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**Guru Ghasidas Vishwavidyalaya**  
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**“A STUDY ON THE EFFECTIVENESS OF HANDMADE SOAP  
TRAINING PROGRAMME FOR EMPOWERMENT OF WOMEN  
OF SELF HELP GROUPS”**



**A DISSERTATION**  
**SUBMITTED FOR PARTIAL FULFILLMENT**  
**FOR THE AWARD OF DEGREE**  
**MASTER OF SCIENCE IN RURAL TECHNOLOGY**  
**Session: 2022-23**

**Supervised To**  
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(Assistant Professor)

**Submitted By**  
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**DECLARATION BY THE CANDIDATE**

I, **Dipti**, hereby declare that this dissertation entitled "**A STUDY ON THE EFFECTIVENESS OF HANDMADE SOAP TRAINING PROGRAMME FOR EMPOWERMENT OF WOMEN OF SELF HELP GROUPS**" Submitted to **Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur** for partial fulfilment of the requirements to the award of **Master of Science** in Rural Technology. It is a record of original research carried out by me under the supervision of **Dr. Dilip Kumar (Assistant Professor)**. It is my own work and best of my knowledge and belief this work has not been submitted elsewhere for any other degree/diploma. The assistance and help received during the course of this investigation have been duly acknowledged.

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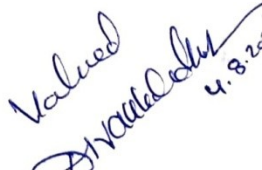
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I would like to express my deepest thanks and gratitude to my all family members my father **Mr. B.R. Aneshwari**, my mother **Mrs. Anita Aneshwari**. I am very grateful to their constant love, encouragement, and belief in my abilities.

I express my profound obligation to Head of the institution Hon'ble Vice Chancellor Prof. **Alok Kumar Chakrawal**, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh for providing an energetic and conductive research environment at GGV Campus.

I am thankful to Dr. Rajendra Mehta (Associate Professor) Head of Department of Rural Technology and Social Development and Dean of School of Studies in Interdisciplinary Education and Research for providing all the necessary facilities to the Department of Rural Technology and Social Development.

I am also great full to Dr. Pushparaj Singh (Associate Professor), Dr. Satendra Kumar Nirala (Assistant Professor), Dr. Bhaskar Chaurasia (Assistant Professor), Dr. Alka Mishra (Assistant Professor), Dr. Lokesh Kumar Tinde (Assistant Professor), Dr. Devendra Singh Porte (Assistant Professor), Dr. Prasoon Soni (Assistant Professor, ), Dr. Shailesh Soni (Lab Assistant), Mr. Devendra Kumar (Ph.D. Scholar), Miss Mrinalini Bramhabhatt (Ph.D. Scholar), Miss Neelam Bhagat (Ph.D. Scholar) and Mr. Shashikesh Raj (Ph.D. Scholar). It was a remarkable experience from the young Researchers/Scholars in the Department of Rural Technology and Social Development for creating research environment and atmosphere.

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## INTRODUCTION

Dams are monumental engineering structures that have been of immense importance throughout human history. These impressive constructions are typically erected across rivers and streams to control the flow of water, create vast reservoirs, and serve a multitude of essential functions. The core components of a dam, including the reservoir, spillway, outlet works, and the dam body, work harmoniously to regulate water supply, generate hydroelectric power, mitigate floods, and support agricultural development. (Ger Bergkamp, Dams, Ecosystem Functions and, 2000) By storing water during wet seasons and releasing it in times of drought, dams provide vital water resources for domestic, industrial, and agricultural use, ensuring the sustainable growth of societies. (Tyson Brown, 2022) Moreover, the energy produced through hydropower plants, an outcome of the potential energy harnessed from the stored water, represents a renewable and environmentally friendly source of electricity. Additionally, dams play a significant role in flood control, moderating the flow of water downstream during periods of heavy precipitation or snowmelt, thereby safeguarding downstream communities from disastrous inundations. The regulated release of water for irrigation purposes further amplifies their impact, enhancing agricultural productivity and food security. Beyond their functional significance, dam reservoirs offer recreational opportunities, fostering tourism, and stimulating local economies through activities such as boating, fishing, and wildlife observation. (Jackson, n.d.)

As we look to the future, sustainable dam management practices that prioritize environmental and social responsibility are imperative. Utilizing modern technologies and conducting thorough environmental assessments during the planning and execution phases can help minimize adverse impacts. Balancing the remarkable benefits of dams with their potential consequences will require a holistic and collaborative approach, fostering a harmonious relationship between human development and the environment. Through informed decision-making, we can ensure that dams continue to serve as vital contributors to water resource management and societal progress, while also preserving the delicate ecological balance that sustains life on our planet. (Baran E., 2015).

The process of selecting an appropriate site for a dam is a crucial undertaking with multifaceted purposes and objectives. The primary purpose is to identify a location that can effectively manage water resources, ensuring a reliable water supply for various needs, such as domestic, agricultural, and industrial use (Jamali et.al.2013). Additionally, the selected site should serve the objective of flood control, strategically regulating water flow during periods of heavy rainfall or snowmelt to mitigate downstream flooding and safeguard communities and infrastructure. For dams designed to generate hydroelectric power, the site selection process aims to find suitable terrain with ample (Carvalho2, 2023). By diligently addressing these purposes and objectives, dam site selection can lead to successful projects that promote responsible water resource management, environmental preservation, and overall societal development.

The Analytic Hierarchy Process (AHP) is a structured technique for organizing and analyzing complex decisions, based on numerical data and psychological perceptions of individual experts or groups of expert's committees. It was developed by Saaty (1970 & 1990).

The AHP is a tool that is used for any complex decision-making. In land suitability analysis, AHP is the most widely used and is considered the most reliable method for multi-criteria decision-making (MCDM). (Saaty, T. L. 1990) The AHP helps structure both subjective and objective



**IDENTIFICATION OF HOSPITAL SITE SELECTION  
BASED ON ANALYTICAL HIERARCHY PROCESS**



**A  
DISSERTATION  
SUBMITTED FOR PARTIAL FULFILMENT OF  
DEGREE OF MASTER OF SCIENCE  
IN  
(RURAL TECHNOLOGY)**

**SUBMITTED BY  
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**2023**





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**DECLARATION**

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*Firstly, would like to express my deepest thanks and gratitude to all my family members for the blessings and love showered upon me. My parents have always given me the energy to overcome all the problems during this dissertation work.*

*I express my profound obligation to **Head of the institution Professor Alok Kumar Chakrawal, Hon'ble Vice Chancellor, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh, India** for providing an energetic and conductive research environment at GGV Campus.*

*I also would like to express my sincere thanks to **Prof. Rajendra Mehta, Dean, School of Interdisciplinary Education and Research and Head of the department of Rural Technology and Social Development** for providing all the necessary facilities to the Department.*

*I am very thankful to my guide **Prof. Pushpraj Singh and Dr. Prasoon Soni (Assistant Prof.)** for all the help and guidance throughout my Master of Science (M.Sc.) dissertation research work duration.*

*I am grateful to **Dr. S. K. Nirala (Assistant Prof.), Dr. Dilip Kumar (Assistant Prof.), Dr. B. Chaurasia (Assistant Prof.), Dr. A. Mishra (Assistant Prof.), Dr. L. K. Tinde (Assistant Prof.), Dr. D. S. Porte (Assistant Prof.) and Dr. S. Soni (Lab. Assistant).***

*I would also like to thank **Mr. M. Pandey (Research Scholar), Miss S. Gautam (Research Scholar), Miss S. Pandey (Research Scholar), Miss N. Bhagat (Research Scholar), and Miss N. Banjare (Research Scholar).** It was a remarkable experience from the young Researchers/Scholar in the Department of Rural Technology and Social Development for creating research environment and atmosphere.*

*I would also very thankful to **Mr. J. R. Yadav and Mr. M. L. Soni** for sustained and caring me for 2 years in Department.*

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**LIST OF ABBREVIATION AND SYMBOLS**

&	And
AHP	Analytical Hierarchy Process
C.G.	Chhattisgarh
CI	Consistency Index
CR	Consistency Ratio
cm	Centimeter
Cm <sup>2</sup>	Square Centimeter
DEM	Digital elevation model
e.g.,	For Example
et.al	Etlia and others
etc	Et-cetra
Fig.	figure
GHI	Global Horizontal Irradiation
GIS	Geographical Information System
ha	Hectare
i.e.,	That is
ILA	That is Integrated Land-Use Assessment
km	Kilometer
Km <sup>2</sup>	Square
LSA	Land Suitability Analysis
LSI	Land Suitability Index
LU/LC	Land Use and Land Cover
m	meter
m <sup>2</sup>	Square meter
MCA	Multi Criteria Analysis
MCDA	Multiple Criteria Decision Analysis
MCDM	Multi-Criteria Decision-Making
mm/day	Milli-meter per Day
m/sec	Meter per Second
No.	Number



## INTRODUCTION

The world's growing population presents significant challenges for various sectors, including healthcare (MacIntyre, 2012). The increasing population directly affects the demand for adequate healthcare facilities, particularly hospitals. As more individuals are born and live longer lives, the need for accessible and efficient healthcare services becomes a top priority.

