EGU 2020

Application of an integrated assessment model in coastal Bangladesh to support strategic delta risk adaptation assessment.

C. Hutton[1], A.Chapman[2], A. Haque[3], R. J. Nicholls[4], A.Lazar[1], M.Rahman[3] & M.Salehin[3], A. Harfoot, C. Markinco[4] S. Hazra [Contact: Prof. Craig Hutton ch9@soton.ac.uk)

[1]School of Geography and Environment, University of Southampton, UK [2]New Economics Foundation, Vauxhall, London, UK [3] Institute of Water and Flood Management (IWFM), Bangladesh University of Engineering and Technology (BUET), Bangladesh [4] School of Engineering, University of Southampton, UK, [5] School of Oceanographic Studies, Jadavpur University Kolkata, India

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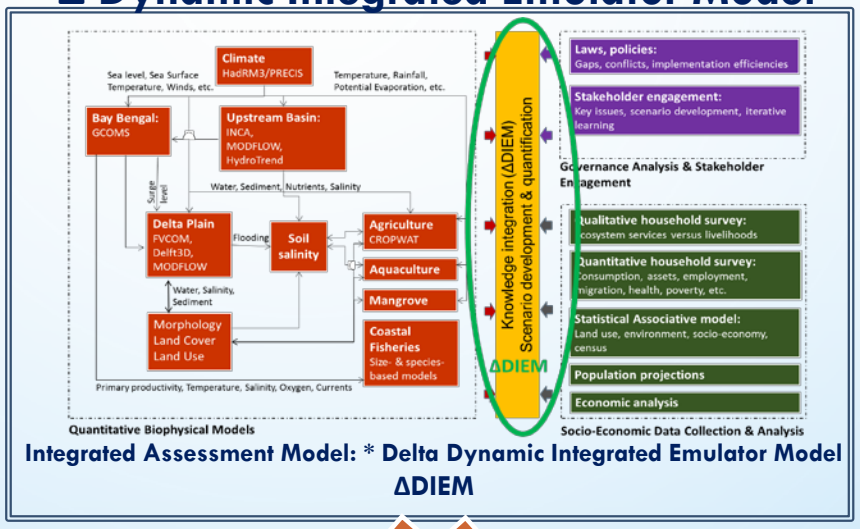
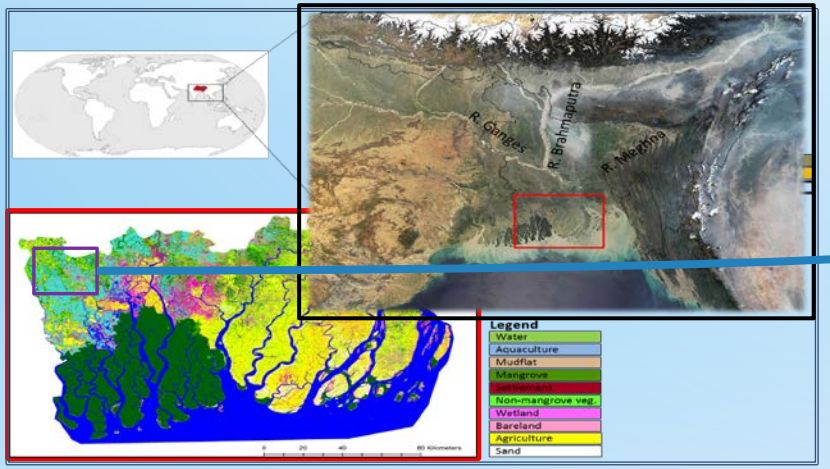
There is growing recognition that new approaches, underpinned by more system-oriented decision support tools, will be required to facilitate development compatible with the Sustainable Development Goals (SDGs) and to prevent the risk of dangerous socio-ecological breakdown. We demonstrate the potential of Integrated Assessment Models (IAMs) to inform strategic policy decision making at the regional level, helping to understand key risks, trade-offs and secondary impacts.

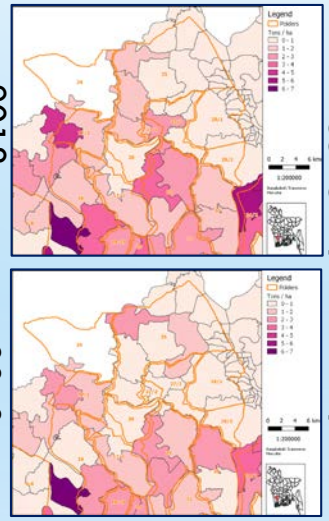
ΔDIEM integrates the outputs of multiple established physically and process-based biophysical models, a number of newly developed process-based models simulating biophysical hazard and household socioeconomics and poverty (vulnerability) with a deep stakeholder engagement process. Models that simulated areas outside the coastal zone (upstream hydrology and Bay of Bengal oceanography), are used as input scenarios (i.e. boundary conditions). Other complex biophysical models focusing on the coastal hydrology and water quality (Delft-3D, FVCOM, MODFLOW) are represented with computationally efficient statistical emulators in ΔDIEM to make tight coupling across the system elements possible. Agriculture and aquaculture are important livelihoods in Bangladesh. Thus a process-based integrated farming model (building on the FAO's CROPWAT model) was developed and included in ΔDIEM.

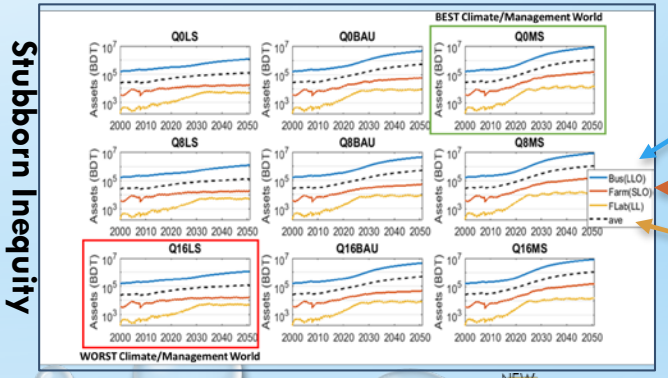
Δ Dynamic Integrated Emulator Model

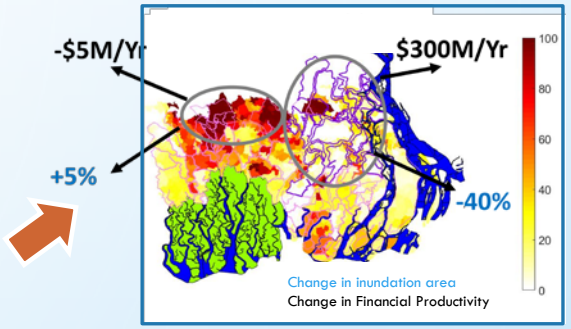


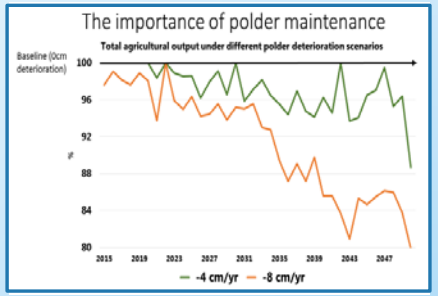
Integrated Assessment Model: * Delta Dynamic Integrated Emulator Model ΔDIEM











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