PROJECT REPORT ON ENVIRONMENTAL STUDIES

TITLE OF THE PROJECT

FLORAL DIVERSITY OF WEST BENGAL AND IT'S IMPORTANCE

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B.A (ENGA HONS) 2ND SEMESTER EXAMINATION

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I would like to extend my heartiest thanks to the people who answered all my questionnaires to arrive at the opinion in the form of this project work and all of them who gave me their priceless suggestions regarding the topic **FLORAL DIVERSITY OF WEST BENGAL AND ITS IMPORTANCE.**

I would also like to thank my classmate for the discussion I had with them and last but not the least the all mighty and my parents for their co-operation and help without which the completion of the project would had been a distant reality.

PLACE: KOLKATA **Dept. of Environmental Studies**

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INTRODUCTION:

Diversity or more specifically species diversity is the variety of living organism found in natural habitat or surrounding environmental. Floral and faunal diversity of an area portrays the health of the habited and natural wealth of that region. It is also very important for conservation perspectives. Proper conservation initiative can only be taken when proper biodiversity database of an area is available. It is important to have and understanding of bio- diversity of an area so that the local people and students can be aware of the richness of bio- diversity of the place they are living in and their responsibility to maintain that richness.

One is able to understand the richness of floral diversity of West Bengal from the statistics that it contributes almost 12% of the total angiosperm diversity found all over India despite deltaic parts of West Bengal possesses a combination of more than 60 species of the Sundarbans Mangrove ecosystem consisting of true mangroves, mangrove associates and obligate mangrove. This combination outnumbers the total mangrove diversity that the rest of India has to offer.

Diversity is further reflected in different types of ecosystem available here like mountain ecosystem of the north, forest ecosystem extending over the major part of the state, fresh water ecosystem, semiarid ecosystem in the western part, mangrove ecosystem in the south and coastal marine ecosystem along the shoreline.

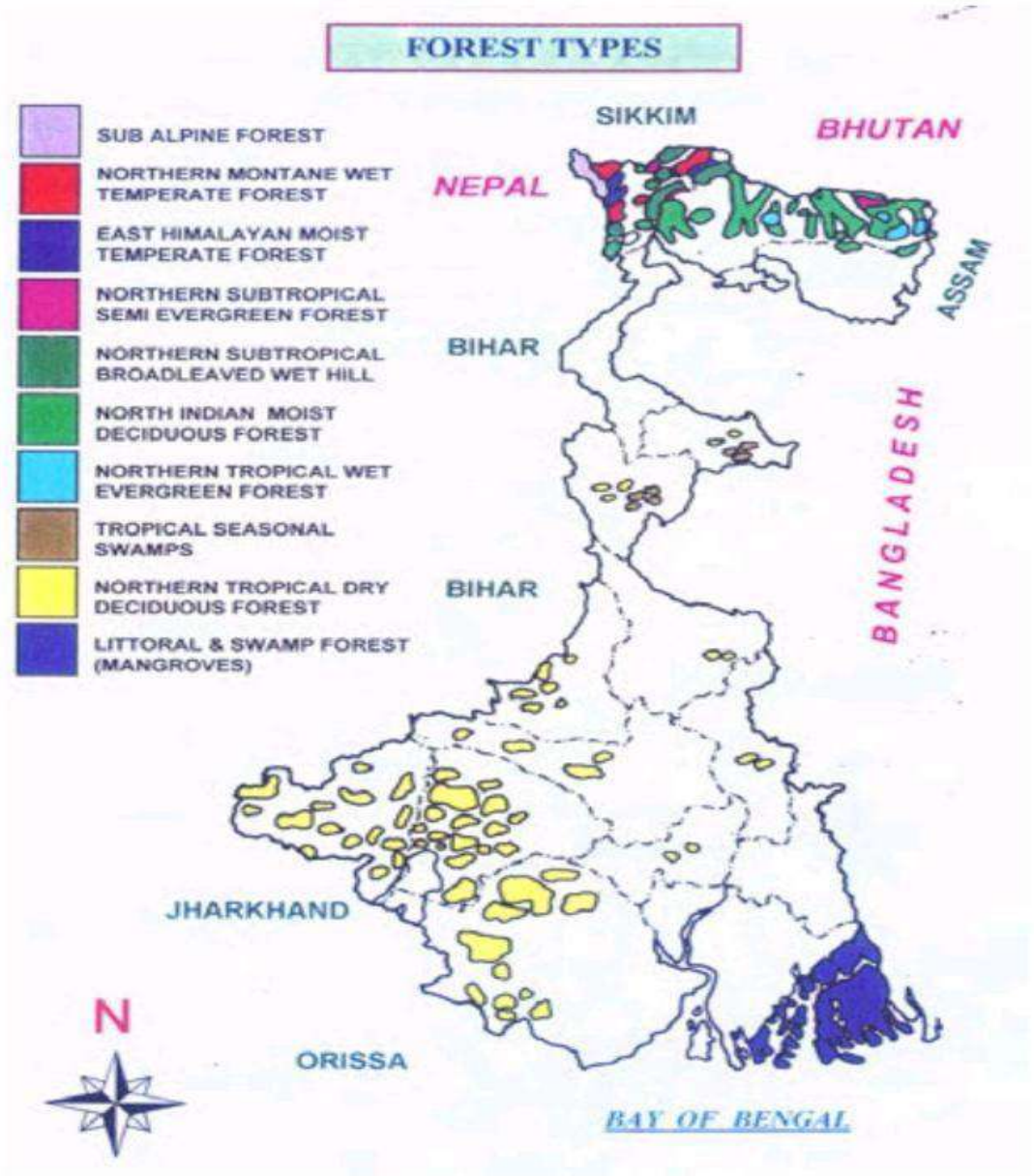

Figure **2-2** The map of forest type

SIGNIFICANCE OF THE STUDY:

The fauna and flora of West Bengal possess the combined characteristics of the Himalayan and Sub Himalayan Gangetic plain. Biodiversity is shaped by the biotic and abiotic components of its environment and this state has rich assemblage of diverse habitats and vegetation designated with the help of eight different forest types. Diversity further reflected in different types of ecosystem available here like mountain ecosystem of the north, forest ecosystem (semi – evergreen, deciduous, dry moist and tidal varieties) extending over the major parts of the state, fresh water ecosystem, semiarid ecosystem in the west tern parts, mangrove ecosystem in the south and the coastal marine ecosystem along the shoreline.

These diverse ecosystem has resulted in rich faunal diversity of the state and consist 10,013 species out of a total of 89,451 species of animals present in our country, thus representing 11.19% of our countries fauna. The floral diversity of the state is also enriched by 4,622 species out of a total of 44,594 floral species in India, and 10.36% of our countries flora.

District wise analysis show that highest number fauna is present in Kolkata (4256), and then in Darjeeling(4166) then Jalpaiguri(1563) south 24 P.G.S(1516) north 24 P.G.S(943) etc.

Status of the flora:

West Bengal has recorded to far 152 species of flora as threatened. Table 2 given below provide a least of such species along with their region of occurrence. Out of these threaten plants, 5 species are considered to be rare, four species and endangered and two species as vulnerable.

The floral diversity is conspicuous in Darjeeling Himalayas along with Terai – Dooars region in the foothills of northern part of West Bengal and in the mangrove forests of Sundarbans adjacent to the Bay of Bengal. Plant association in Darjeeling Himalayas is characterized by abundance of various trees like Oak, Laurel and bamboos apart from several species of Rhododendron, Orchids, ferns bryophytes and lichen. Here orchidaceae type flowering plant form the single largest family with nearly 600 species. There are ten dominant families of angiosperms in the area. It would not be out of the context to mention that 40% of the total Himalayan flora indigenous and majority of them occur in the eastern part. As many as 15 species of gymnosperms occur in the eastern Himalaya with existence of at least 5 genera in this region. Among the pteridophytes which include fern allies, 70% of Polypodiaceae taxa of India are observed in this region. About 50% of more than 2000 moss species are grown in this region while more than 320 species liverworts are found here with high percentage of endemism. About 728 taxa of lichens out of 2000 species said to be existing in India, occur in the eastern Himalaya with a variety of fungal flora too. This region is also medicinal and aromatic plant of different genera. This is also considered as a center of origin of about 82 species of top plants. A tentative list of flora of West Bengal has been give in table 3.

Floral Diversity Of West Bengal

SL NO	NAME OF GROUP	TOTAL NUMBER OF SPECIES
1	Algae- a. Marine Algae b. Others-	658 50 608
2	Fungi	860
3	Lichens	510
4	Bryophyta	642
5	Pteridophyta	530
6	Gymnosperm	21
7	Angiosperm a. Monocots- b. Dicots-	4387 3237 1150
8	True Mangroves	32

Table2: Numerical break up of taxa occurring at Pathra and its vicinity, Paschim Medinipur, West Bengal.

Type	Family	Genus	Species
Dicots	35	76	81
Monocots	7	10	13
Pteridophyte	2	3	3
Total	44	89	97

Table3: Dominant families with number of species

SL NO	Families	Total No. of genus	Total No. of species
1	Asteraceae	9	9
2	Fabaceae	6	7
3	Euphorbiaceae	5	5
4	Amaranthaceae	3	4
5	Acanthaceae, Poaceae	4	4

Description: As of 2009, recorded forest area in the state is 11,879km which is 13.38% of the state's geographical area, compared to the national average of 21.02%. Reserves, protected and unclassed forest constitute 59.4%, 31.8%and 8.9%, respectively , of the forest area. Part of the worlds largest mangrove forest, the Sundarbans is located in southern West Bengal. From a phytogeographic view point, the southern part of west Bengal can be divided into two regions: the Gangetic plain and the littoral mangroves forest of Sundarbans. The alluvial soil of the Gangetic plain, compounded with favorable rainfall, make this region especially fertile. Much of the vegetation of the western part of the state shares a floristic similarities with the plants of the Chota Nagpur plateau in the adjoining state. The predominant commercial tree species is Shorea robusta, commonly known as the Sal tree. The coastal region of Purba Medinipur exhibits coastal vegetation; the predominant tree is the casuarina. A notable tree from the Sundarbans is the ubiquitous sundarim from which the forest gets its name.

The distribution of vegetation in northern west Bengal is dictated by elevation and precipitation. For example, the foot hills of the Himalayas, the dooars, are densely wooded with sal and other tropical evergreen trees. However, above an elevation of 1000meters(3300ft), the forest become p0redominantly subtropical. In Darjeeling, which is above one 1500meters(4900), temperate-forest trees such as oaks, conifers, and rhododendroas predominant.The southern deltaic parts of west Bengal possesses a combination of more than 60 species of the Sundarbans. The mangrove ecosystem consisting of true mangroves, mangrove associates and obligate mangrove in the state of west Bengal.

The Importance Of Floral Diversity

The term flora in Latin means ''Goddess of the Flower''. Flora is a collective term from a group of plant life found in a particular region the whole plant kingdom its represented by this name.

Flora are very important for human existence. The flora liberates oxygen that is consumed by the fauna for respiratory flora hugely benefit mankind through its medicinal and food offerings. Animals maintain the equilibrium by predating on different plants and animals to balance their population on earth. The flora spread across the earth contribute to the aesthetic value of the earth people visit several forests, botanical garden etc to enjoy the beauty on landmarks. This explains significance of flora in our day to day lives. Each plant an animal in the world brings something to the environment that another plant will rely on. This create a balance of life that enables the life circle to survive. The flora is imperative because its from the find net of life. The plants of the earth produce the oxygen that is breathed by the fauna an intern, the fauna exhales the caron di oxide that the flora need to live one can not live out the others, and humans can not live without either. The existence of one species depend upon the existence of the other. The importance of flora and fauna is linked with the very air with breathe and the food we eat. The flora produces medicines and the water absolutely necessary for live to exists. We are all connected through a food chain of which the fauna occupies a significant part. Our ecosystem, the flora and fauna are all inter dependent through food chains. Its starts from the primary the plants and ends with the highest consumer – man.

Plant diversity is invaluable because it balances the ecosystems, protects watersheds, mitigates erosion, moderates climate and provide shelter for animals. Threats to plant diversity include the increasing human population, pollution , deforestation, and species extinction.

DISCUSION

The flora indicates a significant diversity of plants which indicates the overall richness of the place. Overall flora has been classified in eleven groups. The most diverse group is the tree consisting of 70 species, whereas there is only one species of bamboo showing the list diversity. A total pf 256 floral species have been identified. In general the survival of the species is carried out by the process of reproduction. They can reproduce following different methods. From the above survey report it was shown that out of 97 species, only 66 species reproduces by the agent of seed; 9 species through seeds and root-stocks; 9 species by seeds and steam cuttings; two species each by the process of steam cutting, rhizomes, root-stocks; steam and other 1 species each through steams and leaf-cuttings; seeds and rhizome. The reproductive process of 3 pteridophytes is yet to be ascertained.

The finding of the present study reveal the diversity of the area, which possesses habitats with rich natural resources. The study confirm the existence of diversity plant species within the campuses and proper maintenance of the land.

Conclusion: The diversity in floral morphology is likely to have been facilitated by the existence of multiple parallel genetic pathways that can evolve independently of one another. These modular systems include the genetic programs controlling floral organ identity, floral symmetry, organ polarity, phyllotaxy, and merocity.

The medicinal plants are very important for socioeconomic point of view. But indiscriminate collection cause serious damage to the natural population of these plant species. Beside this, due to loss of habitats caused by top layer soil erosion, grazing of cattle, plant disease, deforestation, construction and extension of motorable roads, monoculture, herbicide and pesticide residues in soil, illegal collection, landslides and floods adversely affect the diversity resources of medicinal plant species of West Bengal. Therefore, an immediate attention is required to conserve these useful species from devastation in their habitat.

Literature Cited:

1. Banerjee, S.P. and R.B. Pramanik, 1977. Flora of West Bengal. Botanical Survey of India, Calcutta.
2. Bhattacharya, S.K. 2001. Handbook of medicinal plants. Pointer Publication, New Delhi.
3. Chatterjee, P and A. Mukherjee, 2015. Herbal Remedies in use in Hooghly district, West Bengal : An Ethnomedicinal documentation. Ind.
4. Chopra, R.N Nayar, S.L. and B.S. Verma, 1969 supplement of Glossary of Indian Medicinal Plants. CSIR, New Delhi.

WEBSITES

1. https://planningtank.com/environment/importance-flora-fauna
2. https://www.sciencedirect.com/science/article/pii/S2468265916300300

VIDYASAGAR METROPOLITAN COLLEGE

ENVIRONMENTAL STUDIES

PROJECT ON

FLORAL DIVERSITY OF WEST BENGAL AND ITS IMPORTANCE

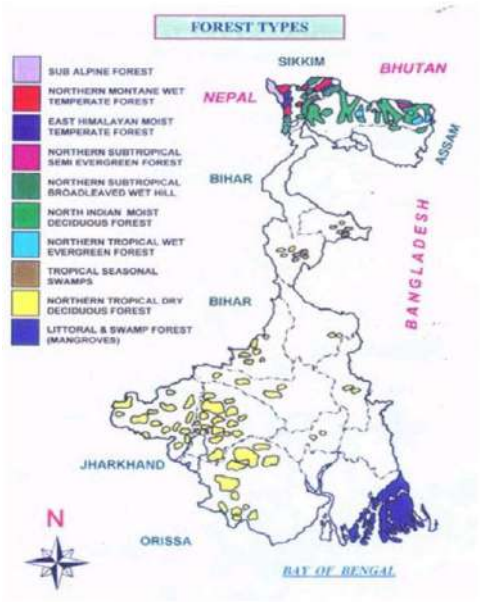

Figure 2-2 The map of forest type

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Lastly, we would like to thank our parents for their co-operation without which the completion of the project would be a distant reality.

Department of Environmental Studies

Place: Kolkata
Date: 26-05-2022

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CONTENT

FLORAL DIVERSITY
INTRODUCTION

Floral diversity refers to the diversity of plants occurring in a specific region during particular era. It generally refers to the diversity of naturally occurring indigenous or native plants. The word "Flora" comes from the Latin, *Flora* – the goddess of plants (*floris* means flower). A total of 215,644 species of plants out of 298,000 predicted have been catalogued on earth till-date. Apart, 8,600 plant species have been recorded from ocean out of estimated 16,600. India, being one of the tropical countries harbours 54,733 species including species of virus/bacteria and fungi. In India, the floral diversity is concentrated in four phytogeographically unique regions, viz., Himalayas, Western Ghats, Northeast India and Andaman and Nicobar Islands. The Indian Flora accounts for 11.4% of the total recorded plant species of the world and about 28% of the plant species are endemic (species confined to a particular geographical region) to India. Angiosperms are the largest plant group in India comprising a total of 21,849 species, constitutes 39.92% of floral diversity of the entire country, followed by fungi comprised of 15,504 species, representing 28.33%. The country also has high level of cryptogam (Bryophytes and Pteridophytes) diversity. A total of 1,310 species of Pteridophytes and around 2,791 of Bryophytes have been recorded from India so far. The bryophytes (Mosses and Liverworts) are also significantly rich in the Himalayas, Nilgiris, Western Ghats, Eastern Ghats and Andaman and Nicobar Islands. Algae and Fungi have widespread distribution in India. The diversity of marine algae in Gujarat coast of Okha-Dwarka region and Mandappam-Pamban region of Tamil Nadu coast appear to be the species-richest. Lichens are composite organisms consist of symbiotic algae and fungi found very rich in the Western Ghats, Eastern and Western Himalayas and Andaman and Nicobar Islands. A total of 2,961 species of Lichenes has been recorded from India so far. Most of the ferns and gymnosperms (including cycads, pines, firs, junipers, etc.) grow in cool temperate zones of the Himalayas, and in the mountainous regions of southern India, especially in the Western Ghats. According to current estimates, the Indian flora represents nearly 12% of the global floral diversity (excluding

viruses). The significance of the Indian flora is further evidenced by the number of species of wild relatives of crop plants in different regions of the country. Rice, sugarcane, jute, tree cotton, yams, brassicas, cucurbits, citrus fruits, various millets, tamarind, banana, mango, jackfruit, ginger, turmeric, cinnamons, cardamom, cumin seeds, black pepper, betel nut and numerous aromatic and medicinal plants are the important plant resources of the Indian region. Conservation is a protective measure to prevent the loss of genetic diversity of all species, to save species from extinction and ultimately to protect all the ecosystems from damage so as to promote their sustainable utilisation.

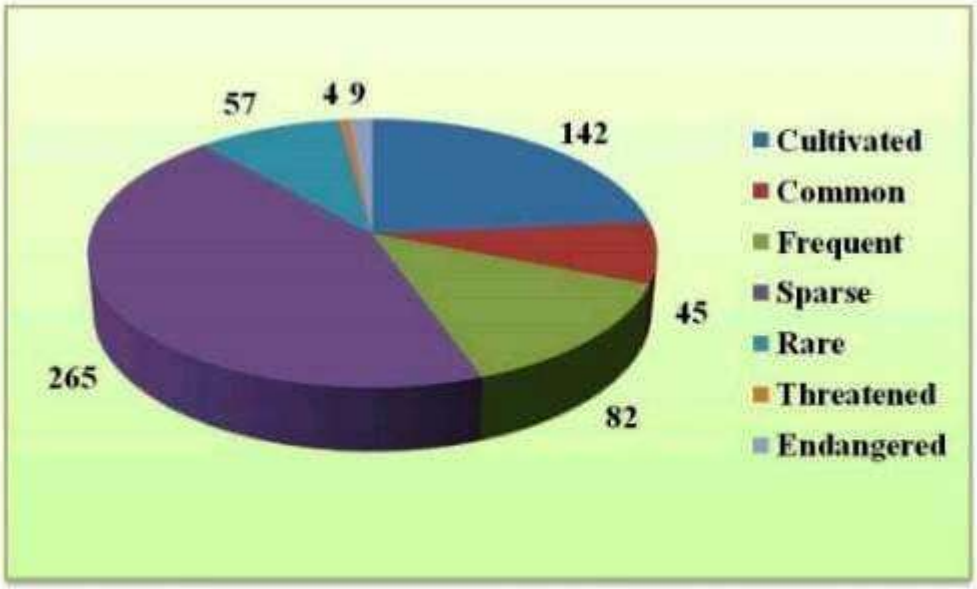

Fig. 1. Availability status of medicinal plant species of West Bengal

FLORAL DIVERSITY IN WEST BENGAL STATE

West Bengal, one of the states in Eastern India, lies between the Himalayas in the north and the Bay of Bengal in the south, at coordinates between $21^{0}45'$–$27^{0}16'$ N and $85^{0}55'$–$89^{0}56'$ E. It is the only state in India where Himalayas are in the north and Sea is at the south, with both plains and plateaus covering the remaining region. At present the state has a total area of about 88,752 km^2. The state on the north is bounded by Sikkim and Bhutan, on the east by Assam and Bangladesh, the Bay of Bengal forms the southern boundary and the on west it is bounded by Odisha, Bihar and Nepal. The state has a coastline of about 210 km.

The major land mass of the state can be divided into two natural geographical divisions, viz. the Northern Himalayas and the southern plane divisions excepting the spurs of western hilly tract of the bordering states of Bihar and Odisha. There are five broad land forms, namely Darjeeling Himalayan hill region, Tarai-Duars region, western undulating high land and plateau, North and South Bengal plains and Gangetic deltaic regions. The Darjeeling Himalayan region includes a number of mountainous ranges rising up to 3900 m, where almost alpine conditions prevail in Sandakphoo and Phaloot. However, administratively there are 20 districts and 3 divisions in the state. The Burdwan division consists of Bankura, Burdwan, Birbhum, East Mednipur, West Medinipur, Hoogly, and Purulia districts, the Jalpaiguri division consists of Alipurduar, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Darjeeling, Jalpaiguri and Malda districts, and the Presidency division consists of Kolkata, Murshidabad, Nadia, North 24 Parganas, South 24 Parganas and Howrah districts. The climate of West Bengal varies from tropical savannah in the southern parts to humid subtropical in the north. The temperature during summer in the state ranges between 26°C and 40°C, while during winter it range from 13°C to 19°C. Because of high altitude, the mountainous parts of Darjeeling and Jalpaiguri districts

experience a cool temperate kind of climate, where the average temperature in summer is about 15°C, and in winter about 2°C. Snowfall occurs in some part of this region. The annual rainfall varies in different parts of the state. North Bengal receives the highest rainfall, ranging from 200 to 400 cm annually. In the coastal areas, rainfall is about 200 cm, in the Gangetic plains and in the central part of the state rainfall is 150–200 cm and in the western plateau region the amount of rainfall received is 100–125 cm. The atmospheric relative humidity varies from 80 to 90% over greater part of the state. West Bengal has many lakes and rivers. There are 54 major rivers that flow through the state, of which important ones are the Ganga, the Teesta, the Torsha, the Jaldhaka, the Raidak, the Sankosh, the Mahananda originate from the Himalayas; the river Damodar, the Mayurakshi, and the Rupnarayan originate from Chotonagpur plateau, the Matla, the Gosaba, the Harbhanga are tidal rivers in Sundarban areas. There are 19 major lakes in the state, of which East Calcutta wetlands and Rasikbil are important. The study of plants in West Bengal was initiated as early as in 1784 when W. Jones founded the Asiatic Society of Bengal in Calcutta. Robert Kyd in 1787 founded the Botanic Garden on the bank of the river Hooghly near Calcutta and since its establishment some of the most important economic plants such as Tea, Jute, Cinchona, Teak and Mahogany were introduced into the garden, for cultivation and development, especially in Bengal.

William Roxburgh in 1814 published an interesting catalogue of about 3500 species of plants under cultivation in Calcutta Botanic Garden. The contributions of two contemporary Botanists, viz. William Carey and Buchanan-Hamilton in botanical and horticultural research are of great significance to West Bengal. Voigt in 1845 enlisted the plants grown in the Botanic Garden of Calcutta and that of Carey's Garden at Serampore. The history of botanical researches in West Bengal and growing interest of local people in plants have a close link with the establishment of the Calcutta Herbarium (CAL). David Prain in 1903 published the flora of the plains of

Bengal as “Bengal Plants” in 2 volumes and it is the only comprehensive and useful flora of the erstwhile Bengal. Since then, numerous works on the flora of different parts of West Bengal as well as on different groups of plants in the state have been published. Some of the recent publications pertaining to the flora of West Bengal are “Flora of Howrah District” by Bennet (1979), “Flora of Murshidabad District” by Guha Bakshi (1984), “Flora of Bankura District” by Sanyal (1994), Flora of West Bengal Volume 1 by Botanical Survey of India in 1997 and “Flora and Ethnobotany of West Dinajpur District, West Bengal’ by Mitra & Mukherjee (2013).