The rapid growth of the population places a strain on existing hospital facilities, creating difficulties in meeting the rising healthcare demands of communities. Many regions experience challenges such as overcrowded hospitals, long waiting times, and stretched resources, all of which can have a detrimental impact on the quality of care provided. Therefore, it is crucial to understand the relationship between population growth and hospital facilities in order to address these issues and ensure the well-being of individuals. (Rekha, 2017)

The growth of population affects hospitals in multiple ways. Firstly, an expanding population leads to an increased number of patients seeking medical care. (Muthukumar S. 2023). This surge in demand requires hospitals to accommodate more individuals, which may necessitate the expansion of existing facilities or the establishment of new hospitals altogether. Without appropriate planning and infrastructure development, hospitals can become overwhelmed, compromising their ability to deliver adequate healthcare services (Lee, 2021).

Secondly, population growth can lead to imbalances in healthcare distribution. In areas experiencing significant population growth, healthcare facilities may struggle to keep pace with the rising demand (Dussault G., 2006). This can result in healthcare disparities, with some communities having limited access to essential medical services (Dehe B., 2015). Such disparities can disproportionately affect vulnerable populations, exacerbating existing health inequalities.

The demand for healthcare facilities has been exponentially increasing worldwide, emphasizing the need for new hospitals (Tripathi, 2021). However, the selection of optimal hospital locations is a complex decision that requires the involvement of various stakeholders and the consideration of heterogeneous criteria. Governments often neglect healthcare during budget allocation and infrastructure development, leading to a disparity in access to healthcare services, especially in urban areas with increasing populations due

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**A**  
**DISSERTATION**  
**ON**  
**CHRONOTYPE PATTERNS OF MEDICAL SHIFT**  
**WORKERS AT GOVERNMENT DISTRICT HOSPITAL**  
**OF BILASPUR, CHHATTISGARH, INDIA**  
**DISSERTATION REPORT SUBMITTED FOR THE**  
**PARTIAL FULFILLMENT OF THE REQUIRED FOR THE**  
**AWARD OF DEGREE**  
**MASTER OF SCIENCE IN RURAL TECHNOLOGY**  
**(M.Sc. RT)**  
**UNDER THE**  
**SCHOOL OF STUDIES IN INTERDISCIPLINARY EDUCATION &**  
**RESEARCH**



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**2023**





## FORWARDING LETTER

Ms. Jaishree Suryavanshi student of M. Sc. Rural Technology, IV Semester in Department of Rural Technology and Social Development has completed her dissertation entitled "Chronotype Patterns of Medical Shift Workers at Government District Hospital of Bilaspur, Chhattisgarh, India" under the guidance and supervision of Dr. Devendra Singh Porte, Assistant Professor, Department of Rural Technology & Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, in partial fulfilment of the requirement for the degree of M. Sc. Rural Technology.

The dissertation is forwarded to the examinee for evaluation.

Date: 25/04/2023

Forwarded by

  
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## CERTIFICATE BY THE SUPERVISOR

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Date: 25/07/2023.

*Devendra Singh*  
25/07/2023

**Dr. Devendra Singh Porte**

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Department of Rural Technology  
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### **DECLARATION BY CANDIDATE**

This is to understand that I, Ms. Jaishree Suryavanshi student of M.Sc. Rural Technology, IV Semester (Enroll. No.- GGV/21/10704) and I declare that the dissertation entitled "Chronotype Patterns of Medical Shift Workers at Government District Hospital of Bilaspur, Chhattisgarh, India" is my own work conducted under the supervision of Dr. Devendra Singh Porte, Assistant Professor, in the Department of Rural Technology & Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). This report is an original work carried out by me and the report has not been submitted to any other University for the award of any degree or diploma.

I further declare that to the best of my knowledge this thesis does not contain any part of any work, which has been submitted for the award of any degree either in this University or any other University/ deemed University without proper citation.

(Ms. Jaishree Suryavanshi)

Date: 25/07/2023

Place: Bilaspur



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**Ms. Jaishree Suryavanshi**



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## CHAPTER-1 INTRODUCTION

Health is a multidimensional concept that encompasses physical, mental, and social well-being. It goes beyond the absence of disease and reflects a state of complete physical, mental, and social vitality. Achieving and maintaining good health is crucial for individuals to lead fulfilling and productive lives (Young *et al.*, 2009). Physical health refers to the overall condition of the body and its ability to function optimally. It involves aspects such as regular exercise, proper nutrition, adequate sleep, and the absence of physical ailments or diseases. Engaging in regular physical activity helps strengthen the cardiovascular system, build muscle strength, improve flexibility, and enhance overall endurance. A balanced diet that includes a variety of nutrients is essential to provide the body with the energy and building blocks it needs to function properly. Sufficient sleep is also vital for the body's restoration and repair processes. Taking care of one's physical health not only prevents the onset of various diseases but also improves the overall quality of life (Corbin and Masurie, 2014).

Mental health is equally important as physical health and refers to a person's emotional and psychological well-being. It encompasses aspects such as emotional stability, the ability to cope with stress, and the presence of positive emotions. Maintaining good mental health involves managing stress effectively, seeking support from others, practicing self-care, and engaging in activities that promote relaxation and mental well-being. Mental health issues, such as anxiety and depression, can significantly impact a person's overall health and functioning. Therefore, it is crucial to prioritize mental well-being and seek professional help if needed (Vázquez *et al.*, 2009).

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---

**STUDIES ON ANTI-CANCER PROPERTIES OF MUSHROOMS: A REVIEW**



**A DISSERTATION SUBMITTED  
FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE**

**IN  
RURAL TECHNOLOGY**

**SUBMITTED BY**

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**2023**

**DEPARTMENT OF RURAL TECHNOLOGY AND SOCIAL DEVELOPMENT  
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## DECLARATION

I **Miss Jyoti Rajput** hereby declare that this dissertation entitled **Studies on Anti-Cancer Properties of Mushroom: A Review** submitted to the Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur for partial fulfillment of the requirements for the award of the degree of Master of Science (M.Sc.) in Rural Technology. The thesis has been completed by me. It is my own work and to the best of my knowledge and belief. The work in the thesis is original and has been done by me under my supervision. To the best of my knowledge, the work has not been submitted to any other Institution for any other Degree /diploma. I have followed the guideline provided by the university in writing the thesis. The assistance and help received during this investigation have been duly acknowledged.

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## ACKNOWLEDGEMENT

I express my profound obligation to the Head of the institution Hon'ble Vice Chancellor **Prof. Alok Kumar Chakrawal**, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh for providing an energetic and conducive research environment at GGVCampus.

I am very thankful to my guide **Dr. Bhaskar Chaurasia** for all the help and guidance throughout my Master of Science (M.Sc.) dissertation research work. I feel honored to have an opportunity to know such a good person. He is a good source of inspiration and an exemplary Scientist.

I am thankful to **Prof. Rajendra Mehta**, Head of the Department of Rural Technology and Social Development, and Dean of the School of Studies of Interdisciplinary Education and Research, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for providing all support.

This thesis would not be completed without mentioning the mention of some great people. This is a humble acknowledgment to convey all my gratitude to them. Firstly, I would like to express my deepest thanks and gratitude to my all-family members my mother **Mrs. Sushila Rajput**, and my father **Mr. Dinesh Singh Rajput**. I am very grateful for their love and support.

I am also great full to **Prof P.R. Singh**, **Dr. Satendra Kumar Nirala (Assistant Professor)**, **Dr. Alka Mishra (Assistant Professor)**, **Dr. Dilip Kumar (Assistant Professor)**, **Dr. Lokesh Kumar Tinde (Assistant Professor)**, **Dr. D. S. Porte (Assistant Professor)**, **Dr. Prasoon Soni (Assistant Professor)**, **Dr. Piyush Shukla (Assistant Professor)**, **Dr. Shailesh Soni (Lab Assistant)**. It was a remarkable experience for the young Researchers/Scholars in the Department of Rural Technology and Social Development for creating a research environment and atmosphere and I am thanking full to my seniors **Ms Sakshi Gautam**, **Ms Surbhi Pandey**, **Ms Ithi Gupta** for their support and help.

