years, so the breakers will extend the life of the reservoir without maintenance to its design life of 50 years.



Annual Variability of sediment erosion and rainfall

The dam catchment drains the capital city, Hargeisa and the more intensely farmed headwaters of the Maroodi Jeex.



Land-Use and Soil spatial input to the erosion model

OTHER NEWS

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Next WRA Board Meeting

21st July 2017, Compleat Angler, Marlow.

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