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# Enumeration and Categorization of the Indoor Plant of Bharatpur Metropolitan City

**Jamuna Acharya\* and Manoj K.L. Das**

Department of Botany, Birendra Multiple Campus

\*Corresponding Author: acharyajamuna2001@gmail.com / manojdas068@gmail.com

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## Abstract

*This study investigates indoor gardening practices in Bharatpur, Nepal. A combination of vision observations, online questionnaires, and a random selection of plant species were used to collect data. 41 respondents to the survey revealed a variety of indoor plants: 39% have less than five plants, 24.4% own ten or more, 19.5% own more than ten, and 17.1% own more than twenty. While 34.1% water their plants weekly, most participants (48.8%) water twice a week. Fertilizer is applied less regularly, with most people using it twice yearly (43.9%). Though gardeners face challenges such as dryness (41.5%) and insect infections (29.3%), indoor plants are recognized for their good energy (34.1%) and air-purifying features (26.8%). Significant choices are available for specific plants, with the *Epipremnum aureum* coming in second at 31.7%, and the *Dracaena trifasciata* at 46.3% being the most popular. With a few of those received as gifts or online, nurseries consider 68.3% of plant purchases. The study identifies important plant families: *Arecaceae*, *Asparagaceae*, *Asphodelaceae*, *Asteraceae*, and *Euphorbiaceae* each have two to six species, while *Araceae* is the family with the greatest number with eleven. Just 1-2 species represent some families, such as *Apocynaceae* and *Piperaceae*.*

**Keywords** Indoor gardening, air-purifier, fertilizer, infection, *Arecaceae*.

## 1. Introduction

Ornamental plants are decorative plants that are being practiced for decorating home gardens and public places (Das, 2018). These plants are of two types i.e. indoor plants and outdoor plants. Growing indoor potted plants is common in urban areas like Bharatpur metropolitan city. Plants have been cultivated indoors for medicinal or culinary purposes for over a thousand year (Gatehouse, 2024). In the future, indoor food production using hydroponic kitchen technology, self-watering systems, and smart gardens could help fight climate change and influence future living space design (Cerro, 2022). An indoor model garden with vertical gardens on the walls was used to identify the fastest-growing plants for improving air quality. According to NASA, the air contains 0.04% carbon dioxide and 20.95% oxygen. If there were enough plants to convert all carbon dioxide into oxygen, the oxygen content would increase to 21% (NASA, 2019). This small change is not noticeable and does not affect people (Choi, 2021). House plants perform as indoor air cleaners in New York showed that both laboratory chamber studies and field studies led to the conclusion that indoor plants have little, benefit for removing indoor

air of VOC (Volatile Organic Compound) in residential and commercial buildings (John, 2009). Indoor plants improve mental health significantly by lowering stress, promoting peace of mind, and enhancing focus and productivity. The act of caring for them creates a feeling of purpose and a connection with nature, as well as positive emotions, happiness, and benefits from treatment (Chawathe, 2024).

In Bharatpur, incorporating indoor plants supports healthier, more pleasant, and sustainable living spaces while offering educational opportunities about plant care and the environmental workplace. It has become a hobby for the young generation and is also important because people nowadays use chemical products to clean and maintain indoor and outdoor spaces (Lifevif Team and JC Franco, 2024). The growth response of indoor ornamental plant species to various artificial light intensities (led) in an indoor vertical garden in each plant species requires a specific minimum amount of light to carry out various physiological and metabolic functions. If this minimum requirement is not met, the plant will struggle to photosynthesize, produce food, and grow properly, which can ultimately result in the plant dying (Gautam, 2021). Promoting Urban Farming for Creating Sustainable Cities in Nepal concluded that local authorities and institutions in Nepal should support urban farmers with technology, marketing, training, and appropriate policies. Municipal governments can implement zoning and land use regulations to promote urban farming while ensuring public health and safety. They can also help establish urban farmers' markets for households with extra food to sell (Bhattarai, 2023). Analysis of Marketing in the Indoor Plant Industry revealed that Instagram and Snapchat were the most popular social media platforms among students. It also found a connection between students' social media preferences and their indoor plant purchasing behaviors. The study aimed to develop a marketing strategy for targeting the university market with indoor plant products, which can be applied to any business in the indoor plant industry (Petersen, 2023)