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## INTRODUCTION

Mushrooms are a kind of organism. Fungi are not animals or plants, but they eat dead ones and take in nutrients from them. The fruiting designs of organisms are essentially known as mushrooms. With the exception of spore-carrying fungi, fungi's bodies lack chlorophyll and differentiation. The beefy spore-bearing designs known as fruiting bodies, or mushrooms, are parasites (Annonymus-1). The regular construction of a mushroom incorporates a stipe (stem), a pileus (cap), and lamellae (gills). In any case, there are a few morphological variations of mushrooms, and only one out of every odd assortment has these qualities. There are approximately 14,000 distinct species of mushrooms, many of which are toxic (Annonymus-2).

Mushrooms are produced by a minuscule structure known as a primordium that develops on a substrate. The primordium matures into a "button," a hyphae-constructed egg-shaped structure. The button is initially enveloped by the global mycelium veil. The cloak parts as the button grows. The remnants of the veil frequently resemble warts or can be seen hanging from the crown of mature mushrooms (Annonymus-2).

Since before time began, individuals have eaten mushrooms as food. In the past, these were considered a delicacy. Mushrooms may serve as a nutritional bridge between meat and vegetables. They are rich in protein, carbohydrates, and vitamins. Mushrooms are suggested for patients with diabetes and heart disease due to their low calory content. They contain more protein than grains, fruits, and vegetables. On a new weight premise, they incorporate proteins (3.7%), carbs (2.4%), fat (0.4%), minerals (0.6%), and water (91%). The nine fundamental amino acids required for human development are available in mushrooms. Thiamine (vitamin B1), riboflavin (vitamin B2), niacin, pantothenic corrosive, biotin, folic corrosive, and nutrients C, D, A, and K are bountiful in mushrooms and are kept up with even in the wake of cooking. Because of their low calory count, high



## **KABADDI**



**A DISSERTATION  
SUBMITTED FOR PARTIAL FULFILLMENT  
FOR THE AWARD OF DEGREE  
MASTER OF SCIENCE IN RURAL TECHNOLOGY  
Session: 2022-23**

**Supervised to  
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**Submitted by  
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#### DECLARATION BY THE CANDIDATE

I, Laxman Patel, hereby declare that this dissertation entitled "Kabaddi" Submitted to Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur for partial fulfilment of the requirements for the award of Master of Science (M.Sc.) in Rural Technology. It is my own work and to the best of my knowledge and belief. It is a record of original research carried out by me under the supervision of Prof. Rajendra Mehta and B.R. Raute to the best of my knowledge in this work has not been submitted elsewhere for any other degree/diploma. The assistance and help received during the course of this investigation have been duly acknowledged.

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## ACKNOWLEDGEMENT

This thesis would not be completed without mentioning the mention of some great people. This is a Humble acknowledgement to convey all my gratitude to them.

I express my profound obligation to Head of the institution Hon'ble Vice Chancellor Prof. Alok Kumar Chakrawal, Guru Ghasidas Vishwavidyalaya, Bilaspur (A Central University), Chhattisgarh For providing an energetic and conductive research environment at GGV, Campus.

I also would like express my sincere thanks to Pro. R K Mehta, Dean of School of Interdisciplinary Education and Research for providing all the necessary facilities to the Department Of Rural Technology and Social Development.

I am very thankful to my guide Pro. R K Mehta (Associate Professor) for all the help and guidance Throughout my Master of Science (M.Sc.) dissertation research work duration. I feel honoured having an opportunity to know such a good person. He is a good source of inspiration, exemplary Scientist.

I am thankful to Prof. R. K Mehta and Head of Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur, (C.G.) and I Am great full to B P Rovte, Dr. Satendra Kumar Nirala (Assistant Professor), Dr. Bhaskar Chaurasia (Assistant Professor), Dr. Alka Mishra (Assistant Professor), Dr. Lokesh Kumar Tinde (Assistant Professor), Dr. Devendra Singh Porte, (Assistant Professor), Dr. Prasoon Soni. It was a Remarkable experience from the young Researchers/Scholars in the Department of Rural Technology And Social Development, for creating research environment and atmosphere.

I would also very thank full to Dr. Shailesh Soni,, Mr. Jhadu Ram Yadav and Mr. Motilal Soni for sustained and caring us for 2 years in Department of Rural Technology and Social Development.

My sincere thanks to all my classmates of M.Sc. (Rural Technology) who have been always helping And encouraging me throughout the year.

  
Laxman Patel



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## Chapter-01

### Introduction

Kabaddi is a traditional contact team sport that originated in ancient India. It is widely popular in South Asia, particularly in India, Bangladesh, and Pakistan, and has gained international recognition in recent years. Kabaddi is often referred to as the “game of struggle” or the “combat sport of Asia” due to its physical and competitive nature.

The game involves two teams, each consisting of seven players. The objective is for one player, known as the “raider,” to enter the opponent’s half of the playing field, tag one or more members of the opposing team, and return to their own half without being caught by the defenders. The defenders, on the other hand, aim to prevent the raider from returning by tackling or restraining them.

Kabaddi is played on a rectangular court, divided into two halves by a midline. Each team takes turns sending a raider while the opposing team defends. The raider must chant “kabaddi” repeatedly during their raid, without taking a breath, to prove that they are not inhaling and therefore not cheating. The defenders, called “stoppers” or “anti-raiders,” work together to immobilize the raider and stop them from reaching their own half.

Points are scored in Kabaddi through various ways. If the raider successfully tags one or more defenders and returns to their half without being caught, their team earns a point for each defender tagged. If the defenders successfully tackle and restrain the raider, their team earns a point, and the raider is declared out. Additional points can be earned through bonus line touches and team infringements.

Kabaddi is known for its fast-paced action, agility, and strategic gameplay. It requires a combination of physical strength, speed, reflexes, and tactical awareness. The sport has gained international prominence, with professional leagues, such as the Pro Kabaddi League in India, attracting millions of viewers and featuring top players from around the world.

Kabaddi promotes teamwork, discipline, and physical fitness among its players. It is recognized by various sports organizations, including the International Kabaddi Federation (IKF), which governs the sport at the international level. The IKF organizes tournaments and championships, including the Kabaddi World Cup, to showcase the skills and talent of Kabaddi players worldwide.

Overall, Kabaddi is a thrilling and culturally significant sport that continues to grow in popularity globally, captivating audiences with its intense competition and unique blend of athleticism and strategy.





**IDENTIFICATION OF SUITABLE SITES FOR THE DAM  
BASED ON ANALYTICAL HIERARCHY PROCESS**

**A DISSERTATION**

**SUBMITTED FOR PARTIAL FULFILMENT OF**

**MASTER DEGREE**

**IN**

**(RURAL TECHNOLOGY)**

**SUBMITTED BY**

**MAHENDRA SALAM**

**M. SC. (R.T.)-IV SEMESTER**

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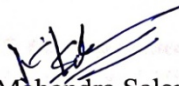
  
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## DECLARATION

I Mr. Mahendra Salam, hereby declare that this dissertation entitled "Identification of suitable sites for the dam based on Analytical Hierarchy Process (AHP) and GIS in Bilaspur district, Chhattisgarh, India, submitted to Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur for partial fulfillment of the requirements for the award of degree on Master of Science (Rural Technology). The work contained in the thesis is original and has been done by me under the supervision of Prof. Pushpraj Singh. To the best of my knowledge the work has not been submitted to any other Institution for any other Degree /diploma program. I have followed the guideline provided by the university in writing the thesis.