	Common Name	Scientific Name	Family
1.	African Tulip Tree	*Spathodia campanulata*	Bignoniaceae
2.	Allspice Tree	*Pimenta dioica*	Myrtaceae
3.	Amla	*Emblica officinalis*	Euphorbiaceae
4.	Ashoka Tree	*Saraca asoka*	Fabeceae
5.	Ashoka Tree	*Saraca asoka*	Fabeceae
6.	Bahera	*Terminalia bellirica*	Combretaceae
7.	Banyan Tree	*Ficus benghalensis*	Moraceae
8.	Bhawarmal, Bohar, Biharukh	*Hymenodictyon orixense*	Rubiaceae
9.	Buddha Coconut	*Pterygota alata*	Sterculiaceae
10.	Burma Teak	*Tectona grandis*	Verbenaceae
11.	Butterfly Tree	*Bauhinia purpurea*	Caesalpiniaceae
12.	Caledonia Pine/ Christmas Tree	*Araucaria cookii*	Arucariaceae
13.	Chhatiyan / Devil's Tree	*Alstonia scholaris*	Apocynaceae
14.	Cluster Fig	*Ficus glomerata*	Moraceae
15.	Copper Pod Tree	*Peltoforum pterocarpum*	Caesalpiniaceae
16.	Custard Apple	*Annona reticulata*	Annonaceae
17.	Drumstick Tree	*Moringa oleifera*	Moringaceae
18.	Dysoxylum sp.	*Dysoxylum costulatum* Miq.	Miliaceae
19.	Elephant Apple	*Dillenia indica*	Dilleniaceae
20.	Eucalyptus	*Eucalyptus* spp.	Myrtaceae

IMPORTANCE

#1. Forests create oxygen

Trees are nature's recycling machines. They take carbon dioxide and transform it into oxygen. On average, two mature trees produce enough oxygen for a family of four every year. If we don't protect our forests, we're endangering our own lives and the lives of everything that needs oxygen to survive. By itself, the Amazon rainforest is responsible for about 6% of the oxygen created by photosynthetic organisms.

#2. Forests filter the air and reduce pollution

Trees don't only create oxygen from carbon dioxide, they're also natural filters. They remove air pollutants like carbon monoxide, nitrogen dioxide, and sulfur dioxide. Using their "stomata," which are essentially pores, trees absorb all kinds of gases and particles, filtering them from the air. Forest conservation can play an important role in reducing air pollution around the world.

#3. Forests provide food security

Besides the nuts, berries, fruits, mushrooms, and seeds that humans eat, the forest supports a huge variety of animal life we also depend on for food. Without forests, these animals would die, leaving us with significantly limited options. There are already people in the world struggling with food insecurity because of deforestation.

#4. Forests help reduce climate change

Carbon dioxide is one of the greenhouse gases that drive climate change. Trees reduce the amount that's released into the atmosphere. As a result, forests cool the environment around them. In cities where it tends to be hotter, green spaces can help keep down the heat. If natural systems like forests were protected and restored, they could help the world get ⅓ of the way closer to meeting our climate change mitigation goals by 2030. On the other hand, destroying forests accounts for 15% of all greenhouse emissions.

#5. Forests are an important part of the water cycle

With their roots, trees pull water from the earth and release it back into the atmosphere. Especially-large forests create their own climates and can trigger rainfall. This is especially important in areas vulnerable to drought. Forest watersheds also provide clean drinking water, acting as a natural water collection, filtration, and storage system.

RESULTS

Floral species observation and identification

Checklist of floral groups with number of species.

	Floral categories	No. of species
1.	Tree	70
2.	Aquatic plants	7
3.	Grass	3
4.	Herb	65
5.	Shrub	60
6.	Creeper	26
7.	Palms	10
8.	Parasitic plants	2
9.	Fern	3
10.	Season flowers	10
	Total species:	256

CONCLUSION

Pathra is a village temple under Gram Panchayat and historically it was an important hub for Hindus, Jains and Buddhists from 8th Century to 12th Century. From the vegetation point o view Pathra is a treasure trove, there are growing as many as 97 floristic components ultimately constitute a flora of its own. The denizens of Pathra and its adjoining areas have religious beliefs, taboos, socio-cultural peace over this place from time immemorial. This floral diversity can be considered as "Treasure House" due to its bio-resource, bio-prospection and ultimate source of information for the conservators, academicians and researchers.

The floristic elements (plants) are also the source of medicines, food, fodder, fuel, pollinators, keystone species, water conservation, nutrient cycle monitoring, soil conservation and ultimately conservation of germplasm of wild relatives.

Above all floristic as well as conservation point of view such pockets should be maintained scientifically from their gradual disappearance through grazing, natural calamities etc giving topmost priority.

BIBLIOGRAPHY

BSI, 1997. *Flora of West Bengal.* Vol. 1. Botanical Survey of India, Calcutta.

Bennet, S.S.R. 1979. *Flora of Howrah district.* Periodical Expert Book Agency, New Delhi.

Bhattacharyya, U.C. 1997. Introduction. In: *Flora of West Bengal.* Vol. 1. Botanical Survey of India, Calcutta. pp. 1—78.

Chakraverty, R.K., Srivastava, R.C., Mitra, S., Bandyopadhyay, S. & Bandyopadhyay, S. 1999. West Bengal. In: Mudgal, V. & Hajra, P.K. (eds.), *Floristic Diversity and Conservation Strategies in India.* Vol. **3**. Botanical Survey of India, Calcutta. pp. 1517—1630.

Champion, H.G. & Seth, S.K. 1968. *A Revised Survey of Forest Types of India.* Govt. of India Press, Delhi.

ENVIS-BSI, 2008. *Bibliography and Abstracts of Papers on Flora of West Bengal.* Volume I. ENVIS Centre on Floral Diversity, Botanical Survey of India, Howrah.

Gamble, J.S. 1875. The Darjeeling forests. *Indian Forester* 1: 73—99.

Gantait, S., Bandyopadhyay, S. & Lakshminarasimhan, P. 2010. *Bibliography and Abstracts of Papers on Flora of West Bengal.* Volume II. ENVIS Centre on Floral Diversity, Botanical Survey of India, Howrah.

Guha Bakshi, D.N. 1984. *Flora of Murshidabad District, West Bengal, India.* Scientific Publishers, Jodhpur.

Malick, K.C. 1966. A contribution to the Flora of Purulia district, West Bengal. *Bull. Bot. Surv. India* 8:45—59.

Mitra, S. & Mukherjee, S.K. 2013. *Flora and Ethnobotany of West Dinajpur District, West Bengal.* Bishen Singh Mahendra Pal Singh, Dehra Dun.

Mitra, S., Bandyopadhyay, S. & Mukherjee, S.K. 2010. *Bibliography of Flora and Ethnobotany in West Bengal.* East Himalayan Society for Spermatophyte Taxonomy, Siliguri.

Naskar, K.R. & Guha Bakshi, D.N. 1987. Mangrove swamps of the Sundarbans – An ecological perspective. Calcutta.

Sanjappa, M., Paul, T.K. & Lakshminarasimhan, P. 2012. A note on some Threatened Plants. Biological Diversity – Origin, Evolution and Conservation. West Bengal Biodiversity Board, Kolkata. pp. 243—251.

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আশ্রমিক শিক্ষা, শান্তিনিকেতন ও রবীন্দ্রনাথ

বিশ্বকবি রবীন্দ্রনাথ ঠাকুর শান্তিনিকেতনে নিজের শিক্ষাচিন্তার ভিত্তিতে শিক্ষাপ্রতিষ্ঠান গড়ে তোলেন। রবীন্দ্রনাথ ঠাকুরের পিতা মহর্ষি দেবেন্দ্রনাথ ঠাকুর রায়পুরের জমিদার ভুবনমোহন সিংহের কাছ থেকে ২০ বিঘা জমি নিয়ে ১৮৬৩ খ্রিস্টাব্দে শান্তিনিকেতন আশ্রম প্রতিষ্ঠা করেন। এখানে রবীন্দ্রনাথ ঠাকুর ১৯০১ খ্রিস্টাব্দের ২২ ডিসেম্বর পাঁচজন ছাত্র নিয়ে ব্রত্মচর্যাশ্রম'নামে একটি বিদ্যালয় প্রতিষ্ঠা করেন। ধাপে ধাপে এই শান্তিনিকেতনেই রবীন্দ্রনাথ ঠাকুর বিশ্বভারতী' প্রতিষ্ঠা করেন।

রবীন্দ্রনাথ ঠাকুরের শান্তিনিকেতন ভাবনা :

১. রবীন্দ্রনাথ ঠাকুর তার নিজস্ব শিক্ষাচিন্তার ভিত্তিতে শান্তিনিকেতনে শিক্ষাপ্রতিষ্ঠান গড়ে তোলেন। তিনি চেয়েছিলেন প্রকৃতির কাছাকাছি আদর্শ পরিবেশের মধ্যে শিশুদের বড়ো করে তুলতে হবে।

২. রবীন্দ্রনাথ ঠাকুর প্রাচীন ভারতের আশ্রমিক শিক্ষার ভাবধারায় অনুপ্রাণিত হয়েছিলেন। তাই তিনি শিক্ষার্থীদের শান্তিনিকেতনে রেখে শিক্ষা দেওয়ার পরিকল্পনা করেছিলেন।

৩. রবীন্দ্রনাথ ঠাকুর শান্তিনিকেতনে গুরু ও শিষ্যের মধ্যে মধুর সম্পর্ক গড়ে তোলার উপর গুরুত্ব আরোপ করেছিলেন। তিনি বলতেন, শিক্ষক শ্রদ্ধার সঙ্গে জ্ঞান বিতরণ করবেন আর শিক্ষার্থীরা শ্রদ্ধার সঙ্গে তা আহরণ করবে।

৪. রবীন্দ্রনাথ ঠাকুর শান্তিনিকেতনে শিক্ষার্থীদের সৃজনমূলক কাজের উপর

গুরুত্ব আরোপ করেছিলেন। এখানে তিনি বিভিন্ন ধরনের উৎসব পালন করারও ব্যবস্থা করেন। তিনি বলতেন, এসবের মাধ্যমে শিক্ষার্থীদের পরিপূর্ণ বিকাশ ঘটবে।

৫. এই বিদ্যালয়ে গতানুগতিক সময়তালিকার বিশেষ গুরুত্ব ছিল না। শিক্ষার্থীর প্রয়োজন ও সামর্থ্য অনুসারে তা নির্ধারণ করা হত।।

শান্তিনিকেতনে বিশ্বভারতী প্রতিষ্ঠা :

রবীন্দ্রনাথ ঠাকুর শান্তিনিকেতনে 'বিশ্বভারতী' প্রতিষ্ঠা করে তাকে বিশ্বজাতির মিলনভূমিতে পরিণত করতে চেয়েছিলেন। তিনি বিশ্বভারতীতে বিশ্বধর্ম ও সংস্কৃতির মেলবন্ধন ঘটাতে চেয়েছিলেন। এজন্য তিনি এখানে চিন, জাপান, ইউরোপ, আমেরিকা-সহ বিশ্বের বিভিন্ন দেশের পণ্ডিতদের নিয়ে এসেছিলেন। রবীন্দ্রনাথ ঠাকুরের শান্তিনিকেতন প্রতিষ্ঠার প্রাথমিক উদ্দেশ্য ছিল অন্ত প্রকৃতির সঙ্গে বহি প্রকৃতির সম্বন্ধ সাধন। মানব সত্যির পূর্ণ বিকাশ এবং নিজেকে জাতির উপযোগী দক্ষ কল্যাণময়ী সদস্য হিসেবে গড়ে তোলা।

এছাড়া শান্তিনিকেতন প্রতিষ্ঠার অপর দিক ছিল মানুষ, প্রকৃতি ও শিক্ষার সমন্বয় এর মধ্য দিয়ে শিক্ষার্থীদের শিক্ষা ভাবনার দিকটিকে তুলে ধরে বিকাশ ঘটানো।এই বিশ্ববিদ্যালয়ের মুখ্য উদ্দেশ্য বিদ্যা উদ্ভাসন এবং গৌণ উদ্দেশ্য বিদ্যা দান। রবীন্দ্রনাথের শিক্ষাদর্শের মূলকথা হল মানবপ্রেম, সৌন্দর্যানুভূতি, স্বাধীনতা এবং প্রকৃতি। তাই তিনি বিদ্যালয়ের ক্ষুদ্র গণ্ডি থেকে ছেলেমেয়েদের মুক্তি দেওয়ার জন্য শান্তিনিকেতনের উন্মুক্ত প্রান্তরে পল্লি প্রকৃতির কোলে বিদ্যালয় স্থাপন করেছিলেন। তিনি ছেলেমেয়েদের মনের সঙ্গে বিশ্বপ্রকৃতির একটা নিবিড় যোগাযোগ স্থাপন করতে চেয়েছিলেন।

শান্তিনিকেতনে প্রকৃতি, মানুষ ও শিক্ষার সমন্বয় ঘটানো :

রবীন্দ্রনাথ ঠাকুর শান্তিনিকেতনে প্রকৃতি, মানুষ ও শিক্ষার সমন্বয় ঘটাতে চেয়েছিলেন। এজন্য শান্তিনিকেতনের ছাত্রছাত্রীদের শ্রেণিকক্ষের বাইরে প্রকৃতির মধ্যে গাছের তলায় শিক্ষা দেওয়া হত। তা ছাড়া শান্তিনিকেতনের সঙ্গে পাশাপাশি গ্রাম ও তার মানুষদের ঘনিষ্ঠ যোগাযোগ

ছিল। তাই শান্তিনিকেতনের শিক্ষা হয়ে উঠেছিল মানবতাবোধের শিক্ষা। তিনি শিক্ষার্থীর মধ্যে মুক্ত শিক্ষার প্রসার ঘটানোর লক্ষ্যে এই বিশ্ববিদ্যালয় প্রতিষ্ঠা করেন। রবীন্দ্রনাথ ঠাকুর এই শান্তিনিকেতনে ১৯২১ খ্রিস্টাব্দে বিশ্বভারতী'

প্রতিষ্ঠা করেছিলেন। রবীন্দ্রনাথ ঠাকুরের শান্তিনিকেতন ভাবনা শুধু বাংলা বা ভারতে নয়, পৃথিবীর ইতিহাসে একদিকচিহ্ন হয়ে আছে। দেশ-বিদেশের বহু ছাত্র ও শিক্ষকরা এই প্রতিষ্ঠানের সঙ্গে যুক্ত হয়েছেন। রবীন্দ্রনাথ ঠাকুর তাঁর শান্তিনিকেতন প্রতিষ্ঠার মধ্য দিয়ে ঔপনিবেশিক চার দেওয়ালের কেরানি তৈরির শিক্ষার সমালোচনা করে প্রাকৃতিক কোলে মুক্তচিন্তার মধ্য দিয়ে মানবসত্তার বিস্তার ঘটিয়ে জীবন শৈলী ও জীবন শিক্ষার বিকাশ ঘটাতে চেয়েছেন। শান্তিনিকেতন হলো ভারতের পশ্চিমবঙ্গের বীরভূম জেলার বোলপুর শহরের একটি পাড়া। পাড়াটি মহর্ষি দেবেন্দ্রনাথ ঠাকুর প্রতিষ্ঠা করেছিলেন এবং তাঁর পুত্র রবীন্দ্রনাথ ঠাকুর তাকে আরো বিকাশিত করেছিলেন। এখানে বিশ্বভারতী বিশ্ববিদ্যালয় অবস্থিত। রবীন্দ্রনাথ ঠাকুর কর্তৃক বিশ্ববিদ্যালয় প্রতিষ্ঠা এবং সেখানে তার অবস্থানের ফলে শান্তিনিকেতন একটি বিশ্ববিদ্যালয়ের শহরে পরিণত হয়। শান্তিনিকেতন এলাকাটি অজয় নদ ও কোপাই নদী দ্বারা আবদ্ধ। ২৭ জানুয়ারি ১৮৭৮-এ (১৩ মাঘ ১২৮৪-এ) রবীন্দ্রনাথ ঠাকুর প্রথম শান্তিনিকেতনে এসেছিলেন। তখন তাঁর বয়স ১৭ বছর। ২০২৩ খ্রিস্টাব্দে ইউনেস্কোর বিশ্ব ঐতিহ্যের তালিকায় স্থান লাভ করে শান্তিনিকেতন। রবীন্দ্রনাথ ঠাকুর তাঁর জীবনের দ্বিতীয়ার্ধের অধিকাংশ সময় শান্তিনিকেতন আশ্রমে অতিবাহিত করেছিলেন। তাঁর সাহিত্য ও সৃষ্টিকর্মে আশ্রম ও আশ্রম-সংলগ্ন প্রাকৃতিক পরিবেশের উপস্থিতি সমুজ্জ্বল। শান্তিনিকেতন চত্বরে নিজের ও অন্যান্য আশ্রমিকদের বসবাসের জন্য রবীন্দ্রনাথ ঠাকুরের অনিন্দ্য স্থাপত্যসৌকর্যমণ্ডিত একাধিক ভবন নির্মাণ করিয়েছিলেন। পরবর্তীকালে আশ্রমনিবাসী বিভিন্ন শিল্পী ও ভাস্করের সৃষ্টিকর্মে সজ্জিত হয়ে এই আশ্রম একটি গুরুত্বপূর্ণ পর্যটনস্থল হয়ে ওঠে। ১৯৫১ সালে বিশ্বভারতী বিশ্ববিদ্যালয় ভারতের কেন্দ্রীয় বিশ্ববিদ্যালয়ের মর্যাদা লাভ করে।

শিক্ষার লক্ষ্য: রবীন্দ্রনাথের মতে শিক্ষার লক্ষ্য হল—

১.শিক্ষার্থীর ব্যক্তিত্বের পরিপূর্ণ বিকাশসাধন।

২.প্রকৃতির সঙ্গে প্রতিটি শিক্ষার্থীর সম্পর্ক স্থাপন

৩.শিক্ষার্থীর মধ্যে সৌন্দর্যবোধের বিকাশ ঘটানো।

৪.শিক্ষার্থীকে চিরন্তন পরমসত্তার উপলব্ধিতে সহায়তা করা।

শান্তিনিকেতন ভবন

শান্তিনিকেতন ভবন আশ্রমের সবচেয়ে পুরনো বাড়ি। মহর্ষি দেবেন্দ্রনাথ ঠাকুর ১৮৬৪ সালে এই বাড়িটি তৈরি করিয়েছিলেন। বাড়িটি দালান বাড়ি। প্রথমে একতলা বাড়ি ছিল। পরে দোতলা হয়। বাড়ির উপরিভাগে খোদাই করা আছে

সত্যাত্ম প্রাণারামং মন আনন্দং মহর্ষির প্রিয় উপনিষদের এই উক্তিটি। তিনি নিজে বাড়ির একতলায় ধ্যানে বসতেন। কৈশোরে বাবার সঙ্গে হিমালয়ে যাওয়ার পথে রবীন্দ্রনাথ ঠাকুর এখানে কিছুদিন বাস করেন। বাড়িটির সামনে রামকিঙ্কর বেইজ নির্মিত একটি বিমূর্ত ভাস্কর্য রয়েছে।

শান্তিনিকেতনর উৎসব-অনুষ্ঠান

পৌষ উৎসব : পৌষমেলা বা পৌষ উৎসব হল শান্তিনিকেতন-শ্রীনিকেতন অঞ্চলের প্রধান উৎসব। দেবেন্দ্রনাথ ঠাকুরের ব্রাহ্মধর্মে দীক্ষাগ্রহণ স্মরণে এই উৎসব পালিত হয়। উৎসব ও মেলা শুরু হয় প্রতি বছর ৭ পৌষ; চলে তিন দিন ধরে। প্রতি ডিসেম্বর মাসের ঠিক ২৩ তারিখ থেকে প্রচুর আলো বাজির রোশনাই সঙ্গে নিয়ে ভুবন ডাঙার মাঠে সূচনা হয় পৌষালী এই মেলার।

বসন্ত উৎসব : বসন্ত উৎসব মানেই হাজার হাজার বাঙালির ঠিকানা শান্তিনিকেতন। রং আর আবিরে যেন রাঙ্গা হয়ে যায় রবীন্দ্রনাথের শান্তিনিকেতন। সকাল থেকেই যেন উৎসবের চেহারা। বেজে ওঠে সেই চেনা গান- "ওরে গৃহবাসী, খোল দ্বার খোল, লাগল যে দোল" অথবা একেবারে শেষ মুহূর্ত –"রাঙিয়ে দিয়ে যাও যাও যাও গো"। ১৯২৫ সালে প্রথম পথ চলা শুরু হয় এই বসন্ত উৎসবের। উৎসবের মূল সুর যেন তখন থেকেই বেঁধে দেওয়া হয়ে গিয়েছিল। তখন থেকেই দেশ-বিদেশের নানা অতিথির পাশাপাশি উৎসবে সামিল করা হতো আদিবাসীদেরও। সেই প্রথা আজও চলেছে। সকাল থেকেই শান্তিনিকেতনের রাস্তা রাঙ্গা হয়ে ওঠে আবিরে। বিশ্বভারতী চত্বরই মূলত এই মূল অনুষ্ঠানের অঙ্গ। সেখানে নৃত্যনাট্যের পাশাপাশি চলে নানা উৎসব। আশ্রমের ছাত্রছাত্রীরা তো থাকেনই। তাছাড়াও থাকেন ভিনদেশি ছাত্রছাত্রীরাও। নেচে ওঠে বিভিন্ন প্রান্ত থেকে আসা পর্যটকরাও। এমনকী বিদেশিরাও। পৌষ উৎসব পেরিয়ে যাওয়ার পর থেকেই শান্তিনিকেতন অপেক্ষায় থাকে, কখন আসবে বসন্ত উৎসব।

কবিগুরুর বিশ্বতীর্থ শান্তিনিকেতন

কবিগুরু রবীন্দ্রনাথের এই শান্তিনিকেতন যেন এক বিশ্বতীর্থ। শহরের কোলাহল থেকে দূরে প্রকৃতির একান্ত নিভৃতে অবস্থান নেয়া এই স্থানটি এখন

গোটা বিশ্বের মানুষের কাছে শুধু বিদ্যা অর্জন নয় এক পরম দর্শনীয় স্থানে পরিণত হয়েছে। যেখানে শাল, সেগুনের ছায়াবীথি, বুনো ফুলের সুবাসে ঋতু বৈচিত্র্যের ছোঁয়া পাওয়া যায়। রবীন্দ্রনাথের সারা জীবনের স্বপ্নময় এই শান্তিনিকেতনে যেন আজও প্রতিটি ক্ষেত্রে তার উজ্জ্বল উপস্থিতি। কবির সময়কালে পাক-ভারতের অনেক বিখ্যাত মানুষের পদচারণা ছিল এই শান্তিনিকেতনে। শান্তিনিকেতনে কবি রবীন্দ্রনাথের স্মৃতিময় অন্যান্য দর্শনীয় স্থান হচ্ছে তাঁর স্মৃতিবিজড়িত বাড়ি।

বিশ্বভারতী বিশ্ববিদ্যালয়

সাহিত্যিক, উপন্যাসিক, প্রাবন্ধিক, নাট্যকার, সঙ্গীতকার ও জাতীয়তা বাণী রবীন্দ্রনাথ ঠাকুরের শিক্ষা চিন্তার মৌলিক প্রতিফলন শান্তিনিকেতন প্রতিষ্ঠা (১৯১১ খ্রিস্টাব্দে)। বিশ্বভারতী বিশ্ববিদ্যালয় ভারতের একটি কেন্দ্রীয় বিশ্ববিদ্যালয়। এই বিশ্ববিদ্যালয়টি পশ্চিমবঙ্গ রাজ্যের বীরভূম জেলার বোলপুর শহরে অবস্থিত। ১৯২১ সালে রবীন্দ্রনাথ ঠাকুর বিশ্বভারতী প্রতিষ্ঠা করেন। ১৯৫১ সালে এটি কেন্দ্রীয় বিশ্ববিদ্যালয়ের মর্যাদা লাভ করে। কবিপুত্র রথীন্দ্রনাথ ঠাকুর ছিলেন বিশ্ববিদ্যালয়ের প্রথম উপাচার্য। দেশবিদেশ থেকে প্রচুর ছাত্রছাত্রী এই বিশ্ববিদ্যালয়ের পড়াশোনা করতে আসেন। এই

বিশ্ববিদ্যালয়ের স্বনামধন্য প্রাক্তনীদের মধ্যে বিশেষভাবে উল্লেখযোগ্য নোবেলজয়ী অর্থনীতিবিদ অমর্ত্য সেন, অস্কারবিজয়ী চিত্র-পরিচালক সত্যজিৎ রায়, ভারতের প্রাক্তন প্রধানমন্ত্রী ইন্দিরা গান্ধী প্রমুখ।

১৯০১ সালের ডিসেম্বরে (৭ পৌষ ১৩০৮ বঙ্গাব্দ) বোলপুরের নিকটস্থ শান্তিনিকেতন আশ্রমে রবীন্দ্রনাথ ঠাকুর "ব্রহ্মচর্যাশ্রম" নামে একটি বিদ্যালয় স্থাপন করেছিলেন। প্রথমদিকে এই বিদ্যালয়ে শিক্ষাদান পদ্ধতি ছিল আশ্রমিক শিক্ষা। প্রাকৃতিক সান্নিধ্য থেকে গুরু শিষ্যের মধ্যে ব্যবধান দূর করে শিক্ষাদান করাই ছিল তার শিক্ষা নীতির মূল কথা। প্রথম পাঁচ জন শিক্ষার্থী নিয়ে শান্তিনিকেতনে ব্রহ্মচর্যাশ্রম বিদ্যালয় প্রতিষ্ঠা করেন (১৯০১ খ্রিস্টাব্দে)। কবিগুরু এইখানে শিক্ষাকে চার দেওয়ালের মধ্যে বেঁধে না রেখে প্রকৃতির কোলে মুক্ত করেন। এই বিদ্যালয়ের উদ্দেশ্য ছিল প্রচলিত বৃত্তিমুখী অপূর্ণাঙ্গ শিক্ষার পরিবর্তে ব্যবহারিক শিক্ষার মাধ্যমে ছাত্রছাত্রীদের পূর্ণাঙ্গ মনোবিকাশের সুযোগদান। রবীন্দ্রনাথ প্রাচীন ভারতের তপোবন বিদ্যালয় থেকে এই বিদ্যালয়ের আদর্শটি গ্রহণ করেন। এই বিদ্যালয় এখন পাঠভবন নামে পরিচিত। কবিগুরু শুধু পাঠভবন গড়েই থেমে থাকেননি, ত্রিপুরার মহারাজার অর্থ সাহায্যে ১৯২১ সালে তিনি গড়ে তোলেন বিশ্বভারতী যা আজ সারা ভারতবর্ষের শিক্ষার এক অন্যতম পীঠস্থান। দেশ বিদেশের নানা প্রান্ত

