



# International Journal of Research in Agronomy

E-ISSN: 2618-0618  
P-ISSN: 2618-060X  
© Agronomy  
NAAS Rating (2025): 5.20  
[www.agronomyjournals.com](http://www.agronomyjournals.com)  
2025; SP-8(12): 509-511  
Received: 13-09-2025  
Accepted: 17-10-2025

**Maneesh Kumar Tiwari**  
BAIF Development Research  
Foundation, Prayagraj, Uttar  
Pradesh, India

**Vinay Kumar Singh**  
BAIF Development Research  
Foundation, Prayagraj, Uttar  
Pradesh, India

**Abhishek Pandey**  
BAIF Development Research  
Foundation, Prayagraj, Uttar  
Pradesh, India

## Identifying suitable chilli varieties for sustainable livelihoods

**Maneesh Kumar Tiwari, Vinay Kumar Singh and Abhishek Pandey**

**DOI:** <https://www.doi.org/10.33545/2618060X.2025.v8.i12Sg.4508>

### Abstract

The cultivation of chillies (*Capsicum annuum* L.) is affected by soil fertility, agroclimatic conditions, and varietal selection. For farmers to increase their income and ensure sustainable cultivation, it is essential to identify high-yielding and well-adapted cultivars. This study assessed the performance of two chilli cultivars, "Eagle" and "Heena," in Kaushambi, Uttar Pradesh, as part of the HRDP project. Ten farmers from the Beniram Katara block participated in the field trial; five of them grew Eagle, and the other five grew Heena. An excellent location for assessing chilli varieties is Beniram Katara, a crucial agricultural area in the Kaushambi district that is distinguished by its rich soil and substantial farming operations. The input cost, production, sale price, gross income, and net income of the two types were evaluated by a comparison study. Direct data collection from the farmers' fields was done, and a two-sample t-test was used for analysis. The cost of growing the two types did not change significantly, according to the study. Additionally, the differences were not statistically significant in terms of productivity, gross income, or net profit. The Eagle variety, however, sold for more money than the Heena variety, which improved the overall financial return. Compared to the Eagle variety (T<sub>1</sub>), which produced 12.90 qt per plot from 0.10 of land, the Heena variety (T<sub>2</sub>) produced 13.55 qt per plot, which was quantitatively superior. For the cultivation of the Eagle variety, the highest reported income was Rs. 55,090, with a net monetary return of Rs. 35,401 from 0.10; however, the Heena variety did not significantly differ. Relative to the Heena variety (Rs. 3,941), the Eagle variety (Rs. 4,270) was significantly more expensive per quintal. Despite the Heena variety's higher production, the Eagle variety's higher market price led to an increased net return.

**Keywords:** Chilli, eagle, Heena, livelihood, Kaushambi, variety

### Introduction

The chilli (*Capsicum annuum* L.), a member of the Solanaceae family, is one of the most prominent commercial spices and vegetables grown in India. The fruit, which is valued for its flavour, colour, and pungency, is grown in large quantities for consumption in both green and dried forms (Bhalabhai *et al.*, 2021) <sup>[5]</sup>. The presence of capsaicin and oleoresin chemicals in chillies makes them useful not just in cooking but also in the food, cosmetics, and pharmaceutical industries (Maharjan *et al.*, 2024) <sup>[11]</sup>. In India, chilli is of great socioeconomic significance, supporting millions of small and marginal farmers who work in cultivation, processing, and trade. India is acknowledged as the world's greatest producer, consumer, and exporter of chillies (Devi *et al.*, 2022) <sup>[6]</sup>. India, often referred to as the "Country of Spices," is the world's leading producer of spices and also world's largest producer and consumer. It accounts for 36% of global chilli production, with China coming in second at 24% (Babu *et al.*, 2018) <sup>[4]</sup>. The most important chili-growing states in India are Andhra Pradesh (49%), Karnataka (15%), Maharashtra (6%), and Tamil Nadu (3%), which together account for more than 75% of the country's total area under cultivation (Jagtap *et al.*, 2012) <sup>[8]</sup>. In India green and dried chillies occupies an area of about 309 thousand ha and 752 thousand ha with production of 3592 thousand MT and 2149 thousand MT, respectively (Anonymous, 2022) <sup>[1]</sup>.