## 2. Materials and methods

### 2.1 Study area

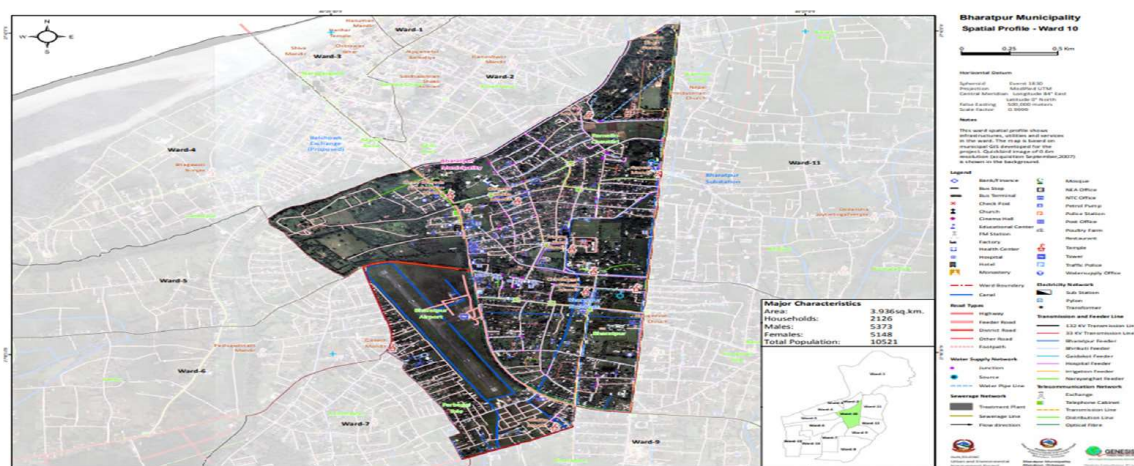


Figure 1. Core area of Bharatpur Metropolitan City

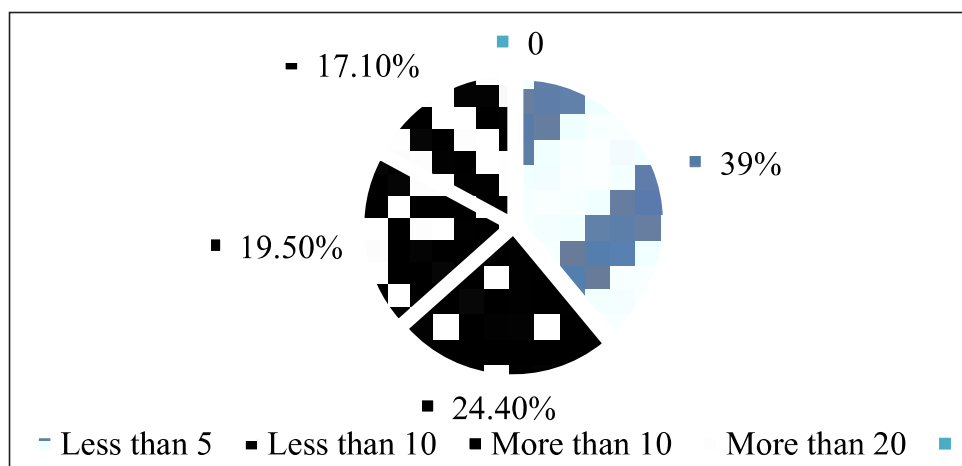
Bharatpur is a metropolitan city and district headquarters located in Chitwan district in the central-southern part of Nepal lies between 27°16.56'- 27°42.14' Latitudes and 83°50.23'-84°46.25' Longitudes. The altitude ranges from 110 m to 850 m above sea level. From October to February, the average temperature is 25°C (Goveremen of Nepal, 2024). The climate of Chitwan is characterized by tropical monsoons with high humidity throughout the year. The vegetation of Chitwan is of the Inner Terai which is a Himalayan subtropical broad-leaf forest with predominantly sal trees covering about 70% forest area. On the southern side of the Churia Hills sal, the vegetation is interspersed with chir pine (Figure 1).

**2.2 Methods**

The current research work is based on both primary and secondary data. The primary data will be collected by random sampling, i.e., plant species collected through visual observation will be identified and described with their families, common names, and uses, using taxonomic literature, books, expert guidance, herbarium species, online resources, etc. The survey on Bharatpur city was done by both direct observation and online survey through Google form. The work mainly concerns local people's personal thoughts and gardening techniques followed for indoor plants in urban city like Bharatpur.

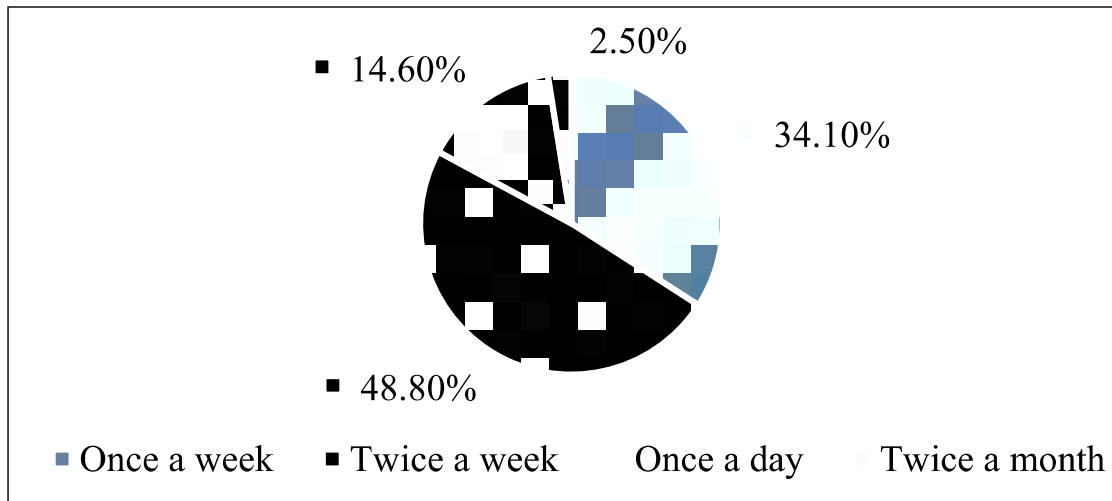
**3. Results**

The survey was conducted among 41 participants about their indoor plant habits and challenges. The collected information on a variety of problems including the number of indoor plants people have, how often they water and fertilize them, the advantages they feel, and the challenges related to keeping them healthy. A total of 48 plant species were found from direct observation in Bharatpur city through random sampling (Appendix I). Pie charts showing the outcomes offer an overview of the most common methods and choices in indoor gardening.



