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Sustainable Irrigation and Drainage Management

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Irrigation and drainage is an ancient topic, which has made a major contribution to facilitate increasing food production in order to meet the needs of an ever-growing world population [1-4]. It has been endowed with new meanings and missions recently, because irrigation and drainage was linked with many hot research topics in the world, such as globe change, hydrological process, balance and environment fates of nutrients (carbon, nitrogen and phosphorus) in agricultural ecosystem, and environment pollution control [2-9]. Thus, sustainable irrigation and drainage management will be a frontier field in the future. This raises a number of questions; how can we increase the efficiency and productivity of water use under the circumstance of increasing uncertainties of flooding and drought [2,9]? How can we reduce the nutrients output from agro-field by using irrigation and drainage technique, to reduce the pollution to groundwater and surface water [1,2,10-12]? How can we alleviate the land degradation, increase the soil carbon pool and soil fertility when applying the irrigation and drainage technique, to realize sustainable use of the soil [2,13,14]? How can we reduce the greenhouse gas (methane, nitrous oxide and carbon dioxide) emission from soil and increase the carbon stock in soil-plant system by reasonable irrigation drainage management [2,6,15,16]? To resolve these issues, the irrigation and drainage technique should be coupled with many agricultural sustainable techniques. Resolving these issues may enable irrigation and drainage to increase its contribution to food security, reduce its environmental input and the socio-economic consequences.

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