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*Firstly, would like to express my deepest thanks and gratitude to all my family members for the blessings and love showered upon me. My parents have always given me the energy to overcome all the problems during this dissertation work.*

*I express my profound obligation to Head of the institution Professor Alok Kumar Chakrawal, Guru Ghasidas Vishwavidyalaya, Hon'ble Vice Chancellor, Bilaspur, Chhattisgarh, India for providing an energetic and conductive research environment at GGV Campus.*

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## LIST OF ABBREVIATION AND SYMBOLS

&	And
AHP	Analytical Hierarchy Process
C.G.	Chhattisgarh
CI	Consistency Index
CR	Consistency Ratio
Cm	Centimeter
Cm <sup>2</sup>	Square Centimeter
DEM	Digital elevation model
e.g.,	For Example,
et.al	Etlii and others
Etc.	Et-cetra
Fig.	figure
GHI	Global Horizontal Irradiation
GIS	Geographical Information System
Ha	Hectare
i.e.,	That is
ILA	That is Integrated Land-Use Assessment
Km	Kilometer
Km <sup>2</sup>	Square
LSA	Land Suitability Analysis
LSI	Land Suitability Index
LU/LC	Land Use and Land Cover
M	meter
m <sup>2</sup>	Square meter
MCA	Multi Criteria Analysis
MCDA	Multiple Criteria Decision Analysis
MCDM	Multi-Criteria Decision-Making
mm/day	Milli-meter per Day
m/sec	Meter per Second
No.	Number
STRM	Shuttle Radar Topography Mission



## INTRODUCTION

Dams are monumental engineering structures that have been of immense importance throughout human history. These impressive constructions are typically erected across rivers and streams to control the flow of water, create vast reservoirs, and serve a multitude of essential functions. The core components of a dam, including the reservoir, spillway, outlet works, and the dam body, work harmoniously to regulate water supply, generate hydroelectric power, mitigate floods, and support agricultural development. (Ger Bergkamp, Dams, Ecosystem Functions and, 2000) By storing water during wet seasons and releasing it in times of drought, dams provide vital water resources for domestic, industrial, and agricultural use, ensuring the sustainable growth of societies. (Tyson Brown, 2022) Moreover, the energy produced through hydropower plants, an outcome of the potential energy harnessed from the stored water, represents a renewable and environmentally friendly source of electricity. Additionally, dams play a significant role in flood control, moderating the flow of water downstream during periods of heavy precipitation or snowmelt, thereby safeguarding downstream communities from disastrous inundations. The regulated release of water for irrigation purposes further amplifies their impact, enhancing agricultural productivity and food security. Beyond their functional significance, dam reservoirs offer recreational opportunities, fostering tourism, and stimulating local economies through activities such as boating, fishing, and wildlife observation. (Jackson, n.d.)

As we look to the future, sustainable dam management practices that prioritize environmental and social responsibility are imperative. Utilizing modern technologies and conducting thorough environmental assessments during the planning and execution phases can help minimize adverse impacts. Balancing the remarkable benefits of dams with their potential consequences will require a holistic and collaborative approach, fostering a harmonious relationship between human development and the environment. Through informed decision-making, we can ensure that dams continue to serve as vital contributors to water resource management and societal progress, while also preserving the delicate ecological balance that sustains life on our planet. (Baran E., 2015).

The process of selecting an appropriate site for a dam is a crucial undertaking with multifaceted purposes and objectives. The primary purpose is to identify a location that can effectively manage water resources, ensuring a reliable water supply for various needs, such as domestic, agricultural, and industrial use (Jamali et.al.2013). Additionally, the selected site should serve the objective of flood control, strategically regulating water flow during periods of heavy rainfall or snowmelt to mitigate downstream flooding and safeguard communities and infrastructure. For dams designed to generate hydroelectric power, the site selection process aims to find suitable terrain with ample (Carvalho2, 2023). By diligently addressing these purposes and objectives, dam site selection can lead to successful projects that promote responsible water resource management, environmental preservation, and overall societal development.

The Analytic Hierarchy Process (AHP) is a structured technique for organizing and analyzing complex decisions, based on numerical data and psychological perceptions of individual experts or groups of expert's committees. It was developed by Saaty (1970 & 1990).

The AHP is a tool that is used for any complex decision-making. In land suitability analysis, AHP is the most widely used and is considered the most reliable method for multi-criteria decision-making (MCDM). (Saaty, T. L. 1990) The AHP helps structure both subjective and objective





LESSER KNOWN FRUITS AND EXPLORATION OF ONE SELECTED FRUIT  
FOR VALUE ADDITION

A  
DISSERTATION

ON

DISSERTATION REPORT SUBMITTED FOR THE  
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD

OF

DEGREE OF

MASTER OF SCIENCE IN RURAL TECHNOLOGY (M.Sc. RT)

UNDER THE

SCHOOL OF STUDIES OF INTERDISCIPLINARY EDUCATION AND RESEARCH

(SESSION - 2021 - 23)



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**FORWARDING LETTER**

Ms. Nidhi Tiwari student of M. Sc. Rural Technology, IV Semester in Department of Rural Technology and Social Development has completed his dissertation entitled **Documentation of lesser known fruit and to prepare the value added product from lesser known fruit** under the guidance and supervision of Dr. Alka Mishra, Assistant Professor Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, in partial fulfilment of the requirement for the degree of M. Sc. Rural Technology. The dissertation is forwarded to the examinee for evaluation.

Supervisor

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**CERTIFICATE BY THE SUPERVISOR**

This is to certify that Ms. Nidhi Tiwari Student of Department of Rural Technology and Social Development, Guru Ghasi Vishwavidyalaya, Bilaspur C. G. India has carried the dissertation for partial fulfilment of requirement for the award of degree of M.Sc. Rural Technology entitled under my supervision and guidance. It is also certified that the student has complied with all the guidelines designed for the project of report. To the best of my knowledge this report is an authentic record of the work carried out by the student and it is considered fit for being referred to evaluation.

**Date:**

**Place:-** Bilaspur

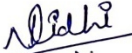
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**DECLARATION BY CANDIDATE**

This is to understand that I, Nidhi Tiwari a student of M.Sc. Rural Technology, IV Semester (GGV/21/10706) and I declare that the dissertation entitled "Documentation of Lesser known fruit and to prepare the value added product from Lesser known fruit." is my own work conducted under the supervision of Dr. Alka Mishra, Assistant Professor, in the Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). This report is an original work carried out by me and the report has not been submitted to any other University for the award of any degree or diploma. I further declare that to the best of my knowledge this thesis does not contain any part of any work, which has been submitted for the award of any degree either in this University or any other University/ deemed University without proper citation.

Date:.....  
Place: Bilaspur

  
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Above all I would like to thank God for his blessing and also my family members to

be with me in ups and downs. Things would not have been possible without you, my heartfelt Regards and thanks to one and all involved in my life.

  
Nidhi Tiwari



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## CHAPTER I INTRODUCTION

Fruits are indeed a valuable source of essential nutrients and are widely recognized for their role in promoting overall health. They provide a variety of vitamins, minerals, and antioxidants that contribute to the prevention of deficiencies and certain chronic diseases. By incorporating fruits into a balanced diet, individuals can reduce their risk of developing various health conditions (Normah, 2003).

Fruits serve as a mechanism for flowering plants, known as angiosperms, to spread their seeds. Through a symbiotic relationship, edible fruits have evolved to entice humans and animals to disperse their seeds, while providing them with nourishment in return. This mutual dependency has led to humans and many animals relying on fruits as an essential food source. As a result, fruits play a significant role in global agriculture, contributing to a substantial portion of agricultural output. Some fruits, such as apples and pomegranates, have gained cultural and symbolic significance over time Benzing, D. H. (2000).

The consumption of fruits as part of a healthy eating pattern offers several advantages. Firstly, fruits are rich in vitamins C and A, which are crucial for maintaining good health and preventing deficiencies related to these vitamins. Secondly, fruits are a great source of important minerals such as potassium, which plays a vital role in various bodily functions. Additionally, fruits contain folate (folic acid), which is essential for proper cell division and the production of DNA. McKeivith, B. (2004)

Antioxidants, including polyphenols, are abundant in fruits. These compounds help protect the body against harmful free radicals, which can cause oxidative stress and contribute to the development of chronic diseases. Some fruits like blueberries, cranberries, strawberries, and citrus fruits also contain phytochemicals, which are currently being studied for their potential health benefits. (Akbari, et al 2022)

Fruit cultivation has been deeply intertwined with Indian culture since ancient times. The historical records and literature of India mention the medicinal uses of various fruits, highlighting their importance in traditional medicine. Fruits such as aonla, bael, wild dates, grapes, hog plum, jackfruit, wild fig, monkey jack, jamun, ber, karonda, lemon, lime, mango, mulberry, orange, sour orange, phalsa, banana, pomegranate, walnut, almond, pistachio nut, and woodapple have all been documented for their medicinal properties. (Handa, et al 2016)

Certain fruits like mango, banana, bael, aonla, and coconut hold special significance in Indian festivals and rituals, symbolizing abundance, prosperity, and auspiciousness. These fruits are often associated with religious ceremonies and cultural practices.

Among the many fruits consumed in India, mango, banana, fig, grape, and date palm have gained particular popularity and are widely enjoyed. They are cherished for their taste, versatility, and nutritional value.

Overall, the cultivation and consumption of fruits have deep-rooted connections to Indian traditions, literature, festivals, and rituals. The wide variety of fruits available in India has not only played a significant role in traditional medicine but also contributed to the diverse culinary landscape of the country.

