

## RESEARCH ARTICLE

## EVALUATION OF DIFFERENT VARIETIES OF CAPSICUM (*CAPSICUM ANNUM L.*) IN DADELDHURA, NEPAL

Madhav Pathak, Niraj Chaudhary\*, Prakash Rijal

Faculty of Agriculture, Agriculture and Forestry University (AFU), Rampur, Chitwan, Nepal.

\*Corresponding Author Email: [Chyniraj693@gmail.com](mailto:Chyniraj693@gmail.com)

This is an open access article distributed under the Creative Commons Attribution License CC BY 4.0, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ARTICLE DETAILS

## Article History:

Received 10 November 2025  
Revised 15 December 2025  
Accepted 19 January 2026  
Available online 05 February 2026

## ABSTRACT

The research carried out in Amargadhi-03, Dadeldhura district, Sudurpaschim Province was aimed at evaluating and suggesting the most appropriate capsicum variety for commercial growth in the specific environmental conditions. Five common varieties (F1, Ganga, California Wonder, Bull and Booster) were assessed using a Randomized Complete Block Design (RCBD) with four replications for each treatment. Data gathering and statistical analysis were conducted using MS-Excel and R-Studio. Significant differences were noted among the varieties in terms of plant height, number of branches, total fruits per plant, average fruit weight, and fruit yield per hectare. California Wonder displayed the tallest plants during the different growth phases, while F1 consistently exhibited the highest branch count per plant. Regarding yield and all the yield attributing parameters, F1 surpassed the other varieties, showing the highest number of fruits per plant (10.91), greatest average fruit weight (200g) and ultimately, the highest fruit yield per hectare (3.04t/ha). Conversely, Bull consistently demonstrated lower performance across all parameters including vegetative and reproductive performances, indicating its lack of suitability for the specified environmental conditions. These results indicate that F1, given its exceptional yield performance and related factors, is the most suitable choice for commercial capsicum cultivation in Amargadhi-03, Dadeldhura district, Sudurpaschim Province.

## KEYWORDS

agro-climatic, capsicum, commercial, varieties

### 1. INTRODUCTION

Capsicum (*Capsicum annuum L.*), also known as bell pepper or sweet pepper, is most commonly grown in tropical and sub-tropical region belonging to the family Solanaceae with chromosome number  $2n=24$ . It is highly cultivated all over the world due to its multi-dimensional consumption uses and worthy export (Malshe et al., 2016). The capacity to flower, set fruit, yield potential, and other quantitative characteristics of chilli cultivars under various agro climates differ significantly (Lohani et al., 2020). In the Terai region, capsicum is used as salad, whereas in the Hill and Mountain regions, they are a source of vegetable and pickles (Bhattarai et al., 2019). Considering it is more productive than main cereals and has a better nutritional and economic value, the capsicum could be a good choice for improving the health and nutrition of rural populations (Ghimire & Dhakal, 2014).

It is an annual crop of the very variable herb or sub-shrub type that grows to a height of 0.5 to 1 m and has extremely branching characteristics (CABI, 2019). The flower is terminal and typically borne individually or in groups of two or three in the leaf axils. Well drained loamy soils pH 5.5 to 6.8, rainfall between 600 to 1200 mm, temperature 20 to 25°C during day and 18 to 20°C during night best suits *C. annuum* (Kishor et al., 2023).

Capsicum is cultivated in more than 125 countries worldwide and more than a billion peoples depend on it as a major source of vegetable and medicinal purpose (CGIAR, 2008). Its global production was recorded over 36.09 million metric tons from more than 17 million hectares of land with

the productivity of 21.76 ton/ha (FAOSTAT, 2020). Nepal is an agricultural country having 66% population of the country belonging to the farming family (CBS, 2018). It covers about 1,193 ha of land producing 12,372 ton with productivity of 10 ton per hectare (MoALD, 2019). Due to lack of enough registered high yielding varieties, the total area under cultivation and total production is relatively lesser than that of other vegetables (MoALD, 2019). Nepal's varied climatic circumstances in different ecological zones, have created practically limitless opportunities for growing wide varieties of capsicum throughout the year.

