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Exploring workload and task distribution among gardeners: A baseline study in an institutional setting

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Abstract

Despite being perceived as a profession with less labor, gardening involves a variety of duties that change in frequency and physical difficulty depending on the season. The purpose of this study was to investigate how gardeners in an institutional setting divide up their workloads. A systematic interview schedule was used to gather information from a sample of 20 gardeners about the kind, frequency, and seasonal change of duties. The findings showed that regular operations like weeding, watering, pruning, and transplanting were carried out, with planting and maintenance seasons seeing the highest workloads. In order to guarantee sustainable working conditions for gardeners, this baseline study emphasized the necessity of more thorough ergonomic assessments.

Keywords: Gardening tasks, workload distribution, institutional gardens, seasonal variation, occupational activities

Introduction

At colleges, parks, public buildings, and private campuses, gardening is essential for preserving the landscapes' aesthetic, ecological, and environmental value. The hard work of gardeners, who frequently work in informal job settings with little ergonomic assistance or machinery, is what creates the aesthetically beautiful green areas. In scholarly and policy discussions, gardening is still often ignored and underestimated despite their vital contribution, particularly when it comes to burden allocation and occupational health. Digging, planting, weeding, watering, trimming, and fertilizing are just a few of the many manual labor-intensive duties that gardeners perform. In addition to requiring physical stamina, the frequency and severity of these chores vary greatly depending on the season. For example, whereas the summer months may be more concerned with irrigation and plant protection, the monsoon season frequently entails extensive transplanting and weeding tasks. Although there is a lack of baseline data documenting gardeners' real task routines and seasonal labor cycles, this variance in task type and workload puts them at risk for cumulative physical strain. Gardening as a profession receives little attention in the majority of occupational workload research that is currently available, which focuses on industrial or agricultural workers. Determining peak pressure times, streamlining labor schedules, and establishing the groundwork for ergonomic or regulatory interventions all depend on an understanding of the task distribution and workload trends among gardeners. In institutional settings, where the scope of work

is broad and frequently repetitious, this becomes especially pertinent. By investigating the type and frequency of tasks gardeners complete and examining how these jobs change with the seasons, this study aims to close this gap. The study intends to improve planning, resource allocation, and knowledge of the physical demands of this underappreciated but vital profession by creating a baseline of their work patterns.

Literature review

Several important conclusions can be drawn from studies on the task distribution of gardeners and similar professions. High workloads for horticulturists were caused by a variety of factors, including task type, body mass index, work experience, and surroundings (Yusuf *et al.*, 2024) ^[5]. With postural analysis showing high risk levels for chores like weeding, hedge cutting, and potting, gardeners report high degrees of drudgery (Martolia *et al.*, 2021) ^[4]. Due to prolonged uncomfortable postures and repetitive activities, gardeners—especially women—were susceptible to musculoskeletal diseases, with lower back discomfort being the most common problem (Rushikesh *et al.*, 2020) ^[3]. Even though mechanization typically results in less effort, the effect was not always substantial, indicating that the technological tools available may not be the best (Groborz & Juliszewski, 2013) ^[2]. Task assignment optimization, employee training, and enhancements to urban landscape design were some suggestions to reduce these risks (Álvarez-Casado *et al.*, 2012). ^[1] In order to lessen burden and improve worker health across a range of horticulture

and care-related industries, these studies emphasized the significance of task redistribution and enhanced mechanization.

Gap in literature

Few studies have examined the workload patterns and task distribution of gardeners, especially those employed in institutional settings, despite the fact that several studies have examined occupational health and ergonomic concerns in the industrial and agricultural sectors. There is a knowledge vacuum on the physical demands of this profession due to the lack of systematic data on daily activities, task frequency, and seasonal workload variations. By offering baseline knowledge about the nature of gardening labor, this study aims to close this knowledge gap and provide guidance for future ergonomic assessments and legislative initiatives.

Research Objectives

- To list the various kinds of gardening tasks that gardeners do.
- To examine how frequently certain tasks are performed.
- To determine how the workload distribution changes with the seasons.