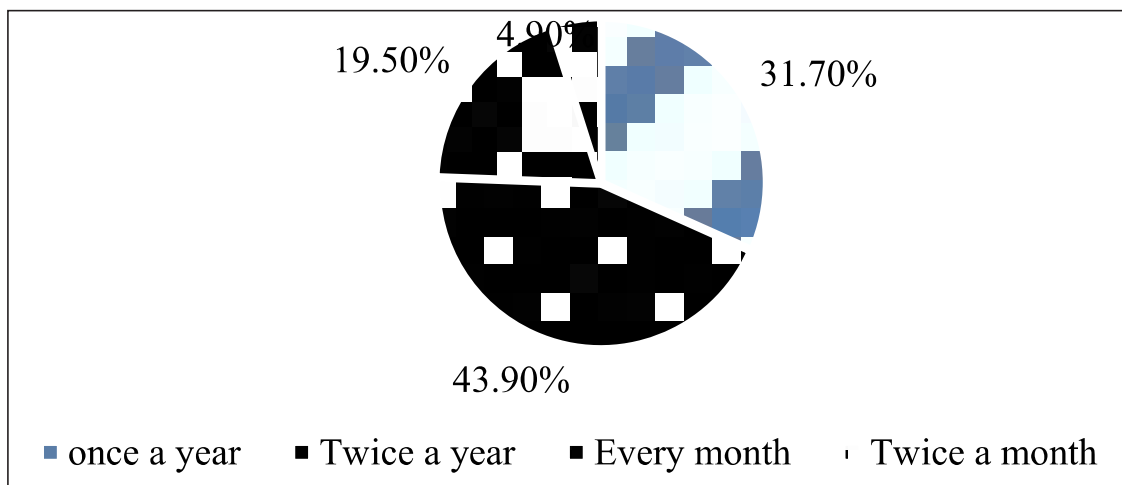
**Figure 2.** Number of indoor plants

The responses to a survey question that drew 41 responses are shown in the pie chart. The inquiry posed was, "How many indoor plants do you have?" Less than five indoor plants were owned by 39% of those surveyed. Less than ten indoor plants were owned by 24.4% of those surveyed. More than ten indoor plants were owned by 19.5% of the participants. Over 20 indoor plants were owned by 17.1% of the respondents (Figure 2).



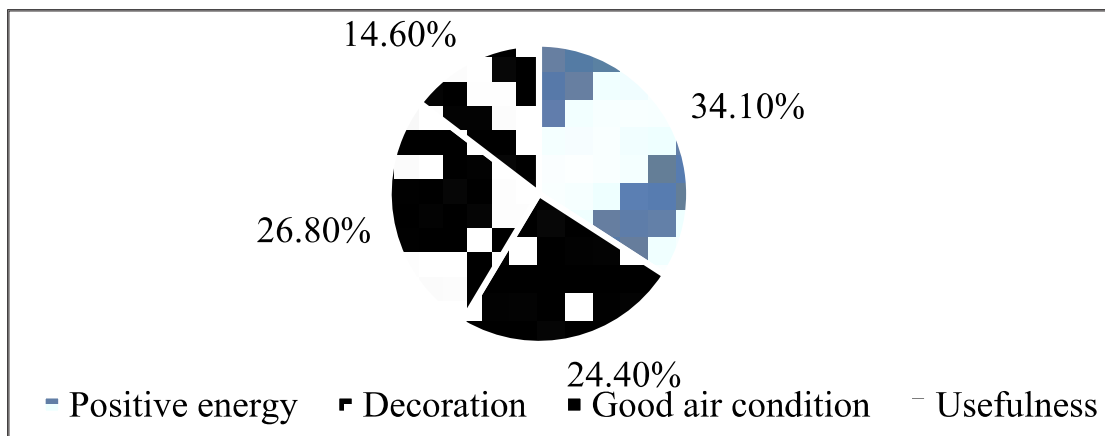
**Figure 3.** Watering time for indoor plant

The question "How often do you water your indoor plants?" was asked in a survey, and a pie chart displaying the 41 responses that were received. Here is how the replies were distributed: Watering indoor plants twice a week was reported by 48.8% of the participants. Weekly irrigation is performed by 34.1% of responders on indoor plants. One daily watering is sufficient, according to 14.6% of respondents who have indoor plants. Watering indoor plants twice a month was done by 2.4% of those polled (Figure 3).



