

Resource Conserving Technologies for Agricultural Sustainability: Evidence from Arsi Zone of Ethiopia.

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Abstract

Sustainability challenges differ among developed and developing nations. For developing nations, agricultural sustainability is a central target to bring about sustainable development. However, the progress of Ethiopian agriculture is very slow towards this goal. Thus, this study deals with the actors, and resource conserving technologies that can help to enhance agricultural sustainability. The objectives of the study are, first, to analyze the perception of farmers and agricultural professionals, and determinants of their perception about the agricultural sustainability issues, focusing on crop productivity and water resources. Second, it is to examine the opinions of agricultural professionals about the relevance of resource conserving technologies for agricultural sustainability as compared with high input farming. Third, it is to study the status and adoption determinants of resource conserving technologies and a new crop variety. To do so, data were collected during December 2009 and January 2010, from 297 randomly selected rural households from three agro-ecology, and 103 agricultural professionals of different institutes. The data collection focused on transdisciplinary approach and methods, notably, the inclusion of social networks and collection of geographic information using GPS. The data were also analyzed using different methods such as descriptive statistics, regression models (binary logit, ordered logit) and Multi-Criteria Decision Analysis (MCDA) tool according to suitability to each objective.

The findings of the study are: (1) The perception of farmers about changes in productivity is mostly different from that of agricultural professionals. However, they have strong similar perception about changes in water resources. The ordered logit regression results reveal that the household asset, age, and education level have significant effects on farmers' perception about decline in crop productivity. With respect to perception about water resources, households in highland agro-ecology are more likely to observe a decline both in quantity and quality. Apparently, there is no evidence about the effect of social networks, age, household asset and education level on the perception of the farmers about the changes in water resources. (2) The professionals prioritized resource conserving technologies as the most effective options for agricultural sustainability as compared with high input farming. (3) In the 2009 cropping season, about 7% of households used conservation tillage, 87% crop rotation,

67% organic farming, 16% fallowing, 69% residue management and 72% a new crop variety. Furthermore, the binary logit results show that adult literacy rate, access to a credit, land size, household asset, distance to agricultural cooperative, perception about the benefit of the technology, perceptions about the changes in water quantity, and the density of social networks have a significant impact on the decision to use most of these resource conserving technologies. However, most of the aforementioned factors have no significant effect on the adoption of a new crop variety.

The study concludes that, both the farmers with any characteristics, and agricultural professionals could observe resources (water) degradation in their area. Besides, professionals prioritized the resource conserving technologies for agricultural sustainability. Moreover, the way resource conserving technologies are adopted is different from typical product innovations such as a variety. Therefore, the implication is that there is recognition of the problems and the benefits of the technologies; however, a favorable policy environment and new extension approaches are a must for the wider diffusion of the resource conserving technologies.

Keywords: *Agricultural Sustainability, Resources Conserving Technology, Perception, Adoption, Ethiopia.*