Early humans relied on wild plant products for sustenance and food preparation before the advent of agriculture. These wild edible plants (WEP) occur naturally and provide a dietary source for humans, apart from cultivated species. It is estimated that there are approximately 75,000 edible plant species worldwide based on a review of 100 published documents. In Indian epics such as the Rāmāyana and Mahābhārata, there are references to characters consuming wild fruits, roots, and stem tubers to satisfy their hunger during the period of banishment in the forest (Vanavāsa). An example mentioned



**Inventorization of leafy vegetables of Bilaspur and  
Janjgir Champa district**

**A DISSERTATION**

ON

DISSERTATION REPORT SUBMITTED FOR

PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD

OF

DEGREE OF

MASTER OF SCIENCE IN RURAL TECHNOLOGY (M.Sc. RT)

UNDER THE

SCHOOL OF STUDIES OF INTERDISCIPLINARY EDUCATION AND RESEARCH

SESSION: 2022 -2023



**SUPERVISED TO**

DR. ALKA MISHRA  
ASSISTANT PROFESSOR

**SUMMITTED BY**

PRABHAT SHANKAR SAHU  
GGV/18/6127

**DEPARTMENT OF RURAL TECHNOLOGY AND SOCIAL DEVELOPMENT**

**GURU GHASIDA VISHWAVIDYALAYA**

A CENTRAL UNIVERSITY ESTABLISHED BY THE CENTRAL UNIVERSITY ACT 2009 No. 25 OF 2009)





**FORWARDING LETTER**

This is certify that **MR. PRABHAT SHANKAR SAHU** student of M. Sc. Rural Technology, IV Semester in Department of Rural Technology and Social Development has completed his dissertation entitled; **Inventorization of leafy vegetables of Bilaspur and janjgir champa district** under the guidance and supervision of Dr. Alka Mishra, Assistant Professor Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, in partial fulfilment of the requirement for the degree of M. Sc. Rural Technology. The dissertation is forwarded to the examinee for evaluation.

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Valued  
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4.8.2023



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**Dr. Alka Mishra**

**Assistant Professor**

**Department of Rural Technology and**

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### DECLARATION BY CANDIDATE

This is to understand that I, **Prabhat shankar sahu** a student of M.Sc. Rural Technology, IV Semester (GGV/21/10706) and I declare that the dissertation entitled **Inventorization of leafy vegetables of Bilaspur and janjgir champa district** is my own work conducted under the supervision of Dr. Alka Mishra, Assistant Professor, in the Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).

This report is an original work carried out by me and the report has not been submitted to any other University for the award of any degree or diploma. I further declare that to the best of my knowledge this thesis does not contain any part of any work, which has been submitted for the award of an degree either in this University or any other University/ deemed University without proper citation.

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M.Sc. RT, IV Semester



## ACKNOWLEDGEMENT

First of all, I would like to express my gratitude to Dr. R. Mehta Head, Department of Rural Technology and Social Development Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G., India, for encouragement and providing necessary facilities for research work. Thanks are also due to him for lending me an opportunity to carry out my dissertation work at Department of Rural Technology and Social Development.

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*Prabhat*



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## INTRODUCTION

Indian Vegetables are an indispensable ingredient of Indian food and medicine. Vegetables contain lots of minerals and vitamins and mainly served as side dishes with an Indian meal. But in Indian cooking and culture, the place of vegetables is not restricted to only side dishes. The vegetables were present in the Indian cuisine since the Vedic era. The first vegetables mentioned in the Rig Veda are the lotus stem (visa) and the cucumber (urvaruka).

Most of the vegetables are mentioned in the Ramayana. Vegetables in Indian food find their mention in Sanskrit and other literatures as well. The major vegetables of India are those which are raised by ploughing, namely cereals, pulses and oilseeds. All these food grains find references in Sanskrit Vedic literature. The collective term for vegetables was 'Shaka', which comprised five kinds. These were ripened vegetables, leaves, roots, flowers and pods. Leaf type vegetables are plant leaves that are eaten as a vegetable, sometimes accompanied by petioles and shoots. Most of the leafy vegetables come from herbaceous plants such as lettuce and spinach. Food is specific to season. India has six different seasons, namely vasanta ritu (spring), grishma ritu (summer), varsha ritu (monsoon), sharad ritu (autumn), hemanta ritu (fall winter), and shishira ritu (winter). Studying and knowing about seasons is important to make an efficient diet plan.

Chhattisgarh state is situated in the central part of India and is also known as the 'Bowl of rice'. Paddy is the principal crop of this state, and rice is the staple diet of the people. The state largely maintains its ethnic food culture as most of its population continues to live within rural and tribal areas. The state has nearly 44% of forest cover which serves as a decent source of food. People here prefer a vegetarian diet, and over 70 varieties of leaves, 25 varieties of tubers and roots are used here as vegetables.

The present article is an attempt to explore the ethnic food culture of Chhattisgarh and to provide information about leafy vegetables which are consumed here. Irrespective of all the modern changes in food habits, the people of Chhattisgarh still preserve their traditional food culture.

This article also focus on economic importance and seasonal changes of Leafy vegetables. So many species and varieties of leafy vegetable are being consumed by people of Chhattisgarh and



**A**  
**DISSERTATION**  
**ON**  
**“TESTING AND EVALUATION OF COW DUNG PRODUCT**  
**PANCHDRAVYA AAHUTI”**  
**DISSERTATION REPORT SUBMITTED FOR THE**  
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**(M.Sc. RT)**  
**UNDER THE**  
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### DECLARATION BY CANDIDATE

This is to understand that I, Pukendra Kumar a student of M.Sc. Rural Technology, IV Semester (Enroll. No. GGV/21/10710) hereby declare that the dissertation entitled “**Testing and Evaluation of Cow Dung Product Panchdravya Aahuti**” is my own work conducted under the supervision of **Dr. S. K Nirala**, Assistant Professor, in the Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). This report is an original work carried out by me and the report has not been submitted to any other University for the award of any degree or diploma.

I further declare that to the best of my knowledge this thesis does not contain any part of any work, which has been submitted for the award of any degree either in this University or any other University/deemed University without proper citation.

  
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Date:

Place: Bilaspur

  
(Pukendra Kumar)



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## CHAPTER - I

### INTRODUCTION

In recent times, the pressing need for sustainable practices has led to a resurgence of interest in traditional resources and ancient knowledge. Among these resources, cow dung holds a special place, revered for its multifaceted utility and sacred significance in various cultural and religious traditions. One remarkable application of cow dung lies in the preparation of "Panchdavva Ahuti," an offering that combines five sacred elements -cow dung, ghee, loban, Kapur and Saw Dust. This sacred concoction, when burned as an offering during religious ceremonies, is believed to purify the environment, promote spiritual well-being, and invoke divine blessings.

The term "Aahuti" is derived from Sanskrit, which is an ancient Indian language and the primary liturgical language of Hinduism. The word is made up of two parts: "aa," which means "to bring" or "to offer," and "huti," which means "oblation" or "offering." Together, the word Aahuti refers to the act of bringing or offering oblations into a sacred fire as part of a Hindu religious ritual. In the Rigveda, one of the oldest Hindu scriptures, there are many hymns that describe the importance of fire and the offerings made into the fire during religious rituals. These offerings, or Aahutis, are believed to symbolize the offering of oneself to the divine and to seek the blessings of the gods. Similarly, the Yajurveda, another important Hindu scripture, provides detailed instructions on how to perform various fire rituals and the significance of the offerings made into the fire. The text emphasizes the importance of Aahuti as a means of invoking the blessings of the divine and achieving one's goals and desires.

Aahuti is a term that is used specifically in the context of Hinduism and its religious practices. It is an important concept in many Hindu rituals, such as yajnas, havans, and homas, and it is believed to have a powerful spiritual significance for those who participate in these rituals.





**“MONKEY MENACE ON GROWN FIELD CROPS IN SARANGARH-BILAIGARH  
DISTRICT (C.G.) INDIA”: THREATS TO SUSTAINABLE AGRICULTURE  
PRODUCTION AND LIVELIHOOD**



A DISSERTATION WORK REPORT SUBMITTED FOR THE PARTIAL FULFILLMENT  
REQUIRED FOR THE AWARD OF THE DEGREE OF

MASTER OF SCIENCE  
IN  
RURAL TECHNOLOGY

SUPERVISED BY  
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SUBMITTED BY  
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2023



Department of Rural Technology and Social Development



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Bilaspur (C.G.) 495009 INDIA

CERTIFICATE

This is to certify that **Mr. Rakesh Jaiswal** Student of **Master of Science (Rural Technology)** 4th semester Roll No. **21049112** in the Department of rural technology and social development, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh India has completed his dissertation work entitled "**MONKEY MENACE ON GROWN FIELD CROPS IN SARANGARH-BILAIGARH DISTRICT OF CHHATTISGARH STATE**":THREATS TO **SUSTAINABLE AGRICULTURE PRODUCTION AND LIVELIHOOD** under the guidance of **Dr. Lokesh Kumar Tinde (Assistant Professor)** has submitted to the Department. He conducted research for his dissertation at Sarangarh, Chhattisgarh."