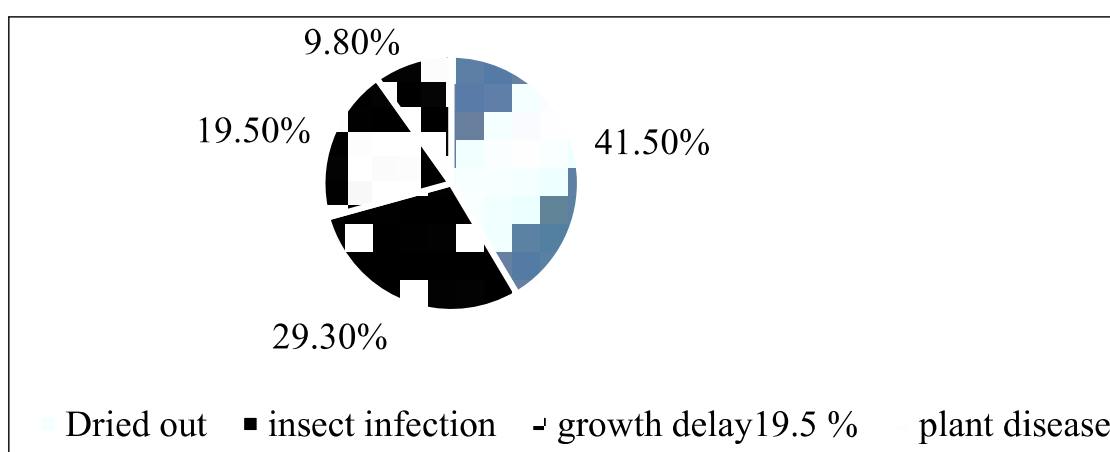
**Figure 4.** Fertilizer used for plant

An inquiry in a survey: "Do you apply fertilizers?" gathered 41 answers, and a pie chart showed the outcomes. 43.9% of respondents use fertilizers twice a year, followed by 31.7% who use them once a year, 19.5% who use them monthly, and 4.9% who use them twice a month, according to the distribution of responses. These findings offer useful data on how frequently the respondents apply fertilizer (Figure 4).



**Figure 5.** Benefits of indoor plants

The pie chart presents the opinions of forty-one respondents regarding the benefits they believe indoor plants bring to their residence or place of business. The majority of participants (34.1%) think that indoor plants provide positive energy, according to the findings. Closely leading is the opinion that indoor plants improve air quality, as expressed by 26.8% of responding people. Furthermore, the majority of respondents 24.4% value indoor plants for their aesthetic value, but the minority 14.6 find indoor plants practical (Figure 5).

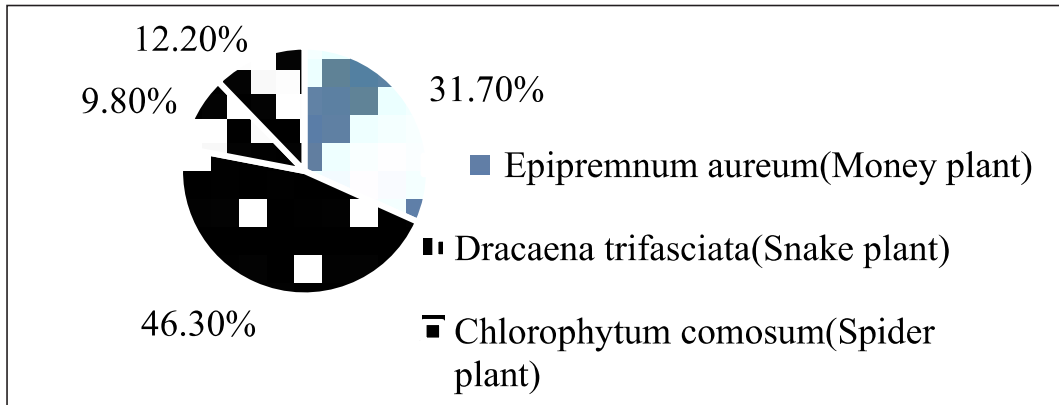


**Figure 6.** Challenges in maintaining indoor plants

A pie chart shows the 41 participants' replies to questions on the difficulties they encountered when taking care of indoor plants. The following are the outcomes: 41.5% of respondents, the highest percentage, said their plants had dried out. Insect

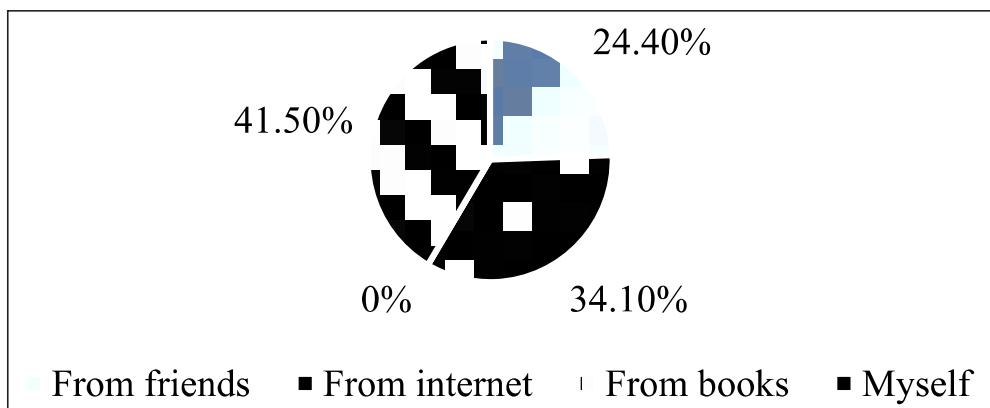


infestations affected 29.3% of respondents. 19.5% had growth that was postponed. 9.8% of respondents, the lowest, reported plant illnesses. These results highlight the typical challenges people have when caring for indoor plants and stress the significance of appropriate maintenance and care procedures for promoting healthy plant growth (Figure 6).



