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An Empirical Analysis of the Determinants of Contract Choice in Groundwater Irrigation in Bangladesh: Are there any lessons for Texas agriculture?

Groundwater (GW) is a scarce and invisible resource, and is a significant concern in many countries. Pollution and depletion of it causes severe economic, environmental and social dislocations in many countries including USA. Water-intensive crops such as high-yielding variety (HYV) rice are grown intensively using GW and densely populated countries, such as Bangladesh, must grow irrigated crops to feed their large populations. Boro rice accounts for 57% of the total annual food grain production (33 million tons) in Bangladesh and about 80 percent of Boro rice is produced using GW irrigation. Many small farmers buy GW from neighbors to irrigate their rice and one-fourth crop sharing has been the dominant payment system for irrigation since the 1970s. In recent years, new payment system for irrigation is emerging which is fixed machine charge system. This study aims to analyze factors influencing the choice of payment system in GW irrigation water markets in Bangladesh. 96 villages were randomly selected from five divisions of the country and primary data were collected through focus group discussions and survey using structured questionnaire on SurveyBe. A multinomial probit model was used to determine the factors influencing the choice of payment in GW irrigation. Results show that crop share, fixed charge, and fixed machine charge are the major payment methods. The probability of choosing these systems was estimated to be 0.58 for fixed charge, 0.25 for crop share, and 0.18 for fixed machine charge. Years in irrigated farming, interest rates of loans, access to electricity, drought, and lowland endowment are the factors that strongly influence the choice of crop share and fixed charge payment schemes. Drought and lowland endowment are the factors that significantly affect the choice of fixed machine charge payment scheme. Fixed machine charge and fixed charge cash payment methods are preferred by the water buyers over the traditional crop share scheme in the irrigation markets. Newly emerging fixed machine charge systems should be promoted among the irrigator farmers since it is economically beneficial to both buyers and sellers of water and it encourages irrigation water saving in rice farming. In South Asian countries, rice production can't be stopped but by choosing better payment method, they can put less pressure on scarce GW resources. Policy should move forward on that direction. In other parts of the world, GW issue can be one of the priority areas in their future research.

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Dr. Mohammad Saidur Rahman is Professor and former Head of the Dept. of Agricultural Economics at the Bangladesh Agricultural University (BAU). He graduated from BAU and completed a second MSc in Development & Resource Economics from the Norwegian University of Life Sciences. He received his PhD from BAU in collaboration with International Rice Research Institute (IRRI), Philippines and Purdue University, USA. He has published extensively on the topic of irrigation and on fisheries economics. Dr. Rahman has traveled widely throughout the world for academic and research purposes. Currently, he is a Fulbright Scholar under the “Scholar-in-Residence Program” of Fulbright at the Texas State University in San Marcos.

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