The dissertation is the partial fulfillment of the requirement to receive the degree in Master of Science (Rural Technology)

Date: 31/07/2023

Place: \_\_\_\_\_

  
**Dr. Lokesh Kumar Tinde**

(Assistant Professor)



**DECLARATION**

I Mr. Rakesh Jaiswal, hereby declare that this dissertation entitled “**MONKEY MENACE ON GROWN FIELD CROPS IN SARANGARH-BILAIGARH DISTRICT OF CHHATTISGARH STATE**”: **THREATS TO SUSTAINABLE AGRICULTURE PRODUCTION AND LIVELIHOOD** submitted to Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur for partial fulfillment of the requirements for the award of degree on Master of Science (M.Sc.) in **Rural Technology**. The thesis has been composed by me. It is my own work and to the best of my knowledge and belief. The work contained in the thesis is original and has been done by me under the supervision of **Dr. Lokesh Kumar Tinde (Assistant Professor)**. To the best of my knowledge the work has not been submitted to any other Institution for any other Degree /diploma. I have followed the guideline provided by the university in writing the thesis. The assistance and help received during the course of this investigation have been duly acknowledged.

Date: 31/07/2023

Rakesh

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(Roll No.21049112)

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**CERTIFICATE OF THE SUPERVISOR**

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I am thank full to my professor Dr. Dr. Rajendra Mehta (Associate professor) and Head of Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) and I am great full to Dr. Pushpraj Singh (Associate Professor), Dr. Satendra Kumar Nirala (Assistant Professor) Dr. Bhaskar Chaurasia (Assistant Professor) Dr. Alka Mishra (Assistant Professor), Dr. Devendra Singh Porte (Assistant Professor), Dr. Sailesh Soni (Lab Technician) and Dr. Prasoon Soni (Assistant Professor), Miss Mrinalini Bramhbhatt (Ph.D. Scholar), Mr. Devendra Kumar (Ph.D. Scholar), Miss Neelam Bhagat (Ph.D. Scholar), Miss Surbhi Pandey (Ph.D. Scholar), Miss Sakshi Gautam (Ph.D. Scholar), Miss Namrata Banjare (Ph.D. Scholar), Mr. Mayank Pandey (Ph.D. Scholar), Miss Shruti Namdeo (Ph.D. Scholar),



Miss Amita Paikra (Ph.D. Scholar), Aakanksha Dwivedi (Ph.D. Scholar) and Miss Nishtha Yadav. It was a remarkable experience from the young Researchers/Scholars in the Department of Rural Technology and Social Development for creating research environment and atmosphere.

I would also very thank full to Mr. Motilal Soni and Mr. Jhadu Ram Yadav for sustained and caring us for 2 years in Development of Rural Technology and Social Development.

*Rakesh*

Rakesh Jaiswal

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## CHAPTER - 01

### Introduction

---

#### *Background*

Monkeys are highly social animals, and almost all live in troops consisting of several females with young and either a single male (as in baboons, mandrills, most guenons, and most langurs) or several males (as in savannah baboons and macaques). Monkeys have large brains and are known for their inquisitiveness and intelligence. Brain development, combined with the freeing of the hands and well-developed vision, allows them a great latitude of activity.

Monkeys are found in two main regions of the world, so scientists have grouped them as either Old World monkeys or New World monkeys. Old World monkeys are found in Africa and Asia. Some examples are guenons, mangabeys, macaques, baboons, and colobus monkeys. New World monkeys are found in Mexico, Central America, and South America. Some examples are woolly monkeys, spider monkeys, howler monkeys, capuchin monkeys, and squirrel monkeys. Marmosets and tamarins also live in New World habitats but are different enough to be in their own different scientific grouping. (<https://animals.sandiegozoo.org/animals/monkey>)

In India, three primate species in particular are strongly commensals, namely the bonnet macaque (*Macaca radiata*), the hanuman langur (*Semnopithecus entellus*) and, of course, the rhesus (*Macaca mulatta*). Despite the damage they are capable of causing, monkeys have benefited from India's tradition of veneration for them.

The population of monkeys has grown at an alarming rate during the last decade. According to the last count there were 50 million monkeys in India which has resulted in their migration from the forest areas towards towns and cities and also to the cultivated areas.

Among all other macaques in India, rhesus monkey (*Macaca mulatta*) is the most common monkey and occupied an important role in the cultural and traditional aspects of the country.

Monkeys are fascinating animals to watch and interact with. They are incredibly intelligent creatures and are very close relatives of humans. Just like humans, we classify monkeys as primates. Primates have relatively larger brains than the size of their body and a higher degree of intelligence.

Monkeys come in different sizes, types, colors, and shapes. There are over 200 different species of monkeys all over the world (Malik I. 1999).



A  
DISSERTATION  
ON

**MORNINGNESS-EVENINGNESS PREFERENCES  
AMONG STUDENTS OF GURU GHASIDAS  
VISHWAVIDYALAYA, BILASPUR (C.G.)**

**DISSERTATION REPORT SUBMITTED FOR THE  
PARTIAL FULFILLMENT OF THE REQUIRED FOR THE  
AWARD OF DEGREE**

**MASTER OF SCIENCE IN RURAL TECHNOLOGY  
(M.Sc. RT)**

**UNDER THE  
SCHOOL OF STUDIES IN INTERDISCIPLINARY EDUCATION &**



**RESEARCH**

**SUPERVISED BY:**

**Dr. DEVENDRA SINGH PORTE  
ASSISTANT PROFESSOR**

**SUBMITTED BY:**

**Mr. SAKET NIRALA  
(GGV/18/6145)**

**DEPARTMENT OF RURAL TECHNOLOGY & SOCIAL  
DEVELOPMENT  
GURU GHASIDAS VISHWAVIDYALAYA BILASPUR (C.G.) 495009**

**(2023)**



## FORWARDING LETTER

**Mr. Saket Nirala** student of M. Sc. Rural Technology, IV Semester in Department of Rural Technology and Social Development has completed his dissertation entitled **“Morningness-Eveningness Preferences Among Students of GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) ”** under the guidance and supervision of **Dr. Devendra Singh Porte**, Assistant Professor, Department of Rural Technology & Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, in partial fulfilment of the requirement for the degree of M. Sc. Rural Technology.

The dissertation is forwarded to the examinee for evaluation.

Date:

Forwarded by

*Valued  
Dr. Saket Nirala  
4/8/23*

*RJ*  
4/8/2023  
**Prof. Rajendra Mehta**

Head  
Department of Rural Technology  
& Social Development,  
Guru Ghasidas Vishwavidyalaya,  
Bilaspur (C.G.)



## CERTIFICATE BY THE SUPERVISOR

This is to certify that **Saket Nirala** Student of Department of Rural Technology & Social Development, Guru Ghasi Vishwavidyalaya, Bilaspur, (C.G.), India has carried the dissertation for partial fulfilment of requirement for the award of degree of M.Sc. Rural Technology entitled "**Morningness-Eveningness Preferences Among Students of GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)**" under my supervision and guidance. It is also certified that the student has complied with all the guidelines designed for the project of report. To the best of my knowledge this report is an authentic record of the work carried out by the student and it is considered fit for being referred to evaluation.

Date: 25/07/2023

*Devendra Singh*  
25/07/2023

**Dr. Devendra Singh Porte**

Assistant Professor

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## **DECLARATION BY CANDIDATE**

This is to understand that I, **Saket Nirala** student of M.Sc. Rural Technology, IV Semester (Enroll. No.- GGV/18/6145) and I declare that the dissertation entitled "**Morningness-Eveningness Preferences Among Students of GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)**" is my own work conducted under the supervision of **Dr. Devendra Singh Porte**, Assistant Professor, in the Department of Rural Technology & Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). This report is an original work carried out by me and the report has not been submitted to any other University for the award of any degree or diploma.

I further declare that to the best of my knowledge this thesis does not contain any part of any work, which has been submitted for the award of any degree either in this University or any other University/ deemed University without proper citation.

**(Saket Nirala)**

Date: 27/07/2023

Place: Bilaspur



## ACKNOWLEDGEMENT

I would like to express my gratitude to **Prof. Rajendra Mehta**, Head, Department of Rural Technology & Social Development Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G., India, for encouragement and providing necessary facilities for research work. Thanks are also due to him for lending me an opportunity to carry out my dissertation work at Department of Rural Technology and Social Development.

First of all, I avail this opportunity to pay my deepest sense of gratitude and heartfelt regard to my supervisor **Dr. Devendra Singh Porte**, Assistant Professor, Department of Rural Technology & Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G. India, for his immense interest, patient guidance, encouragement and advice provided throughout my research work. I have been extremely lucky to have a supervisor who cared so much about my work, and who responded to my queries so promptly. Under his intellectual guidance, I found the passion of doing academic research and the courage of facing the difficulties in this process.