Chilli cultivation is an important component of the spice crop industry in Uttar Pradesh (U.P.). The crop is mostly grown in the eastern and central districts, where ideal soil and climate conditions exist, including Varanasi, Mirzapur, Jaunpur, Azamgarh, and Ghazipur. Around 0.13 lakh hectares of chilli are grown in Uttar Pradesh, according to state horticulture figures from 2024 (Gajbhiye and Mandal, 2000) <sup>[7]</sup>. The state produces 0.16 lakh tons of chilli annually, with

**Corresponding Author:**  
**Abhishek Pandey**  
BAIF Development Research  
Foundation, Prayagraj, Uttar  
Pradesh, India

an average productivity of 1.25 tonnes per hectare, which is comparable to the national average. Both green and dried chilli growing are feasible in the area because of the abundance of workers, guaranteed irrigation, and fertile alluvial soils (Madhavi *et al.*, 2023) <sup>[10]</sup>. Chilli's nutritional and economic worth is astounding. Along with antioxidants that have health-promoting qualities, it is abundant in vitamins A, C, and E (Azlan *et al.*, 2022) <sup>[3]</sup>. The main ingredient in chillies, capsaicin, has demonstrated pharmacological efficacy for controlling metabolism, reducing pain, and fighting bacteria. The crop makes a substantial contribution to India's export revenue as well (Maharjan *et al.*, 2024) <sup>[11]</sup>. Bangladesh, Thailand, Sri Lanka, China, and the US are among the nations to which India exports value-added goods including oleoresin, dried chillies, and chilli powder (Mani and Kabiraj, 2019) <sup>[12]</sup>.

### Materials and Methods

The current study was carried out in the Beniram Katara block of Uttar Pradesh, India, as an On-Farm Trial (OFT) during the cropping season 2022-23. Through statistical analysis, the experiment sought to determine the relative productivity and adaptability of two chilli types, Eagle and Heena, under farmers' field circumstances. Together with ten farmers from the chosen block, the study was conducted. With scorching summers and moderate rains, the region has a sub-tropical climate. The alluvial soil is rich and ideal for growing chillies. Progressive growers with consistent field conditions were chosen to reduce variability brought on by management and environmental factors. An easy comparative design was used to set up a varietal experiment in actual field conditions. Five of the 10

participating farmers grew the "Eagle" variety, and the other five grew the "Heena" variety. All common agronomic procedures for site preparation, planting, irrigation, and pest control were consistently applied across treatments, and each farmer served as a replication. To maintain comparability, the plot size per farmer was maintained at a same level. The average fruit weight (g) and total fruit yield (kg/plot), two important agronomic and yield-related metrics, were noted. Farmers followed the suggested set of practices and kept their cultural operations consistent. Based on the average yield from each farmer, the mean production per variety was calculated. The t-test (Student's t-test) was used to compare the mean performance of the two types (Eagle and Heena) based on the data that was gathered. The test assisted in determining the consistency of performance throughout the farmers' fields as well as the superiority of the variety under field conditions.

### Results and Discussion

#### Yield

The yield performance of two chilli varieties, Eagle and Heena, under on-farm conditions is presented in Table 1. Heena's average yield (1,355 kg) was slightly higher than Eagle's (1,290 kg) per 0.10ha. At the 5% level of significance, the computed t-value (1.099) was less than the tabulated t-value (2.306), indicating that the mean yield difference was statistically non-significant. This suggests that both types fared similarly in comparable field and management settings. Therefore, depending on farmers' preferences and local adaptability, either of the two kinds can be suggested for production. Similar results were also observed by Venkanna and Rao, 2020 <sup>[14]</sup>.

**Table 1:** Comparative yield performance of chilli varieties

| Variety                | Number of Observations | Yield (Kg) | Standard Deviation | T statistic calculated | T tabular value (0.05) |
|------------------------|------------------------|------------|--------------------|------------------------|------------------------|
| T <sub>1</sub> : Eagle | 5                      | 1290       | 82.386             | -1.099                 | 2.306                  |
| T <sub>2</sub> : Heena | 5                      | 1355       | 103.441            |                        |                        |

#### Cost of cultivation

The comparative analysis of the cost of cultivation for two chilli varieties, *Eagle* and *Heena*, is presented in Table 2. Eagle had an average cultivation cost of ₹19,689.80, which was somewhat more than that of Heena (₹19,128.20) of 0.25 acre. The computed t-value (1.351) was less than the tabulated t-value (2.306) at the 5% level of significance, indicating that the

difference

costs under field circumstances were almost equal, suggesting similar production economics. As a result, growers can select either variety without their cultivation costs changing significantly. Similar results were also reported by Arunkumar *et al.*, 2023 <sup>[2]</sup> and Kumar *et al.*, 2022 <sup>[9]</sup>.