The different varieties of capsicum mostly cultivated in Nepal are OP, F1, Sagar, California Wonder, Ganga, NS 632, Bull (AICC, 2018). As the population grows geometrically, people are becoming more conscious of the nutritional advantages and health benefits of capsicum as well as the range of ways they can be taken (Shrestha et al., 2020). Furthermore, the potential for vegetable production and commercialization in Nepal has grown dramatically. Local varieties like Ganga, Bull, Booster, etc. has lower productivity as compared to other improved varieties like Sagar, F1, California Wonder, etc. have been registered in Nepal. Farmers in Nepal are compelled to grow commercial varieties of capsicum developed by the other countries due to less research activities on local varieties (Poudel et al., 2023).

There is enormous scope for cultivation of this crop in Dadeldhura which is located in mid-hills and has equivalent agro-climatic condition. The major reason behind negative trade deficit is its lower productivity and lack of abundant variety as well random selection of the varieties which has caused outbreak of various disease and pest along with increased cost

## Quick Response Code



## Access this article online

Website:  
[www.sfna.org.my](http://www.sfna.org.my)

DOI:  
10.26480/sfna.01.2026.11.15

of production. This scenario express the necessity and urgency of developing and selecting capsicum variety adaptable in that region with reasonably high productivity. The present research work was aimed on evaluation of best variety for commercial purpose and producing high quality and yield giving capsicum in Dadeldhura, Nepal.

## 2. MATERIALS AND METHODOLOGY

### 2.1 Site description

The field trial was conducted in Amargadhi-03, Dadeldhura district, Sudurpaschim Province, Nepal. The experimental field was located in Subtropical mid hills with latitude 28° 59' N to 29° 26' N and longitude 80° 12' E to 80° 47' E and altitude from the 333masl to 2639masl (Figure 1). The soil type was found to be sandy loam with pH of 6.2, nitrogen (0.29%), phosphorus (97 kg/ha) and potassium (167kg/ha). The trial was executed from March 2023 to July 2023. The average temperature recorded in field was 6.06°C - 18.57°C, precipitation was 198.51mm and relative humidity (RH) was 50.15% (Figure 2).

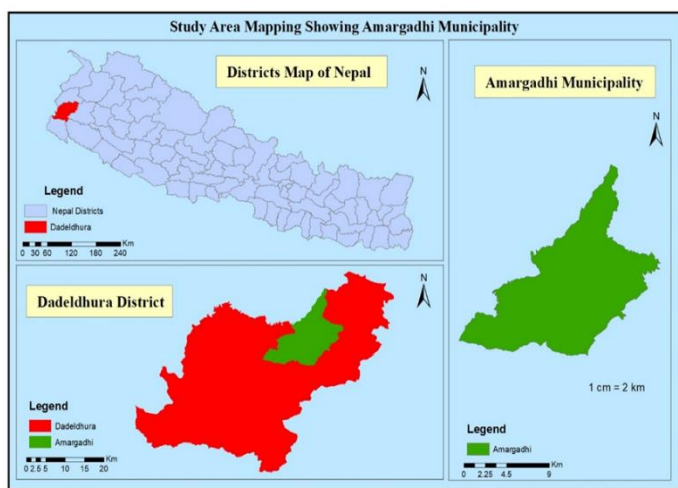


Figure 1: Map of Nepal showing research location

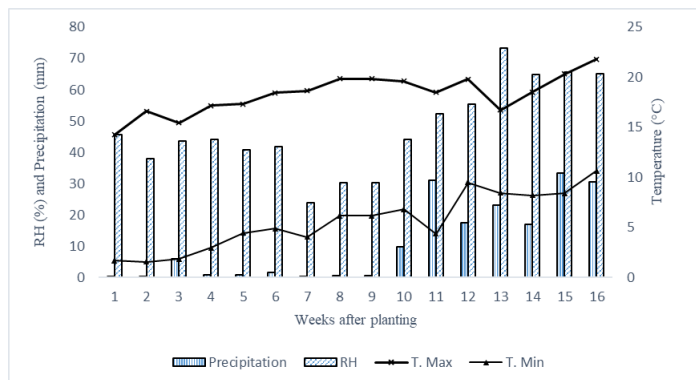


Figure 2: Graph showing meteorological data of research location

### 2.2 Experimental Materials and Design

This study used a total of five capsicum varieties, namely California Wonder, Ganga, F1, Booster, and Bull, as the experimental materials. These varieties were employed as treatment for its evaluation which are available in local agro-vet, where each treatment was replicated four times.