থেকে মানুষ এইখানে পড়তে আসেন যা আক্ষরিক অর্থে এক মিলনভূমি তৈরি করেছে। বিদ্যালয় প্রতিষ্ঠায় রবীন্দ্রনাথ তাঁর পিতা দেবেন্দ্রনাথ ঠাকুর সানন্দক অনুমতি ও আশীর্বাদ লাভ করেছিলেন। বিদ্যালয়ের প্রথম পাঁচজন ছাত্রের অন্যতম ছিলেন কবিপুত্র রথীন্দ্রনাথ ঠাকুর।

শান্তিনিকেতন প্রাণের আরাম মনের আনন্দ আত্মার শান্তি

বিশ্বভারতী আর শান্তিনিকেতনের গোটা এলাকাটাই নানা জাতের গাছগাছালি আর পাখির কলকণ্ঠে মুখরিত। এখানে ঢুকলেই মনে হবে শহর থেকে অনেক দূরে কোন পল্লী গ্রামে এলাম। যেখানে ছায়া সুনিবিড় শান্তির নীড় এই শান্তিনিকেতন। রাস্তার দু'পাশে কড়ি ফুলের গাছ, সাদা সাদা ফুলে ছাওয়া গাছগুলোতে বর্ণালি প্রজাপতির উড়ে বেড়ানো। হিজল, তমাল, বৈচী, কৃষ্ণচূড়া, নানা বর্ণের পলাশ ফুল, বিশাল বটপাকুড়, তালগাছসহ রয়েছে আরও অনেক গাছগাছালি। এই গাছগাছালি আর ভাঁট ফুলের ঝোপঝাড়ে পাখপাখালির কলতানের সঙ্গে অসংখ্য ছোট কাঠবিড়ালীর ভয়ার্ত চেঁচামেচি আর ছোটাছুটি দেখে যে কেউ বিমুগ্ধ হবে। এই প্রাকৃতিক নিসর্গে মনের নিভৃতে কবিতা যে অজান্তে ডানা মেলে। লাল মাটির রাস্তা ধরে হাঁটতে হাঁটতে কোন এক একলা বিকেলে পৌঁছে যাওয়া যায় খোয়াইয়ে। এবড়ো খেবড়ো খোয়াইয়ে

সোনাঝুরী গাছের ফাঁক দিয়ে সূর্যটা পালিয়ে যাওয়ার আগে আকাশের মুখে ঢেলে দিয়ে যায় এক বালতি কমলা রং। সেই কমলা রঙে হারিয়ে যেতে যেতে একটু এগিয়ে গেলেই দেখা মিলবে ক্যানাল পার আর ভাঙ্গা খালের। এই পথ ধরে এগিয়ে গেলে পৌঁছে যাওয়া যায় আমার কুঠীতে। যদিও বর্ষা ছাড়া শান্তিনিকেতনের বুক চিরে বয়ে চলা কোপাই নদীতে জলের সন্ধান মেলে না তবুও কোপাইয়ের ধারে কেটে যেতে পারে অনাবিল একটা সুন্দর সন্ধ্যা। আশেপাশের নাম না জানা সাঁওতাল গ্রামগুলোও কিন্তু কম সুন্দর নয়।

সহায়ক গ্রন্থ : *রবীন্দ্রজীবনকথা; প্রভাতকুমার মুখোপাধ্যায়; আনন্দ পাবলিশার্স, কলকাতা; অগ্রহায়ণ, ১৩৮৮*

Project Report

(Submitted for the degree of B.com Honours in Accounting and Finance under the Calcutta University)

Title of the project

A study on Fruits and Vegetables Wholesalers of Baranagar Market

Name of the candidate :- Subhalaxmi Bose

Registration no:- 137-1211-0211-20

University Roll no:- 201137-11-0011

Name of the college :- Vidyasagar Metropolitan College

College Roll no:- B.com/20/1142

Supervised by

Name of the supervisor: - Dr.Sarajit Sardar

Designation :- Associate Professor

Month & Year of Submission

May,2023

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I am really thankful to them.

I would also like to thank my parents and friends who helped me a lot in finishing this project within the limited time.

I am making this project not only for marks but also increase my knowledge and experience.

Date :

Subhalaxmi Bose

SUPERVISOR'S CERTIFICATE

This is to certify that Subhalaxmi Bose , a student of B.com (Honours) in Accounting & Finance of Vidyasagar Metropolitan College under the University of Calcutta has worked under my supervision and guidance for her project work and prepared a project report with the title "**A study on Fruit and Vegetables Wholesalers of Baranagar Market".**

Date :

Signature :

Name : Dr. Sarajit Sardar

Designation: Associate Professor

College Name : Vidyasagar Metropolitan College

STUDENT'S DECLARATION

I, Subhalaxmi Bose , a student of B.com(Honours) in Accounting & Finance , hereby declare that the project work **"A study on Fruits and Vegetables Wholesalers of Baranagar Market** " submitted to the department of commerce , Vidyasagar Metropolitan College is a record of original work done by me under the supervision of **Dr. Sarajit Sardar** .

The information and data given is authentic to the best of my knowledge.

DATE :

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Contents

Abstract

Wholesale markets promote commercialization of agricultural production, economic development and engage the farmers to enter into contractual relations with traders. These wholesale markets generally specialize on sales of specific goods, for example, **Baranagar Market of North 24 Paraganas** has specialty in dealing a with vegetables. This market is one of the 54 wholesale markets in the City according to the West Bengal State Marketing Board and is one of the oldest and biggest markets. The market is the hub of wholesale vegetable trade of the State and caters to the entire City of Kolkata and its turnover is one of the largest vegetable markets in India. A bulk of Kolkata's vegetable supply from the rural areas is distributed from this market. This wholesale market has a wider impact on the socioeconomic life of the different hierarchical division of workers associated with it. This paper is an attempt to examine the functioning of the market, to analyze the socioeconomic profile of the market functionaries, to find out the problems experienced by the market and finally to look into the overall effect of the market on the economic development of the city. Participants in the wholesale market include manufacturers, producers, distributors, wholesalers, and retailers. Manufacturers and producers are the original source of goods, while distributors and wholesalers act as intermediaries who purchase goods in large quantities and distribute them to retailers. Retailers are the end buyers who sell goods to individual consumers.Key characteristics of the wholesale market include economies of scale, as large quantities of goods are bought and sold, allowing for cost efficiencies. It also involves B2B (business-to-business) transactions, as the focus is on selling goods in bulk to other businesses rather than individual consumers. The wholesale market operates based on supply and demand dynamics, with prices determined through negotiations and market forces.In conclusion, the wholesale market plays a critical role in the global supply chain, serving as a central marketplace for the exchange of goods and services between producers and retailers. It facilitates price discovery, aggregation, and distribution of goods, and involves various participants. Understanding the abstract of the wholesale market is essential for businesses and policymakers to navigate the complex world of global trade and commerce.

Keywords: Marketing, Supervision, Wholesale market, Commercialization, Economic Development.

CHAPTER-1

1.1 Introduction

The history of marketing for fruits and vegetables in India goes back several centuries, with agriculture and horticulture being the backbone of the Indian economy for a long time. However, the efficiency of marketing for these products has varied over time, depending on the prevailing economic, social, and political conditions. Prior to India's independence in 1947, the marketing of fruits and vegetables was largely unorganized and dominated by intermediaries such as commission agents, brokers, and moneylenders, who often exploited farmers and paid them low prices for their produce. The marketing infrastructure was also poor, with inadequate storage and transportation facilities, which led to significant wastage of agricultural produce. After independence, the government introduced several policies aimed at improving the marketing infrastructure and reducing intermediaries' role in the marketing process. One of the key initiatives was the establishment of regulated market yards, known as Agricultural Produce Market Committees (APMCs), which provided a platform for farmers to sell their produce directly to buyers.

Baranagar is a city located in the North 24 Parganas district of the Indian state of West Bengal. It is known for its thriving wholesale market, which is one of the largest in the state. The wholesale market of Baranagar is a hub for the trading of a wide range of commodities, including fruits, vegetables, grains, and spices. The market operates on a large scale, with buyers and sellers coming from all over the region to participate in the trade. The market is divided into several sections, each dedicated to a specific category of goods. For example, there are separate sections for fruits, vegetables, and grains, each with its own set of traders and commission agents.The wholesale market of Baranagar is known for its competitive pricing and transparent trading practices. The market operates on a commission basis, with commission agents playing a key role in facilitating trade between buyers and sellers.

Overall, the wholesale market of Baranagar is an important center for trade and commerce in West Bengal, playing a vital role in the economy of the region.

1.2 Background of the study:

The fruits and vegetables market are the backbone of our everyday life, we cannot live without this market as it is the primary source of our daily food habits. There are many big markets in North 24 Paraganas of which Baranagar is one of them. As, I lived in this place and every day I witness this market, even the fruits and vegetables vendors who do their daily activity buy their products from Baranagar market on a regular basis. Whenever, any occasion happens in my house we try to purchase vegetables and other items from this local market as there are varieties of vegetables there. A great curiosity was born to do a project on this big wholesale market where a lot of people's income are depending on this market, especially the small retailers from nearby places like Baranagar Market , Netaji colony, Pramadnagar Market etc. Frequently, when I visited this market, I witnessed that the sale of vegetables in the traditional markets (wholesale and retail) are decreasing day by day due to mall culture especially because of the young generations who prefers to buy from mall or by online delivery systems. As, a result the procurement of these fruits and vegetables are not happening in a proper way as the e-commerce companies or big retail companies like more, Flipkart Grocery, Blink it ,Spencers ,Big Basket and many companies like that they are purchasing these at a lower price thereby decreasing their profitability which can be dangerous in the near future. So, I have chosen the current project to understand the impact of Online and Mall Culture on the traditional market and also showcase their profitability, marketing expenses, marketing infrastructure etc.

The study also made an attempt to identify the prevailing value chain from the farmer. Farmer → Pre-harvest contractor → Commission.

Agent → Wholesaler → Retailer → Consumer in terms of costs, prices and their shares in the selected markets.

1.3 Literature Review :-

A real paucity of work is observed regarding the wholesale market functioning, socio-eco environmental profile of workers in markets of **North 24 Paraganas** . P. Sengupta (1992), in his study of "Whole Study of a Market in **North 24 Paraganas "**explained the detailed functioning of a wholesale market in the Cit published by the Centre of Rural Economic Study, Department of Economics, University of Ca Gandhi and N.V. Namboodiri (2004) in their research paper "Marketing of Fruits and Vegetables Study Covering the Ahmedabad, Chennai and Kolkata Markets" compared the marketing of pro markets of Ahmedabad, Chennai and Kolkata City.

1.4 Objectives of the study:-

The basic objectives are :

- To examine the functioning of **Baranagar Wholesale Market in North 24 Paraganas.**
- To make a micro study on **Wholesale Market of Baranagar**.
- To understand the current market situation at **Baranagar Wholesale Market.**
- To analyze the volume and type of goods that are transacted.
- To find out the extent of congestion inside the **Baranagar Market** and the problem that the market faces.
- To get an idea about the profitability of wholesale market .

1.5 Research Methodology :-

This chapter deals about the material and methodology followed in conducting the study under the following sub-headings:

- **Study Area:** The study area is situated in the **Baranagar Market** ward no. 33 of the South 24 Paraganas. Maximum people are coming to the **Baranagar Market** for purchasing fruit and vegetables and ranks first in North 24 Paraganas for transaction of highest amount of wholesale fruit and vegetables.

- **Number of respondents:** In Baranagar Market , North 24 Paraganas , a list of fruits and vegetables wholesalers was selected separately . Total number of traders is 40 of Baranagar Market.

- **Database:** Primary level field survey is one of the major sources of data and information. The data have been collected from the Baranagar Wholesale Market and carried out through 10 points questionnaire of the Fruit and Vegetables market of Baranagar . Relevant books on study area , relevant data and maps from the internet also have been collected .

- **Time Period:** The traders have shared information of the financial year 2022-2023 on the basis of their daily transactions. It had to make an approximation for monthly details.

  The survey has been conducted from February 2023 to March 2023.

- **Data Analysis:** Collected data are analysed with the help of various statistical tools such as Tables, Charts and graphs etc.
- **Questionnaire:** Various question were asked according to questionnaires scheduled and structured to various aratdars and survey was carried among them about the conditions of fruits and vegetables market.


TOI

CHAPTER-2

2. Conceptual Framework

2.1 Basic Concept :-

Botanically, fruits and vegetables are classified depending on which parts of the flower of a plant , while the other parts of the plant are categorized as vegetables. Fruits contain seeds, while vegetables can consist of roots , stems and leaves . From a culinary perspective, fruits and vegetables are classified based on taste.

2.2 General Importance of fruit and vegetable market :-

Here are some key points outlining the importance of the fruits and vegetables market :-

Essential Nutrients :- Fruits and vegetables are in rich vitamins , mineral, fibers and other essential nutrients that are important for maintaining good health and preventing chronic diseases.

Economic Importance :- The fruits and vegetables market provides employment opportunities for millions of people worldwide, including farmers , traders, processors and retailers. It is also an important export commodity for many countries , generating revenue and supporting economic growth.

Environmental Significance :- Fruits and Vegetables require fewer resources and produce fewer greenhouse gas emissions compared to animal-based products. Therefore, promoting their consumption can contribute to sustainable food production and help mitigate climate change.

Food Security : - The availability of diverse range of fruit and vegetables is crucial for ensuring food security , especially in developing countries where malnutrition is a significant concern.

Innovation :- The fruits and vegetables market is constantly evolving , with new varieties and cultivation methods being developed to increase production ,reduce waste and improve quality .

Health promotion :- Encouraging people to consume more fruits and vegetables can help promote healthier eating habits and reduce the risk of chronic diseases such as heart disease , diabetes and cancer.

Cultural Significance :- Fruits and Vegetables are an integral part of many cultural and traditional diets around the world , and their consumption is often associated with religious and social customs.

2.3 Present Cultivation pattern of North 24 Paraganas ;-

North 24 Parganas is a district in the Indian state of West Bengal, and it is primarily an agricultural region. The major crops grown in the district include paddy, jute, sugarcane, and vegetables such as potato, tomato, brinjal, cauliflower, and cabbage. The district is also known for its production of fruits such as mangoes, litchi, and bananas.

The cultivation pattern in North 24 Parganas is largely dependent on the monsoon season, which is the main source of irrigation for crops. The district has a predominantly rural economy, and most of the farmers in the region are small and marginal landholders. They rely on traditional farming methods and manual labor, although some farmers have started to adopt modern agricultural practices, including the use of tractors and other machinery.

Overall, the cultivation pattern in North 24 Parganas is characterized by a mix of traditional and modern farming practices, and it is influenced by factors such as climate, soil type, and market demand.

2.4 Production of fruit and vegetables :-

South America : The production percentage of fruits and vegetables in South America varies depending on the country and region. However, here are some general statistics on the production of fruits and vegetables in South America:

Brazil is the largest producer of fruits in South America, with a production of about 45 million tons per year. The most produced fruits in Brazil are oranges, bananas, mangoes, and apples. Brazil is also a significant producer of vegetables such as tomatoes, onions, and carrots.

Colombia is the second-largest producer of fruits in South America, with a production of about 7 million tons per year. The most produced fruits in Colombia are bananas, oranges, and pineapples. Colombia also produces significant amounts of tomatoes and onions.

Argentina is the third-largest producer of fruits in South America, with a production of about 4 million tons per year. The most produced fruits in Argentina are apples, pears, and grapes. Argentina also produces significant amounts of vegetables such as lettuce, onions, and potatoes.

Chile is a significant producer of fruits in South America, with a production of about 3.5 million tons per year. The most produced fruits in Chile are grapes, apples, and avocados. Chile also produces significant amounts of vegetables such as onions, tomatoes, and lettuce.

Overall, South America is a significant producer of fruits and vegetables globally, and its agricultural sector plays a crucial role in the economy of the region.

North America : The production percentage of fruits and vegetables in North America varies depending on the country and region. However, here are some general statistics on the production of fruits and vegetables in North America:

The United States is the largest producer of fruits and vegetables in North America, with a production of about 437 million tons per year. The most produced fruits in the United States are apples, oranges, bananas, grapes, and strawberries, while the most produced vegetables are potatoes, tomatoes, lettuce, onions, and sweet corn.

Mexico is the second-largest producer of fruits and vegetables in North America, with a production of about 40 million tons per year. The most produced fruits in Mexico are avocados, oranges, limes, lemons, and mangoes, while the most produced vegetables are tomatoes, onions, peppers, cucumbers, and zucchinis.

Canada is a smaller producer of fruits and vegetables in North America, with a production of about 4.5 million tons per year. The most produced fruits in Canada are apples, strawberries, and blueberries, while the most produced vegetables are potatoes, carrots, and lettuce.

Overall, North America is a significant producer of fruits and vegetables globally, with the United States and Mexico being the major players in the region. The agricultural sector in North America plays a crucial role in ensuring food security and supporting local economies.

Europe : The production percentage of fruits and vegetables in Europe varies depending on the country and region. However, here are some general statistics on the production of fruits and vegetables in Europe:

Spain is the largest producer of fruits and vegetables in Europe, with a production of about 35 million tons per year. The most produced fruits in Spain are oranges, mandarins, lemons, and strawberries, while the most produced vegetables are tomatoes, peppers, cucumbers, and lettuce.

Italy is the second-largest producer of fruits and vegetables in Europe, with a production of about 20 million tons per year. The most produced fruits in Italy are grapes, oranges,

kiwis, and apples, while the most produced vegetables are tomatoes, peppers, onions, and artichokes.

The Netherlands is a significant producer of fruits and vegetables in Europe, with a production of about 10 million tons per year. The most produced fruits in the Netherlands are tomatoes, apples, and pears, while the most produced vegetables are tomatoes, cucumbers, and peppers.

France, Germany, Poland, and Greece are also major producers of fruits and vegetables in Europe, with a combined production of about 70 million tons per year. The most produced fruits and vegetables in these countries vary, but typically include apples, pears, grapes, strawberries, tomatoes, peppers, cucumbers, and carrots.

Overall, Europe is a significant producer of fruits and vegetables globally, with several countries having a strong agricultural sector that supports the local economy and ensures food security.

Asia : The production percentage of fruits and vegetables in Asia varies depending on the country and region. However, here are some general statistics on the production of fruits and vegetables in Asia:

China is the largest producer of fruits and vegetables in Asia, with a production of about 600 million tons per year. The most produced fruits in China are citrus fruits, apples, and bananas, while the most produced vegetables are tomatoes, onions, and cabbages.

India is the second-largest producer of fruits and vegetables in Asia, with a production of about 230 million tons per year. The most produced fruits in India are bananas, mangoes, and citrus fruits, while the most produced vegetables are potatoes, tomatoes, and onions.

Turkey is a significant producer of fruits and vegetables in Asia, with a production of about 40 million tons per year. The most produced fruits in Turkey are grapes, apples, and cherries, while the most produced vegetables are tomatoes, peppers, and cucumbers.

Iran, Indonesia, and Vietnam are also major producers of fruits and vegetables in Asia, with a combined production of about 200 million tons per year. The most produced fruits and vegetables in these countries vary, but typically include bananas, citrus fruits, mangos, potatoes, tomatoes, and onions.

Overall, Asia is a significant producer of fruits and vegetables globally, with China and India being the major players in the region. The agricultural sector in Asia plays a crucial role in ensuring food security and supporting local economies.

2.5 National and International Scenario :-

The global production of fruits and vegetables has been steadily increasing over the past few years. According to the Food and Agriculture Organization (FAO), in 2019, the world's total fruit production was estimated at 719 million tonnes, while vegetable production was estimated at 1.5 billion tonnes. Major producing countries: China is the largest producer of fruits and vegetables in the world, followed by India and the United States. Other major producing countries include Brazil, Spain, Italy, Mexico, Turkey, Egypt, and Iran.

India is one of the world's largest producers of fruits and vegetables. According to the Food and Agriculture Organization (FAO), India ranks second in the world in the production of fruits, with an estimated annual production of 98.3 million tonnes (MT) in 2020, second only to China.In terms of vegetable production, India ranks first in the world, with an estimated annual production of 196.3 million tonnes in 2020. China is the second-largest producer of vegetables, with an estimated annual production of 197.8 million tonnes in 2020.

India's diverse climate and soil conditions make it possible to grow a wide variety of fruits and vegetables. Some of the major fruits grown in India include mangoes, bananas, citrus fruits, guavas, and apples, while some of the major vegetables grown in India include potatoes, onions, tomatoes, and cauliflower.

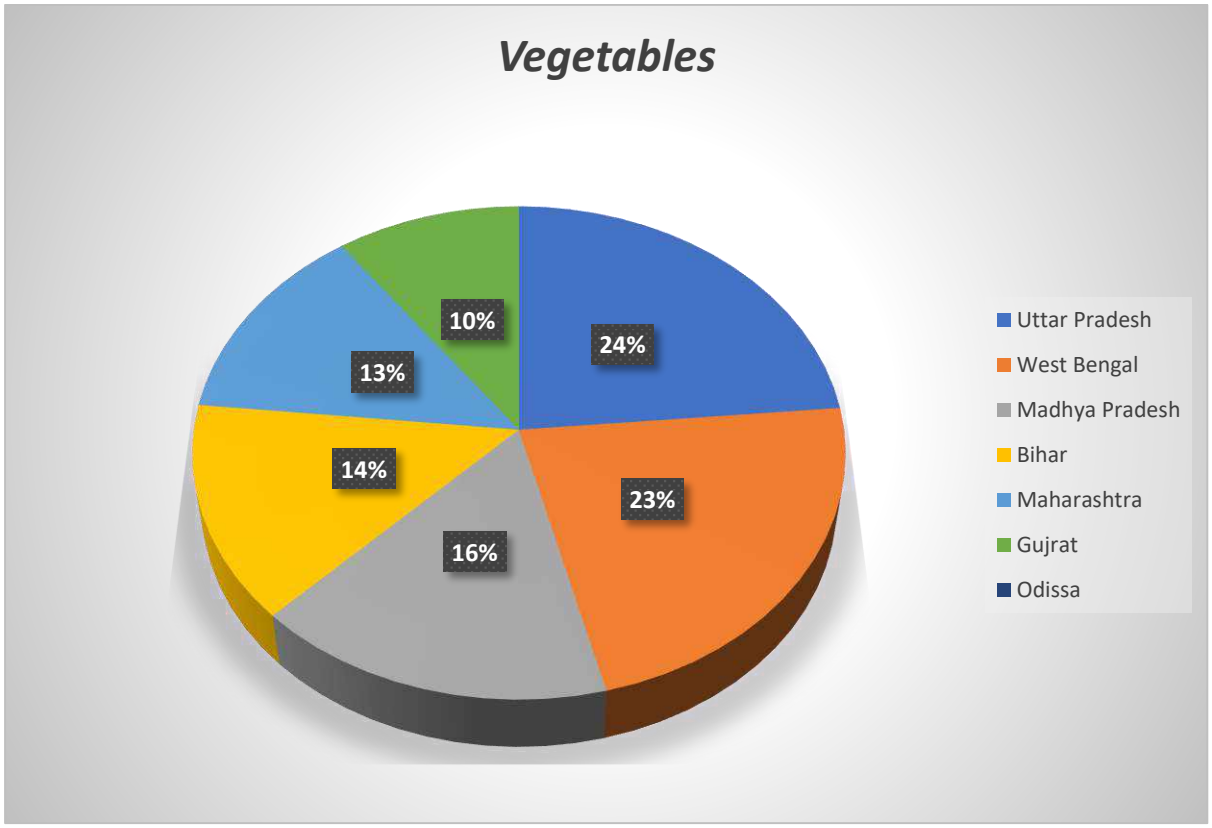
According to the Agricultural and Processed Food Products Export Development Authority (APEDA), the export of fresh fruits and vegetables from India stood at around $1.46 billion in 2020-21, which was a decrease of around 8.9% from the previous year due to the COVID-19 pandemic. In terms of quantity, India exported around 2.51 million metric tons of fresh fruits and vegetables in 2020-21.

