



Quantifying the Impact of Future Scenarios for Climate-Smart Agriculture, Fish & Food in Bangladesh

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Knowledge gap: from sector to system perspectives

In the development of policies for low-carbon transitions, conflicts with existing policies based on sector-specific decision tools can ultimately lead to competing demand for natural resources. A linked modelling framework can tackle this problem by providing a quantitative assessment of the wider implications of such policies in a systemic approach of linkages between for example agriculture and the rest of the economy. In turn, it also supports a detailed impact assessment of policies that initially aimed for non-agricultural sectors.

Introducing CGE modeling

Computable General Equilibrium (CGE) models are comprehensive economic models that use both theory and empirical data to evaluate the impact of policy shocks in the economy of a country such as Bangladesh as whole and in relation to the rest of the world. Unlike sectoral model they provide a system perspective by capturing all the existing interactions and dependencies among various economic agents and sectors within that economy.

MAGNET model

The Modular Applied GeNeral Equilibrium Tool (MAGNET) is a global economic market CGE simulation model. Supported by a dedicated team of experienced modellers, the MAGNET model has provided high-level policy advice to clients including the European Commission, the OECD and FAO. MAGNET has been used to examine (inter alia) the impact of socioeconomic pathways on food and nutrition security, the implications of a shift towards a more bio-based economy, and climate, trade and agricultural policy reform scenarios (cf. Woltjer & Kuiper 2013). Figures present preliminary projections for Bangladesh.

Climate & food security in Bangladesh for agri-food sectors under business-as-usual (SSP2) - MAGNET

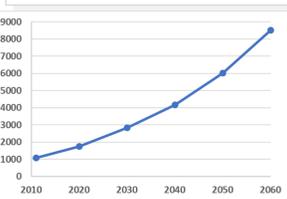
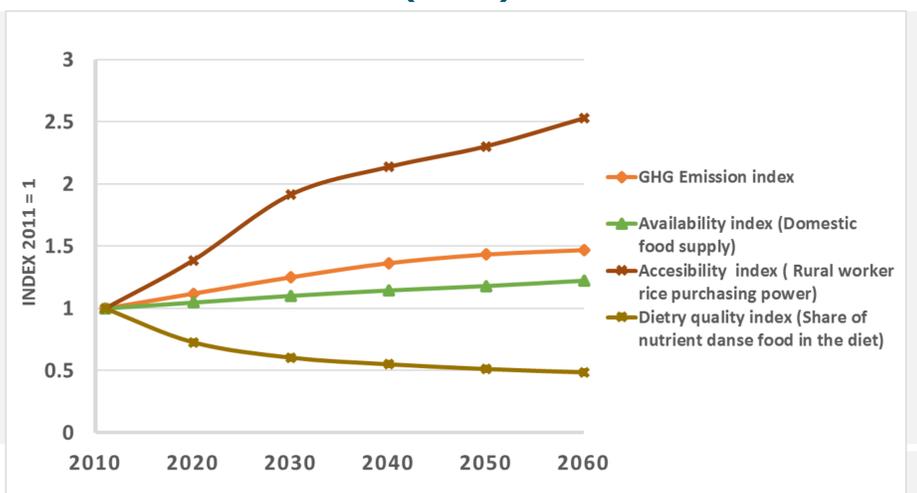


Figure 2. GDP per capita, Bangladesh under SSP2 (MAGNET)

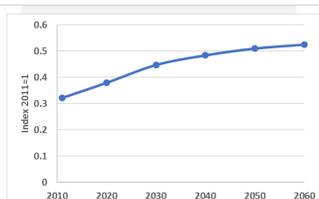


Figure 3. Yields index, Bangladesh under SSP2 (MAGNET)

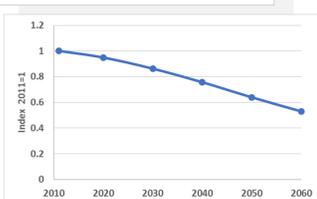


Figure 4. Energy use index, Bangladesh, Agri-Food sectors under SSP2(MAGNET)

MAGNET can be used to evaluate potential policy options using a scenario approach, for example:

Food security framework

- R&D investments in cropping technology, i.e growth of rice yields and reduced post-harvest losses (Smeets-Kristkova et al. 2018)
- Enhanced labour market mobility (Banse et. al., 2013)
- Cash programs for food access
- Trade policy framework for regional collaboration on reserves (Rutten et. al., 2013)

Diets and nutrition policies

- Integrate measures to improve climate change resilience and nutritional value of crop and livestock products along the value chain
- Enhance diet quality of the low-income households in the face of supply shocks and growing food demand.
- Include diet quality goals in climate adaptation and mitigation targets

Climate change mitigation in agriculture and food sectors

- Increased energy efficiency in agriculture
- Reduced emission from management practices in rice farming (Meijl et. al., 2017)
- R&D investments in rising feed conversion in the livestock industry
- Reforestation and nature conservation (Dixon et a. 2015)

Conclusions

- MAGNET is a comprehensive and flexible tool for a data-driven systemic view of the impact of climate, bioenergy, agricultural, and trade policy for national economies
- Future Scoping: Assessment of socio-economic and environmental impacts of implementing the INDCs for a country under a selection of country-specific policy scenarios

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