Research Methodology

Study Area and Sample Size

This pilot study was conducted at the GB Pant University of Agriculture and Technology in Pantnagar of Udham Singh Nagar district situated in Uttarakhand. For this baseline investigation, 20 gardeners were chosen as a purposeful sample employed for maintaining the university's landscape, gardens, and lawns of hostels and colleges.

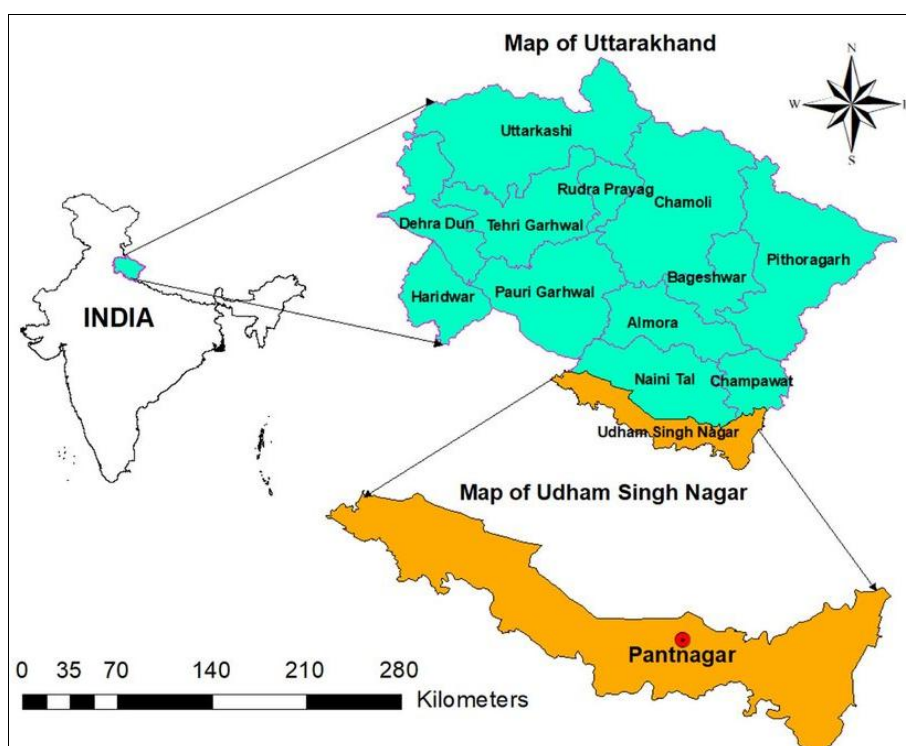


Fig 1: Map showing the locale of the study

Data Collection Tool

A planned interview schedule was created to gather data on:

- Types of tasks performed
- Daily and weekly frequency of tasks
- Duration of each task
- Seasonal variations in workload

Data collection was done through direct interviews and observation during peak working hours.

Analysis of data

To display respondents' distribution and seasonal workload trends, data was tabulated and examined using basic frequency counts and percentages.

Result and Discussion

According to the examination of the respondents' job allocation, weeding was the activity that all gardeners

(n=20) engaged in with the most frequency. This demonstrates its essential function in garden care and its frequent appearance in daily work schedules. Ninety percent of gardeners reported watering as their second most often chore, underscoring the importance of regularly keeping plants hydrated, particularly in hot or dry seasons. Eighty-five percent of respondents said they did transplanting, demonstrating the significance of this practice during seasonal planting events. Seventy-five percent of gardeners reported pruning or cutting plant parts, indicating the need to maintain the aesthetics of the university premises. Seventy percent of the participants reported digging and soil preparation, highlighting the importance of these tasks during the land preparation stages, especially prior to planting or flowerbed development. Sixty percent of plants underwent manuring and fertilizer treatment, suggesting a moderate frequency that may vary depending on the type of plant and fertility cycles. Fifty percent of the gardeners were

engaged in filling polybags, which was frequently linked to nursery management or sapling preparation for sale purposes. Forty-five percent of the respondents reported

applying pesticides, because of the safety concerns, seasonal variations, or the need for trained workers to handle chemicals.