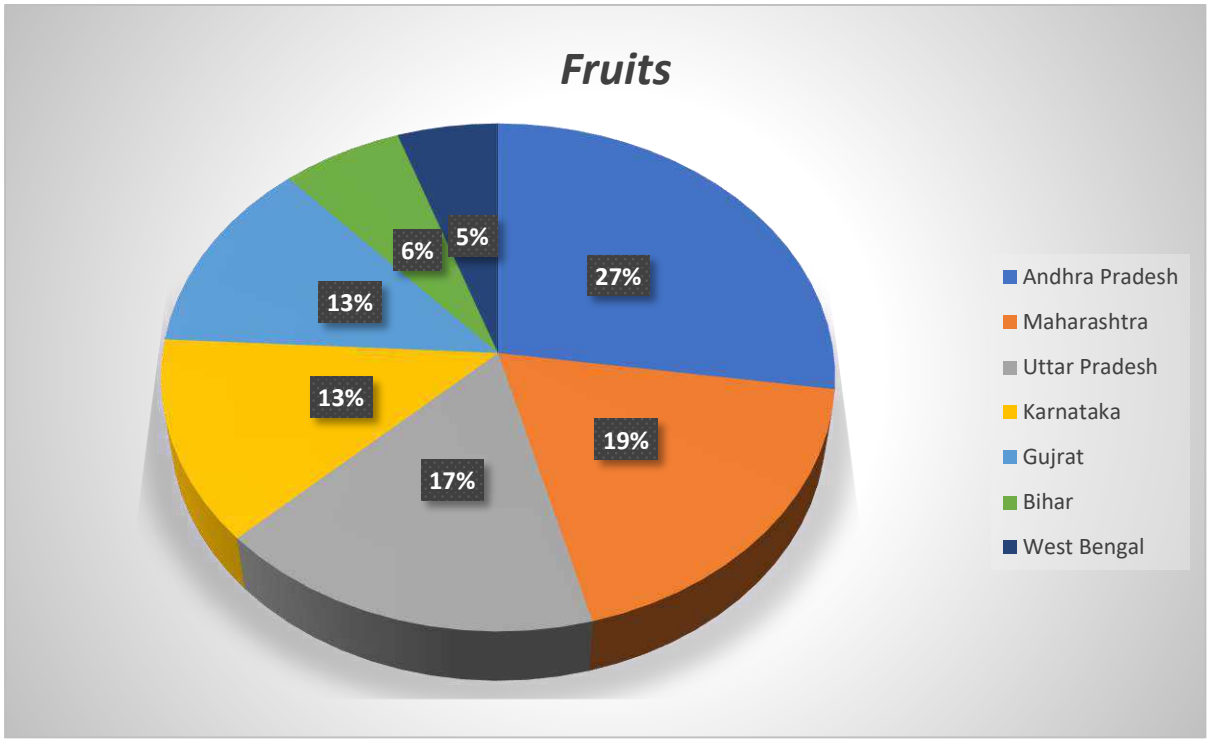
Some of the major fruits and vegetables exported by India include mangoes, bananas, grapes, pomegranates, onions, and okra. These products are primarily exported to countries in the Middle East, Europe, and Southeast Asia.

Highest Vegetables and Fruits Producing States in India :-

Vegetables		Fruits	
States	**Production (in metric tons)**	**States**	**Production (in metric ton)**
Uttar Pradesh	29.58	**Andhra Pradesh**	18.01
West Bengal	28.23	**Maharashtra**	12.30
Madhya Pradesh	20.59	**Uttar Pradesh**	11.26
Bihar	17.77	**Karnataka**	8.55
Maharashtra	16.78	**Gujrat**	8.24
Gujrat	12.55	**Bihar**	4.20
Odissa	9.13	**West Bengal**	3.50

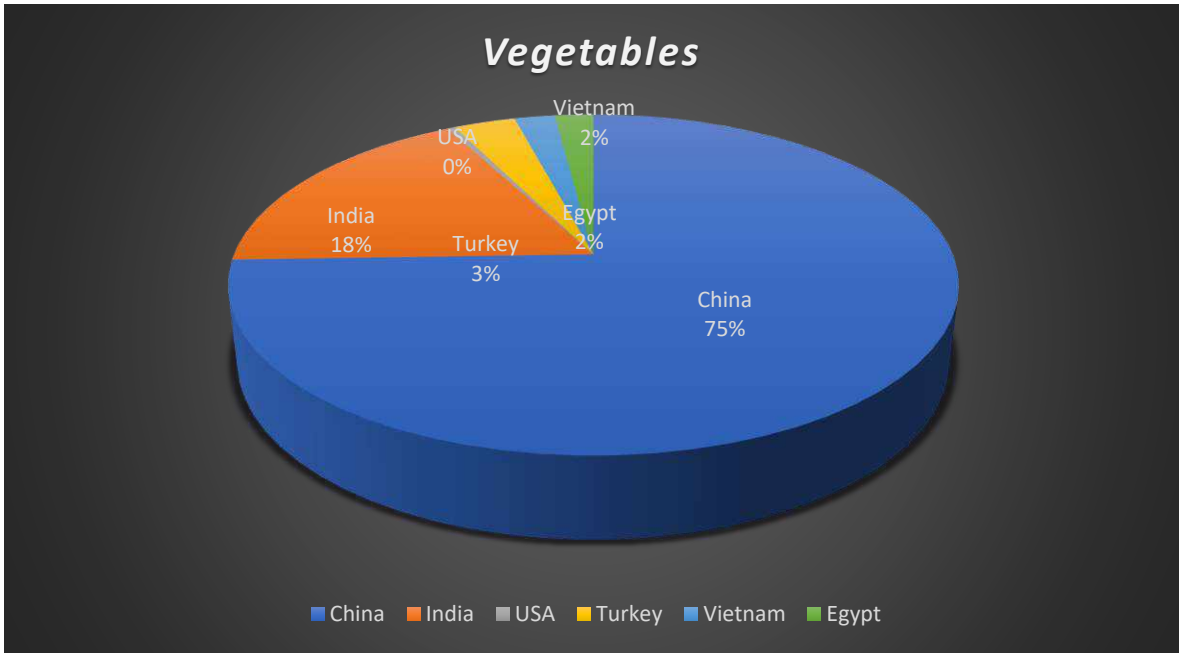
Charts :-

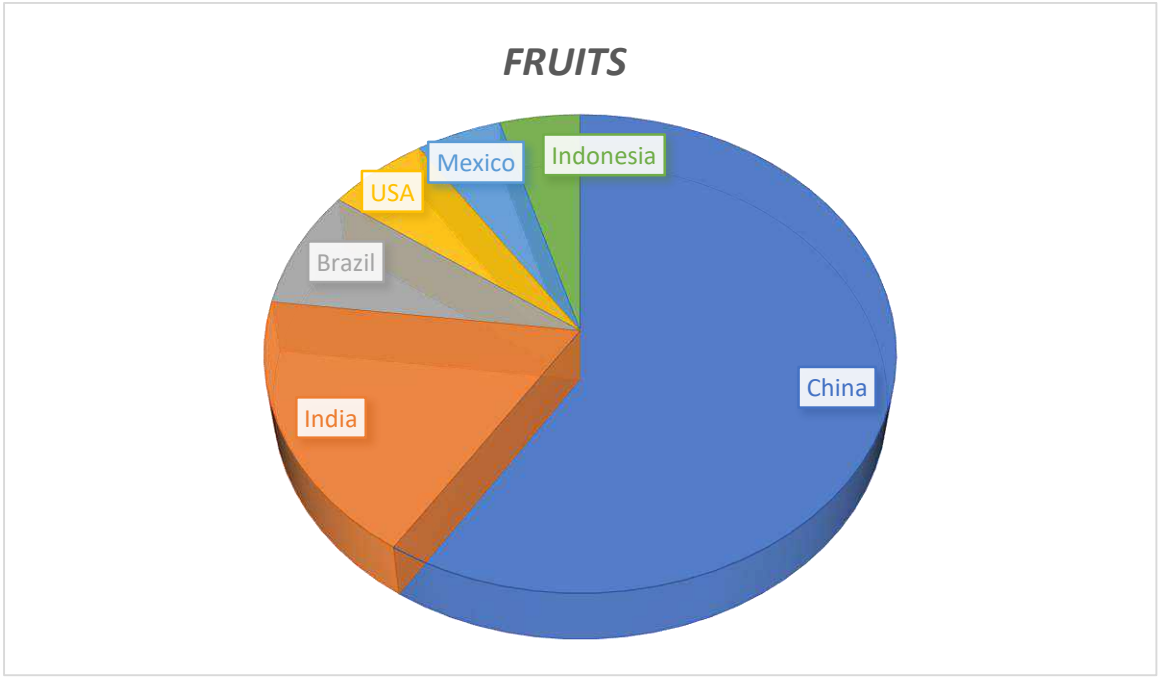

Vegetables
24%
23%
16%
14%
13%
10%
Uttar Pradesh
West Bengal
Madhya Pradesh
Bihar
Maharashtra
Gujrat
Odissa


Fruits
27%
19%
17%
13%
13%
6%
5%
Andhra Pradesh
Maharashtra
Uttar Pradesh
Karnataka
Gujrat
Bihar
West Bengal

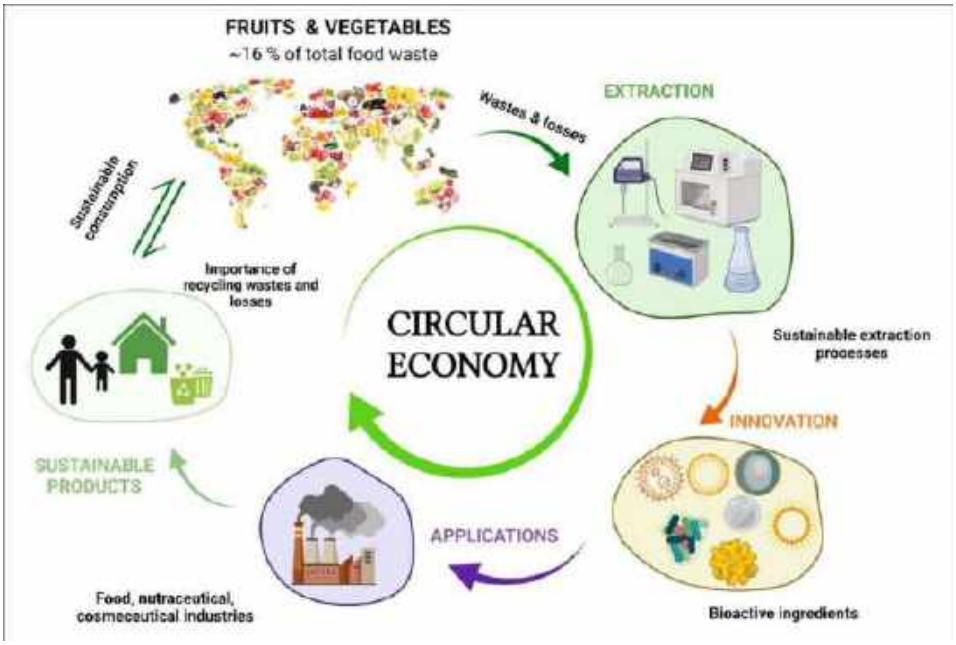
Highest Fruits and Vegetables Producing nations Worldwide :-

Vegetables		Fruits	
Nations	**Production (In million metric ton)**	**Nations**	**Production (In million metric ton)**
China	594.05	**China**	323.8
India	141.2	**India**	97.50
United States	33.12	**Brazil**	43.50
Turkey	25.96	**United States**	31.40
Vietnam	17	**Mexico**	26.40
Egypt	16.14	**Indonesia**	24.80


Vegetables
Vietnam
2%
USA
0%
India
18%
Egypt
2%
Turkey
3%
China
75%
China
India
USA
Turkey
Vietnam
Egypt


FRUITS
Mexico
Indonesia
USA
Brazil
India
China

CHAPTER-3


FRUITS & VEGETABLES
~16 % of total food waste
Wastes & losses
EXTRACTION
Sustainable consumption
Importance of recycling wastes and losses
CIRCULAR ECONOMY
Sustainable extraction processes
INNOVATION
SUSTAINABLE PRODUCTS
APPLICATIONS
Food, nutraceutical, cosmeceutical industries
Bioactive ingredients

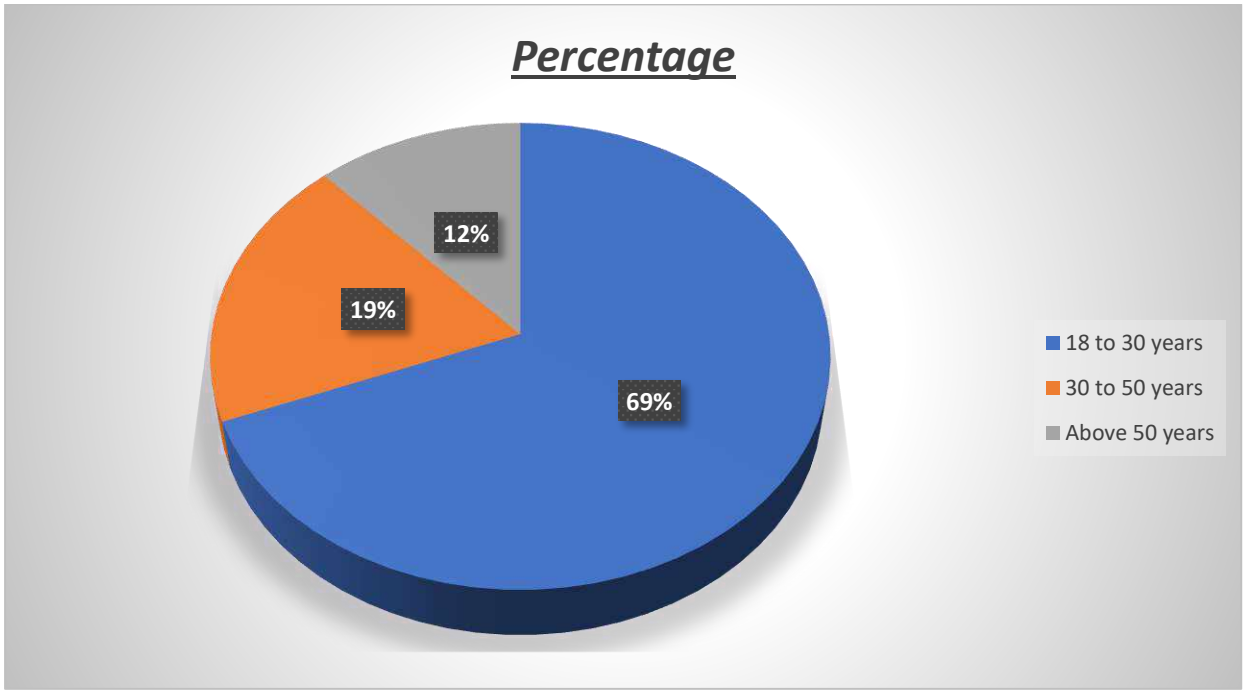
3.Data Analysis

Table -1

1.Age wise analysis of Wholesalers

Age	Frequency	Percentage (%)
18 to 30 years	29	69
30 to 50 years	8	19
Above 50 years	5	12
Total	42	100

Chart-



(Source – Survey Report)

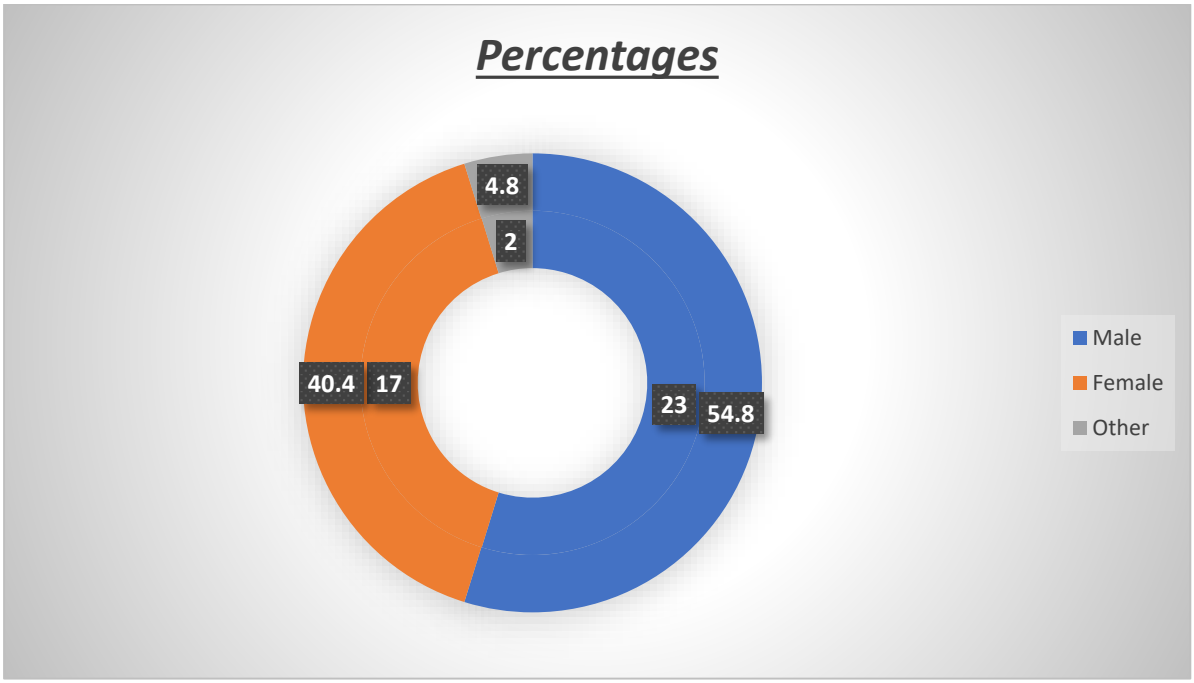
Data Interpretation :- From the above table and graph we can clearly say that among 42 Wholesalers where 29 are between 18 to 30 years, 8 are between 30 to 50 years and 5 Wholesalers are above 50 years.

Table -2

2. Sex-wise analysis of wholesalers

Gender	Frequency	Percentage (%)
Male	23	54.8
Female	17	40.4
Other	2	4.8
Total	42	100

Charts :-



(Source -Survey Report)

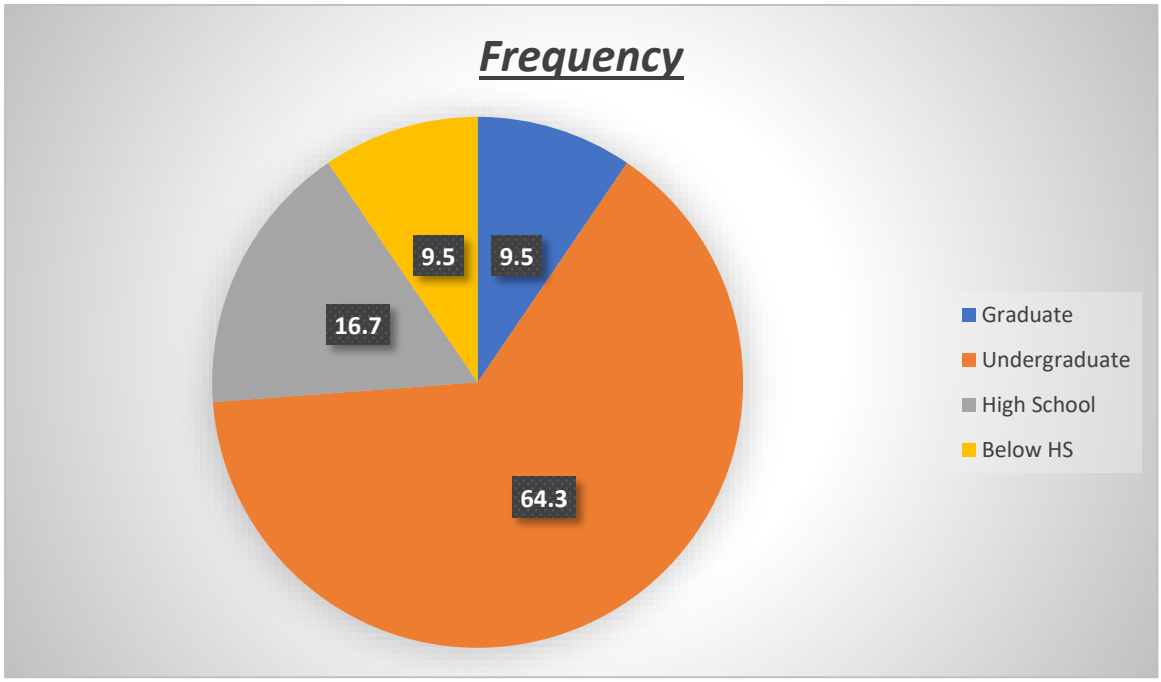
Data Interpretation :- From the above table and graph we can clearly say that among 42 Wholesalers , 23 are Male , 17 are female and 2 are Others.

Table-3

3. Educational Qualification wise analysis of wholesalers

Educational Qualification	Frequency	Percentage (%)
Graduate	4	9.5
Undergraduate	27	64.3
High School	7	16.7
Below HS	4	9.5
Total	42	100

Chart:-



(Source – Survey Report)

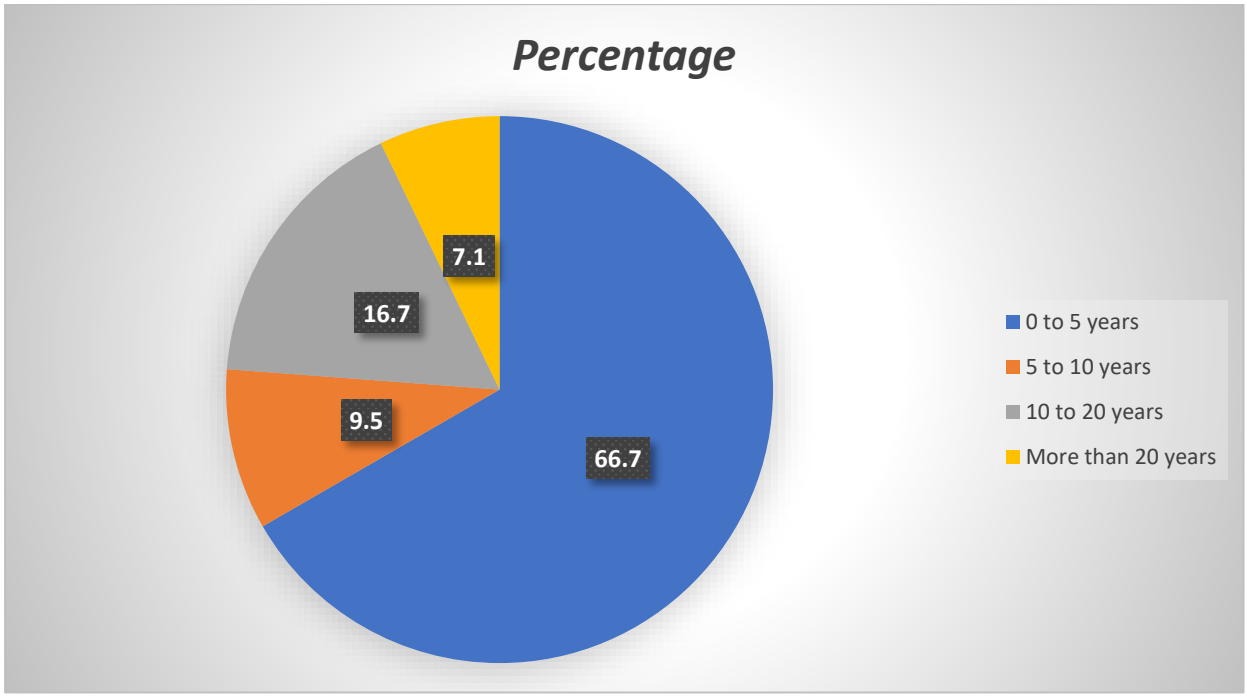
Data Interpretation :- From the above table and graph we can clearly say that among the 42 Wholesalers ,there are 4 person graduate, 27 are Undergraduate, 7 are High School and 4 are Below HS.

Table-4

4. Experience based analysis of Wholesalers

Experience	Frequency	Percentage (%)
0 to 5 years	28	66.7
5 to 10 years	4	9.5
10 to 20 years	7	16.7
More than 20 years	3	7.1
Total	42	100

Chart:-



(Source- Survey Report)

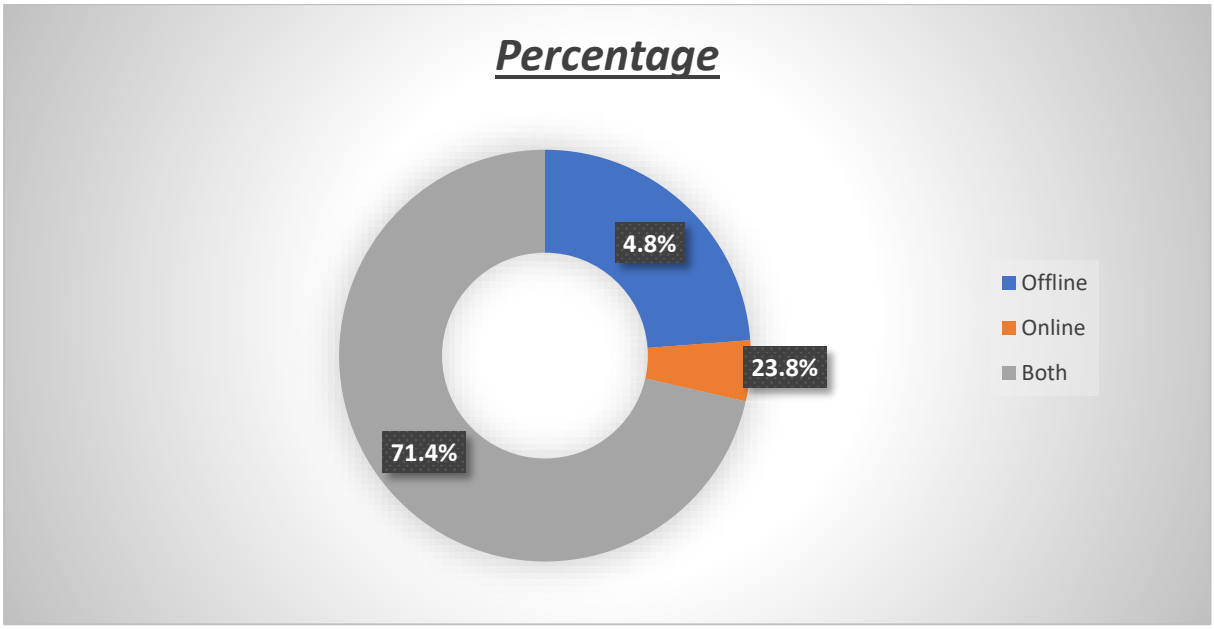
Data Interpretation:- :- From the above table and graph we can clearly say that among the 42 Wholesalers ,28 are between 0 to 5 years , 4 are between 5 to 10 years , 7 are 10 to 20 years and 3 are More than 20 years experience .