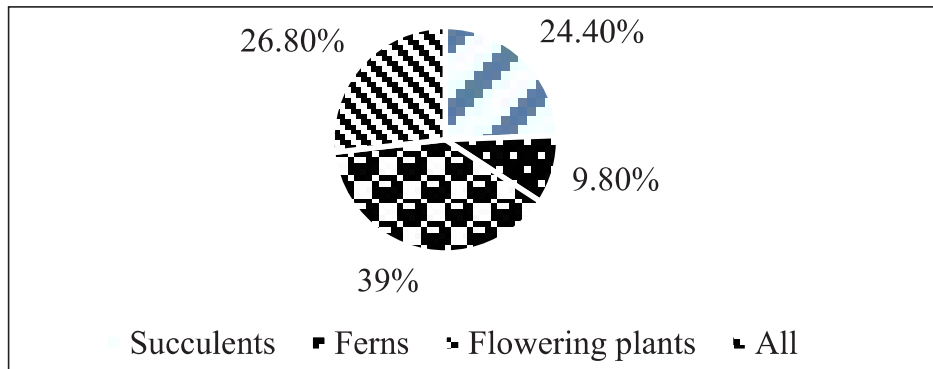
**Figure 7.** Plants that are easier for gardening

Based on ease of maintenance, 41 participants' choices for different indoor plant species are shown in a pie chart. The Snake plant (*Dracaena trifasciata*) was preferred by most people (46.3%), Money plant (*Epipremnum aureum*) (31.7%), and Spider plant (*Chlorophytum comosum*) (9.8%). 12.2% of interviewees said they liked different species of plants (Figure 7).



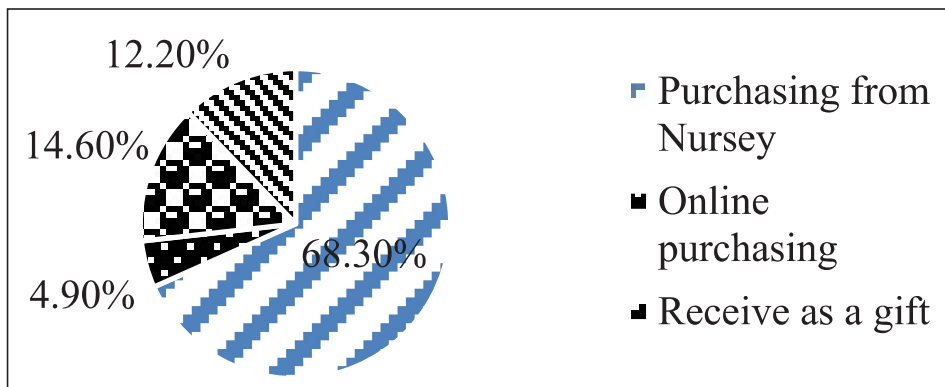
**Figure 8.** Motivated to start gardening

The reasons given by 41 respondents for adding indoor plants to their homes are represented in the pie chart: Of those who were motivated, 41.5% did so on their own, 34.1% were convinced by material found online, and 24.4% were inspired by friends. It's interesting to note that no respondent chose this category, indicating that none of them were inspired by books. In general, the most important motivators were self-motivation and internet resources (Figure 8).



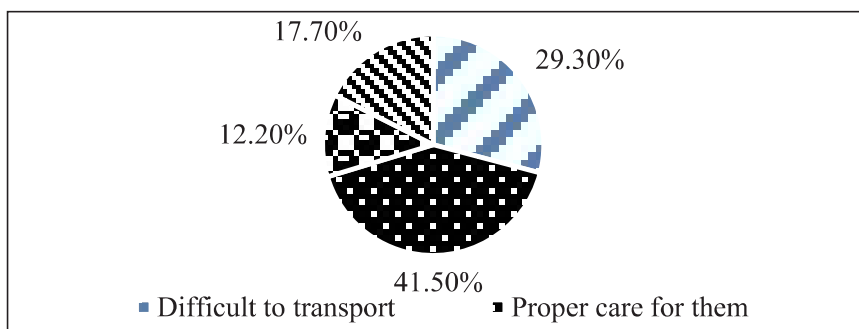
**Figure 9.** Types of indoor plants

The pie chart displays the preferences of 41 respondents for indoor plants: 39% like flowering plants, 26.8% like all kinds of indoor plants, 24.4% like succulents, and 9.8% like ferns. The most favored option among the responders is ferns, but flowering plants are the most popular choice (Figure 9).



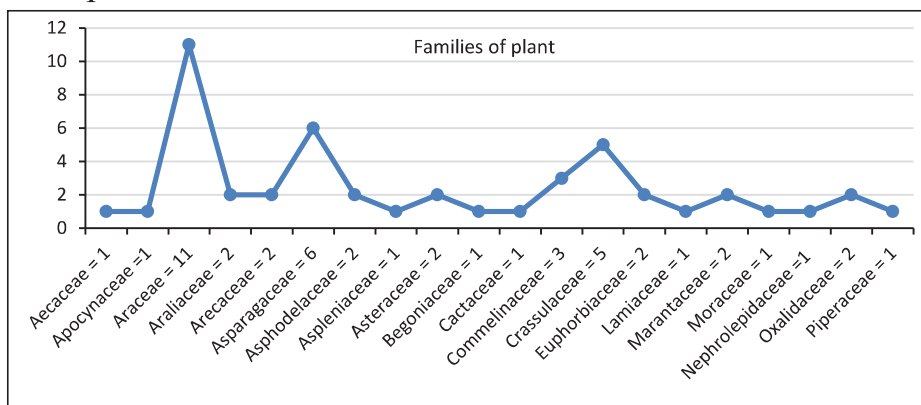
**Figure 10.** Typically acquire plants from

Based on 41 survey replies, the pie chart shows the most common ways that people get their indoor plants. According to the research, 68.3% of the respondents choose to buy their plants from nurseries. Online shopping is the second most popular technique, selected by 14.6% of respondents. The most popular technique, chosen by only 4.9% of participants, is gathering plants from the wild; receiving plants as presents accounted for 12.2% of responses (Figure 10).