The details of the treatment are shown below:

Notations	Treatments
T1	Boxer (F1)
T2	Ganga
T3	California Wonder
T4	Bull
T5	Booster

Six treatments were replicated four times in the field experiment, which was carried out using a randomized complete block design (RCBD). There were 20 separate plots total, each measuring 2.4 \*2 m<sup>2</sup> and containing 20 plants. Plants were maintained in 4 rows kept at distance of 60 cm between them and each row contain 5 plants having planting distance 40cm. Space between plots and blocks was maintained at 50 cm and 100cm respectively with margin of 100 cm on all sides.

### 2.3 Preparation Of Seedling And Land

With the objective to raise seedlings, the seeds were soaked in water for a full night before being spread out over a polythene sheet for two hours to remove any remaining surface moisture. Seeds were sown at 2nd week of March 2023, in plastic tray containing mixture of coco peat, soil and vermiculite at the ratio of 1:1:1. Then it was covered with newspaper under room temperature for raising seedlings. The experimental plot was deep ploughed with a mini tiller and levelled one week before plantation and well decomposed FYM was incorporated thoroughly into the soil @15-20 ton/ha. Weed trashes were eliminated and pre-irrigation was done. Along with organic manure, Recommended dose of fertilizer for capsicum was used via: Nitrogen (N), Phosphorus (P) and Potassium (K) @120:70:70 kg NPK/ha. Half dose of urea, full dose of DAP and MOP was applied as basal dose and remaining urea was applied in split at 30 and 45 DAT.

The grown seeding were transplanted in main field after 5 weeks in evening to minimize transplanting shock and instantly, light watering was done with water can. Irrigation was done at 3-4 days interval after root establishment in soil. Earthing up was done after 30 days and 45 days of planting and proper staking was done to prevent plant from lodging. Fruits were harvested with the help of hands and sharp secateurs in fields at maturity and graded according to their individual weight, presence and absence of any sort of abnormalities.

### 2.4 Data Collection and Analysis

Six plants were tagged as sample plants from each plot excluding border plants in a Z pattern at different times. plant height, number of branches per plant and number of fruits per plant, fruit weight and fruit yield per plant along with physical quality were observed to evaluate vegetative and yield parameters of different varieties.

Soil samples were collected from more than 10 spots of research field at the depth of 15cm before the application of FYM and fertilizers. A composite sample was made from the collected sample from each spot. It was then shade dried, grinded sieved through 2-3mm sieve and subjected to determine their major nutrient status of experimental site.

Plant height (cm) was measured from ground surface at 30 DAT, 60 DAT and 90 DAT from selected sample plant from each plot. The number of branches arising from the main shoot per plant were counted at 60 & 90 DAT from sampled plants and the average was calculated.

At the time of harvest, average of total number of fruits per plant was recorded from harvest of all sampled plants. Average Fruit weight (g) was recorded as the ratio of the total weight of fruits harvested to total number of fruits harvested from all experimental plants. Fruit weight was recorded in gram using digital weighing machine for accurate result. Total fruit yield (ton ha<sup>-1</sup>) was recorded as the sum of all harvested fruits based on the area covered by experimental plants.

Yield per plant (g) = Individual fruit weight (g) × Number of fruits per plant

For the analysis of variance (ANOVA) and other data analysis, the gathered data were carefully organized using statistical programs MS-EXCEL and R-STUDIO. The means were compared by using Duncan's Multiple Range Test (DMRT) at 5% level of significance (Gomez, 1984).

## 3. RESULTS

### 3.1 Plant Height

Different capsicum varieties had a significant variation of plant height observed at 30 DAT (Date of Transplantation), 60 DAT and 90 DAT (Table 1). Among all varieties, the maximum average height was recorded in California wonder at different growth stages as 20.91cm, 46.39cm and 60.32cm was recorded in 30 DAT, 60 DAT and 90 DAT respectively. Minimum average height was recorded in Ganga (19.37cm) at 30 DAT and in Bull (42.79cm) at 60 DAT and in Booster (56.69cm).