**Table 2:** Comparative cost of cultivation of chilli varieties

| Variety                | Number of Observations | Cost of Cultivation (₹) | Standard Deviation | T statistic calculated | T tabular value (0.05) |
|------------------------|------------------------|-------------------------|--------------------|------------------------|------------------------|
| T <sub>1</sub> : Eagle | 5                      | 19689.80                | 857.012            | 1.351                  | 2.306                  |
| T <sub>2</sub> : Heena | 5                      | 19128.20                | 359.966            |                        |                        |

#### Gross Income

The gross return obtained from two chilli varieties, *Eagle* and *Heena*, is presented in Table 3. Compared to Heena (₹51,717.20), the variety Eagle had a little better average gross return (₹55,090.80) from 0.10 ha. However, because the computed t-value (1.329) was less than the tabulated t-value (2.306) at the 5% level of significance, the difference between

the two means was determined to be statistically non-significant. This suggests that under on-farm settings, the economic returns of the two types were about equal. Therefore, according on their yield stability and market desire, producers can choose between Eagle and Heena. Similar results were also observed by Mehta and Kumari, 2018 <sup>[13]</sup>.

**Table 3:** Comparative gross return of chilli varieties

| Variety                | Number of Observations | Gross Return (₹) | Standard Deviation | T statistic calculated | T tabular value (0.05) |
|------------------------|------------------------|------------------|--------------------|------------------------|------------------------|
| T <sub>1</sub> : Eagle | 5                      | 55090.80         | 3796.606           | 1.329                  | 2.306                  |
| T <sub>2</sub> : Heena | 5                      | 51717.20         | 4218.049           |                        |                        |

#### Rate of chilli

The data on the market rate per quintal of two chilli varieties, *Eagle* and *Heena*, are presented in Table 5. For Eagle, the average market price was ₹4,270 per quintal, whilst for Heena, it

was ₹3,941 per quintal. According to statistical analysis, there was a substantial difference in the market prices of the two types, with the computed t-value (3.419) being larger than the tabulated t-value (2.306) at the 5% level of significance.

According to the data, Eagle sold for a far greater price than Heena in the market, most likely as a result of traders and consumers favoring fruit with superior qualities like colour, size, or pungency. Given the farmers' field conditions in the Beniram

Katara block of Uttar Pradesh, this notable difference in rate per quintal suggests that Eagle has a stronger economic advantage and market preference, which raises gross and net returns.

**Table 4:** Comparative rate of chilli varieties

| Variety                | Number of Observations | Rate/quintal (₹) | Standard Deviation | T statistic calculated | T tabular value (0.05) |
|------------------------|------------------------|------------------|--------------------|------------------------|------------------------|
| T <sub>1</sub> : Eagle | 5                      | 4270             | 0.89               | 3.419                  | 2.306                  |
| T <sub>2</sub> : Heena | 5                      | 3941             | 1.961              |                        |                        |

### Net Return

Heena produced an average of ₹32,589.60, while Eagle produced a greater mean net return of ₹35,401.00 from 0.10ha. At the 5% threshold of significance, the estimated t-value (1.137) was less than the tabulated t-value (2.306), indicating that the difference between the two kinds was statistically non-significant even though Eagle displayed a numerical advantage of almost ₹2,811.40/ from 0.10 ha. This implies that both types fared about equally well in terms of profitability in the field

settings used by farmers. The findings suggest that Eagle's somewhat higher yield potential may be the cause of its higher net return; nonetheless, the variance falls within the bounds of natural field differences. Therefore, in the Beniram Katara block of Uttar Pradesh, both Eagle and Heena can be regarded as economically feasible choices for chilli growing. Similar results were also observed by Mehta and Kumari, 2018 <sup>[13]</sup> and Arunkumar *et al.*, 2023 <sup>[2]</sup>.