Table 1: Types of gardening tasks performed by the respondents n=20

S. No.	Task	Number of Gardeners Performing	Percentage (%)
1	Weeding	20	100%
2	Watering	18	90%
3	Pruning/Cutting	15	75%
4	Transplanting	17	85%
5	Manuring/Fertilizer Application	12	60%
6	Polybag filling	10	50%
7	Digging/Soil Preparation	14	70%
8	Spraying pesticides	09	45%

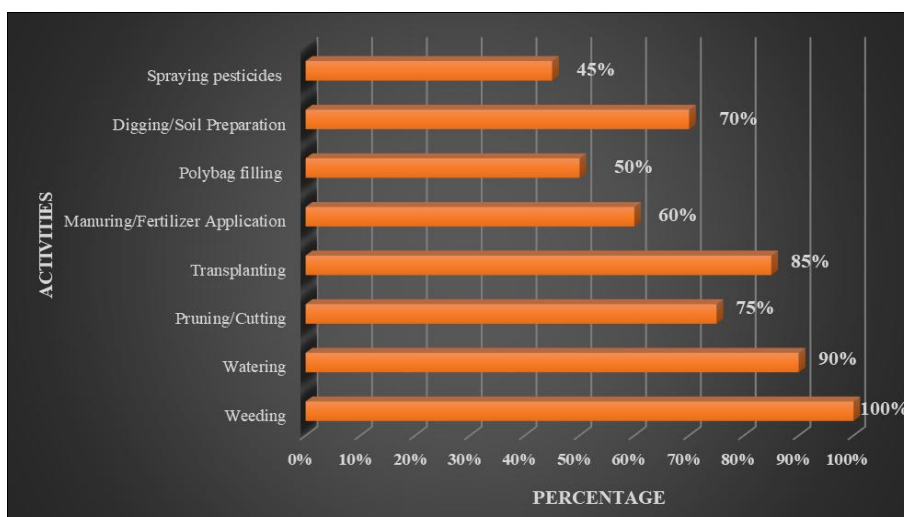










Fig 2: Distribution of respondents based on the activities they perform

Table 2: Respondents performing different tasks

S. No	Name of the Activity	Respondents performing activity
1	Weeding	
2	Watering	

3	Pruning/ cutting	
4	Transplanting	
5	Manuring/fertilizer application	
6	Polybag filling	
7	Digging/soil preparation	
8	Spraying pesticides	

Frequency of performing different activities

Depending on the type and level of difficulty of each job, the gardeners' frequency of task execution showed significant variations. One of the most often completed activities was weeding; eight gardeners did it every day, ten did it two or three times a week, and seven did it once a week. This suggested that weeding was the most tedious and often repeated because weeds grow quickly, particularly during the monsoon season. Twelve gardeners watered the plants every day, making it the most common exercise they did. Depending on the kind of plants or irrigation systems available, fewer gardeners watered two to three times a week (6) or once a week (5). Although not a daily task, pruning was often done two to three times per week by ten gardeners, six of whom did it every week. Pruning was only done by four gardeners every day, indicating that it was more task-specific and contingent on plant growth rates or varieties.

Transplanting was mostly done two to three times a week (12 gardeners), with only two identifying it as a daily chore and six doing it weekly. This implies that transplanting was a labor-intensive process that was typically carried out during particular times, such as planting or flowerbed preparation seasons. Only three gardeners carried out manuring every day, compared to eight who did it two to three times a week and five who did so once a week. This suggested that manuring was a less frequent and more seasonally scheduled task. Depending on the demand, four gardeners performed the somewhat polybag filling duty

every day, six did so two to three times a week, and three did so once a week. Only five gardeners reported doing soil preparation and digging every day, whereas eleven reported doing so once a week. This illustrated its recurring need, usually at the garden's pre-planting or reorganization stages. Only two gardeners each sprayed pesticides daily, two to three times a week, or weekly, making this the least common activity. This could be attributed to the seasonality of pest management or the selective assignment of the task due to safety concerns. According to the data, labor-intensive or specialist activities like digging, pesticide spraying, and transplanting were done less frequently or only when necessary. In contrast, regular maintenance tasks like watering and weeding were done more frequently overall. These variances show how gardening work is cyclical and adaptive, based on plant cycles, environmental factors, and labor availability.

