

氣象服務於農業終端使用者需求落差與異質性分析

Heterogeneity and Demand Gaps in Weather Services for Agricultural End-Users

張郁婕¹ (Chang Y.-C.) 陳注維¹ (Chen C.-W.) 陳孟瑋² (Chen M.-W.) 林恒億¹ (Lin H.-I.)
溫芳宜¹ (Wen F.-I.)

¹財團法人中華經濟研究院 ²國立中山大學經濟學研究所

¹ Chung-Hua Institution for Economic Research

² Institute of Economics, National Sun Yat-sen University

摘 要

氣象資訊的應用服務具有準公共財特性，在農業管理的面向上，可作為農業終端使用者在面對風險識別與調適決策的重要支援工具。然而現有氣象服務是否有效回應不同農業從業人員之防災管理需求，一直是氣象主管機關長期關注的議題。為分析農業終端使用者對氣象資訊之應用需求與效用落差，本研究運用 2022 年 916 份臺灣農業終端使用者調查資料，透過 Probit 模型與 OLS 線性交互作用模型進行實證分析。初步結果顯示，農業終端使用者對氣象資訊需求存在顯著的收入門檻效應。當受訪者的年收入超過40萬元時，農業終端使用者取得氣象資訊的支付意願增加9.3%，而受訪者的災損經驗對其支付意願在統計上並不顯著，顯示出受訪的多數農業終端使用者可能仍未將氣象資訊視為是常態性減災管理的流程之一。

此外，從調查受訪者的滿意度分析發現，現行國內的公共氣象服務對高所得果農受訪者存在顯著的效用天花板效應。高所得果農受訪者將大尺度氣象資訊運用於田間微氣候管理時，面臨較高的資訊轉譯成本，致使滿意度呈現出期望落差。然而，當受訪者個人認為預報資訊準確時，高所得果農之滿意度提升幅度（0.744）高於低所得群體（0.570），顯示其對高品質氣象資訊具有較高需求，提升氣象預報品質可有效縮小高所得農戶對公共氣象服務之效用落差。本研究結果初步認為，農業氣象服務應採差異化發展策略，公部門應持續強化基礎氣象服務與資訊轉譯能力，同時透過開放資料與公私協力模式，促進民間產業高階客製化氣象服務之發展，以提升我國氣象資訊於農業管理與防災應用之效益。

關鍵字：氣候服務、防災決策、需求異質性、期望落差

Abstract

The application of weather services as characteristics of a quasi-public good, serving as critical support tools for end-users in risk identification and adaptive decision-making within agricultural management. However, whether existing weather services can effectively address the heterogeneous disaster management needs of end-users remains a long-standing concern for meteorological authorities. To evaluate agricultural end-users' demand and utility gaps, this study conducts an empirical analysis using 2022 survey data from 916 farmers in Taiwan, applying Probit and ordinary least squares (OLS) linear interaction models. The preliminary results indicate a significant income threshold effect in agricultural end-users' demand for weather information. When end-users' annual agricultural income exceeds NTD 400,000, the probability of willingness to pay for weather information increases by 9.3 percentage points, whereas prior disaster experience has no statistically significant effect on willingness to pay. This suggests that the majority of surveyed agricultural end-users may not yet consider weather information a routine component of disaster mitigation management.

Furthermore, satisfaction analysis of the respondents reveals a significant utility ceiling effect in current domestic public weather services among high-income fruit farmers. When applying coarse-resolution weather data to field-level microclimate management, high-income fruit farmers face higher information translation costs, resulting in an expectation gap in satisfaction. However, when respondents perceive the forecast information as accurate, the marginal increase in satisfaction for high-income fruit farmers (0.744) is greater than that for the low-income group (0.570). This indicates a stronger demand for high-quality weather data among high-income farmers, demonstrating that improving forecast quality can effectively narrow their utility gap regarding public weather services. These preliminary findings suggest the need for a differentiated development strategy for agricultural weather services. The public sector should continue to strengthen basic weather services and information translation capabilities. Simultaneously, through open data and public-private partnerships (PPPs), it should promote the development of high-end, customized weather services by the private sector to enhance the effectiveness of meteorological information in agricultural management and disaster prevention in Taiwan.

Key words: Climate Services; Disaster Risk Management; Demand Heterogeneity; Expectation Gap