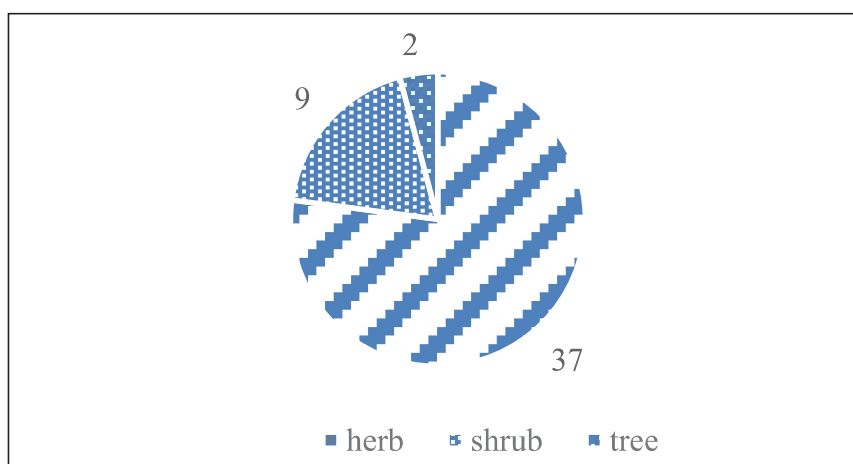
**Figure 11.** Challenges in maintaining plants

Based on 41 replies, the pie chart depicts the difficulties people encounter when trying to care their indoor plants. The main conclusions show that, for 41.5% of respondents, taking good care of indoor plants is the most frequent issue. Furthermore, 17.1% of respondents report having problems with care, transportation, and knowledge gaps, while 29.3% of respondents find it difficult to move their plants. Moreover, 12.2% of respondents said that knowledge is their biggest problem (Figure 11). The result is analyzed by using Excel. The number of families, herbs, and shrubs is calculated and represented in the chart below:



**Figure 12.** Families of indoor plants

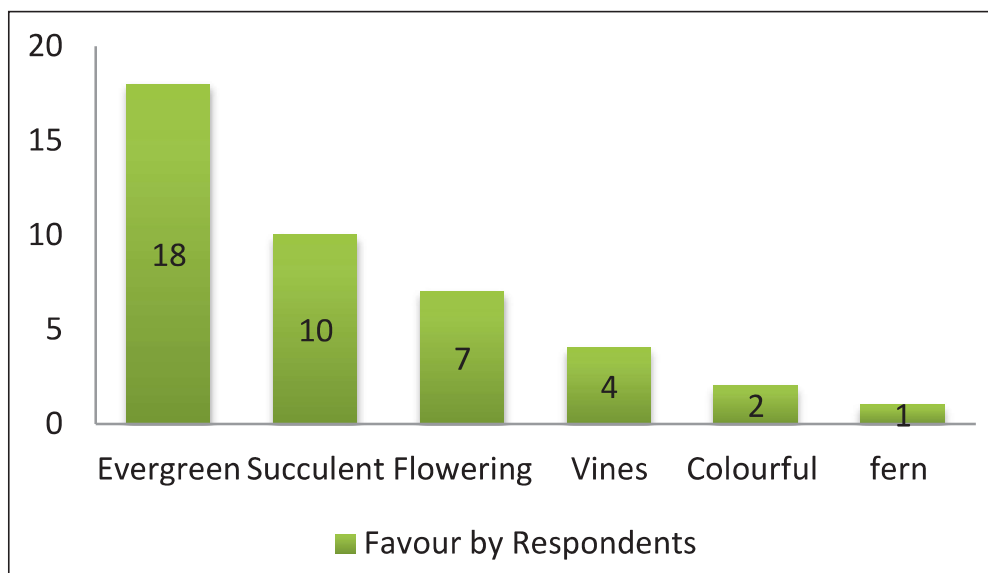
The bar chart illustrates the distribution of plant families, with the x-axis representing the different families and the y-axis indicating the number of species in each family. In summary, Araceae stands out with the highest number of species at 11 occurrences. Arecaceae, Asparagaceae, Asphodelaceae, Asteraceae, and Euphorbiaceae show moderate occurrences, ranging from 2 to 6 species. On the other hand, families like Apocynaceae, Piperaceae, and others have only 1 or 2 species. Overall, the chart highlights the significant variation in the number of species among different plant families in the dataset (Figure 12).



**Figure 13.** Habit of plant



The division of indoor plants according to habit is shown in the pie chart. With 37 plants, or 77% of the total, the data shows that herbs make up the majority. Trees are the least common, with only 2 plants, or 4% of the total, while shrubs come in second with 9 plants, or 19%. The picture features 48 different indoor plant species in total (Figure 13).



**Figure 14.** Types of indoor plants

The bar and line chart illustrates the distribution of various indoor plant types. Evergreen plants are the most favored, with 18 species, followed by succulents with approximately 10 species. Flowering plants come in third with 7 species, while vines have 4 species. Colorful plants are represented by 2 species, and ferns are the least popular with only 1 species (Figure 14).