Table 3: Distribution of respondents based on the frequency of performing tasks

S. No.	Task	Daily	2–3 Times/Week	Weekly
1	Weeding	08	10	07
2	Watering	12	06	05
3	Pruning	04	10	06
4	Transplanting	02	12	06
5	Manuring	03	08	05
6	Polybag filling	04	06	03
7	Digging/Soil Preparation	05	08	11
8	Spraying pesticides	02	02	02

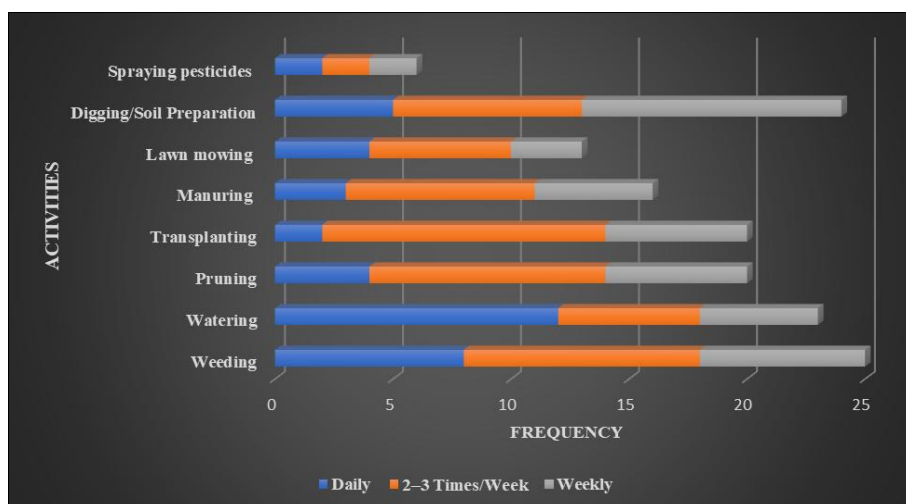


Fig 3: Representation of respondents based on the frequency of performing tasks

The respondents' average time spent on different gardening jobs provided important information about the time commitment and physical difficulties of each task. Respondents reported spending an average of 5 to 6 hours each day on weeding and transplanting, which were the most time-consuming tasks of all. These "High Duration" tasks were frequently strenuous, repetitive, and necessitated extended bending or squatting positions, which raised the risk of musculoskeletal strain. The high duration group also included digging/soil preparation, watering, and manuring, which gardeners spent three to four hours a day on. Particularly during the busy growing and planting seasons, these were crucial elements of plant care and bed

preparation. The substantial time commitment for these jobs highlighted their importance in daily garden maintenance and showed that physically taxing duties took up a large amount of the gardeners' workday. Pruning/cutting and pesticide spraying were classified as moderate-duration chores since they lasted an average of 2 to 3 hours each day. Even if they didn't take as long as digging or weeding, these jobs can nevertheless be ergonomically hazardous since they frequently call for accuracy, repetitive hand motions, or the handling of tools and chemicals. The moderate duration category also included polybag filling, which took an average of two to 2.5 hours each day. In conclusion, a large portion of gardening tasks were

classified as high duration, highlighting the long workdays and physical strain associated with garden care. In order to lessen fatigue and avoid long-term health problems among gardeners, this research emphasized the necessity of proper task rotation, planned breaks, and need for ergonomic solutions.

