ASSESSING THE ENVIRONMENTAL IMPACT OF CHEMICAL FERTILIZERS AND EXPLORING VIABLE ORGANIC FERTILIZER ALTERNATIVES FOR VEGETABLE CULTIVATION IN NUWARA ELIYA DS DIVISION, NUWARA ELIYA DISTRICT

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ABSTRACT

Agriculture in Sri Lanka's Central Highlands, particularly in the Nuwara Eliya Divisional Secretariat Division, plays a vital role in vegetable production but is increasingly threatened by environmental degradation due to excessive chemical fertilizer use. This study investigates the environmental impacts of chemical fertilizers and evaluates the feasibility of organic alternatives as sustainable inputs, drawing on agroecological sustainability and innovation adoption frameworks. A quantitative survey of 100 randomly selected vegetable farmers was conducted using structured questionnaires, and data were analysed with descriptive statistics and multiple regression models in SPSS. The results indicated that chemical fertilizers dominate use Urea (100%), MOP (97%), and TSP (64%) while organic fertilizer adoption remains minimal due to labour intensity, limited availability, insufficient knowledge, and yield concerns. Despite this, most farmers recognize environmental consequences such as water pollution (81%), biodiversity loss (77%), and soil degradation (43%). Regression analyses reveal significant relationships between fertilizer practices and environmental outcomes: the organic fertilizer impact model ($p = 0.003$) explained 31.8% of variance, with farmers' awareness and attitudes ($p = 0.002$) and cultivation of potatoes ($p = 0.007$) and tomatoes ($p = 0.001$) as key predictors; the chemical fertilizer impact model ($p = 0.023$) accounted for 27.7% of variance, with fertilizer type ($p = 0.009$) and application frequency ($p = 0.020$) significantly influencing outcomes. The organic fertilizer adoption model was highly significant ($p = 0.001$), explaining 41.2% of variance, showing that frequent organic fertilizer use increases adoption intention ($p = 0.005$) while reliance on chemical inputs reduces it ($p = 0.008$). Although farmers are increasingly aware of the environmental risks of chemical fertilizers, adoption of organic alternatives is constrained by labour, availability, technical knowledge, and institutional support. The findings emphasize the need for strengthened extension services, improved supply chains, targeted subsidies, and policy interventions promoting integrated nutrient management to enhance sustainable and environmentally responsible vegetable production in the highlands.

Keywords: Chemical Fertilizers; Environmental Sustainability; Farmer Awareness; Nuwara Eliya; Organic Fertilizers; Vegetable Cultivation

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