**Table 1:** Plant height as observed in different varieties of capsicum at Dadeldhura, 2023

Treatments	Plant height (cm)		
	30 DAT	60 DAT	90 DAT
F1	20.69 <sup>a</sup>	45.36 <sup>ab</sup>	60.15 <sup>a</sup>
Ganga	19.37 <sup>b</sup>	44.36 <sup>b</sup>	58.12 <sup>ab</sup>
California wonder	20.91 <sup>a</sup>	46.39 <sup>a</sup>	60.32 <sup>a</sup>
Bull	19.44 <sup>b</sup>	42.79 <sup>c</sup>	56.69 <sup>ab</sup>
Booster	19.77 <sup>b</sup>	44.60 <sup>b</sup>	53.94 <sup>b</sup>
SEm (±)	0.1874	0.4219	1.5292
F probability	***	***	*
LSD (=0.05)	0.57	1.30	4.71
CV, %	1.87	1.88	5.28
Grand mean	20.04	44.70	57.84

\*, \*\* and \*\*\* represent significant at 5%, 1% and 0.1% level of significance respectively, NS=Non-significant. Treatment means followed by common letter(s) within column are not significantly different among each other based DMRT test., DAT: Days after Transplanting

### 3.2 Number Of Branches Per Plant

The statistical analysis shows variation in the number of branches per plant across different varieties and observation days (Table 2). Maximum number of branches per plant was recorded on F1 (7.45) and F1 (8.12) at 60 DAT and 90 DAT respectively. Likewise, minimum number of branches per plant was recorded on Bull (4.41) and on Bull (5.16) at 60 DAT and 90 DAT of observation.

**Table 2:** Number of branches per plant as observed in different varieties of capsicum at Dadeldhura, 2023

Treatments	Number of branches per Plant	
	60DAT	90 DAT
F1	7.45 <sup>a</sup>	8.12 <sup>a</sup>
Ganga	5.79 <sup>c</sup>	6.29 <sup>c</sup>
California wonder	6.70 <sup>b</sup>	7.37 <sup>b</sup>
Bull	4.41 <sup>e</sup>	5.16 <sup>d</sup>
Booster	5.25 <sup>d</sup>	6.00 <sup>c</sup>
SEm (±)	0.1568	0.2026
F probability	***	***
LSD (=0.05)	0.48	0.62
CV, %	5.29	6.14
Grand mean	5.92	6.59

\*, \*\* and \*\*\* represent significant at 5%, 1% and 0.1% level of significance respectively, NS=Non-significant. Treatment means followed by common letter(s) within column are not significantly different among each other based DMRT test., DAT: Days after Transplanting

### 3.3 Number Of Fruits Per Plant

Number of fruits per plant of capsicum were significantly different of different varieties in the research field (Table 3). Highest number of fruits per plant was found in F1 (10.91), similarly lowest number of fruits per

plant was found in Bull (6.25).

**Table 3:** Number of fruits per plant as observed in different varieties of capsicum at Dadeldhura, 2023

Treatments	Number of fruits per plant
F1	10.91 <sup>a</sup>
Ganga	8.33 <sup>b</sup>
California wonder	8.79 <sup>b</sup>
Bull	6.25 <sup>c</sup>
Booster	7.79 <sup>b</sup>
SEm (±)	0.4341
F probability	***
LSD (=0.05)	1.33
CV, %	10.31
Grand mean	8.41

\*, \*\* and \*\*\* represent significant at 5%, 1% and 0.1% level of significance respectively, NS=Non-significant. Treatment means followed by common letter(s) within column are not significantly different among each other based DMRT test.

### 3.4 Average Weight Of Fruit Per Plant

The analysis of variance for average weight of Fruit per plant shows varieties to be significantly different (Table 4). The highest and lowest average Fruit weight per plant was recorded from F1 (200g) and Bull (110g) among different varieties.

**Table 4:** Weight of Fruit per plant as observed in different varieties of capsicum at Dadeldhura, 2023

Treatments	Average weight of fruits per plant (g)
F1	0.20 <sup>a</sup>
Ganga	0.16 <sup>a</sup>
California wonder	0.17 <sup>a</sup>
Bull	0.11 <sup>b</sup>
Booster	0.13 <sup>b</sup>
SEm (±)	0.0115
F probability	**
LSD (=0.05)	0.035
CV, %	14.34
Grand mean	0.15

\*, \*\* and \*\*\* represent significant at 5%, 1% and 0.1% level of significance respectively, NS=Non-significant. Treatment means followed by common letter(s) within column are not significantly different among each other based DMRT test.

