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From Tunnels to Transformation: Evidence of Livelihood Enhancement through Protected Vegetable Farming in Meghang, Nuwakot

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Abstract This study was carried out from March 2025 to June 2025 to assess the contribution of tunnel based vegetable farming in household income and livelihood enhancement in Meghang Rural Municipality, Nuwakot. The data was taken from five wards namely Panera (ward No.6), Samari (ward No.5), Kimtang (ward No.4), Deurali (ward No.3), Bungtang (ward No.2). A total of 100 farmers were selected through simple random sampling, and data were collected using household surveys and interviews. According to the study, farming community was dominated by male farmers (68%) and the majority were between the ages of 30 to 50. The majority of respondents were involved in vegetable farming as prime occupation and source of income. Tomato was the dominant crop grown under tunnels, and most farmers adopted improved practices such as drip irrigation and mulching. Majority of farmers relied on agro vets for hybrid seeds, applied FYM with chemical fertilizers, and had built medium sized, 6*12 m tunnel covered with 90 GSM plastic sheets. About 38% of the farmers who produced vegetables in tunnels earned more than NRs. 3 lakhs annually. About 23% of income was saved and was mostly used for health, education, and food. However, farmers faced challenges such as high initial investment, limited access to inputs, and market dependency. Overall, plastic tunnel farming has the potential to support household income generation and livelihood improvement in the study area.

Keywords Farming; Income; Livelihood; Tunnel; Vegetable

1 Introduction

Vegetable farming is an important income generating activity for smallholder farmers in Nepal. It plays significant role in Nepal's agricultural economy as a valuable cash crops and provides quick cash, improves household income, food security and livelihood conditions among smallholder farmers. As compared to traditional and cereal based farming systems, vegetable production provides opportunity for higher economic return within short production cycle and limited land resources while having higher demand in the market. Vegetables are considered important for both nutrition and economic reasons. Vegetables are abundant in nutrients, minerals and vitamins. Vegetables consist of phytochemicals which are antioxidant and anti-inflammatory in nature, these properties help reduce the risk of chronic diseases such as diabetes, cancers, obesity or cardiovascular diseases (Abobatta, 2021).

Vegetable production, yield, and cultivation area have all steadily increased in Nepal's agriculture sector during the last ten years. While production climbed by 21% in the fiscal year 2020-21, the cultivated area increased by nearly 16% between 2011-12 and 2020-21. But in the last year, productivity has only gone up by 4.38%. With the exception of the fiscal years 2016-17, 2019-20, and 2020-21, the cultivated area, production, and productivity were all steadily rising overall (Ghimire et al., 2023).

According to the Food and Agriculture Organization (FAO's) 2024 data, global fruit and vegetable production reached 2.1 billion tonnes in 2023, which represents a 1% rise compared to 2022 (FAO, 2024). In Nepal, the vegetable industry is the largest subsector, accounting for 80.09% of the country's total horticultural produce and 9.7% of its overall Agricultural Gross Domestic Product (AGDP). Over the past 20 years, Nepal's total per capita