I am very much thankful to the all faculty of the department namely **prof. Pushpraj Singh, Dr. B. Chaurasia, Dr. S. K. Nirala, Dr. Alka Mishra, Dr. Dilip Kumar, and Dr. Lokesh Kumar Tinde** for their timely advice. I gratefully acknowledge the help received from Dr. Shailesh Soni and the other supporting staff of the department during my dissertation work.

Above all I would like to thank God for his blessing and also my father **Mr. Sukhram Nirala** and mother **Mrs. Sumitra Nirala** to be with me in ups and downs. Things would not have been possible without you, my heartfelt Regards and thanks to one and all involved in my life.

  
**Saket Nirala**



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## CHAPTER-1

### INTRODUCTION

Circadian rhythms – the cycles of our internal clock influence our daily activity and productivity. Achievements in academic studies [1], programming [2], and other domains are affected by circadian rhythms. Chronotype, or diurnal preference, is a person's tendency toward activity at certain times of day and is thought to be a natural characteristic of an individual [3]. Circadian typology or chronotype is a concept based on an individual's predilection to exhibit morning or evening trait, a property acquired because of the inter-individual variations in organising various biological and behavioural activities in a 24-hour period. Inter-individual differences in sleep-wake pattern, peak alertness times and diurnal preferences lie behind the phenomenon of morningness-eveningness [1]. Literature investigating the morningness-eveningness dimension is scarce especially in the context of Indian population. It is a little explored entity representing a novel, interesting topic of research for researchers/clinicians/educators.

Morning chronotypes (M-types) are individuals who exhibit morning tendencies like rising early in the morning and also who are at their best both physically and mentally in the early hours of morning [2]. Evening chronotypes (E-types) are individuals who prefer to get up late in the morning and stay awake till late night and also perform their best during late afternoon or evening [2]. The aforementioned M-type and E-type categories are regarded as the two extremes of a continuum, on which Intermediate type (I-type) or Neutral type (N-type) individuals represent the largest category. The sleep-wake pattern, preferred times of physical and mental performance and subjective alertness after arising and before going





**STUDIES ON MUSHROOM GROWING KIT PREPARATION OF  
OYSTER MUSHROOM**



A DISSERTATION SUBMITTED  
FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE

IN  
RURAL TECHNOLOGY

SUBMITTED BY

**SNEHLATA**

M.Sc. IV Semester  
ROLL NO: 21049114 ; ENROLLMENT NO: GGV/21/10708

SUPERVISOR

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DEPARTMENT OF RURAL TECHNOLOGY AND SOCIAL DEVELOPMENT

**2023**

**DEPARTMENT OF RURAL TECHNOLOGY AND SOCIAL DEVELOPMENT  
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR-495001(C.G.)**



#### DECLARATION

I Miss Snehlata hereby declare that this dissertation entitled "Studies on Mushroom Growing Kit Preparation of Oyster Mushroom" submitted to Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur for partial fulfillment of the requirements for the award of degree of Master of science (M.Sc.) in Rural Technology. The thesis has been completed by me. It is my own work and to the best of my knowledge and belief. The work contained in the thesis is original and has been done by me under the supervision of. To the best of my knowledge the work has not been submitted to any other Institution for any other Degree /diploma. I have followed the guideline provided by the university in writing the thesis. The assistance and help received during this investigation have been duly acknowledged.

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Valued  
Snehlata  
4/8/23



**CERTIFICATE**

This is to certify that Miss Suchlata Student of Master of Science (rural technology) 4th semester in the Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh India, has completed his dissertation work entitled "Studies on Mushroom Growing Kit Preparation of Oyster Mushroom" under the guidance of Dr. Bhaskar Chourasia, Assistant Professor, Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur has submitted to the Department. The dissertation is the partial fulfillment of the requirement to receive the degree in Master of Science (Rural Technology).

  
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I am very thankful to my guide **Dr. Bhaskar Chaurasia** for all the help and guidance throughout my Master of Science (M.Sc.) dissertation research work. I feel honored to have an opportunity to know such a good person. He is a good source of inspiration and an exemplary Scientist.

I am thankful to **Prof. Rajendra Mehta**, Head the Department of Rural Technology and Social Development, and Dean of School of Studies of Interdisciplinary Education and Research, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) for providing all support.

This thesis would not be completed without mentioning the mention of some great people. This is a humble acknowledgement to convey all my gratitude to them. Firstly, I would like to express my deepest thanks and gratitude to my all-family members my mother **Mrs. Mamta**, and my father **Mr. Shankar Lal**. I am very grateful to their love and support.

I am also great full to **Prof P.R. Singh**, **Dr. Satendra Kumar Nirala (Assistant Professor)**, **Dr. Alka Mishra (Assistant Professor)**, **Dr. Dilip Kumar (Assistant Professor)**, **Dr. Lokesh Kumar Tinde (Assistant Professor)**, **Dr. D. S. Porte (Assistant Professor)**, **Dr. Prasoon Soni (Assistant Professor)**, **Dr. Piyush Shukla (Assistant Professor)**, **Dr. Shailesh Soni (Lab Assistant)**. It was a remarkable experience form the young Researchers/Scholars in the Department of Rural Technology and Social Development for creating a research environment and atmosphere and I am thanking full to my seniors **Ms Sakshi Gautam**, **Ms Surbhi Pandey**, **Ms Ithi Gupta** for their support and help.

I would also very thank full to **Mr. Jhadu Ram Yadav** and **Mr. Motilal Soni** for sustained and caring me for last five years in Department of Rural Technology and Social Development.

Date 04/02/23

  
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## CHAPTER-1

### INTRODUCTION

The fruiting bodies of some fungi, a lower class of plants, are known as "Mushrooms." The bodies of fungi, with the exception of those that carry spores, are undifferentiated and devoid of chlorophyll. Mushroom fruiting bodies are spore-bearing fungi with fleshy structures. (Kanani, *et al.* 2023). They are filled with spores, which serve as the fungi's seeds, much like the seeds of higher plants.

Since the beginning of time, humans have been attracted to mushrooms, which appear after rain in a variety of sizes, colors, and shapes. Even when people lived as hunters and gatherers, mushrooms were sure to catch their interest. Despite the fact that man first practiced agriculture 10,000 years ago, the growing of mushrooms is a relatively recent phenomenon that just began to gain popularity globally in the last century. The Chinese were reportedly the first to artificially cultivate tropical and sub-tropical mushrooms thousands of years back, but commercial production started in Europe with button mushrooms in caves during the 16th and 17th centuries. (Boa, 2004).

These fungi, which are minuscule in size, develop a mycelium throughout their growth stage and spread via saprophytic mode, producing spores in the gills of their fruiting bodies, or what we call mushrooms, for dispersal, completing their life cycle. In a favorable climate and on suitable substrates, the disseminated spores produce hyphae or mycelium, and the life cycle process continues. Because they lack chlorophyll, mushrooms cannot photosynthesize, or use sunlight's energy to create energy, the way green plants can. The majority of mushrooms that grow in forests are deadly if eaten raw, and people frequently get sick after eating such mushrooms.

Mushrooms are a good source of protein, vitamins, and minerals and are known to have a broad range of uses both as food and medicine. These are often found as saprophytes on soil, open fields, farmlands, wood, and roadsides. The fruiting bodies are large enough to be visible to



**“Long-Term Spatiotemporal Dynamics of Rainfall Trend over Arpa  
River Basin”**



**A DISSERTATION  
SUBMITTED FOR PARTIAL FULFILLMENT  
FOR THE AWARD OF DEGREE  
MASTER OF SCIENCE IN RURAL TECHNOLOGY  
Session: 2022-23**

**Supervised to  
Dr. Lokesh Kumar Tinde  
(Assistant Professor)**

**Submitted by  
Suneha Singh Thakur  
M.Sc. (RT) 4<sup>th</sup> Sem.  
Roll No.21049115**

**DEPARTMENT OF RURAL TECHNOLOGY AND SOCIAL  
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GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)  
(A Central University established by the central university, Act 2009 No. 25 of 2009)**



**DECLARATION BY THE CANDIDATE**

I, **Suneha Singh Thakur**, hereby declare that this dissertation entitled “**Long-Term Spatiotemporal Dynamics of Rainfall Trend over Arpa River Basin**” Submitted to Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur for partial fulfillment of the requirements for the award of **Master of Science (M.Sc.)** in Rural Technology. It is my own work and to the best of my knowledge and belief. It is a record of original research carried out by me under the supervision of **Dr. Lokesh Kumar Tinde (Assistant Professor)** to the best of my knowledge in this work has not been submitted elsewhere for any other degree/diploma. The assistance and help received during the course of this investigation have been duly acknowledged.

