



Evaluating the distributional impacts of water management strategies based on multiple lenses of justice: A case study in the Vietnam Mekong Delta

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Since the Doi Moi policy reform in 1986, Vietnam's agricultural sector has experienced tremendous growth of its total rice production. This growth is mainly attributed to the developments of water infrastructure development. For instance, the construction of high dikes in the Vietnam Mekong Delta (VMD) has prevented inundation on the paddy fields during the rainy season, allowing farmers to crop their field three times a year instead of twice. At the national level, the strategy to promote triple rice cropping practices has substantially improved the total rice production. However, at the household level, recent studies have found that this strategy can deepen inequality, as small-scale farmers and double rice cropping farmers are indirectly being harmed by the construction of high dikes.

The rising inequality due to high dikes and triple rice cropping is an example of unintended consequences emerging from a water management strategy that overlooks its distributional impacts. In this study, we explore the distributional impacts of alternative water management strategies on the welfare of farmers in two provinces in the upper VMD: Dong Thap and An Giang. Specifically, we consider further dikes construction alternatives and land-use zoning strategies. We use an integrated model with bidirectional coupling between the environmental system and the land-use change system. The environmental system is represented by a theory-informed metamodel that simulates the water and sediment distribution as well as soil nutrient balance in the region under different climate scenarios, while the land-use change model represents people's bottom up responses to changes in the environment.

We evaluate the distributional impacts at the commune level (third level administrative division) based on five alternative principles of justice: improvement of overall welfare (pure utilitarianism), reduction of welfare differences across communes (Rawlsian difference principle), improvement of overall welfare while avoiding reduction of anyone's welfare (Pareto principle), improvement of the worst-off commune (prioritarianism), and balancing improvement on overall welfare and reduction in inequality (weighted utilitarianism). Lastly, we elaborate on the consequences and policy recommendations that follow from using each principle of justice. For instance, inequality can still be reduced although pure utilitarianism is employed as long as the Kaldor-Hicks criterion is fulfilled and welfare transfer among the farmers is politically and technically feasible.