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Environmental sustainability of increasing silk demand in India

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Natural resources competition between food and cash crops is a current challenge in many developing countries that are experiencing both lack of food availability and a fast growing economy, such as India. Silk industry has always been significant for the Indian economy since it provides high profits and employment. Almost 90% of the world commercial silk production is mulberry silk. Recently, to the aim of increasing silk production in the Country, the Central Silk Board of the Indian Ministry of Textile and the Indian Space Research Organization have identified potential suitable areas for mulberry cultivation through horizontal expansion in wastelands. Here, taking India as a case study, we analyse if the current cultivation of mulberry silk and the horizontal expansion of moriculture is environmentally sustainable. To this end, using the present land cover, we use a dynamic spatially distributed crop water balance model evaluating mulberry water requirement, the green and blue water provision and analysing both water scarcity at pixel scale and the impact of present and future moriculture on its increase.

Results show in the baseline scenario some States (e.g. West Bengal, Bihar, Tamil Nadu, Madhya Pradesh, Uttar Pradesh, Karnataka, Telangana) suitable for mulberry horizontal expansion already experiencing water scarcity conditions and high prevalence of malnutrition that will be exacerbated, both on yearly and monthly scale, by increasing moriculture. Other States (i.e. Orissa, Chhattisgarh, Mizoram, Assam, Manipur, Tripura, Meghalaya and Nagaland) show Mulberry expansion as the triggering factor of water scarcity condition. Particularly affected by water scarcity will be the North-Eastern Indian districts where potential mulberry areas are clustered.

The analysis of the population exposure to water scarcity due to mulberry horizontal expansion shows 11 million people potentially affected in India, where more than 65% living in the North-Eastern States. Compared to the total North-Eastern Region inhabitants, affected population accounts for more than the 15%.