**Table 5:** Comparative Net return of chilli varieties

| Variety                | Number of Observations | Net Return (₹) | Standard Deviation | T statistic calculated | T tabular value (0.05) |
|------------------------|------------------------|----------------|--------------------|------------------------|------------------------|
| T <sub>1</sub> : Eagle | 5                      | 35,401.00      | 3,827.63           | 1.137                  | 2.306                  |
| T <sub>2</sub> : Heena | 5                      | 32,589.60      | 3,989.26           |                        |                        |

### Conclusion

Eagle and Heena, two chilli varieties, both farmed well in the Beniram Katara block of Uttar Pradesh, according to the results of an on-farm varietal testing. Even though Eagle had slightly higher gross (₹55,090.80) and net returns (₹35,401.00) from 0.10ha land and Heena had slightly higher yield (1,355 kg), the differences in yield, cultivation cost, and returns were not statistically significant at the 5% level. This suggests that the productivity and profitability of both types are similar. The market prices per quintal, however, showed a notable difference, with Eagle fetching a significantly higher price (₹4,270/q) than Heena (₹3,941/q), indicating superior quality traits and market acceptance. All things considered, Eagle was a marginally better variety in terms of price advantage and economic return, but Heena did well in terms of yield stability. Therefore, both varieties can be recommended for cultivation, with *Eagle* offering better market prospects in the study region.



### References

- Anonymous. Horticulture statistics at a glance 2022. New Delhi: Department of Agriculture and Farmers' Welfare, Government of India; 2022.
- Arunkumar R, Krishnakumar S, Ramessh C, Usharani P, Arul Arasu P. Assessment of chilli hybrids for higher yield. *Pharma Innov J*. 2023;SP-12(10):504-506.
- Azlan A, Sultana S, Huei CS, Razman MR. Antioxidant, anti-obesity, nutritional and other beneficial effects of different chili peppers: A review. *Molecules*. 2022;27(3):898.
- Babu BS, Radha Y, Rao DS, Umar SN. Economics of chilli cultivation in Guntur district of Andhra Pradesh. *Andhra Agric J*. 2018;65(2).
- Bhalabhai JG, Rajhans S, Pandya H, Mankad A. A comprehensive review on *Capsicum* spp. *Int J Res Anal Rev*. 2021;8(4):581-599.
- Devi MB, Chanu LJ, Verma VK, Talang HD, Rymbai H, Assumi SR. King chilli (*Capsicum chinense* Jacq.): A potential species for sustainability and income enhancement for tribal farmers of NEH region. In: Kisan Mela on empowering tribal farmers through technology-led farming; 14-15 Nov 2022; Kolasib, Mizoram. Umiam (Meghalaya): ICAR Research Complex for NEH Region; 2022. p. 128. (PME Publ No. 79).
- Gajbhiye KS, Mandal C. Agro-ecological zones, soil resources and cropping systems. In: Status of farm mechanization in India. New Delhi; 2000. p. 1-32.
- Jagtap PP, Shingane US, Kulkarni KP. Economics of chilli production in India. *Afr J Basic Appl Sci*. 2012;4(5):161-164.
- Kumar A, Sharma S, Thakur N. Performance of chilli (*Capsicum annum* L.) hybrids for yield and quality traits. *J Spices Aromat Crops*. 2022;31(2):146-153.
- Madhavi Reddy K, Ponnamm N, Barik S, Rakesh Reddy V, Saha K, Lakshamana Reddy DC, *et al.* Chillies and capsicums in India. In: Handbook of spices in India: 75 years of research and development. Singapore: Springer Nature; 2023. p. 2033-2084.
- Maharjan A, Vasamsetti BMK, Park JH. A comprehensive review of capsaicin: Biosynthesis, industrial production, processing, applications and clinical uses. *Heliyon*. 2024;10(21).
- Mani A, Kabiraj A. Export potential of spices and value-added products. *Agric Food e-Newsletter*. 2019;1(8):339-347.
- Mehta N, Kumari V. Economic evaluation of chilli (*Capsicum annum* L.) varieties under Chhattisgarh plains. *Int J Agric Sci*. 2018;10(1):44-48.
- Venkanna Y, Rao BB. Performance of a new chilli variety LCA-620 in farmers' fields of Telangana State, India. *J Appl Hortic*. 2020;22(1):45-48.