

Determinants of Farmers' Plastic Use Behavior in Agriculture: A Cross-Country Study

E.M.N. Manjula¹, S.A. Weerasooriya^{1*}, H. Osbahr², M. Bhattacharya², and M. Ariyaratne³

¹ *Department of Agricultural Economics & Business Management, Faculty of Agriculture, University of Peradeniya, Sri Lanka.*

² *Department of International Development, School of Agriculture, Policy and Development, University of Reading, Reading, UK.*

³ *Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka*

**senalw@agri.pdn.ac.lk*

Plastic use in agriculture has gained momentum since the middle of the twentieth century. However, the consequences of this is relatively unknown. This study investigates farmers' plastic use behavior in poly-tunnels, net houses, and mulch usage across Sri Lanka, India, China, Egypt, and Vietnam. It addresses the knowledge gap on plastic adoption across countries and promotes sustainable use. A questionnaire survey with 6 sections was conducted targeting farmers who use net houses, mulch, or poly-tunnels. The sections included questions on demographics, plastic use types, perception of benefits, problems and information acquisition, plastic waste disposal techniques, perception of micro-plastic risks, and intention to adopt biodegradable mulch. Three-stage sampling was done which used purposive random sampling to select districts and villages, proportionate random sampling, and systematic random sampling to select households from villages. Altogether 1,500 households were selected with 300 households per country. Graphical analysis identified changes in plastic usage over five years, while Tobit and fractional regressions analyzed factors influencing plastic use concerning the area proportion cultivated with plastic. Graphical analysis shows Sri Lanka's increasing plastic usage in agriculture, while India, China, Vietnam, and Egypt have constant usage. However, India shows an increasing plastic mulch usage. Regressions indicate a significant positive effect of gender and perception of disposal barriers on the proportion of areas cultivated with plastic ($P < 0.05$). While membership in a farmer society, family size, farming experience, education, and opinion on recycling motivations show negative effects ($P < 0.05$). China, Egypt, and Vietnam positively influence plastic usage, while India negatively affects it compared to Sri Lanka ($P < 0.05$). Therefore, demographics and personal attitudes impact plastic use in agriculture. Given Sri Lanka's rising plastic usage, enhancing awareness of recycling and sustainable practices is crucial. Policymakers should introduce incentives for recycling, environmentally friendly disposal techniques, and technologies like biodegradable mulch that do not require recycling.

Keywords: Agricultural Plastics, Farmers' Behavior, Farmers' Perception, Recycling Practices, Plastic Disposal

Project coordination and financial assistance from the GCRF Agri-Plastic project (NE/V005871/1) is acknowledged.