#### 4. Discussion

Most of people were planted indoor plants with their own interest by thoughts that plant gives positive energy while most of the plants were herbs. That result is strongly supported by the previous studies (Das, 2018), observed that Bharatpur has a large number of ornamental plants, the majority of which were herbaceous and shrubby species. Similarly, Das (2020) confirmed the diversity in indoor plant choices by recording a wide selection of ornamental plants in a different environment. While (Poudel, 2022) highlighted the popularity of particular plants, such as *Sansevieria* and *Aloe vera*, this study focused on a wider variety of interests rather than these specific species.

Although most of the people were planted indoor plants for positive vibes, decoration, good air condition as well as usefulness which was clearly supported to the results of (Girman, 2009) where he was more negative and came to the conclusion that indoor

plants have little effect on removing volatile organic compounds (VOCs) from indoor air while (Choi, 2021) suggested that indoor plants could moderately improve oxygen levels. This difference highlights the need for further research into the special air-purifying properties of various plant species.

The social media and online media were promoted the plantation for the people which strongly supporting on the several paper such as results of Burke (2022) and Petersen (2023), who noted an increase in public interest in plants due to social media and online communities, are consistent with this. As further demonstrated, social media has a bigger and bigger impact on behavior connected to plants (Burke, 2022).

These results show that, as indoor gardening achieves greater popularity, more focused guidance and resources are required to help gardeners avoid challenges and maximize the advantages of indoor plants. Future research may investigate how indoor gardening affects people's health and the environment over time, as well as how modern technology might improve gardening practices.

## 5. Conclusion

This research offers a significant understanding of indoor gardening habits in Bharatpur, as it is based on a survey of 41 respondents. 39% of respondents had fewer than five indoor plants, whereas a smaller percentage (17.1%) owned twenty or more. These results show that ownership of indoor plants varies. There is variation in the frequency of plant watering; 48.8% of respondents water their plants twice a week. Only 43.9% of people use fertilizer twice a year, which is a lower frequency. Indoor gardening has been shown to have several advantages, including improved air quality (26.8%) and positive energy (34.1%), as well as functional and aesthetic applications. Insect problems (29.3%) and plant dryness (41.5%) are the two main problems faced by indoor gardeners. Three types of plants are most preferred: the Money plant (*Epipremnum aureum*), the Spider plant (*Chlorophytum comosum*), and the Snake plant (*Dracaena trifasciata*). Nurseries provide the majority of respondents' plants (68.3%). Araceae is the most common family among the 48 plant species found in Bharatpur that were discovered by direct observation. With 77% of the reported species being herbs, shrubs (9%), and trees (4%), in smaller proportion, round out the dominant plant behaviors.

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## APPENDIX I

### Indoor plants

S. N.	Scientific name	Family	Common name	Habit	Ornamental parts	Types of plants	Nature of plant
1	<i>Aglaonema commutatum</i> S.	Araceae	Chinese Evergreen	Herb (45-60cm)	Leaves, vine	Evergreen	Toxic
2	<i>Aloe vera</i> L.	Asphodelaceae	Ghikumari	Herb	Whole plant	Succulents	Edible, medicinal benefits for skin
3	<i>Anthurium andraeanum</i> L.	Araceae	Flamingo Flower	Herb (40cm)	Flower leaves.	Flowering plant	Poisonous due to calcium oxalate (skin, eye)
4	<i>Aspidistra elatior</i> B.	Asparagaceae	Cast iron plant	Herb	Leaves	Evergreen plant	Use in art of Japan
5	<i>Asplenium nidus</i>	Aspleniaceae	Bird's Nest Fern	Shrub	Whole plant	Fern	Grow in another tree in the wild
6	<i>Beaucarnea recurvata</i> L.	Asparagaceae	Ponytail Palm	Tree	Leaves	Evergreen	Critically endangered species