Table -5

5. Online and Offline Platform usage for Business Purpose

Answers	Frequency	Percentage (%)
Online	2	4.8
Offline	10	23.8
Both	30	71.4
Total	42	100

Charts:-



(Source- Survey Report)

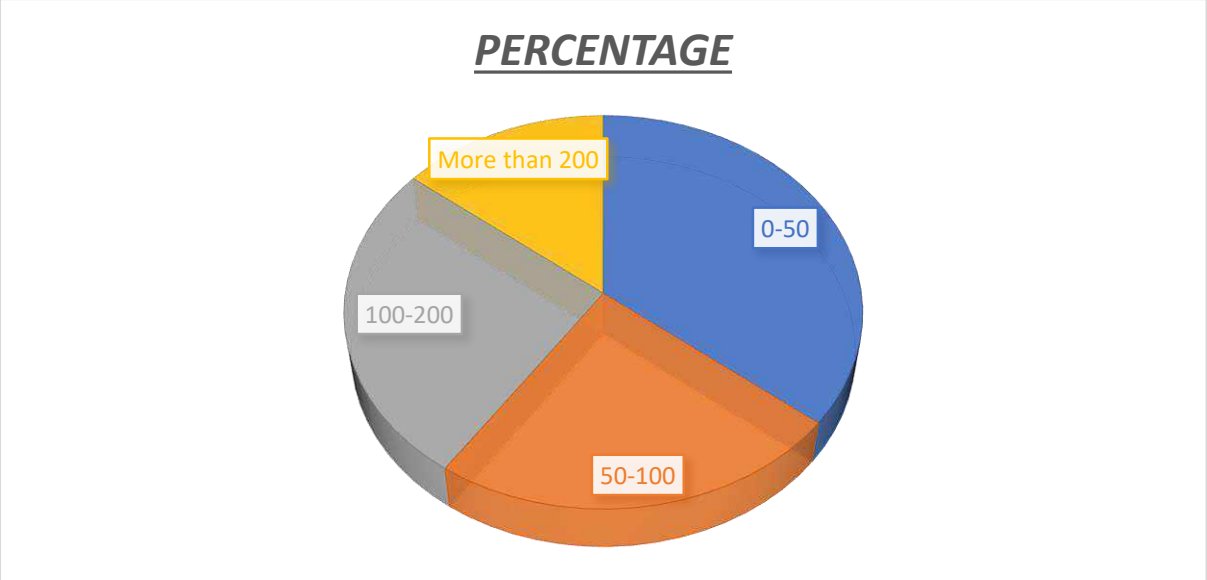
Data Interpretation:- From the above table and graph we can clearly say that among the 42 Wholesalers , 2 are in online Platform, 10 are in Offline Platform and 30 Wholesalers are used both platforms.

Table -6

6. Average Monthly Customers in Online

Numbers	Frequency	Percentage (%)
0-50	15	35.7
50-100	10	23.8
100-200	11	26.2
More than 200	6	14.3
Total	42	100

Charts:-



(Source- Survey Report)

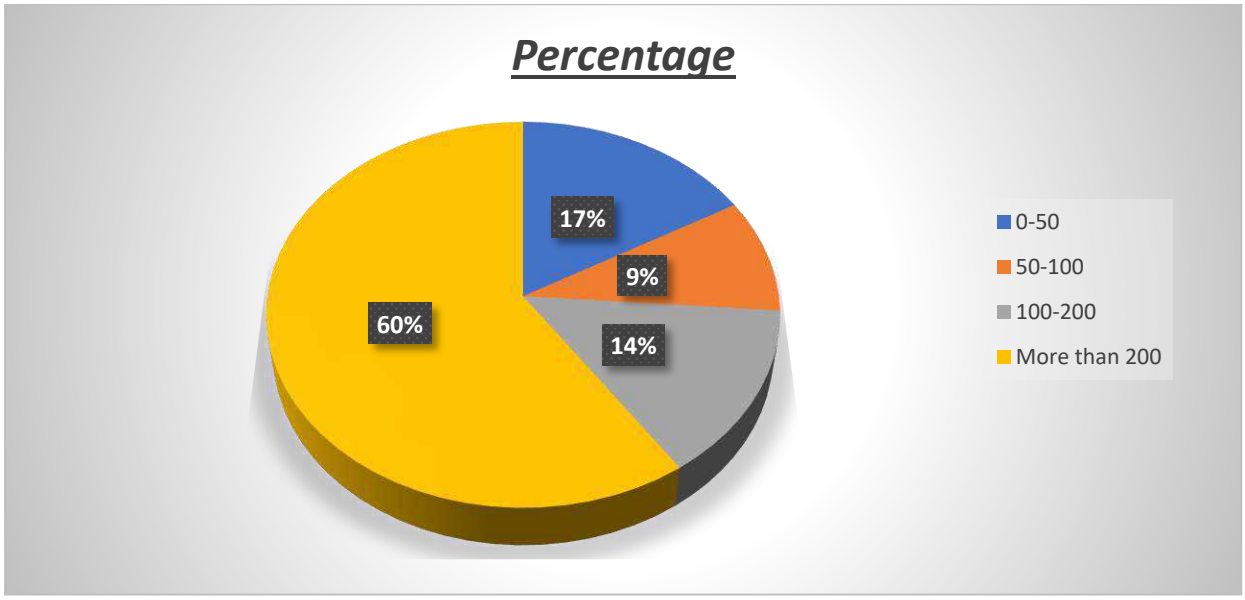
Data Interpretation:- From the above table and graph we can clearly say that among the 42 Wholesalers , 15 are between 0-50, 10 are between 50-100, 11 are between 100-200 and 6 are in More than 200.

Table-7

7. Average Monthly Offline Customers

Numbers	Frequency	Percentage (%)
0-50	7	17
50-100	4	9
100-200	6	14
More than 200	25	60
Total	42	100

Charts-



(Source- Survey Report)

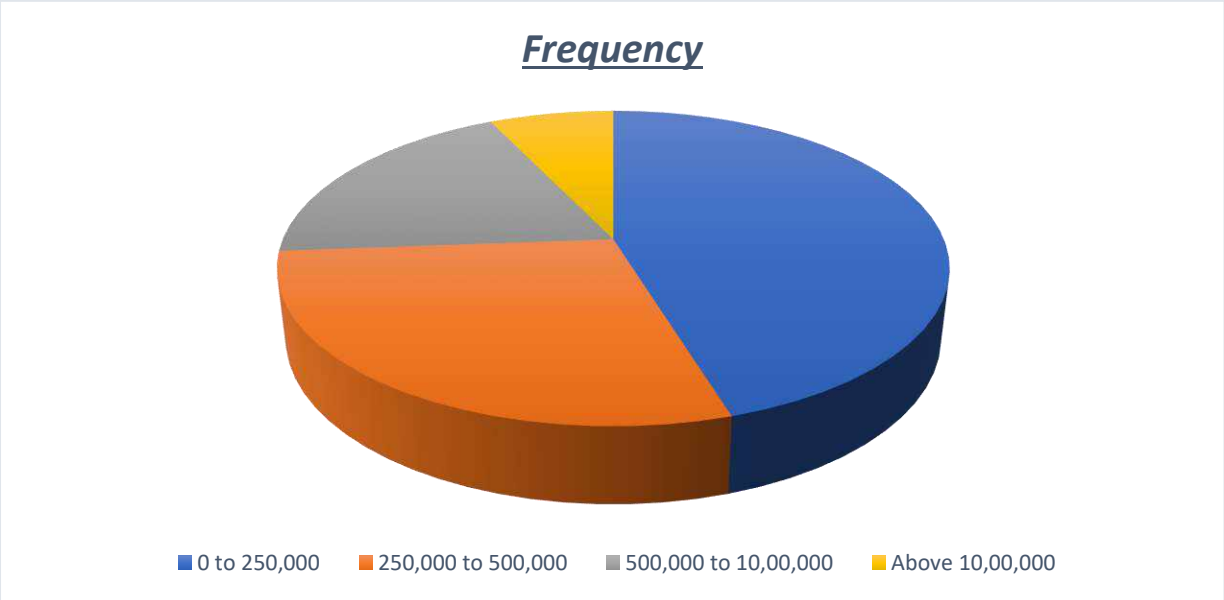
Data Interpretation :- From the above table and graph we can clearly say that among the 42 Wholesalers, 7 are between 0-50, 4 are between 50-100, 6 are between 100-200 and 25 are in More than 200.

Table-8

8. Sales value of Fruits and Vegetables in the Financial year of 2022-23-Online

Sales Value	Frequency	Percentage (%)
0 to 250,000	19	45.2
250,000 to 500,000	12	28.6
500,000 to 10,00,000	8	19
Above 10,00,000	3	7.2
Total	42	100

Charts:-



(Source -Survey Report)

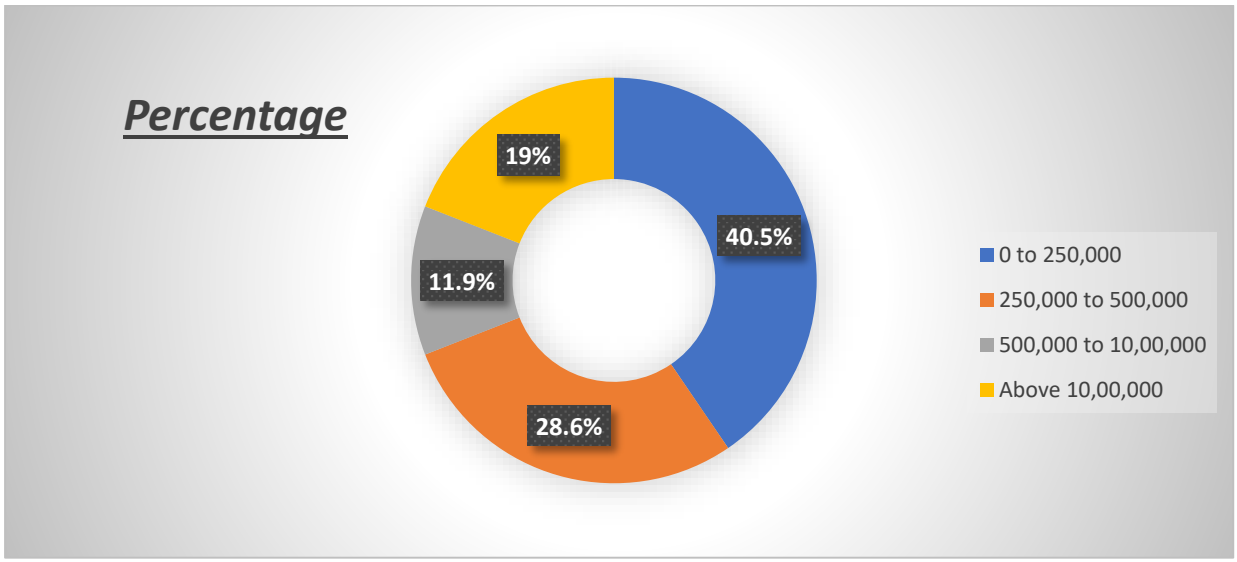
Data Interpretation :- From the above table and graph we can clearly say that among the 42 Wholesalers, 19 are between 0 to 250,000, 12 are between 250,000 to 500,000, 8 are between 500,000 to 10,00,000 and 3 are above 10,00,000.

Table- 9

9. Sales value of Fruits and Vegetables in the Financial year of 2022-23-Offline

Sales Value	Frequency	Percentage (%)
0 to 250,000	17	40.5
250,000 to 500,000	12	28.6
500,000 to 10,00,000	5	11.9
Above 10,00,000	8	19
Total	42	100

Charts:-



(Source- Survey Report)

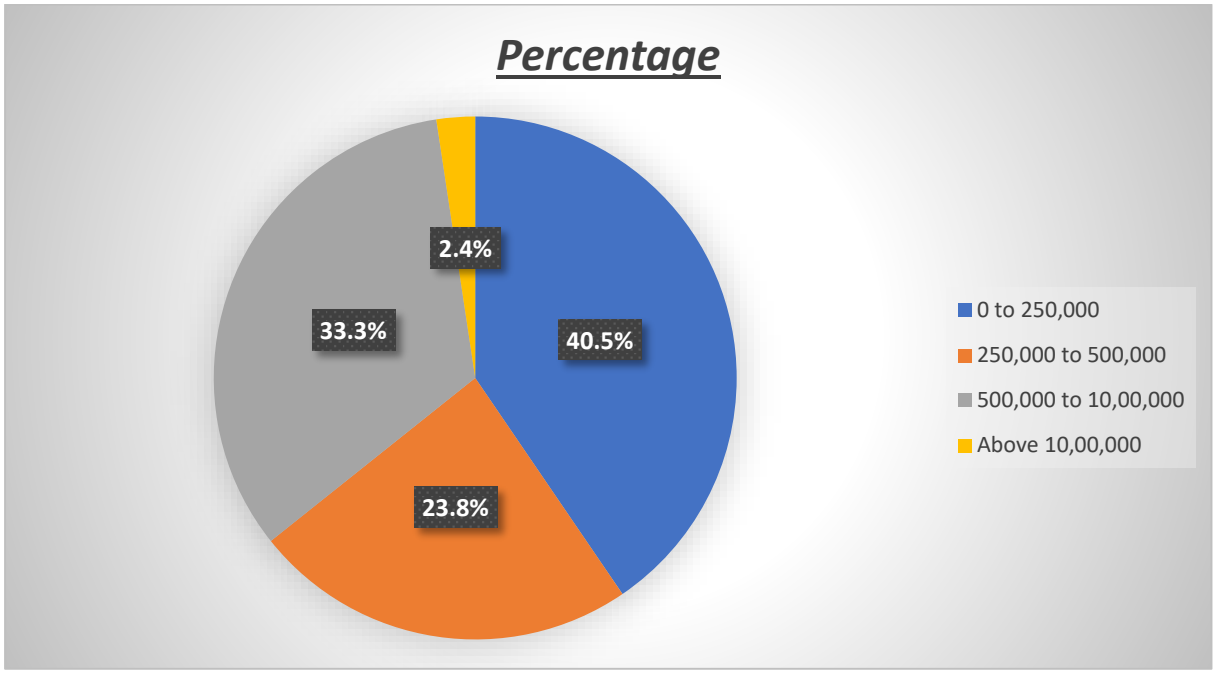
Data Interpretation :- :- From the above table and graph we can clearly say that among the 42 Wholesalers, 17 are between 0 to 250,000, 12 are between 250,000 to 500,000, 5 are between 500,000 to 10,00,000 and 8 are above 10,00,000.

Table -10

10. Yearly Income of Aratdars – Online

Income	Frequency	Percentage(%)
0 to 250,000	17	40.5
250,000 to 500,000	10	23.8
500,000 to 10,00,000	14	33.3
Above 10,00,000	1	2.4
Total	42	100

Charts:-



(Source- Survey Report)

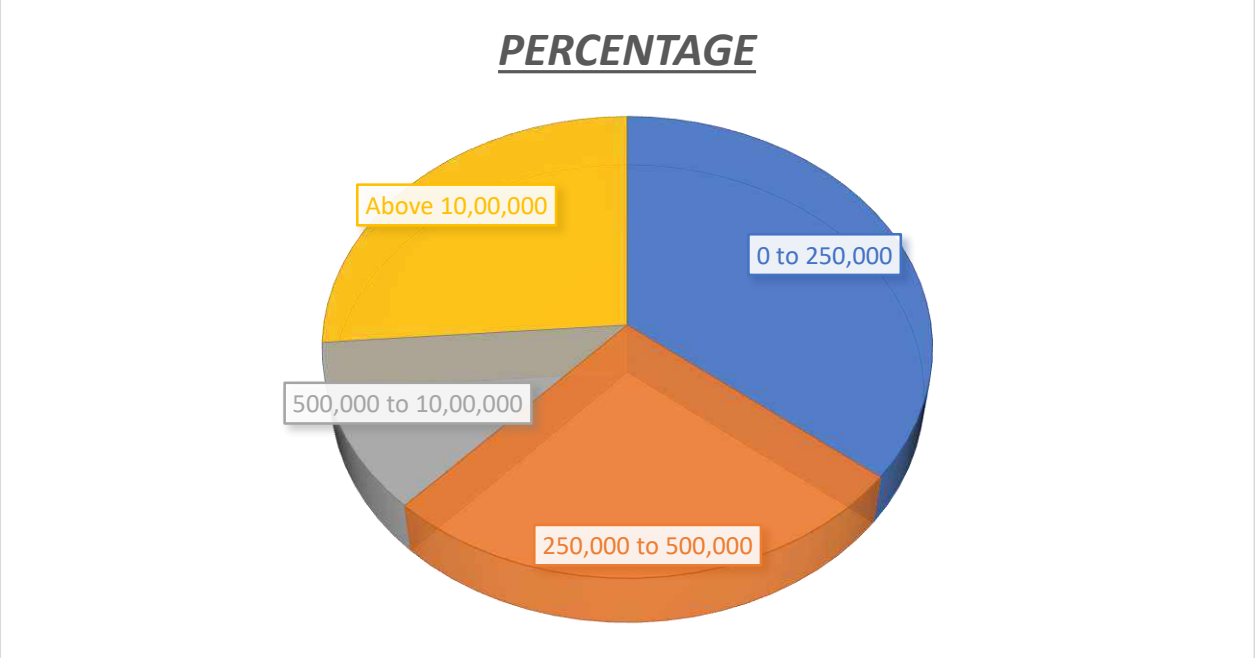
Data Interpretation :- :- From the above table and graph we can clearly say that among the 42 Wholesalers, 17 are between 0 to 250,000, 10 are between 250,000 to 500,000, 14 are between 500,000 to 10,00,000 and 1 are above 10,00,000.

Table-11

11. Yearly Income of Aratdars – Offline

Income	Frequency	Percentage (%)
0 to 250,000	15	35.7
250,000 to 500,000	11	26.2
500,000 to 10,00,000	5	11.9
Above 10,00,000	11	26.2
Total	42	100

Chart:-



(Source- Survey Report)

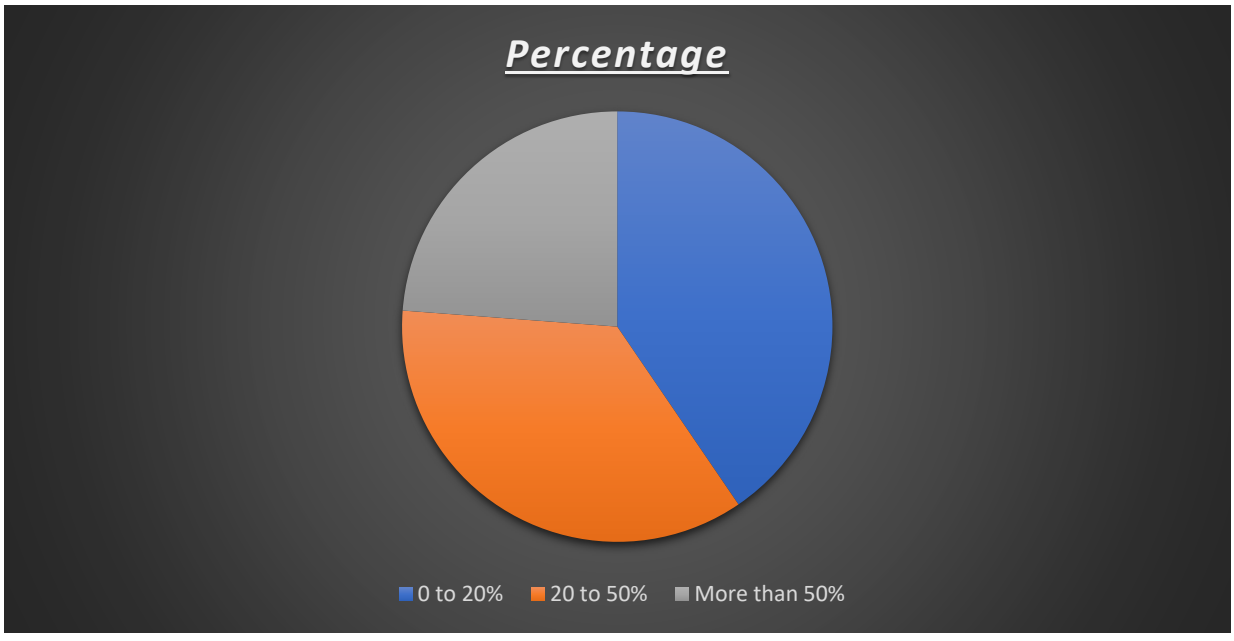
Data Interpretation :- From the above table and graph we can clearly say that among the 42 Wholesalers, 15 are between 0 to 250,000, 11 are between 250,000 to 500,000, 5 are between 500,000 to 10,00,000 and 11 are above 10,00,000.

Table-12

12. Profit Percentage-Online

Profit	Frequency	Percentage (%)
0 to 20%	17	40.5
20 to 50%	15	35.7
More than 50%	10	23.8
Total	42	100

Charts:-



(Source – Survey Report)

Data Interpretation :- From the above table and graph we can clearly say that among the 42 Wholesalers, 17 are between 0 to 20%, 15 are between 20% to 50% and 10 are between More than 50%.

Table -13

13. Problems of Wholesalers in Online

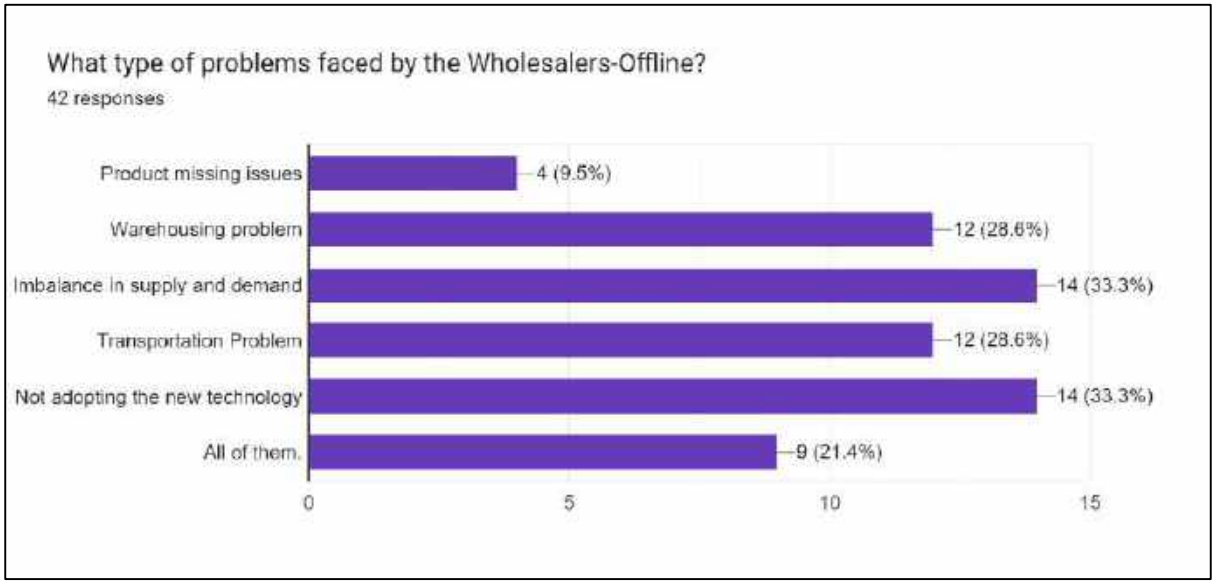
Issues	Frequency	Percentage (%)
Product missing issues	12	28.6
Warehousing problem	5	11.9
Imbalance in supply and demand	12	28.6
Transportation problem	13	31
Not adopting the new technology	7	16.7
All of them	16	38.1
Total	42	100

Data Interpretation:- From the above table and graph we can clearly say that among the 42 Wholesalers, 12 persons are facing Product missing issues,5 persons are facing warehousing problem, 12 persons are facing imbalance in supply and demand problem,13 persons are facing transportation problem , 7 are facing problem with new technology and 16 are facing all of them.