### 3.5 Fruit Yield (T/Ha)

Marketable fruit yield (t/ha) of varieties tested in field were significantly different from each other (Table 5). The highest Fruit yield was recorded from F1 (3.04t/ha) and lowest Fruit yield was recorded from Bull (1.84t/ha).

**Table 5:** Yield as observed in different varieties of capsicum at Dadeldhura, 2023

Treatments	Yield (t/ha)
F1	3.04 <sup>a</sup>
Ganga	2.51 <sup>b</sup>
California wonder	2.69 <sup>ab</sup>
Bull	1.84 <sup>c</sup>
Booster	1.99 <sup>c</sup>
SEm (±)	0.1513
F probability	***
LSD (=0.05)	0.46
CV, %	12.50
Grand mean	2.42

\*, \*\* and \*\*\* represent significant at 5%, 1% and 0.1% level of significance respectively, NS=Non-significant. Treatment means followed by common letter(s) within column are not significantly different among each other based DMRT test

#### 4. DISCUSSION

One desirable feature that helps increase plant canopy and biomass is plant height. The growing environment or inherited characteristics were most likely the cause of the differences in plant height between kinds (Malshe et al., 2016). Lower temperature during earlier months of growing might be the cause of slower earlier growth of capsicum (Banjade, 2019). Plant genetics and the quality of plant materials might be the cause for differences in plant height between the varieties (Eaton et al., 2017).

Number of branches is maximum in F1 and minimum in Bull variety. It influences the fruit production as more the vegetative growth and branches, greater will be flowering nodes resulting number of fruits per plant (Malshe et al., 2016). Plant genetic differences among the varieties or interaction of temperature and light intensity along with organic and inorganic nutrients present in soils may be the cause that influence the significant differences in number of branches that grow per plants (Lynch et al., 2012).

Similarly, differences in the numbers of Fruits of different grades and weights among varieties could be related to the variety's tolerance to the trial site's climatic circumstances, its genetics, or the quality of the capsicum seed (Eaton et al., 2017). Higher values of fruit length, width and wall thickness contributed to maximum average fruit weight in F1 variety and least in Bull variety.

Fruit yield (t/ha) is seen significantly maximum in F1 variety and least in bull variety. As the number of primary, secondary and tertiary branches increase, there could be a possibility of increasing the number of fruit producing buds (Malshe et al., 2016). The fruit yield is affected by environmental factors such as soil temperature, moisture, light intensity, fertilizer delivery, and disease and pest control (Bhattacharjee et al., 2022). The quality of the capsicum seed, the variety's adaptive responses to the climatic conditions of the trial site, or genetic variations in yield among kinds could all contribute to this outcome.

#### 5. CONCLUSION

The result of the research recognized F1 and California Wonder as superior types of capsicum in relation to both yield and characteristics contributing to yield. It suggests all the commercial farmers to select the varieties accordingly while cultivating capsicum in large scale. To achieve optimal results in Dadeldhura, Nepal, it is advisable to recommended for the F1

variety. It is recommended to undertake additional research and endeavors aimed at the official release and commercialization of California Wonder. Considering the limited scope of the study, which focused on a single season and location, it is proposed that forthcoming research should cover various agro-ecological regions to confirm the results in broader contexts, thereby ensuring a thorough grasp and suitability in diverse environmental settings.

#### AUTHORS CONTRIBUTION ROLES

Each of the author mentioned have played significant role in conducting the research and finding its significant result. From literature review to performing field activities, and collecting data and its analysis, in every part of the study and manuscript preparation and final review has been performed by all authors with their equal contribution.

#### ACKNOWLEDGEMENTS

Although Agriculture and Forestry University Rampur, Chitwan provided materialistic support, the prior study was conducted without financial support from the institution. Financial assistance was not obtained at any stage of the research process, from field testing to publication.

#### ETHICAL CONSIDERATION

The research adhered to ethical principles throughout the data collection process. Informed consent was obtained from all participants, ensuring their willingness to participate in the study. Participants' privacy and confidentiality were strictly maintained and the data collected were used solely for research purposes.

