

According to Bhandari and Paudel (2021) majority of farmers spend their revenue on necessities like food, clothing, and school supplies, as typical areas of spending. As they made more money, they either saved it or used it for other purposes, such as buying farmland, renovating homes, constructing restrooms, and other lavish items.

3.7 Reasons for practicing tunnel farming and challenges faced by respondents

Farmers in the research area are encouraged to adopt tunnel cultivation because vegetable produced under tunnel gives higher yield, better quality, off-season prices, better climate adaptability, and better disaster protection compared to open field. The cool temperate climate of the elevated area, where low temperatures and weather fluctuations frequently limit open field vegetable cultivation, the implementation of this technology provides farmers with safer environment for their vegetables. Plastic tunnels provides protective microclimate that enables more stable and reliable production compared to open field conditions. The protective role of tunnels against unfavourable weather conditions like intense rainfall, hailstorm, high winds and frost motivates farmers to adopt this system. This lowers the chance of crop damage and production loss. Moreover, tunnel farming enables off-season vegetable cultivation which gives farmers access to market when supply from open field is limited. This seasonal benefit leads to increase market prices, as vegetables grown in tunnels are typically of superior quality and accessible during times of shortage. Thus, the integration of favourable climatic conditions, enhanced crop protection and off season cultivation with superior quality products leads to more profitable and resilient production system compared to open cultivation in the study area.

Although plastic tunnel vegetable cultivation has income increasing potential, it is still constrained by factors such as capital, markets, technology, and agricultural inputs. One of the major constraints is the high initial investment for the construction of tunnel structures including the cost of plastic sheets, pipes, and labour, which restricted farmers from adoption and expansion. Moreover, limited access to the market and dependence on middlemen reduces bargaining power and results in lower farm gate price despite higher production costs. Insufficient training and extension support further limits the production capacity, as farmers have minimal knowledge about modern farming techniques, pest and disease control, and efficient use of resources, all of which are essential for maximizing tunnel productivity. In addition, irregular availability and limited access to quality agricultural inputs like seeds, fertilizers and organic manure create additional production uncertainties and impact yield. These constraints demonstrate that although plastic tunnel farming has considerable income generating potential, its effectiveness is greatly affected by financial access, institutional support and input supply systems.

4 Discussion

4.1 socio-economic factors influencing tunnel vegetable farming

The findings show that the adoption of tunnel technology is highly influenced by socioeconomic characteristics and farmer's motivation to improve their household earnings. Agriculture being a primary occupation and the dominance of economically active farmers indicates that protected vegetable cultivation has been an important commercial enterprise for people of Meghang. The farmers who are active and have received basic education are more interested in adopting improved technologies because they are better able to understand technical information, participate in extension programs, respond to market opportunities and manage labor intensive work. Likewise, farmers having larger landholdings can allocate more land for commercial vegetable farming and recover higher investment costs associated with tunnel constructions. Although women also participate in farming activities, men have more decision making power, from managing marketing channels to investment decisions, while women are more active in production activities.

These results align with earlier research carried out in Nepal. Kc et al. (2021) found that tunnel technology enhanced production consistency and livelihood prospects for smallholder farmers by reducing climatic constraints. Likewise, Gc and Hall (2020) found that commercialization of smallholder farming is influenced by better access to enhanced production technologies and market prospects. More recently, Subedi et al. (2023) have highlighted that education, extension services, farming experiences and government subsidies significantly