

Research Article

MULTI- CRITERIA DECISION-MAKING AT UNCERTAINTY (MCDM)- GENESIS, REVIEW, AND ITS SCOPE IN AGRICULTURE WITH A REAL TIME PROBLEM

G Tejaswini Reddy* et al., 2023

ABSTRACT

Uncertainty is a state of doubt about the future or about what is the right thing to do in almost all sectors where key decisions are required for better planning. Uncertainty refers to epistemic situations involving imperfect or unknown information in any sector. Despite technical progress, crop yields are still very much dependent on natural factors and hence are highly uncertain. In the Agriculture sector uncertainties are inherent in weather, yields, prices, government policies, global markets, and other factors causing risks in farming and fluctuating farm income. Risk management involves choosing among alternatives that reduce the financial effects that can result from such uncertainties. Decision making at uncertainties is a systematic and formal process that involves four steps; identification of the problem, deriving the preferences, evaluation of alternatives and identification of the best alternatives. This decision-making approach reduces biases and provides more transparent and consistent decisions. In general, a problem may be governed by single criteria like maximization of profit or minimization of cost, but the real-life situation in the agriculture sector demands the evaluation of a set of alternatives against multiple criteria and typically structuring it as multi-criteria decision-making (MCDM) problem. This study is planned to explore the advantage of the MCDM methodology in providing optimum decisions for farmers in uncertain conditions. The Case studies presented in this paper enrich the researchers to apply the MCDM in any field to serve the farming community in a better way. Certain care is taken in explaining MCDM methodology from genesis to application in keeping the view of researchers from all the disciplines. Further, a typical problem is considered where a farmer faces a dilemma in selecting the best rice variety among four varieties; Variety1, Variety2, Variety3 and Variety4 (variety names are unrevealed) to achieve profitable returns despite their fluctuated prices, oscillated yields, uncertainty in grain quality, vulnerability to pest and suitability for the environment. All four methods of MCDM used in this study suggest that Variety 3 is the best option as it outperformed the other three varieties and provides optimum profit.

KEYWORDS: Uncertainty, Decision making, MCDM, Agriculture