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**CERTIFICATE OF THE SUPERVISOR**

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Supervisor 25/07/2023

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(Assistant Professor)

  
Dean & Head of Department  
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Firstly, I would like to express my deepest thanks and gratitude to all family members My Mother Mrs. Chanchal Singh Thakur My Father Mr. Ashok Singh Thakur, I am very grateful to their love and support.

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I also would like express my sincere thanks to **Dr. R. K. Mehta**, Dean of school of Interdisciplinary Education and research providing all the necessary facilities to the Department of Rural Technology and Social Development.

I am very thankful to my guide **Dr. Lokesh Kumar Tinde** (Assistant Professor), for all the Help and guidance throughout my Master of Science (M.Sc.) dissertation research work duration. I feel honoured having an opportunity to know such too good person. They are good source of inspiration, exemplary Scientist. The progress of my project could not have been achieved without the kind support of my dissertation work guide Dr. Lokesh Kumar Tinde, Assistant Professor Department of Rural Technology and Social Development. It will be pleasure to acknowledge, utmost co-operation and valuable suggestion from the staff of Department of Rural Technology and Social Development.

I am thank full to professor **Dr. R. K. Mehta** ( professor) and Head of Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) and I am great full to Dr. Pushpraj Singh ( Professor), Dr. Satendra Kumar Nirala (Assistant Professor)Dr. Bhaskar Chaurasia (Assistant Professor)Dr. Alka Mishra (Assistant Professor), Dr. Devendra Singh Porte (Assistant Professor), Dr.Sailesh Soni (Lab Technician) and Dr. Prasoon Soni (Assistant Professor), Miss Mrinalini Bramhbhatt (Ph.D. Scholar), Mr. Devendra Kumar (Ph.D. Scholar), Miss Neelam Bhagat (Ph.D. Scholar), Miss Surbhi Pandey (Ph.D. Scholar),

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I would also very thank full to Mr. Motilal Soni and Mr. Jhadu Ram Yadav for sustained and caring us for 2 years in Development of Rural Technology and Social Development.

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*Suneha*



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## CHAPTER - 01

### Introduction

---

#### *Background*

Climate is the key components of the earth system. There are many variables in the form of weather parameters such as rainfall, temperature, humidity and atmospheric pressure that constitute climate and weather. The amount of the variability or fluctuations of the parameters varies according to stations locations (Panda and Sahu 2019). Agricultural farming and related various enterprises sectors, food security, and energy conservation of India are mainly dependent on adequate amount of water. The rainfall received in a catchment area is main factor in determining the amount of available water to explore the various demands, such as agricultural farming, industrial uses, and domestic water supply and for generation of hydroelectric power. Global climate changes may affect long-term rainfall patterns impacting the amount of water, along with the increasing droughts and floods in the economical area (Jain and Kumar 2012). It has noticed that most of the studies are conducted on the changing patterns of precipitation and temperature only. There are also some other parameters in universe which may influence the climatic condition (Deb *et al.*, 2019). Rainfall is one of the single most important key parameter in planning for farming in rain-fed ecological situation. Around 60% of the Indian farmers are dependent on rain (Pradhan *et al.*, 2020). Many researchers have examined the variability and patterns of weather parameters across the world (Westra *et al.* 2014, Thornton *et al.* 2014, Addisu *et al.* 2015, Ay and Kisi 2015, Du *et al.* 2017, Seo and Ummenhofer 2017, Kala and Vaidyanathan 2018, Arabeyyat *et al.* 2018, Gedefaw *et al.* 2018). Indian researchers also have several studies carried out to know the variability and trends in annual and seasonal rainfall (Sinha *et al.* 2018, Mondal *et al.* 2018, Chandniha *et al.* 2017, Swain *et al.* 2015, Pandey and Khare 2018, Nikumbh *et al.* 2019, Meshram *et al.* 2017, Pal and Mishra 2017, Markand and Kishtwal 2014, Kumar and Jaswal 2016). Fluctuation of climate has become a most significant challenge for development of sustainability. In 2018, Intergovernmental Panel on Climate Change (IPCC) explained that it would significantly impact on human lives and ecology (Bora *et al.* 2022). Studies on rainfall variability and patterns lead to a better knowledge of drought-related problems, flood and extreme climate conditions (Myhre *et al.* 2019, Papalexioiu and Montanari 2019). The precipitation variability and pattern of rainfall give vast results about the increasing or decreasing of trend pattern with the help of statistical hypothesis testing tools such



A  
DISSERTATION  
ON  
“PREPARATION AND MAKING OF COW DUNG PRODUCT  
PANCHDRAVYA AAHUTI”  
DISSERTATION REPORT SUBMITTED FOR THE  
PARTIAL FULFILLMENT OF THE REQUIRED FOR THE  
AWARD OF  
DEGREE OF  
MASTER OF SCIENCE IN RURAL TECHNOLOGY  
(M.Sc. RT)  
UNDER THE  
SCHOOL OF STUDIES OF INTERDISCIPLINARY  
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2023



## FORWARDING LETTER

Tinkle, student of M. Sc. Rural Technology, IV Semester in Department of Rural Technology and Social Development has completed his dissertation entitled "Preparation and Making of Cow Dung Product Panchdravya Aahuti" Under the guidance and supervision of Dr. S. K Nirala, Assistant Professor, Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, in partial fulfilment of the requirement for the degree of M. Sc. Rural Technology.

The dissertation is forwarded to the examinee for evaluation.

Date:

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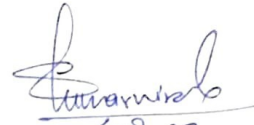




## CERTIFICATE BY THE SUPERVISOR

This is to certify that Tinkle, Student of Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur C. G. India has carried the dissertation for partial fulfilment of requirement for the award of degree of M.Sc. Rural Technology entitled "Preparation and Making of Cow Dung Product Panchdravya Aahuti" under my supervision and guidance. It is also certified that the student has complied with all the guidelines designed for the project of report. To the best of my knowledge this report is an authentic record of the work carried out by the student and it is considered fit for being referred to evaluation.

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## DECLARATION BY CANDIDATE

This is to understand that I, Tinkle a student of M.Sc. Rural Technology, IV Semester (Enroll. No. GGV/21/10710) hereby declare that the dissertation entitled "**Preparation and Making of Cow Dung Product Panchdravya Aahuti**" is my own work conducted under the supervision of **Dr. S. K Nirala**, Assistant Professor, in the Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.). This report is an original work carried out by me and the report has not been submitted to any other University for the award of any degree or diploma.

I further declare that to the best of my knowledge this thesis does not contain any part of any work, which has been submitted for the award of any degree either in this University or any other University/deemed University without proper citation.

*Tinkle*

(TINKLE)

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Place: Bilaspur



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Date:

Place: Bilaspur

*Ankita*



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## CHAPTER - I

### INTRODUCTION

India has the highest number of cattle and buffaloes in the world. As of 2021 the cattle's population in India is 306.7 million (Mani *et al.*, 2021) but in 2022 it will be increased to 308 million (A. Minhas, 2022). Cow dung can be defined as the undigested residue of consumed food material being excreted by herbivorous bovine animal species. Total Bovines animal species population in 2019 is 302.3 by livestock Census. In India, 69.9 % population resides in rural areas (The Hindu 2011), where cow (*Bos indicus*) is major cattle and generates 9–15 kg dung/day (Werner *et al.* 1989; Brown 2003). The cow is revered in Hinduism as a symbol of nonviolence, a mother goddess, and a bringer of good fortune and wealth. In Hinduism, the cow is still regarded as a sacred, faith-filled, and protected animal. The Hindu religion recognises the rights of animals to co-exist with humans; therefore, people are taught to love, nurture and worship them. The religion promotes the belief that various Hindu gods and goddesses incarnate in various animal forms. In the past, kings and emperors used various species of animals in their emblems to show their respect. Many festivals in India are still being celebrated to honour different animals (Agoramoorthy & Hsu 2006). The cow is the most sacred of all the animals of Hinduism. It is known as Kamadhenu, or the divine cow, and the giver of all desires. Historical evidences states that the divine "Kamdhenu" was served by Maharishi Vasishtha. Panchagavya, a wonderful medicine (a formulation consisting of all the five products of cow such as urine, dung, milk, curd and ghee) was presented by Maharishi Dhanvantari. Also, the Vedic period of Indian civilization describes cow as Kamdhenu, meaning "which fulfils the wishes asked". Cow is trusted as a "mobile hospital" to treat various diseases and deficiencies. In Sanskrit, an individual product is called as "gavya" and the combination of five ("panch" means five) is named as "panchagavya". Panchagavya has been mentioned in the holy scripts of Vedas.