#### REFERENCES

- ABPSD. 2019/2020. Statistical information on Nepalese agriculture. Agri-business Promotion and Statistics Division.
- AICC. 2018. Statistical information on Nepalese agriculture. Ministry of Agriculture and Livestock Development.
- Banjade, S., Shrestha, S. M., Pokharel, N., Pandey, D., Rana, M., 2019. Evaluation of growth and yield attributes of commonly grown potato (*Solanum tuberosum*) varieties at Kavre, Nepal. International Journal of Scientific and Research Publications, 9(11), Pp. 134–139.
- Bhattacharjee, P., Panchaal, R., Warang, O., Das, S., Das, S., 2022. Impact of climate change on fruit crops: A review. Current World Environment, 17(2), 319–330. <https://doi.org/10.12944/CWE.17.2.04>
- Central Bureau of Statistics. 2019. Central Bureau of Statistics. <https://cbs.gov.np/>
- Clausen, R. T., 1941. On the use of the terms "subspecies" and "variety." Rhodora, 43(509), 157–167.
- Dahal, K. C., Sharma, M. D., Dhakal, D. D., Shakya, S. M., 2006. Evaluation of heat tolerant chilli (*Capsicum annuum* L.) genotypes in Western Terai of Nepal. Journal of the Institute of Agriculture and Animal Science, 27, 59–64. <https://doi.org/10.3126/jafu.v4i1.47059>
- Eaton, T. E., Azad, A. K., Kabir, H., Siddiq, A. B., 2017. Evaluation of six modern varieties of potatoes for yield, plant growth parameters, and resistance to insects and diseases. Agricultural Sciences, 8(11), 1315–1326. <https://doi.org/10.4236/as.2017.811095>
- Food and Agriculture Organization of the United Nations. 2020. FAO statistical yearbook 2013. FAO.
- FAOSTAT. 2016. FAOSTAT statistics division. Food and Agriculture Organization of the United Nations.
- FAOSTAT. 2020. FAOSTAT data. Food and Agriculture Organization of the United Nations. <http://www.fao.org/faostat/en/#data/QC/visualize>
- Gomez, K. A., Gomez, A. A., 1984. Statistical procedures for agricultural

research. John Wiley and Sons.

Kishor, B., Rajiv, R. B., Singh, S., Verma, N., Goyal, A., Sahu, V., 2023. Influence of capsicum hybrids and micronutrients on growth and quality of capsicum (*Capsicum annuum* L.) under naturally ventilated polyhouse. *Journal Name*, 12, 2631–2635.

Lynch, J., Marschner, P., Rengel, Z., 2012. Effect of internal and external factors on root growth and development. In P. Marschner (Ed.), *Marschner's mineral nutrition of higher plants* Pp. 331–346. Academic Press. <https://doi.org/10.1016/B978-0-12-384905-2.00013-3>

Lohani, S., Sharma, M. D., Shah, S. C., Shrestha, A. K., 2020. Evaluation of sweet pepper (*Capsicum annuum* L.) varieties as influenced by nitrogen levels in Chitwan, Nepal. *Nepalese Horticulture*, 14(1), 33–42. <https://doi.org/10.3126/nh.v16i1.44971>

Malshe, K. V., Palshetkar, M. G., Desai, B. G., 2016. Comparative study of different capsicum varieties under open and protected conditions. *Journal Name*, Volume(Issue), pages.

Ministry of Agriculture and Livestock Development. 2019. Statistical information on Nepalese agriculture. MoALD.

Ministry of Agriculture and Livestock Development. 2020. Statistical information on Nepalese agriculture. Monitoring, Evaluation and Statistical Division, MoALD.

Ministry of Agriculture and Livestock Development. 2076. Statistical information on Nepalese agriculture. MoALD.

Ministry of Agriculture and Livestock Development. 2077. *Krishi diary*. Department of Agriculture.

Poudel, S., Gautam, I., Shrestha, S., Ghimire, D., Dhakal, M., Pandey, S., Subedi, S., Regmi, R., 2023. Evaluation of sweet pepper genotypes for yield and quality in open field using plastic mulch in mid-hill conditions of Nepal. *Nepalese Horticulture*, 17, Pp. 60–68. <https://doi.org/10.3126/nh.v17i1.60634>