7	<i>Begonia rex P.</i>	Begoniaceae	Rex Begonia	Herb	multicolor leaves	Flowering plant	It is mildly toxic if ingested, causing mouth and stomach irritation.
8	<i>Parodia magnifica (F Ritter)</i>	Cactaceae	Balloon Cactus	Herb	Whole plant	Succulent	Adapted to dry region
9	<i>Caladium lindenii A.</i>	Araceae	Elephant ear	Herb	Leaf	Flowering plant	poisonous, should not be ingested, and it may irritate sensitive skin
10	<i>Calathea bachemiana (E Morren)</i>	Marantaceae	Calathea	Herb	Whole plant	Evergreen plant	several species are threatened with extinction
11	<i>Callisia repens J.</i>	Commelinaceae	Creeping inch plant	Herb	Leaves, vines	Succulent	It has a ground-covering effect.
12	<i>Chamaedorea elegans M.</i>	Arecaceae	Parlor plant	Shrub	Leaves	Evergreen	The most extensively sold indoor plants.
13	<i>Chamaedorea seifrizii B.</i>	Arecaceae	Bamboo palm	Tree	Stem, leaves	Evergreen	Grow for religious and decorative purposes.
14	<i>Chlorophytum comosum (Thumb.) J.</i>	Asparagaceae	Spider Plant	herb	Whole plant	Evergreen	Easy to grow, sensitive to fluoride.
15	<i>Cissus rhombifolia J.</i>	Araceae	Grape Ivy	Herb	Leaves, vines	Vines	Easy to grow.
16	<i>Codiaeum Variegatum (L.), AJuss.</i>	Euphorbiaceae	Croton	Shrub	Leaves	Evergreen	Toxic
17	<i>Crassula ovata (Miller) Druce.</i>	Crassulaceae	Jade plant	Herb	Leaves	Succulent	Mildly toxic, used as a medicinal plant
18	<i>Dieffenbachia seguine (Jacq. Schott).</i>	Araceae	Dumb Cane	Herb	Leaves	Evergreen	Poisoning effect i.e. temporary unable to speak
19	<i>Dracaena marginata Lam.</i>	Asparagaceae	Dragon Tree	Shrub	leaves	Evergreen	Expensive, significant to its aesthetic value
20	<i>Dracaena sanderiana Mast.</i>	Asparagaceae	Lucky Bamboo	Herb	Stem leaves	Evergreen	It is believed to bring luck to you.
21	<i>Echeveria elegans Rose.</i>	Crassulaceae	Hens and chickens	Herb	Whole plant	Succulent	Serve as host plant for butterfly
22	<i>Epipremnum aureum L.</i>	Araceae	Pothos	Herb	leaves, vines	Vines	Toxic due to the presence of raphides
23	<i>Euphorbia milii D.</i>	Euphorbiaceae	Crown of Thorns	Herb	Flowering plant	Succulents	Slightly poisonous irritates the skin and eye
24	<i>Ficus elastica R.</i>	Moraceae	Rubber Plant	Shrub	Leaves	Succulents	Used for the manufacture of rubber
25	<i>Haworthiacooperi B.</i>	Asphodelaceae	Haworthia	Herb	Whole plant	Succulents	Nontoxic, low-maintenance
26	<i>Hedera helix L.</i>	Araliaceae	English ivy	Herb	Leaves, flower	Vines	Poisonous

27	<i>Hoya carnosa L.</i>	Apocynaceae	Hoya or Wax Plant	Herb	Leaves, flower	flowering plant	It is known as Hindu rope, low maintenance
28	<i>Kalanchoe blossfeldiana P.</i>	Crassulaceae	Kalanchoe	Herb	Whole plant, flower	Succulents	Used in traditional medicine
29	<i>Kalanchoe tomentosa B.</i>	Crassulaceae	Panda Plant	Herb	Leaves	Succulents	low maintenance plant
30	<i>Maranta leuconeura E.</i>	Marantaceae	Prayer Plant	Herb	Leaves	Evergreen	It tends to droop or pray at night
31	<i>Monstera deliciosa L.</i>	Araceae	monstera	herb	leaves	evergreen	Roots have been used to make rope and baskets. Slightly toxic, but has medicinal value
32	<i>Nephrolepis exaltata L.</i>	Nephrolepidaceae	Boston fern	Herb	Whole plant	Fern	It helps to restore moisture to air naturally
33	<i>Oxalis triangularis A.St.</i>	Oxalidaceae	Shamrock plant	Herb	Whole plant	Flowering plant	Used as decoration for salad
34	<i>Oxalis milli L.</i>	Oxalidaceae	clover	Herb	Whole plant	Flowering plant	Used as decoration for salad
35	<i>Peperomia pellucida K.</i>	Piperaceae	Peperomia	Herb	Leaves	Evergreen	Food, medicine
36	<i>Philodendron hederaceum S.</i>	Araceae	Philodendron	Shrub	Leaves, vine	Evergreen	Food and root used as rope
37	<i>Plectranthus scutellarioides L. Benth.</i>	Lamiaceae	Coleus	Herb	Leaves multicolour	Colorful	Has medicinal value
38	<i>Rhapis excelsa</i>	Aecaceae	Lady Palm	Shrub	leaves	Evergreen	easy to grow
39	<i>Sansevieria trifasciata Thunb.</i>	Asparagaceae	Snake Plant	Herb	Whole plant	Succulents	medicinal value, easy to grow
40	<i>Schefflera arboricola Hayata.</i>	Araliaceae	Schefflera or Umbrella Tree	Shrub	Leaves	Evergreen	toxic if contact with the skin
41	<i>Senecio rowleyanus</i>	Asteraceae	Senecio	shrub	flower	Flowering plant	has medicinal value
42	<i>Senecio radicans LF.</i>	Asteraceae	String of Bananas	Herb	Vines	Vines	hanging indoor plants used for decoration
43	<i>Senecio rowleyanus H.Jacobsen</i>	Crassulaceae	String of Pearls	Herb	Whole plant	Vines	hanging indoor plants used for decoration
44	<i>Spathiphyllum wallisii R.</i>	Araceae	Peace Lily	Herb	Flower	Flowering plant	toxic to skin, burning of the mouth
45	<i>Syngonium podophyllum S.</i>	Araceae	Arrowhead plant	herb	leaves	Evergreen	brings positive energy to the house, toxic because of calcium oxalate
46	<i>Tradescantia spathacea Sw.</i>	Commelinaceae	Moses in the cradle	Herb	Leaves multicolour	colorful	toxic, traditionally used in medicine
47	<i>Tradescantia pallida Rose.</i>	Commelinaceae	Purple heart	Herb	Whole plant	colorful	toxic, traditionally used in medicine
48	<i>Zamioculcas zamiifolia Lodd.</i>	Araceae	ZZ plant	Herb	Leaf	Succulents	toxic