Table -14

14. Problems of Wholesalers in Offline

Issues	Frequency	Percentage (%)
Product missing issues	4	9.5
Warehousing problem	12	28.6
Imbalance in supply and demand	14	33.3
Transportation problem	12	28.6
Not adopting the new technology	14	33.3
All of them	9	21.4
Total	42	100

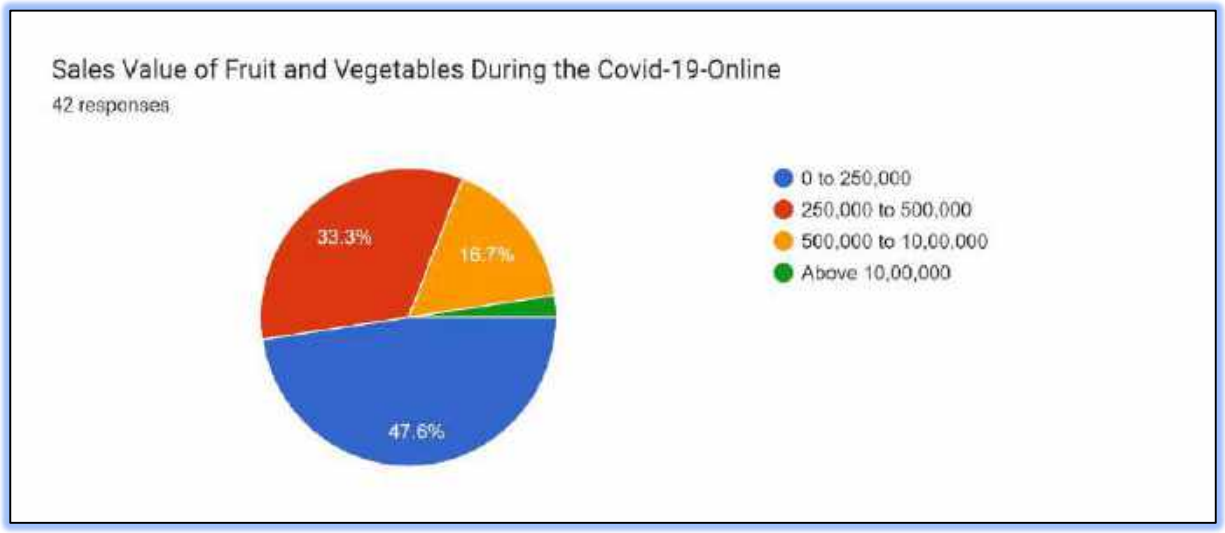


Data Interpretation:- From the above table and graph we can clearly say that among the 42 Wholesalers, 4 persons are facing Product missing issues,12 persons are facing warehousing problem, 14 persons are facing imbalance in supply and demand problem,12 persons are facing transportation problem , 14 are facing problem with new technology and 9 are facing all of them.

Table-15

15. Sales value of Fruit and vegetables during the Covid-19 in Online

Sales Value	Frequency	Percentage (%)
0 to 250,000	20	47.6
250,000 to 500,000	14	33.3
500,000 to 10,00,000	7	16.7
Above 10,00,000	1	2.4
Total	42	100



Data Interpretation:- :- From the above table and graph we can clearly say that among the 42 Wholesalers, 20 are between 0 to 250,000, 14 are between 250,000 to 500,000, 7 are between 500,000 to 10,00,000 and 1 are above 10,00,000.

4. Findings

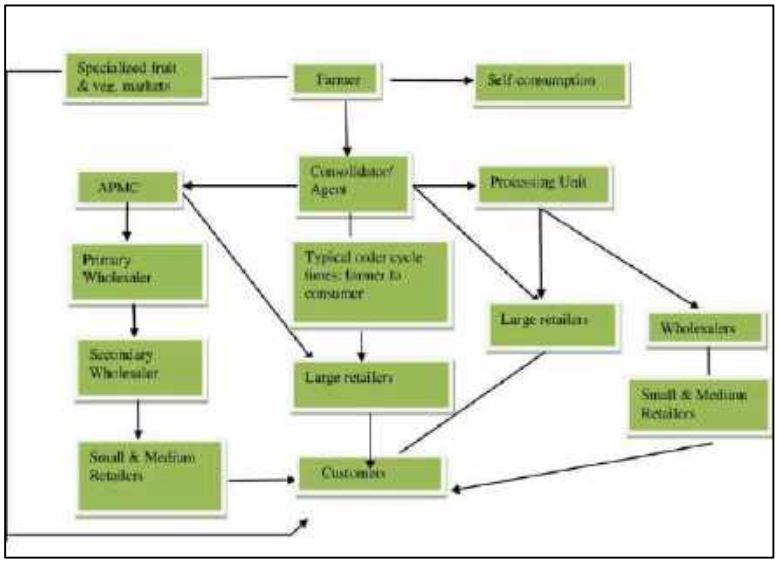
Findings based on the analysis:-

1. **Current situation**: Most of the Wholesale business are not running well currently, they aren't even able to sell the goods they bring to the market.
2. **E -commerce:** The growth of online markets, which can offer advantages such as wider product selection and convenience for buyers .
3. **Price volatility**: Wholesale markets are highly sensitive to supply and demand fluctuations, which can result in sharp price movements. This can make it difficult for businesses to plan their operations and make investment decisions.
4. **Information asymmetry**: In many cases, buyers and sellers in wholesale markets have unequal access to information. This can lead to situations where one party has an advantage over the other, resulting in unfair pricing or other unfavorable outcomes.
5. **Lack of transparency**: Wholesale markets are often opaque, making it difficult for participants to understand the true value of goods and services. This can result in market inefficiencies and reduced competition.
6. **Regulatory challenges**: Wholesale markets are subject to complex and often changing regulatory frameworks. Compliance can be costly and time-consuming, and regulatory changes can create uncertainty and market disruption.
7. **Concentration of market power**: Wholesale markets can be dominated by a few large players, which can limit competition and reduce market efficiency. This can result in higher prices and reduced innovation.
8. **Problems regarding Covid situation**: - As per sellers last two years completely destroyed all their plans and made the future full of uncertainty. It even pushed some new sellers to find some other means of earning.

5. Suggestions

Technology Related As regards the technological fronts the following suggestions are made to achieve the future progress of fruit and vegetable processing in West Bengal.

1. **Promoting post-harvest-handling techniques:** Huge post-harvest losses in case of fruit and vegetables can be minimized by promoting proper post-harvest handling techniques like controlled ripening of fruit and vegetables, cleaning properly after harvesting; storing the harvest in a right place with appropriate temperature, and waxing them for higher durability. Further modern techniques like chorine treatment, sprout treatment, trimming, etc. will help in extending their durability for longer period.



2. **Location**: Choose a location that is easily accessible for both buyers and sellers, with good transport links and ample parking facilities.
3. **Range of Products**: A wholesale market should offer a wide range of products to attract different types of customers. You may want to consider specializing in a particular type of product, or offering a diverse range of products from different industries.

4. **Pricing**: Wholesale markets should offer competitive pricing to attract buyers. You should research the pricing strategies of your competitors and try to offer better prices or discounts to attract more customers.

5. **Customer Service**: Make sure to provide excellent customer service, as this can greatly impact the reputation of your wholesale market. Ensure that your staff is knowledgeable, friendly, and willing to help customers with their queries.
6. **Facilities**: Wholesale markets should have proper facilities such as restrooms, clean drinking water, and food courts. These facilities will provide convenience for the customers and encourage them to stay longer at your market.
7. **Marketing**: Use effective marketing strategies to promote your wholesale market to potential buyers and sellers. Utilize social media platforms, advertise in local newspapers, and attend trade shows to promote your business.

8. **Payment Options**: Offer multiple payment options to make transactions easier for customers. This may include credit/debit card payments, online payment options, or cash payments.

9. **Security**: Ensure the security of your wholesale market with proper security measures such as CCTV cameras, security personnel, and secure entrances and exits.
10. **Networking**: Build a network of suppliers, buyers, and industry experts to gain insights into market trends and opportunities. Attend trade shows and networking events to meet new contacts and expand your business network.
11. **Innovation**: Continuously innovate and improve your wholesale market to stay ahead of the competition. Introduce new products, services, and technologies to keep your customers interested and engaged.

6. Limitations of the study

- I have worked on a single market, few other markets would give me better idea of the nature of the business.
- Wholesale markets are often located far from retail markets, which can increase transportation costs and reduce the competitiveness of prices.
- Wholesale markets often depend on intermediaries or middlemen to facilitate transactions, which can increase costs and reduce efficiency.
- As the business does not mention the proper records following the standard format, I had difficulty in gathering information.
- The study based on primary and secondary data gathered by me.
- Due to unavailability of proper data all the chapters matter is based on oral questionnaires.

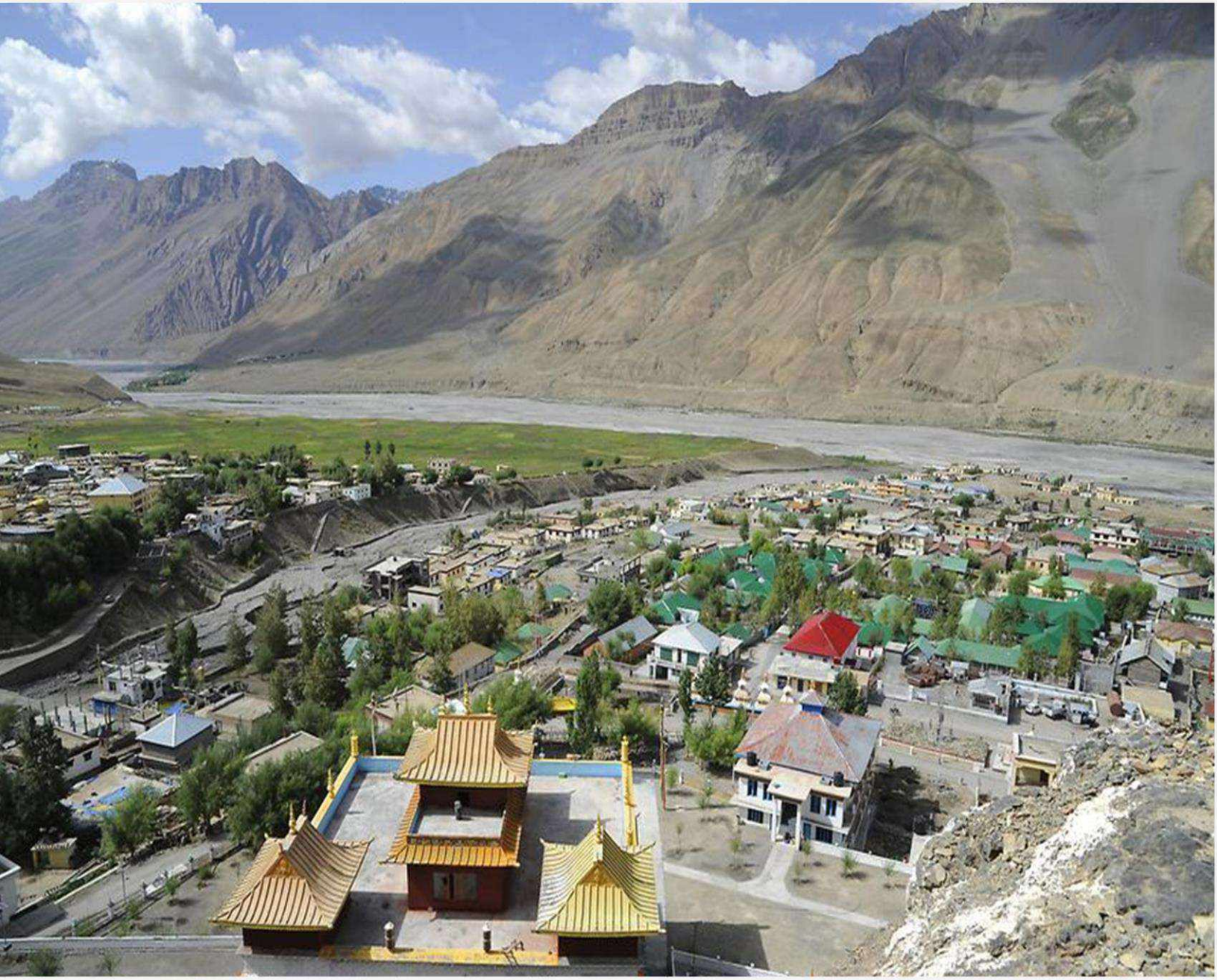
7. Conclusion

The study establishes it clearly that the unexploited potentials of the fruit and vegetable processing sector in West Bengal, the major problems lie with poor infrastructure, primitive production and processing technologies, poor quality control, and lack of farm-firm linkages. Hence, the urgent need is that the government should invest more on developing hardcore infrastructure in view of the fact that the private sector is not likely to come forward to invest for infrastructural development. In that the priority areas appear to be road, power, transport, and cold chain system. It may be mentioned in this context that Bengal agriculture is dominated by small and marginal producers and this scenario, given the agrarian structure, will continue to remain the same. Thus, it is highly important that our research and development system must provide an efficient alternative to small producers for improving their product quality, income, and employment opportunity. In this context efficient institutional arrangements for promoting farm-firm linkages and enforcing stringent food laws seem to constitute the need of the time.

8.References

- Lopez, A., Iguaz, A., Esnoz A. & Virseda P. (2000). Thin-Layer Drying Behaviour of Vegetable Wastes From Wholesale Market. Drying Technology, Vol. 18, 995, DOI: 10.1080/07373930008917749
- Gandhi, V. P., & Namboodiri, N. V. (2004). Marketing of Fruits and Vegetables in India: A Study Covering the Ahmedabad, Chennai and Kolkata Markets. Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad, Working paper no. 2004-06-09, 62
- Kaul, G.L. (1997). Horticulture in India: Production, Marketing and Processing. Indian Journal of Agricultural Economics, Vol. 52, 3
- Nagarik Mancha (2005). A report on locked-out factories, plight of workers and urban space. SARAI Centre for Study of Developing Societies Delhi, India, 18. Retrieved from http://www.nagarikmancha.org/images/1211-Reports-%20LOCKED OUT%20FACTORIES,%20PLIGHT%20OF%20WORKERS%20AND%20URBAN%20SPACE.pdf/
- [5] Pardhan, C., (2011), Fragile: A Story of Bihar Migrants Working in Calcutta's Largest Wholesale Market. [Online] Available: http://yalejournal.org/photo-essay_post/migrants-from-bihar/ (November 1, 2011)
- [6] Saxena, H.M. (2004). Marketing Geography. Jaipur: Rawat Publications, pp. 19
- [7] Sengupta, P. (1992), Wholesale Market: Study of a Market in Kolkata, Centre of Urban Economic Study, Department of Economics, University of Calcutta
- [8] Subbanarasaiah, N. (1991). Marketing of Horticultural Crops in India. North 24 paraganas: Anmol Publishing Co.

➢ [9] Vance, J.E.Jr. (1970). The Merchants World: The Geography of Wholesaling. New Jersey: Prentice Hall, pp.45 [10] WBSMB. (2015). Retrieved Nov 11, 2015, from http://www.wbagrimarketingboard.gov.in.



FIELD REPORT ON

PHYSICAL AND CULTURAL CHARACTERISTICS OF KAZA SOMA VILLAGE WITH SPECIAL REFERENCE TO PROBLEMS OF TOURISM,

LAHUL & SPITI DISTRICT, HIMACHAL PRADESH

ACADEMIC YEAR 2022-2023

CONTENT

CHAPTER IV: CONCLUSION

Appendix

ACKNOWLEDGEMENT

While preparing my Field report and compiling the same I would like to express my gratitude and gratefulness for help, guidance, co-operation extended to me in my endeavors.

First of all, I would like to express my indebtedness to Prof. Arunabha Mishra, Prof. Jadablal Santra for their valued guidance and help. I also wish to thank Principal, Vidyasagar Metropolitan College and office staff of the college, for their support and for providing us with all the facilities.

I would like to express my sincere gratitude to the concerned staff of Panchyat office, office of the sub divisional magistrate, water shade management office, Police station, Bus and Taxi depot for providing us important information.

I also take this opportunity to thank the people of Kaza village who were kind enough to spare their time to be interviewed by us.

Last but not the least in this connection I would like to acknowledge my class friends and well-wishers to who are too numerous to mention individually for cooperation of various kinds in the different stages of the preparation of this report.

We, the group of students

LIST OF MAPS AND DIAGRAMS

CHAPTER I

INTRODUCTION

The domain of the subject of geography precisely describes it as a natural science or an earth science or a regional science and/or a field science. Any segment of the earth's surface provides an open natural laboratory to a geographer who seeks to identify and explain the spatial organization of the surface of geographical features through a careful study of the patterns and processes. A field study gives a scope to discover a set of geographical facts hitherto inexperienced. It involves the observation of landscape in minute details.

Basic principles of Field work

Field work is collecting information and a good field work is collecting information for a purpose (Greasley, 1984). The sequence of steps to be followed in such an investigation rest on a fixed frame—

Steps	Work theme
1	Correlation between physical and cultural landscape of Kaza village,
2	To set the concept, several questions be framed following geographical logic,
3	For each question, postulate a geographically relevant hypothesis, i.e., there has been a sound and positive correlation between the physical and cultural elements of the study region,
4	It is now to be decided, what information is to be collected,
5	Process and analyze the results of field work,

The name Spiti is locally pronounced as 'Piti', meaning middle province in Tibetan dialect. During the past, it remained as a chief of the overbearing neighboring clans, including Tibet. In 1846, the British took possession of Spiti and hereditary chieftain, 'The nono' was entrusted with the power of revenue collection and trail of minor criminal cases. In 1941, Spiti with Lahoul was made a separate tehsil and then a district in the year 1960. Lahual- Spiti is the largest district in Himachal Pradesh. The Lahual region is located at an altitude of 3000-3900m.The Spiti Valley is connected to Lahual through the 4500m long Kunzum La Pass. Kaza is the largest settlement and the administrative centre of Spiti. Kaza is the capital of Spiti Valley. Monasteries, villages, high altitude farming, a rugged terrain and rocky mountain slopes sweep down to the river beds giving the landscape a moon like appearance. The region is known as **'Cold Desert'** and doesn't receive rainfall. In winter the temperature can drop below freezing point, when heavy woolens are required. In summer, the weather remains pleasant when light woolens are advised. Kaza's peoples are Buddhist culture.

Objectives: Main objective of the field report are----

[i] to study the physical features like climate, relief, vegetation, soil, etc.
[ii] to highlight the existing accommodation and marketing facilities of the above-mentioned places,
[iii] to study the demographic, social, cultural and economic status of the KAZA people,
[iv] to formulate the suggestions for future development,
[v] to suggest probable remedies to overcome of problems.

Source of the Data: Both primary and secondary date has been used vigorously for the field report. Data in the primary source is based on the questionnaire which includes households, market; occupation, transport etc. Secondary data includes office's records, Census of India, NATMO, different administrative offices, district gazetteer of Himachal Pradesh District, different relevant books.

The major problems are as follows---Accommodation problem—Communication problem Electricity problem --Lack of health facility and higher education facility etc.

Data collection

The data required to test ideas or questions would depend very much upon the specific idea or question being tested. Normally two types of data are collected—(i) Primary and (ii) Secondary.

The first one concerns the firsthand information collected in the field while the second one collected from the extra field sources. The primary data are obtained from the actual field work by a series of thorough surveying or by a set of questionnaires with the help of random sampling sufficiently to draw statistical inferences at a desired significance level. This includes surveying (e.g., land use, market, household etc.), questionnaires, field sketches, measurements and interviews. The checklist of equipment for the collection of primary data consists of instruments (viz. Dumpy level, Prismatic compass, Clinometer, GPS, Tape, staff, camera etc.), data recording articles and well-planned questionnaires.

The secondary data refers to those collected from secondary sources like books, journals, Census Hand books, District Gazetteers, Statistical Abstracts, Maps etc.

This report is organized by four sections containing general aspects of the study area, physical background, socio-economic background and relationship between physical and cultural aspects. We do our best to find out the relationship, but and right some difficulties regarding the collection of primary and secondary data and proper response from the household arose during the field work. All these compelled us to make some assumptions that may affect the establishment of main idea. We, the students of Geography, Vidyasagar Metropolitan College, Kolkata, carried on this field work at Kaza Soma, a village of Lahul and Spiti district under the
state of Himachal Pradesh on 20th. October, 2022, under the guidance of our departmental teachers.

Selection criteria as a study area

The present work has been taken up as a field project in the 5th semester examination in the Department of Geography, Vidyasagar Metropolitan College, Calcutta University. The main reasons behind selecting this place for our field work are---

(i) The village of **Kaza Soma** or **Kaze Some** is the sub divisional headquarters of the remote Spiti Valley in the western Himalayas in the Lahaul and Spiti district of the northern Indian state of Himachal Pradesh. Spiti is a high altitude or cold desert having close similarities to the neighboring Tibet and Ladakh regions in terms of terrain, climate and the Buddhist culture. Kaza Soma, situated along the Spiti River at an elevation of 3,650 metres (11,980 ft) above mean sea level, is the largest settlement and commercial center of the Spiti valley. So, being a developing area, efficiency can be analyzed in a systematic manner,

[4]

(ii) Being a hill resort, Kaza Soma has difficult planning problems due to its topography and being a holiday resort. Being a developing area and a tourist hot spot, efficiency of economy and environment can better be understood with demographic changes and other developmental works.

Methodology

The study is based on the evolutionary methods in terms of both qualitative and quantitative processes. The functional morphology and land use map of the area have been prepared on the basis of field observation in relation to socio-economic characteristics. The data were collected and analyzed to understand the morphology and dichotomy of the settlements in the region. Hence to achieve the objectives of the study, the whole field work has been conducted in three stages—Pre field, Field and Post field.

Pre field stage: In the Pre field study relevant information, literatures, maps and statistical data relating to the study of physical-cultural analysis of the town, have been collected from the different sources. Collected materials have been analyzed to acquire sufficient knowledge for conducting the survey work conveniently.

Field work stage: During the field work different surveys were carried out to get relevant information on topography, demography, literacy, occupational structure, spatial characteristics of service centers and housing patterns, traffic flow and tourist interests etc. These surveys provided us the data, the analyses of which form the major and integral part of the study area.

Post field stage: In the post field study the collected data and information were analyzed and different key maps were prepared with proper cartographic methods for the transmission of the data effectively. These helped us to evaluate the spatio-temporal growth of the area.

Both statistical and cartographic techniques have been used to prepare the report. Statistical part includes surveyed data which is converted to master table and then to convert small tables according to everyone's need, then the calculated data from primary and secondary sources are being depicted on maps by diagrams or suitable cartograms.

CHAPTER

II

LOCATION AND PHYSICAL ASPECT

Nestled in one corner of the beautiful Indian state of Himachal Pradesh, Kaza Soma happens to be a tranquil and serene destination in Spiti Valley. Packed with majestic snow-covered mountains, bubbling rivers, picturesque landscape, and shimmering streams, this dreamy place is no less than a paradise on earth. The entire area of Kaza is categorized into 2 parts – Kaza Khas village and Kaza Soma village. While the former accommodates the king's palace, the latter is home to government offices. The presence of historical wonders, monasteries, and gompas adds a sense of magic to this charming town. At present day, the Himalayan village of Kaza Soma features an exotic amalgam of ancient culture and modernity that is sure to leave every traveler totally awestruck and spellbound. The pristine locales and mountainous terrain of Kaza Soma lure tourists who are interested in experiencing spirituality as well as adventurous activities. The place even forms a base camp from where travelers can venture to experience activities such as mountaineering and trekking. Some well-known trails that start from the village of Kaza Soma include Pin-Bhaba, Parang-La, and Pin-Parvati. In addition to trying adventure sports and visiting various Buddhist shrines, tourists flocking here also like to take a walk to the small villages nearby Kaza Soma, which offers an exciting and unique experience.

The village of Kaza Soma is blessed with a plethora of decent accommodation facilities and food outlets, helping tourists in having a comfortable vacation. All the elements put together, make tourism flourish in this small Himalayan destination.

2.1 LOCATION

Kaza Soma village belongs to the kaza Tehsil of Lahul and Spiti district under the state of Himachal Pradesh. The entire study area is located on the hilly region of northern Himalayas in Himachal Pradesh. The longitudinal and latitudinal extension of Kaza is 32.22 N and 78.08 E in the northern bank of Spiti river. **MAP 2.1 & 2.2**

Physiographic location: Kaza Soma is the capital of Spiti Valley. Monasteries, villages, high altitude farming, a rugged terrain and rocky mountain slopes sweep down to the river beds giving the landscape a moon like appearance. The region is known as 'Cold Desert' and doesn't receive rainfall. Kaza Soma, located at an altitude of 3,800 m is spread over an area of 358.66 hectare. The town is divided into the old, as Kaza Khas and new as Kaza Soma sections. The new town contains the administrative buildings.

Topographic location: 32.22 N and 78.08 E

Administrative Location: A small hilly village and sub divisional headquarter of Spiti Tehsil, Lahul and Spiti district, Himachal Pradesh.

Distance location: Kaza Soma is overlooked by high mountain ridges on the NE and SW sides. The Spiti River runs from NW to SE past Kaza Soma. Kaza Soma has two access routes: one from Kinnaur valley and the other from the Lahaul valley. The route via NH 505 through Kinnaur is open throughout the year, except for occasional short periods resulting from landslides or heavy snowfall. This road, starting from Shimla, follows the Sutlej river unto a little beyond Poo, thereafter turning northwards to follow the Spiti river all the way to Kaza Soma . The other road starts from Manali and after crossing the 13,090-foot (3,990 m) high Rohtang Pass to reach Gramphoo where it joins the road from Keylong and proceeds south along Chandra River till Batal then climbs up to cross the 14,928-foot (4,550 m) high Kunzum pass, enters the Spiti valley to reach Kaza Soma . It remains closed during winter months, normally from October end to June due to heavy snowfall on both the passes.

2.2 GEOLOGY

Spiti valley forms part of the Tethyan Himalayan, known for its complete record of sedimentation from upper Proterozoic to Eocene sediments. Our study area lies in the upper Spiti valley, with lithologies dominated by rocks from Paleozoic and Mesozoic successions. The Paleozoic (Permo-Carboniferous) rocks comprise friable and splintery shale, quartzite and meta-sediments, whereas the Mesozoic successions are dominated by black limestone with intercalations of shale, dolomite and sandstone (Lilang group), shales (Spiti formation) and sandstones (Guimal formation).

