

3.4 Production and productivity of French beans

It reveals that the average productivity of French beans in the study area was 76.10 kg per ropani, indicating a moderate yield under the prevailing traditional production practices (Table 4). The average annual production per household was 429.7 kg, which reflects the small-scale nature of bean cultivation and limited land allocation to the crop. Households consumed an average of 132 kg per year out of the total production, which highlights the importance of French beans as a key component of household nutrition and food security. The marketed surplus was 255.7 kg per household per year, with a monetary value of NRs 51,550, which represents a substantial share of total production, indicating that the French bean is not only grown for subsistence but also serves as an important cash crop.

Table 4 Production and productivity of French beans

Variables	Value
Productivity	76.10 kg/ropani
Average total production from household	429.7 kg/year
Average family consumption	132 kg/year
Average stored for seed	42 kg/year
Marketed Surplus	255.7 kg/year

3.5 Gross margin, net margin and benefit cost ratio

The results show that average gross return was NRs. 15,372.2 per ropani, resulting in a gross margin of NRs. 4,062.2. After deducting fixed costs, the net margin was NRs. 4,022.2 per ropani, indicating that French bean cultivation is financially viable under the existing production conditions in the study area. The B:C ratio of 1.35 further confirms profitability, as returns exceeded costs by 35 percent (Table 5).

Table 5 Gross margin, net margin and benefit cost ratio

Variables	Average value NRs/ropani
Total cost	11,350
Total fixed cost	40
Total variable cost	11,310
Gross returns	15,372.2
Gross margin	4,062.2
Net margin	4,022.2
B:C ratio	1.35

3.6 Mean yield comparison of farmers

The results show that French bean productivity was significantly higher among farmers who received training and those who were members of cooperatives, indicating the positive role of institutional support and access to information (Table 6). Literate farmers also achieved markedly higher yields than illiterate farmers, highlighting the importance of education in improving farm productivity. In contrast, male farmers recorded slightly higher yields than female farmers, but the difference was not statistically significant. Overall, training, cooperative membership, and literacy emerged as key factors influencing french bean productivity in the study area.

3.7 Factors affecting production of French bean in the study area

Table 7 reveals that multiple regression model was statistically significant ($F = 28.00$, $p < 0.001$), indicating that the explanatory variables jointly influenced the bean production. The model explained approximately 75.9% of the variation in production ($R^2 = 0.758, 8$), and the high adjusted R^2 (0.731, 7) confirmed strong explanatory power even after accounting for the number of predictors. With 100 observations and a relatively low Root MSE (229.25), the model demonstrated good statistical reliability and robustness.