Table 3: Duration of each activity performed by the respondents

S. No.	Task	Average Duration per Day	Duration Category
1	Weeding	5-6 hours	High Duration
2	Watering	3-4 hours	High Duration
3	Pruning/Cutting	2-3 hours	Low Duration
4	Transplanting	5-6 hours	High Duration
5	Manuring	3-4 hours	High Duration
6	Polybag filling	2–2.5 hours	Moderate Duration
7	Digging/Soil Preparation	3–4 hours	High Duration
8	Spraying pesticides	2–3 hours	Moderate Duration

Seasonal variation in workload

The type of gardening tasks needed throughout each season had a major impact on the workload that gardeners faced, which varied greatly from season to season.

The burden was classified as heavy during the summer (May to July), mostly because of labor-intensive duties like watering and transplanting. Plants required more frequent and extended watering sessions due to the increased water demand caused by high temperatures. During this time, transplanting required a lot of physical labor, such as lifting, bending, and careful handling of fragile saplings, which added to the total physical strain on respondents performing the task. Weeding emerged as the most common activity during the monsoon season (August to October), which was linked to a moderate to heavy workload. Weeding was observed to be the constant and difficult task during this period because to the increasing wetness and ideal circumstances for weed development. Even though weeding wasn't as physically taxing as transplanting, the prolonged periods and repetitive postures nonetheless cause significant ergonomic stress. The workload was described as moderate throughout the winter months of November through January, when gardeners mostly worked on digging, manuring, and pruning. Though they required less time and physical effort than summer or spring chores, these actions were crucial for getting plants and soil ready for the next growth season.

Activities like cutting and pesticide spraying caused the workload to increase once again throughout the spring (February to April). In order to ensure good plant growth and pest management prior to the arrival of hard summer weather, this period is usually one of preparation and protection. Even while these jobs might not take a long time, they need a lot of attention, repeated motions, and the use of equipment or chemicals, which may lead to physical and mental exhaustion. Overall, the data showed that gardeners work the most throughout the summer and spring, with monsoon and winter bringing significantly lower but still significant workloads. To avoid overwork and guarantee the health of gardening employees all year long, these seasonal fluctuations must be considered when scheduling personnel breaks, and ergonomic support systems.

Table 4: Seasonal variation of workload

S No.	Seasons	Peak activities	Workload
1	Summer (May, June, July)	Transplanting, watering	Heavy
2	Monsoon (Aug, Sept, Oct)	Weeding	Moderate to heavy
3	Winter (Nov, Dec, Jan)	Pruning, manuring, digging	Moderate
4	Spring (Feb, Mar, Apr)	Cutting, spraying pesticides	Heavy

Conclusion

Important baseline information about the kind, frequency, length, and seasonal variation of gardening chores carried out by institutional gardeners has been provided by the current study. Numerous repetitive, time-consuming, and physically taxing tasks are part of gardening's labor-intensive job, according to the investigation. The most often carried out and time-consuming tasks, which frequently take five to six hours per day, were weeding, watering, transplanting, and soil preparation. With weeding and watering being done virtually every day, the frequency of these chores further illustrates the ongoing workload that gardeners endure. According to a seasonal examination of workload allocation, tasks like transplanting, watering, trimming, and pesticide spraying make the summer and spring the most taxing seasons. Weeding, trimming, and excavating guarantee that the workload stays substantial throughout the year, even during the rain and winter. These differences highlight the ongoing physical strain that gardeners endure, which can result in weariness and chronic musculoskeletal problems if left unchecked. Even though they play a crucial role in maintaining and enhancing institutional areas, gardeners sometimes operate in unofficial settings with no ergonomic assistance. The study's findings underscore the necessity of additional ergonomic assessments and interventions, which may involve job rotation, sufficient rest periods, the utilization of assistive devices, and body mechanics instruction.

Thus, this baseline study establishes the groundwork for more thorough research and policy considerations targeted at enhancing the productivity, well-being, and occupational health of gardeners—a workforce that is nonetheless vital but underappreciated in institutional settings.

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