Kaza Soma along the left bank of the Spiti

Structural investigation revealed that Spiti valley forms part of a large syncline (Spiti-Zanskar Syncline) with a NW–SE-striking fold axis. The valley encompasses several active and inactive faults affecting the Precambrian–Quaternary successions. The termination of the Spiti syncline in the lower Spiti valley gives rise to N–S-trending Kaurik–Chango (K–C) fault and nearby NNE-trending west-dipping fault of the Leo-Pargil Horst fault systems. These fault systems largely control the active tectonics in the region. Continued exhumations of high-grade metamorphic rocks are reported along these fault zones. **MAP-2.3**

Anticlinal folded structure

2.3 GEOMORPHOLOGY

The geomorphologial set up of the area is highly complex. The terrain has an immature topography and is traversed by deep valleys and high hill ranges. The area can be divided into two major geomorphological unit viz. Structural hills and valley fills. Structural hills are underlain by rocks belonging to pre-cambrian, palaeozoic, Mesozoic and Cenozoic eras. Escarpments and hogbacks are common features. Valley fills include both fluviatile deposits and moraines. These deposits occur as narrow and elongated strips along the main streams. Glacio-fluviatile deposits are confined to the upper reaches of drainage system of the watersheds. These areas are either along the snowline or near to it. Mostly these are demarcated along the river/stream courses. These valleys are broad and gently sloping, generally devoid of any vegetation cover. The side walls of the valley are mostly covered with talus scree, limiting the exposure of bed rocks. Meandering and braiding, that often reflects relative changes in gradient is found within the course of the Spiti River, whereas the section within the landslide debris is deeply incised. Debris fans, mostly associated with ephemeral streams have partially blocked the Spiti River at several points. Terraces identified in the upper Spiti valley are mostly paired aggradational river terraces (correlative terraces preserved on both side of the river) found at the mouth of the tributary streams joining the Spiti River. They comprise

Earth Pillar and lake sediments

Landscape of Kaza Soma

poorly sorted boulders and gravels indicative of a steady and fast alluviation event. Three levels (T1, T2 and T3) of terraces

were identified. The T2 and T3 terraces attain a height of ~0.5–1m, whereas the T1 terrace occurs at a height of ~20 m from the river bed. Due to sparse vegetation, high rate of erosion, and ongoing tectonic activity, the lake sediments do
not occur continuously along the entire valley but form discrete outcrops. The lake sediments are mostly laminated and include occasional sand and gravel layers.

Landscape of Kaza Soma

LONG PROFILE ALONG THE THAWLAGE OF SHILLA NALA BY CLINOMETER SURVEY

Shilla is a mountain peak close to Spiti Valley, part of

the Himalaya mountains. Its peak is 6,132 meters (20,118 ft) above sea level. The long profile shows the gradient of Shilla Nala as it journeys from source to mouth. Average slope varies between15° to 25°.Slope of the Upper part (source to 170 m) is very steep (mean slope angle 25°), middle (170 m to 495 m) and lower part (495 m to 1095 m) is moderate (mean slope angle is 15°). It spans the source of Shilla and the mouth (Spiti). Shilla Nala flows from steep gradients to low gradients. In this part velocity of river water is high, erosion

Long Profile survey

Survey by Clinometer

and friction power are also high. River carries the debris formed by weathering. Various stones roll on the river bed and moreover friction between these moving rocks results in formation of round shape rocks. Gravitational Pull and snow melt water plays an important role at this part/stage of river. Snowmelt water starts flowing downwards because of gravitational pull. Because of 'downcutting' erosion process at this stage various landforms are formed. The process of 'land form' formation is high in areas having soft rocks and in mountains rocks are hard therefore down cutting is possible. Down cutting forms tight steep-side valleys. Erosion and transportation only take place in large quantities in this river bed when the river's discharge is high after periods of snow melting. When the river's discharge falls the river stops transporting the large boulders its transporting and deposits them. **MAP-2.4**

Steep River bank

Long Profile survey from Highway to Spiti River Bed by Dumpy Level Survey

Hill slopes constitute the flanks of valleys and the margins of eroding uplands. They are the major zones where rock and soil are loosened by weathering processes and then transported down gradient, often to a river channel.

Four major varieties of hill slopes occur in nature (*Fig: Long Profile from Highway to Spiti River Bed by Dumpy Level Survey*):

A) Face Fall Slope: Characterized by soil creep, terrace formation etc.

B) Transitional Mid Slope: Formed by transportation of materials by mass movement and ice melted water action.

C) Colluvial Foot Slope: Re-deposition of materials by mass movement.

D) Alluvial Toe Slope: Formed by alluvial deposition.

Spiti River and earth pillar

Two major varieties of hill slopes occur in nature

A) On **weathering-limited slopes (Dip amount above 17°)** transport processes are so efficient that debris is removed more quickly than it can be generated by further weathering. Such hill slopes develop a faceted or angular morphology in which an upper free face, or cliff, contributes debris to a lower slope of accumulation. Slopes of this sort are especially common on bare rock where the profile of the slope is determined by the resistance of the rock, not by the erosional processes acting on it. **MAP-2.5**

One consequence of this is that many rock slopes retreat parallel to them in order to preserve the characteristic slope angle for a rock type of given strength. If the features of the rock change with depth into the slope, however, the characteristic angle of the slope will change. Rock slopes develop where weathering and soil erosion are slow (as in arid regions) and where rock resistance is high.

B) The second major variety of slope is **transport limited (Dip amount below 17°)**. Transport-limited slopes occur where weathering processes are efficient at producing debris but where transport processes are inefficient at removing it from the slope. Such slopes lack free faces and faceted appearances, and they are generally covered with a soil mantle. The profile of this type of slope generally has a sigmoid appearance, with convex, straight, and concave segments. The shape of the slope is an expression of the process acting upon it.

2.4 DRAINAGE

Braided Spiti River

The Spiti River originates from the Kunzum range. Tegpo and Kabzian, Pin streams are its tributaries. Its position across the main Himalayan range deprives it from the benefit of the South-West monsoons that causes widespread rain in most parts of India from June to September. The river attains peak discharge in late summers due to glacier melting. After flowing through Spiti valley, the Spiti River meets the Satluj near Khab and Namgia in Kinnaur district traversing a length of about 150 km. from the North-West. Steep mountains rise to very high altitudes on either side of the Spiti River and its numerous tributaries.The course of the Spiti River in the upper valley follows the trace of the Spiti fault and makes a sharp turn towards the toe end of the fault in W–E direction. In the lower Spiti valley the W–E-flowing River makes an abrupt shift in the course near Sumdo and follows the trace of K–C fault suggesting that the Spiti river course is mainly controlled by the active faults in the region. We also note that all the three major landslides (Hansa and Mane palaeo-landslides, and the 1975 earthquake-triggered Parachu landslide) in the Spiti valley have occurred along the fault zones.

The extracted longitudinal river profile of the Spiti River provides evidence of active deformation in the region. The rivers that are not affected by tectonic deformation mostly develop a smooth concave longitudinal profile. Departures of the river gradient from this ideal smooth shape reflect variations in the lithology of the river bed or variations in rock uplift rates along the river course. The sharp knick-point observed mostly along the active fault zones indicates tectonic influence as the cause for the gradient change.

Erosion, Transportation and Depositional Characteristics of Spiti River:

A) Hjulstrom curve: Hjulstrom curve describes the relationships between erosion, transportation, and deposition of sediments. Based on this logarithmic plot, it is possible to determine whether a river will erode, transport, or deposit the sediment depending on the particle size and water velocity. The upper curve depicts the critical erosion velocity as a function of particle size, which decreases with decreasing particle size down to around 0.1mm. For particles below that size, the critical erosion velocity increases with decreasing grain size in cohesive sediments. The lower curve shows the deposition (settling) velocity as a function of particle size. The critical velocity for deposition depends on the settling velocity of particles, which decreases with smaller grain sizes. Hjulstrom curve of Spiti River shows that most of the sediments are transported as bed load and a few are transported as suspension. **MAP-2.6**

Pebbles measurements

B) Pebble's Shape Analysis: A **pebble** is a clast of rock with a particle **size** of 4 to 64 millimeters based on the Udden-Wentworth scale of sedimentology. **Pebbles** are generally considered larger than granules (2 to 4 millimeters diameter) and smaller than cobbles (64 to 256 millimeters diameter). One of the important tasks of sedimentology are to sort the infinite number of conceivable pebble shapes into a finite number of classes, because well-chosen classes carry important information on the history of the sediment, providing clues about transport and characterizing depositional environments. Although shape is a basic attribute of all objects, including pebbles, complete characterization of such three-dimensional shapes poses formidable difficulties. Despite the large literature on the topic, there is little agreement on the best classification method for pebble shape analysis. A variety of shape indices and diagrammatical presentations of grain shape have been proposed in the past (*Wentworth 1922; Zingg 1935; Krumbein 1941; Aschenbrenner 1956; Sneed and Folk 1958; Smalley 1967; Dobkins and Folk 1970*). These methods for quantitative characterization of pebble shapes have been the subject of lively discussions during recent years (e.g., *Illenberger 1991, 1992a, 1992b; Benn and Ballantyne 1992; Woronow 1992; Graham and Midgley 2000; Oakey et al. 2005; Blott and Pye 2008*). All these classification systems require the measurement of the three orthogonal axis lengths $a>b>c$ of the approximating three-axial ellipsoid, where *a* is the longest, *b* the intermediate and *c* the shortest axis of the pebble.

We examined the agreement between E-classes and Z*p*-classes on 54 collected pebble samples from Spiti River Bed Near Kaza. The samples are from several different geological settings, representing different depositional environments, abrasion processes and pebble lithology. We determined the E-class of all pebbles as well as their axis ratios *c/b* and *b/a*. Based on the latter, the Z*p*-class can be determined if the parameter *p* is given (in the classical Zingg case $p=2/3$ is assumed). We found that all samples, the Z/E diagram has one (and only one) characteristic peak, in the range 0.55 to 0.89. Most of the pebbles are round but spheroid in nature, a few are flats or blade or roller shaped in nature.

MORPHOLOGICAL STREAM CLASSIFICATION OF THE PART OF SHILLA NALA

The Rosgen Stream Classification is a system for natural rivers in which morphological arrangements of stream characteristics are organized into relatively homogeneous stream types. This is a widely-used method for classifying streams and rivers based on common patterns of channel morphology. The specific objectives of this stream classification system are as follows: 1) predict a rivers behavior from its appearance; 2) develop specific hydrologic and sediment relationships for a given stream type and its state; 3) provide mechanisms to extrapolate site-specific data to stream reaches having similar characteristics; and 4) provide a consistent frame of reference for communicating stream morphology and condition among a variety of disciplines and interested parties. These objectives are met through Rosgen's four hierarchical levels (I-IV) of river morphology.

Hierarchy of the Rosgen Stream Classification

Level I categorize stream types into letters A - G based on their geomorphic characteristics that result from the integration of basin relief, land form, and valley morphology.

Level II characterizes stream type by using numbers 1 - 6, in addition to letters A - G, to include the assessments of the channel cross-section, longitudinal profile, and plan-form pattern.

Level III describes the existing condition of a stream as it relates to its stability, response potential, and function.

Level IV verifies the process relationships inferred from the previous three levels of classification.

The cross section of Shilla Nala represents A type river. The salient features of this type river are as follows:

Stream type "A" is similar to the described “Aa+”, in terms of associated landforms and channel characteristics. The exception being that channel slopes range from 4 to 10 percent, and stream flows at the bank full stage are typically described as step/pools, with attendant plunge or scour pools. Normally, "A" stream types are found within valley types that due to their inherent channel steepness, exhibit a high sediment transport potential and a relatively low in-channel sediment storage capacity.

We determined the E-class of all pebbles as well as their axis ratios *c/b* and *b/a*. Based on the latter, the Z*p*-class can be determined if the parameter *p* is given (in the classical Zingg case *p*=2/3 is assumed). We found that all samples, the Z/E diagram has one (and only one) characteristic peak, in the range 0.55 to 0.89. Most of the pebbles are round but spheroid in nature, a few are flats or blade or roller shaped in nature.

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2.5 CLIMATE

Lahaul & Spiti district falls in the rain shadow area of Himalaya. The monsoon hardly penetrates and rarely reaches the valley in the form of mostly drizzle. The summer months are invariably dry. It falls in the dry temperate zone of Himachal Pradesh. There is great diversity of climate in the zone due to variation in altitude, topography and geographical location. In general, the climate is extremely cold and heavy snowfall occurs during winter; the temperature at some places remains several degrees below zero level. The winter season spans from November to March and most parts of this zone remain cut

off from rest of the world during this period. Spiti in particular becomes the harsh cold desert during winter months. **MAP-2.7**

There is only one cropping season starting from April to September or early October when the mean minimum and maximum temperatures range approximately between 12 to 24° C; though occasionally it ranges from as low as 5° C to 30° C. During winter months, the temperature goes much below the freezing point (-20 to -40° C). Rainfall also varies from one location to another. Though, the average annual rainfall of the zone is 250 mm, yet it ranges from very low at 90 mm to as high as 1,200 mm and most of it is received as snowfall in winter.

The annual rainfall in the area during 2012 was 455.4 mm. Snowfall varies from less than 1 m to 6 m and may be higher at higher altitudes.

2.6 SOIL

The soils of Kaza Soma are silty clay in texture and neutral to alkaline in reaction with low water holding capacity. These are low in nitrogen and medium to high in P and K. The soil strata are generally loose. The water holding capacity also
varies from poor to medium. These soils are prone to erosion due to cultivation on steep slopes, splashing floods, flow irrigation and overgrazing.

2.7 PLANT SPECIES DIVERSITY

Spiti is a high-altitude cold desert located above the tree line, with only a few stunted willows and scattered trees in some villages. There are shrubs on the valley floor.

Stunted willow trees

Plant Species diversity is **the measure of biological diversity observed in a particular ecological community indicating a number of species or species richness in an ecological community**. A plant species diversity map has been prepared along the left bank of Shilla Nala by Simpson's Diversity Index. Simpson's Diversity Index is **a measure of diversity which takes into account the number of species present, as well as the relative abundance of each species**.

As species richness and evenness increase, so diversity increases. The major plant species found in the region are Black cherry, Asparagus, Carlina and Drummon. Vegetation coverage of Kaza Soma is very low. But along the river bed of Shilla Nala few vegetation coverages have been observed. Plant species diversity map revealed moderate diversity in the area. Most of the species are scrubs and shrubs. Due to lack of moisture the shrubs have Spines which are technically modified leaves as well as Thorns which are technically modified stems. However, a few wooden species are also found in this region. **MAP-2.8**

2.8 ENVIRONMENTAL ISSUES, PRONENESS TO NATURAL HAZARDS

Environment plays a crucial role in establishing the path for future development. Both natural as well as built environment, not only need to be conserved but also protected from various natural hazards. Kaza Soma area is endowed with various ecologically sensitive natural features such as rivers, hill slopes etc. Hence, planning for this area needs to be taken up in an environmentally sustainable manner. Kaza Soma area is vulnerable to natural disaster due to its location on hilly terrain. Floods, earthquakes and landslides are some of the major threats.

2.8.1 PHYSICAL ENVIRONMENT

GEOLOGY AND HYDROGEOLOGY OF THE STUDY AREA

The hydrogeological framework of the area is essentially controlled by geological setting, distribution of rainfall, snowfall and porosity of rocks constituting aquifers. Geologically, the area is underlain by the rocks of Proterozoic era to the quaternary period. Hydrogeologically, all these formations can be divided into units namely fissured and porous formations.

Fissured formations are constituted by hard rock formations ranging in age from Precambrian to Mesozoic and composed mainly of granites, gneisses, slates, phyllites, quarzites, schists and limestones. These rocks are generally massive and devoid of any primary porosity. However due to tectonic activities, secondary porosity has been developed along fractures, joints and faults zones.

Porous formations include both fluviatile and fluvio-glacial deposits. There is no development of the alluvial terrains in the valley as most of their river courses flow through narrow valley portions between well-defined compact and hard rock valley walls.

2.8.2 NATURAL HAZARDS

Kaza Soma area is prone to various hazards both natural and manmade. In the area the geological hazard, mainly earthquakes, landslides and soil erosion are most critical, the flash flood is also hydro metrological hazard. The road accident, epidemic and domestic fire could also occur but cause damage locally only.

EARTHQUAKE

Modern seismic data for the last five decades shows the region is seismically active. The earthquake in 1975 with a recorded magnitude of 6.8 Ms is the best example of the recent seismic activity in this region. Massive landslides and slope failures also followed the earthquake in which debris from one of the major rock slides in the Parachu valley attained a height of 60 m and blocked the Parachu River —a modern analogue to the early Holocene damming of the Spiti River. Intense damage was noted along the N–S-trending Kaurik–Chango fault indicating its genetic relationship with the earthquake. The fault plane solution of the earthquake provides evidence for the east–west extension of normal faults in Spiti valley. The investigation of late Quaternary fluvial–lacustrine sediments from Spiti valley also yielded evidence of tectonic uplift and palaeoseismicity.

LANDSLIDES

The palaeo-landslides in the upper Spiti valley were identified near Hansa and Mane village. The landslides are of rock slide type with debris consisting of carbonaceous rocks with fractured and pulverized rock at the bottom of the debris.

The movement of both the landslides has taken place mainly along the bedding plane surface, and the landslide debris climbed up the opposite valley blocking the Spiti river course and resulting in the formation of a lake upstream. Extensive faulting has also been identified in places (Mane and Hansa) where the palaeo-landslides have occurred. This weakening of rocks through extensive faulting can provide ideal preconditions for mega-landslides. Finally, the erosion of the landslide debris by the Spiti River resulted in the breaking of the dam and dissection of the infilled depressions thereby exposing the fine-grained lacustrine deposits.

2.8.3 ENVIRONMENTAL AND DISASTER MANAGEMENT PROPOSALS

Environment and disaster risk for a given area are intrinsically linked. Many of the disasters occur due to combination of natural hazard and vulnerability. This report tries to reduce vulnerability by inhibiting dense concentration of population and environmentally-sensitive Development Control

Regulations. This can help in minimizing the disaster risk which exists in the area due to presence of natural hazards. This approach can be categorized as a pre-disaster approach, where instead of solely focusing on post disaster response, measures are adopted to mitigate disaster and to minimize its ill effects in the event of disaster.

PROPOSALS

The following are proposed to conserve the environment as well as to minimize disaster risk.

- **Delineation of undeveloped zone –** This zone, which comprises of river bank area, covers more than 15% of the area. Construction shall not be allowed in this zone, except for temporary structures subject to conditions specified in the Development Control Regulations and only with special permission.
- **Restrictions on slopes--**Construction on slopes more than 45° shall not be allowed, while construction on slopes below 45° shall be only after prior permission from the competent authority.
- **Building permission--**New building permission shall only be given to buildings incorporating earthquake resistant designs.
- **Restrictions on liquefaction of site--**No land shall be used as a site for the construction of building if the site is found to be liable to liquefaction by the competent authority keeping in view the earthquake intensity of the area.

CHAPTER III

SOCIO-ECONOMIC ASPECTS

Study of economy can better be understood with the study of demographic behavior, literacy status and occupational structure of an area. Detailed studies during our field work show that in all parts of Kaza Soma, variation of various components is so prominent that efficiency in economy has different levels of its attainment.

3.1 DEMOGRAPHIC ASPECTS

Since the decade of 1961, the behavior of decadal growth rate of population of Kaza Soma has been erratic, varying in a wide range. The growth rates in some years, both positive and negative are incredible. From the decade 1971-81 to till now, Kaza Soma showed a steady increase of growth rate from 23.2% to 45.46%.

MAP—3.1

According to the 2011 census, the total population of Kaza Soma was 1027 with a sex-ratio 805 females/'000 males, much below the state average of 963. In Kaza Soma Scheduled Castes and Scheduled Tribes accounted for 5.6% and 84.22% respectively. The literacy rate of Kaza Soma was 78.3%, compared to the national average of 72.99% and state average of 83.9%. The Kaza Soma had a total of 253 households.

Kaza village women

Local people

There was a total of 961 workers of which main workers were 735, no. of marginal workers was 226, comprising 73 cultivators, 38 agricultural laborers, 2 household industrial workers. As per the religious census of 2011, Kaza had 20% Hindus, 12% Nepali, 48% Buddhist and 20% others.

Religious activity in own house

Kaza child

The highest concentration of population is found in Kaza Soma. Almost 60% of population is migrated from the surrounding area in general and rest of the state in particular.

In Kaza Soma average family size varies due to the differentiation of educational status, occupational structure, social

Kaza house keeper

nomenclature etc. Kaza Soma experienced average family size of more than 4. This reveals that family wise population is comparatively low in comparison to other urban areas of sub-Himalayan area. Male- female differentiation in family size is quite insignificant. If we look into the marital

status, it is evident that marriage is a compulsory social phenomenon, but the age at marriage of females is quite high—above 22 years. About 20% of employed females in age group 25-29 and 30-34 are unmarried. This is due to family burdens and/or growing consciousness of free living. The age-sex pyramid of Kaza Soma shows the low fertility rate as a consequence of very low child population in the age group 0-4 and very high migrated population in the working age group 25-44. Besides, percentage of male working population is comparatively higher than the female working population in different working age groups. Dependent population is more or less low except the old dependency. Overall, the structure of population in this growing village is comparatively young. It was found that on an average all the sampled families of Kaza Soma are residing for about 10-25 years. Only 4 percent families have moved in the village within last 5 years. Of all the household's 5.8 percent migrated from nearby area.

Kaza family

3.2 LITERACY STATUS

Literacy, being an important indicator of social development, it affects the demographic characteristics and labor participation. As per Census 2011, literacy rate in Kaza Soma was 57.2 for males and 42.8 for females. This data shows a gender gap of 14.4 at Kaza Soma. **MAP- 3.2**

There are about 7pre- primary and primary schools, 5 secondary schools and 2 Higher secondary schools at Kaza Soma. As per our household survey out of 252 literate population 14.1% are literate below primary level, 14.7% primary, 50.3% secondary, 13.2% higher secondary, 5.4% graduate, 1.3% post graduate and 1% others.

3.3 OCCUPATIONAL STRUCTURE AND CONCENTRATION OF INCOME

Of the BPL family's 13 percent do not have any legal right of their land, but 52 percent of the poor have legal rights of land. Middle-and high-income groups are mainly on leased land. A large portion of BPL families are staying in rented house, ownership of house is very low among them, but 29 percent is on leased land. Even in other income groups a large portion have house on leased land. Of the BPL family's 10 percent are having kuchha houses. In the poor and lower-middle group houses are mostly semi-pucca in nature and about 62 percent higher income group families have pucca houses. Legal electric connection is available in most of the sampled houses. On an average 19 percent of all the families in the slums stays with some other family. Being a tourist spot secondary and tertiary are very prevalent here and so economy of the people is more or less sound and stable. Besides financial assistance from the ghompas help people to own their residential houses.

Road cleaning

Carrying of dry grasses

If we look into the type of houses, we find that maximum people have single storied building. In few parts double and multiple storied building have been found. Primarily the people of the native Kaza have agriculture as primary activities and due to gradual development of secondary and tertiary activities basic economy are growing very slowly and hence single storied residential buildings are found in almost every area. **MAP—3.3**

Field preparation for cultivation

In this village service is the main occupation. Besides, business, transport and communication etc. are other major occupation. In Kaza Soma some patches of agricultural land are found and some people are engaged in agricultural activities.

In Kaza Soma about 48.8% household earn below Rs.10, 000/month and only 10.4% household earn above Rs. 50,000/month. There has tremendous income disparity in cultivation induced area and business & commerce induced area. Concentration of income is variable two villages. This is due to the variation of occupational level. Those people who are engaged in secondary and tertiary activities have better income and better living standard.

The workforce participation rate at Kaza Soma in 2011 is 56.73%, the male participation rate is 61.71% and the female rate is significantly lower at 38.29%. Majority of the people are engaged in tertiary sector since Kaza Soma has a tourism-based economy. Transport and commerce related activities are dominant in the town.

3.4 HOUSEHOLD SOCIO-ECONOMIC CHARACTERISTICS

Household socio-economic characteristics were analyzed through a primary survey of 110 households which amounted to about 44% of the total households. Some of the salient findings from the survey are as under-**(1)** The average household size is almost 4 and nearly 82% of the household are nuclear,

Household surveying

(2) The sex ratio observed was 850/'000 male population and 38.29% females were in the working category. The dependency ratio was 32.88%,

(3) It was observed that 48.8% of the population was earning less than Rs 10,000/month, 27% had income between Rs. 10,000-20,000, 13.8% had income between Rs. 20,000-30,000 while rest 10.4% had above Rs. 30,000,

(4) In terms of occupational pattern, 30% were engaged in Trade and Commerce and 42% were engaged in other services,

Household surveying

(5) The trend in occupational structure shows a sharp increase towards tertiary sector i.e., tourism related activities,

Household surveying

The data related to types of Government and non-Government occupation show that all the occupational activities are related to non-Government organizations. In maximum areas occupations related to Government sector are limited due to low employability. But occupations like business, service, trade and commerce etc. in the non-Government sector are very much predominant in almost every area.

