Agrarian crisis in India: Smallholder Socio-hydrology explains small-scale farmers' suicides

Saket Pande and Hubert Savenije

Delft University of Technology, Delft, Netherlands (s.pande@tudelft.nl)

Maharashtra is one of the states in India that has witnessed one of the highest rates of farmer suicides as proportion of total number of suicides. Most of the farmer suicides in Maharashtra are from semi-arid divisions such as Marathwada where cotton has been historically grown. Other dominant crops produced include cereals, pulses, oilseeds and sugarcane. Cotton (fibers), oilseeds and sugarcane providing highest value addition per unit cultivated area and cereals and pulses the least. Hence it is not surprising that smallholders take risks growing high value crops without 'visualising' the risks it entails such as those corresponding to price and weather shocks.

We deploy recently developed smallholder socio-hydrology modelling framework to understand the underlying dynamics of the crisis. It couples the dynamics of 6 main variables that are most relevant at the scale of a smallholder: water storage capacity (root zone storage and other ways of water storage), capital, livestock, soil fertility and fodder biomass. The hydroclimatic variability is accounted for at sub-annual scale and influences the socio-hydrology at annual scale. The model is applied to Marathwada division of Maharashtra to understand the dynamics of its cotton growing marginal farmers, using diverse data sets of precipitation, potential evaporation, agricultural census based farm inputs and prices.

Results confirm existing narratives: low water storage capacities, no irrigation and poor access to alternative sources of incomes are to blame for the crisis. It suggests that smart indigenous solutions such as rain water harvesting and better integration of smallholder systems to efficient agricultural supply chains are needed to tackle this development challenge.