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*Evaluating the impact of change on livelihoods of forest dependent communities in central India: A novel approach to resilience analysis*

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Climate change will disproportionately affect poor and natural resource dependent communities around the world, and especially in developing countries. Understanding the resilience of communities to such shocks is important for designing adaptation strategies. Since communities operate as complex and dynamic social-ecological systems, evaluating their resilience is often challenging. While many methods have been proposed to operationalize resilience research, there have been very few techniques that help evaluate resilience in future contexts. Based on the case of poor, forest-dependent and climate-vulnerable villages in Madhya Pradesh, Central India, this research develops a novel method to evaluate livelihood resilience at the local level. Four years of asset-based socio-economic household and ecological data were collected through census around 6 villages of Pipaliya Goli Panchayat in Raisen district between 2009 and 2012. Qualitative data for scenario analysis were collected through focus group discussions with various stakeholders, including villagers, local government officials, businessmen and political representatives. Primary data on forest regeneration were collected through sampling of forest plots, while secondary data on forest density and species distribution were gathered from local forest management plans. System dynamics (Vensim software) was used to develop a village household forest-livelihood model. The model simulated a baseline scenario, as well as scenarios associated to the impacts of shifts in weather patterns, political capital, and forest management policies. The study finds that there is significant pressure on the local forests due to overgrazing by livestock, frequent forest fires, unsustainable extraction of fuelwood and non-timber forest products. The finding also strengthens the argument that a diverse portfolio of livelihoods provides greater resilience to poor communities. Projecting forward over time, the study finds that shifts in government policies on natural resource extraction stand to have much greater impacts on the resilience of poor communities than shifts in weather. Further, forest communities become extremely vulnerable if impacts of climate change coincide with shifts in government policies. Such a combination of impacts will cause significant disruption to rural livelihoods leading to forced migration from the region. By integrating two independent frameworks i.e. cross scale resilience analysis and the asset based sustainable livelihood framework, and employing techniques of system dynamics modeling and scenario analysis, our research showcases a novel methodology for evaluating resilience of households to multiple shocks. This technique demonstrates a step by step method of analyzing community-level resilience, which has the potential to be adapted to evaluate the resilience of forest dependent communities around the world.