

Climate change and rice (*Oryza sativa* L.) production

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ABSTRACT : Agriculture is extremely vulnerable to climate change. High temperatures eventually reduce yields of desirable crops while encouraging weed and pest proliferation. The present CO₂ of 380 ppm, projected to double by the end of the century, could benefit the rice crop by increasing photosynthesis and biomass depending on rice cultivar, growth stage and environment (IPCC, 2007). The Inter Governmental Panel on Climate Change defined Climate change as a “change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer”. It refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC, 2007). The present CO₂ of 380 ppm, projected to double by the end of the century, could benefit the rice crop by increasing photosynthesis and biomass depending on rice cultivar, growth stage and environment (IPCC, 2007). Although elevated CO₂ could enhance photosynthesis, especially in C₃ crop like rice, it is a potential component to trap the short Wave radiations from the earth surface only to be redirected back to increase the global surface mean temperature. Increased biomass production due to elevated CO₂ could potentially increase yield, provided microsporogenesis, flowering, and grain-filling are not disrupted by environmental stresses such as drought or high temperature. The adaptation strategies for changing climate are, Screening of CO₂ - responsiveness and temperature-tolerant varieties, Changing cultivation method, Site-specific adjustment in crop management (shifting planting dates and improved water management), Geographic analysis of vulnerable regions (where the rice crop is already experiencing critical temperature levels), Regional climate modelling to identify future “tilting points” of rice production (temperatures or CO₂ levels above which major yield losses are experienced)

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