3.5 SOCIAL WELL-BEING AND STATUS OF LIVING

Social Well Being is evaluated as a combination of factors including income, level of education, and occupation. It is a way of looking at how individuals or families fit into society using **economic** and **social** measures. These factors have been shown to impact individuals' health and wellbeing.

Kaza room interior

For the overall sound growth of the area, it is necessary to increase the space for residential area to avoid congestion. New colony of residential area may be developed in the western part of Kaza Soma so that density (persons/hectare) of population can be reduced in a sustainable manner. Bus stand should be shifted from current congested area to the new open space. Green belt may be developed in the south-western and southern part of the village. Shopping complex may be shifted to the present bus stand area.

3.5.1 HOUSING

Housing is a basic human right since it is a basic human need. Hence access to adequate housing for the residence of Kaza Soma is of at most importance.

Stone walled house

Housing Typology: Housing typology has been analyzed on the basis of observations during site survey. They are classified in to predominantly three types on the basis of----

1. Ground coverage and plot area,
2. Built up area,
3. Condition of housing,

According to survey nearly 60% of the total occupied houses are privately owned houses. Further, 90% of the total houses are permanent, 4% are semi-permanent and 6% are temporary. It was observed that 70% of the total households have the facility of separate kitchen.

Slums and Squatters: There are small clusters of slums spread unevenly over the village. It has been observed that presence of hotels and tourism sector has resulted in increase in slum population within the village. Slums near the water bodies pose a serious threat to natural water channels.

Mud roofed hose with storage of fire wood

House building materials

Type of house building materials

From the collected data it is analyzed that 56% of the houses are made up of brick mud and only 44% of the houses are made up of brick.

Type of floor materials

Different types of floor materials have been used in different houses.48% house used stone and mud, 28% houses used mud, 12% houses used cement, 8% houses used cement and stone,

and 4% houses used stone as their floor materials.

Type of wall materials

Various types of wall materials have been used.48% houses wall materials is brick,32% houses wall materials are stone and 20% houses wall materials is other materials. **MAP—3.4**

Type of roof materials

64% houses used stone, grass, wood, and cement as their roof materials and 36% houses uses other materials as their roof materials.

Market scenario

Kaza market is the main place of availability of goods as there is lack of availability of goods as there is lack of local shops. Maximum shops were established after 6-12 years ago, about 45% of the shops are 6-12-year-old.27% of shops are new which are established around 5 years ago.

Major commodities of the market food items and shoes, other predominant commodities are electronics; garments. Some special goods are stone jewelries, wools and metal show pieces.

From the transport data it is cleared truck is the dominant modes of transport and about 50% of goods are carried by trucks. Goods come from Rampur, Shimla, Chandigarh, Delhi, Ludhiana, Amritsar, Manali, Kullu, Ladakh, Nepal, Punjab, Haryana and Jammu. **MAP—3.5**

Market of Kaza

From the diagram of different income of shops, it can be said that maximum income come from Garment shops (daily income is 12000-13000), the 2nd highest income come from electronic goods (daily income is about8000-9000), the 3rd one is Iron goods (daily income is about 6000-7000). Shops open at 8.00 am and close at 8.00 p.m.

3.5.2 PEOPLE'S PERCEPTION

Perception is the process of attaining awareness or understanding of the environment by organizing and interpreting in the nervous system, which in turn result from physical simulation of the sense

organs. So, the various peoples have various perceptions on any concept.
For perception study of people from different family of Kaza Soma are surveyed. Local people enjoy the facilities are-Banking facilities, Recreational facilities, educational facilities, Power supply, Waste disposal, Water supply, Transport facilities etc. The people from different families have different types of view. According to the percentage of views of the most people the facilities of bank is in good condition, the facilities of Recreational, Education, Medical, Power supply, waste disposal are in moderate condition. The facilities of transport and water supply are not in good condition. 48% people go to Kaza hospital and 52% people go to local health center for their medical treatment. Tap water is the only source of drinking water. Sanitation condition is moderate, only 38% people have septic tank and other goes to open field or low-cost latrines. Many people used traditional medicine like ayurvedic and most of the people used modern medicines. Bike and local buses are transport facilities available to them. 80% people have mobile phone in their houses. Radio and television are their recreational facilities; all of the people have solar power facility. Banking facilities is moderate.

3.6 AGRICULTURE

The area remains covered under snow fall for more than six months so there is only one crop season (Monocropping). Pea and Barley are the only crops grown in the entire cultivated area and each crop covers nearly half of the cultivated area. The average yield of the pea is about 80 q/ha. The farmers are growing high yielding varieties of pea namely Azad P-1 Arkel Lincon. In case of barley the farmers grow only local varieties. The farmers are using about 5 q seeds of pea where as in case of barley the seed rate is 1.8 q/ha. No chemical fertilizers are used in any of the crop. The farmers also use plant protection chemicals such as Karathane for the control of powdery mildew in pea crop. Ploughing is done partly by bullocks and partly by tractor. So, there is possibility of mechanization in the watershed. A watershed is defined as that geographical area which feeds water to a drainage line (like a rivulet stream river etc.). However, a watershed is not only a geographical area but also the area from where the community living within draws its sustenance. The quality and health of the watershed therefore directly affects the quality of life of the people living in that area. Watershed development involves the conservation regeneration and judicious utilization of natural resources seeking to bring about an optimum balance between the demand and use of resources. It therefore involves complex interactions between various components like Community Development, Soil and land Management, Water Management, Crop Management, Afforestation, Pasture/Fodder Management, Rural Energy Management and related areas. The concept of watershed development seeks to bring equilibrium among these components so that sustainable development of area may become possible.

Female agricultural labor

Agricultural field

Preparation of agricultural field

LAND USE AND LAND COVER

Land is the most important natural resource, which comprises soil and water and the associated flora and fauna, thus involving the total eco system. Knowledge of the spatial distribution of land use and land cover is essential for the planning and management activities. Land use is characterized by the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it. Definition of land use in this way establishes a direct link between land cover and the actions of people in their environment. It can be defined as the use of land by human, usually with emphasis on the functional role of land in economic activities. The term land cover describes the types of materials/features present on the surface of the earth. Land cover is the observed (bio) physical over on the earth's surface. Land use patterns reflect the character of a society's interaction with its physical environment, fact that becomes obvious when it is possible to see different economic and social systems occupying the similar environments. Knowledge of land use and land cover is important for many planning and management activities concerning the surface of the earth. **MAP-3.6**

The land use and land cover map have been prepared using the information from the Panchayat office, Survey of India Topographical sheet, Google Earth Image and field survey. Kaza Soma village covers an area of 358.66 hectare. The village is surrounded by hills on all sides. The average altitude is 3500m. The village being a major tourist destination, it caters to many hotels and retail shops.

1. **Residential use:** Area under residential land use forms 12.86% of the area. The residential areas are distributed in almost all areas, especially in central part of Kaza Soma. Residential bungalows of Government servants and defense personnel are in the Kaza Soma area.

2. **Commercial use:** The majority of area under commercial use is occupied by hotels and lodges. 1.5% of the village area is under commercial use. The majority of retail shops and few restaurants and hotels are located on Kaza Khas market area. Some auto repair shops have come near bus stand. The vegetable market is located near market area.

In terms of major land uses in Kaza Soma residential use (12.86%) followed by public-semi public (7.65%), Institutional (2.9%), Commercial (1.51%), Transportation (1.38%) etc. account for major share in the area. Further temporal trends in land use pattern indicate that uses such as residential, commercial, government and circulation area have shown an increase in intensity of development between 2010 and 2015 as reflected by an increase in their respective share as proportion of area.

3.7 TOURISM

Tourism is a fast-developing industry in India which is not only a source of income but also a means to rest and relax from the day-to-day mechanical life of the urban and rural population. Kaza Soma is bestowed with many tourist destinations as well as is the gateway to many tourist attractions nearby. Many trekking routes around the village add to its attraction for tourists. The largest settlement in **Spiti Valley** of **Himachal Pradesh**, Kaza Soma

Langza, the fossil village

boasts of high mountains with snowy crowns, crystal clear rivers, streams and barren splendor interspersed with patches of green. Kaza is known for its colorful festivals and the **Sakya Tangyud Monastery.** Rudyard Kipling described the Kaza region as 'a world within a world' and situated about 11,980 feet above sea level, it really is just that. Strung along the Spiti River, Kaza and the Spiti Valley has strong geographical and cultural similarities with Tibet and **Ladakh**. Kaza Soma is the sub-divisional headquarters of Spiti Valley, making it an important administrative and commercial hotel, market, main bus depot, hospitals and government offices are located here. Its mountainous terrain and pristine locales attract visitors who want to indulge in adventurous activities and spiritual wellbeing alike. It is the base camp for trekking, mountaineering and other adventures. Pin-Parvati, Parang-La and Pin-Bhaba are some of the popular trails which start from Kaza Soma. A gentle stroll to villages around Kaza can also be an interesting experience.

Komic village, world's highest restaurant

Sakya Tangyud Monastery

Monasteries and *gompas* are the repositories of the ancient culture and tradition of Kaza. **Tabo Monastery**, one of the oldest Buddhism centers in the western Himalaya, is located here. Murals of Tabo Monastery are quite similar to Ajanta paintings. It is also the best place to watch Lama dance and get insights into Tibetan Buddhism.

Hikkim, the highest post office in the world

The main places of interests are Kibber village (4270 m), Tabo (3050 m), Key monastery (4166 m), Dhankar monastery (3980 m), Dhankar lake (4120 m), Kunzum pass (4551 m), Chandra Tal (4300 m), SakyaTangyud monastery (4520 m), Komic village (4275 m) etc. which are situated within 50 km radius from Kaza.

Different Types of Tourism in and around the Area

PILGRIMAGE TOURISM	1. Sakya Tangyud Monastery 2. Tabo Monastery 3. Key monastery 4. Dhankar monastery 5. Aakya Tangyud monastery
NATURE / ADVENTURE TOURISM	1. Dhankar Lake 2. Kunzum pass 3.Chandratal Lake 4. Komic village

NATURE / ADVENTURE TOURISM	5. Lanza village 6. Kibber village 7. Nako village 8. Tabo village 9. Pin-Parvati, Parang-La and Pin-Bhaba

Month wise domestic visitor arrival in and around Kaza, 2019

April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
22250	26285	28417	23392	21925	20618	14751	8651	6949	321	229	5453	179241

Month wise foreign visitor arrival in and around Kaza, 2019

April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
456	630	2291	6854	4843	2292	992	705	821	0	0	128	20012

ISSUES/ CHALLENGES

●**Lack of activities and infrastructure to hold the tourists and increase duration of stay**--

Though tourism is the primary economic activity in the village, the current average duration of stay is 2 days only due to lack of adequate activities, infrastructure and facilities for the tourists.

Chicham, Asia's highest bridge

●**Large floating population**-- The village hosts a large floating population coming for tourism and work. Kaza Soma is also the divisional headquarter of Spiti. As a result, the village faces added load in the peak tourists' seasons; thereby stressing the natural environment and urban infrastructure.

PROPOSALS FOR TOURISM DEVELOPMENT

Strategies to improve tourism infrastructure and experience of tourists in the area are given below---

♦ **Establishment of Tourist information center:** Tourist information center is present at Kaza. More information centers need to be established in the area.

♦ **Artisans village cum vocational training center:** Towards promoting local handicrafts, handloom and other allied functions, where talented artisans from all over region can perform, village cum vocational center to be developed. Besides, a cultural center has to be developed to perform the regional folk dance and other cultural activities.

♦ **Formation of volunteer network for identified sites:** Many famous treks like Pin-Parvati, Parang-La and Pin-Bhaba, Kunzum La etc. are falling in the area which are difficult to be monitored all the time. Sometimes people get lost during trekking. To overcome this problem, the department of tourism and district administration should mobilize a volunteer network

Kunzum Top

Key Monastery

for taking up necessary work locally. Local people, stakeholders and institutions have to be identified in each locality which can take up the task of monitoring and facilitation of the visitors and other such activity. Tour operators and other infrastructure providing institutions must work closely with this volunteer network to identify and resolve the issues.

Nako Lake

♦ **Tourism branding and promotion:** Government of Himachal Pradesh is promoting the state tourism through television advertisement and other media. Also, tourism department, is taking necessary steps to promote tourism in Kaza Area but it can be advertised more on a larger scale so that more people can participate and witness the festivals and fairs held there every year.

Chandra Tal

CHAPTER

IV

CONCLUSION

4.1 KEY ISSUES

The sectoral key issues that emerged out of public consultations, field visits, analysis of data from secondary sources and discussions with Kaza panchayat office are---

(1) ***Physical Growth and Environment:*** The major issues that face Kaza Soma are --
(a) Hilly terrain and ecologically fragile areas restrict the physical expansion within the village boundary;
(b) Although ecologically sensitive areas have been earmarked as 'prohibited areas' in the plan, there is high incidence of unauthorized construction in these areas;
(c) Many buildings in the old village area are in dilapidated condition;
(d) Growth of slums and squatter settlements is leading to environmental degradation;
(e) Unsafe construction practices render the buildings vulnerable to natural disasters;
(f) Landslides on surrounding hills, and
(g) Pollution in the locality.

(2) ***Water Supply:*** Kaza Soma depends on springs and streams originating high above in the surrounding hills for its water supply. The flow in these springs and khads depends on a variety of factors including levels of rainfall and snowfall, rate of snowmelt, land use in the catchment, and is also likely to be affected by climate change, urbanization etc.
However, unequal distribution of water, low pressures, old dilapidated pipelines, uncontrolled zoning and unsatisfactory operation and maintenance requires thorough reorganization and up-gradation of this sector to meet future demand.

(3) ***Storm Water Drainage:*** In a hilly village like Kaza Soma, adequate storm water drainage facilities are required to prevent soil erosion and control of pollution to water bodies. Investments are needed to address the needs of
(a) repairs and reconstruction of drains in critical sections,
(b) additional cross walls and catch-pits,
(c) provision of screens at outfalls,
(d) disconnection of side drains from sewers and
(e) removal of obstruction in drains.

Open drain

(5) ***Solid Waste Management:*** The village has not met its mandatory obligations under the Solid Waste Management Rules, 2000 and is burdened with an inefficient collection system, environmentally unsound disposal practices and uncontrolled dumping at a site down a gorge like formation. It thus requires immediate and sustained effort to upgrade to an acceptable level.

(6) ***Roads and Transport:*** High percentage of tourists with respect to the resident population, growing number of vehicles and lack of space lead to an unacceptable congestion in Kaza Soma. Traffic management, road hierarchy and provision of parking are greatest needs. Pedestrianisation of tourist areas and alternative intermediate transport are of utmost importance. The village needs immediate investment in these areas.

(7) ***Heritage and Tourism*****:** Kaza Soma is a known destination in the Tribal and Buddhist voyage of India. Tourists are attracted by the beauty of Kaza Soma surrounded by hills and its rich cultural heritage. Its rich heritage needs to be conserved and showcased to promote tourism through

diverse means such as interpretation centers, experiential museums, walks, publications, etc. Other elements need attention, are--- demonstration of model architectural elements and
restoration of heritage buildings such as gompas, monasteries etc. Kaza Soma has the potential to tap high end tourism by development of eco-tourism and adventure tourism.

4.2 SWOC ANALYSIS AND VISION

Kaza Soma started its journey as a popular tourist destination of to-day. Along with tourists, came the hotel industry, shopkeepers and traders, raising population, putting pressure on land and urban infrastructure. In addition to the human pressure, the natural formation has undergone changes; some of it is in the form of landslides along adjoining hill slopes and changes in topsoil and vegetation. To-day the village is still growing, obviously shifting the growth westwards at Kaza Soma to wherever buildable land is available. The citizens of Kaza Soma, who grew-up with the hills, is not too pleased with the present state of affairs and the forces affecting their lifestyle and expectations. They want to `retain' the ecologically sound and beautiful character' of Kaza Soma, yet seek an efficient management with a progressive and healthy economy. Protecting natural environment, which is the main asset of the village becomes all the more important towards sustainability of the village.

Detailed village profiling and analysis of various aspects led to identification of the following strengths, weaknesses, opportunities and Challenges for Kaza Soma Area.

4.2.1 STRENGTHS

4.2.1.1 STRONG TOURISM BASE

Kaza Soma is a popular destination for tourists coming in for its natural scenic beauty, adventure sports, and rich cultural heritage. The village also attracts international tourists and scholars, researchers, artists working on Tibetan literature, Buddhist paintings and arts from all across the globe. Presence of Majestic main Himalayan range suitable for adventure sports, established trekking routes to Pin valley, rich and unique cultural mix of Tibetan, Kangri, Gaddi and Nepali cultures, vicinity to famous Kunzum pass, Chandra Tal, clean and pollution free environment, suitable climate for winter & summer tourism contribute to its increasing tourism base.

4.2.1.2 VERY RICH CULTURAL HERITAGE

The culture of Kaza Soma and surroundings is very vibrant and closely linked with the religious practices followed by the people of this village. The influences of the nomadic Gaddis, Votis, Hinduism and Buddhism can all be found in the traditions here. This led to opportunity for developing the tourism potential and a cultural economy.

4.2.1.3 ADEQUATE HOUSING

A wide range of housing, including rental housing, is available in the village with affordable, moderate and luxury housing clustered together with less than 0.5% of the village population in the house-less category (District Census handbook, 2011). However, there is need to ensure adequate and affordable housing for the population that has been included in the village with the recent increase in the ULB area and anticipated in-migration.

4.2.1.4 ENVIRONMENTALLY CONSCIOUS AND RESPONSIBLE COMMUNITY

4.2.1.5 STRENGTHENING ADMINISTRATION FUNCTION

Kaza Soma, a sub-divisional headquarter, was declared as an administrative hub of Lahaul and Spiti district and thus lead to proliferation various administrative offices.

4.2.2 WEAKNESSES

4.2.2.1 LACK OF DEVELOPMENT OF TOURISM ATTRACTION POINTS AROUND KAZA SOMA AND RELATED INFRASTRUCTURE TO HOLD TOURISTS INTEREST AND INCREASE THEIR AVERAGE DURATION OF STAY

Though tourism is the primary economic activity in the village, the current average duration of stay is 2 days only due to lack of adequate activities, infrastructure and facilities for the tourists.

4.2.2.2 UNPLANNED GROWTH AND INEFFICIENT LAND MANAGEMENT

The village's rapid rise as a popular tourist destination has increased demands for hotels, markets etc. This has led to rampant, unauthorized and ad-hoc development with more than 50% of the building construction not meeting the required standards in the key tourist location.

4.2.2.3 LACK OF PUBLIC TRANSPORT AND INADEQUATE NMT INFRASTRUCTURE

The village faces perennial traffic congestion along National Highway making it unsafe for walking and causing air and noise pollution. Moreover, there are inadequate mobility options for residents and tourists with lack of sustainable public transport and pedestrian infrastructure. This has resulted in steep private vehicular growth, increased congestion and road accidents.

4.2.2.4 INADEQUATE AND INEFFICIENT INFRASTRUCTURE AND SERVICES

The lack of adequate and efficient infrastructure and services in the village is leading to significant reduction in the quality of life for the citizens and tourists. Management of solid waste and waste water and providing sufficient water supply are some of the urgent needs of the area. Lack of open and community spaces is one of the key needs of the people.

4.2.2.5 SEASONAL TOURISM

The village has tourism-based economy with less job opportunities. There is also a large share of informal sector in the hospitality sector with lack of sufficient facilities.

4.2.2.6 LACK OF INDUSTRIAL ACTIVITIES

Though promotion of heavy industrial activities may not be desirable, lack of handicraft and Small-scale home-based activities is a weakness of the area.

4.2.3 OPPORTUNITIES

4.2.3.1 GLOBAL TOURISM DESTINATION

The village has opportunity for developing a Global Tourism Destination for all seasons and all reasons through development of adventure, leisure, winter and cultural tourism infrastructure.
It would lead to enhanced tourism spending and days of stay, thus leading to job opportunities and income growth.

4.2.3.2 INFRASTRUCTURE DEVELOPMENT

Opportunity for development of sustainable quality living and world class amenities through existing sustainable and infrastructure development initiatives.

4.2.3.3 NATURAL FEATURES

Perennial water streams and mesmerizing landscape gives opportunity to develop nature-urban connect including eco-tourism activities.

4.2.3.4 WILLINGNESS OF STAKEHOLDERS FOR PLAN

Availability of Government land parcels in business areas of Kaza Soma for redevelopment. Willingness of the stakeholders gives an opportunity to create open spaces for mixed land use facilities to make village livable for citizens and attractive for tourists.

4.2.4 CHALLENGES

4.2.4.1 LARGE FLOATING POPULATION

Though the resident population is small, the village hosts a large floating population coming in for tourism and work. Kaza Soma is also the sub-divisional and block headquarters of Spiti. As a result, the village faces added load in the peak seasons; thereby stressing the natural environment and infrastructure.

4.2.4.2 DISASTER RISK

Kaza Soma being in seismic zone-V is highly vulnerable to natural hazard. The area is highly prone to landslides caused due heavy snow melt water events. Moreover, there is a high likelihood of climate change impacts and induced extreme events in the area (HP State Action Plan on Climate Change, 2012).

4.2.4.3 INCREASING TRAFFIC RELATED ISSUES AND UNORGANISED PARKING

These traffic related issues, if not attended timely may lead to rapid deterioration in the quality of life and environment.

The socio-economic as well as physical environmental aspect of Kaza Soma needs attention to the planners. The availability of civic amenities is in primary level and if we want to develop it as a prime tourist spot, we should have to give much focus on it.

Though the developmental activities create many environmental problems which are localized, yet the interaction between these problems give them a regional dimension. Thus, the basic purpose of policies concerning environment and development must be concerned to enhance life quality along with satisfaction of human needs. In reality policies to promote anthropogenic ventures and designs to enact them are the forces directing impacts and consequences of anthropo-environmental interactive system, at a junction where far less is known about complexity of environmental systems prevailing in highlands.

APPENDIX

REFERENCES

1. Ameta, S.S. 1979. Some observation on the geomorphology of the Spiti Valley, Lahaul and Spiti district, Himachal Pradesh. *Himalayan Geology*, 9(2): 646-656.
2. Auden, J.B. 1934. The geology of the Krol Belt. *Records of Geological Survey of India*, 67(4): 357-454.
3. Bagati, T.N. 1990. Lithostratigraphy and facies variation in the Spiti Basin (Tethys), Himachal Pradesh, India. *Journal of Himalayan Geology,* 1(1): 35-47.
4. Bagati, T.N., Kumar, R. and Ghosh, S.K. 1991. Regressive-transgressive sedimentation in the Ordovician sequence of the Spiti (Tethyan) Basin, Himachal Pradesh, India*. Sedimentary Geology,* 73: 171-184.
5. Bagati, T.N. and Suresh, N. 1991. Sedimentology of the Lingti Lacustrine Sequence, Spiti Valley, Himachal Pradesh. *Journal of Himalayan Geol*ogy, 2(2): 124-132. Bagati, T.N. and Thakur, V.C. 1993. Quaternary basins of Ladakh and Lahaul-Spiti in northwestern Himalaya. *Current Sci*ence, 64 (11 & 12): 898-903
6. Bagati, T.N., Thakur, V.C., 1993. Quaternary basins of Ladakh and Lahaul-Spiti in north western Himalaya. Current Science 64, 898–903.
7. Bhargava, O.N., Bassi, U.K., 1998. Geology of Spiti–Kinnaur Himachal Himalaya. Geological Survey of India Memoirs 124, 1–210.
8. Detailed Project Report Department of Rural Development, Government of Himachal Pradesh, Under Integrated Watershed Management Programme for WMP Lahaul and Spiti-II (Kaza), CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176 062 (Himachal Pradesh).
9. Consolidated detailed project report for Spiti Block under Integrated Watershed Management Program in development block Spiti (Himachal Pradesh), Govt. of India.
10. Halder Supriyo, Socio Economic analysis of Indian cold desert region: A case study of Kaza, Lahual Spiti in Himachal Pradesh, International Journal of Multidisciplinary Research and Development, Volume 3; Issue 2; February 2016; Page No. 189-197

PRIMARY AND SECONDARY DATA AND SURVEY QUESTIONNAIRE

ACTIVITY REPORT

DEPARTMENT OF HISTORY

JULY TO DECEMBER 2022

EXHIBITION ON THE EVE OF INDEPENDENCE DAY

Name of the Department: Department of History

Title of the activity: Historical exhibition on National Movement

Date: 15th August 2022

Time: 10.00 a.m

Name of the Competitors: 23 participants

Winners of the Competition:

First prize- AKM Asifurzaman and Bandana Dutta

Second Prize- Swarnock Das, Ritonkor Mallick, Puja Das, Chandrika Mayak

Third Prize- Koushiki Biswas

Description:

The exhibition was organized by Department of History, Vidyasagar Metropolitan college on 15th August 2022 to commemorate the 75th year of Independence. The exhibition centred around Indian National Movement. The exhibition was thematically divided into 9 periods- 1857-1866, 1867-1876, 1877-1886, 1887- 1896, 1897-1906, 1907-1917, 1917-1926, 1927-1936, 1937-1947.

Geo-tag Photos

VISIT TO ALIPORE JAIL MUSEUM

Name of the Department: Department of History

Title of the activity: Educational Tour to Alipore Jail Museum

Date: 9/11/2022

Time: 1.30 p.m

Participants: 20 participants- Semester VI

Geo -tag photos:


GPS Map Camera
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India
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SPECIAL LECTURE BY DR DEBALINA BANERJEE

Name of the Department: Department of History

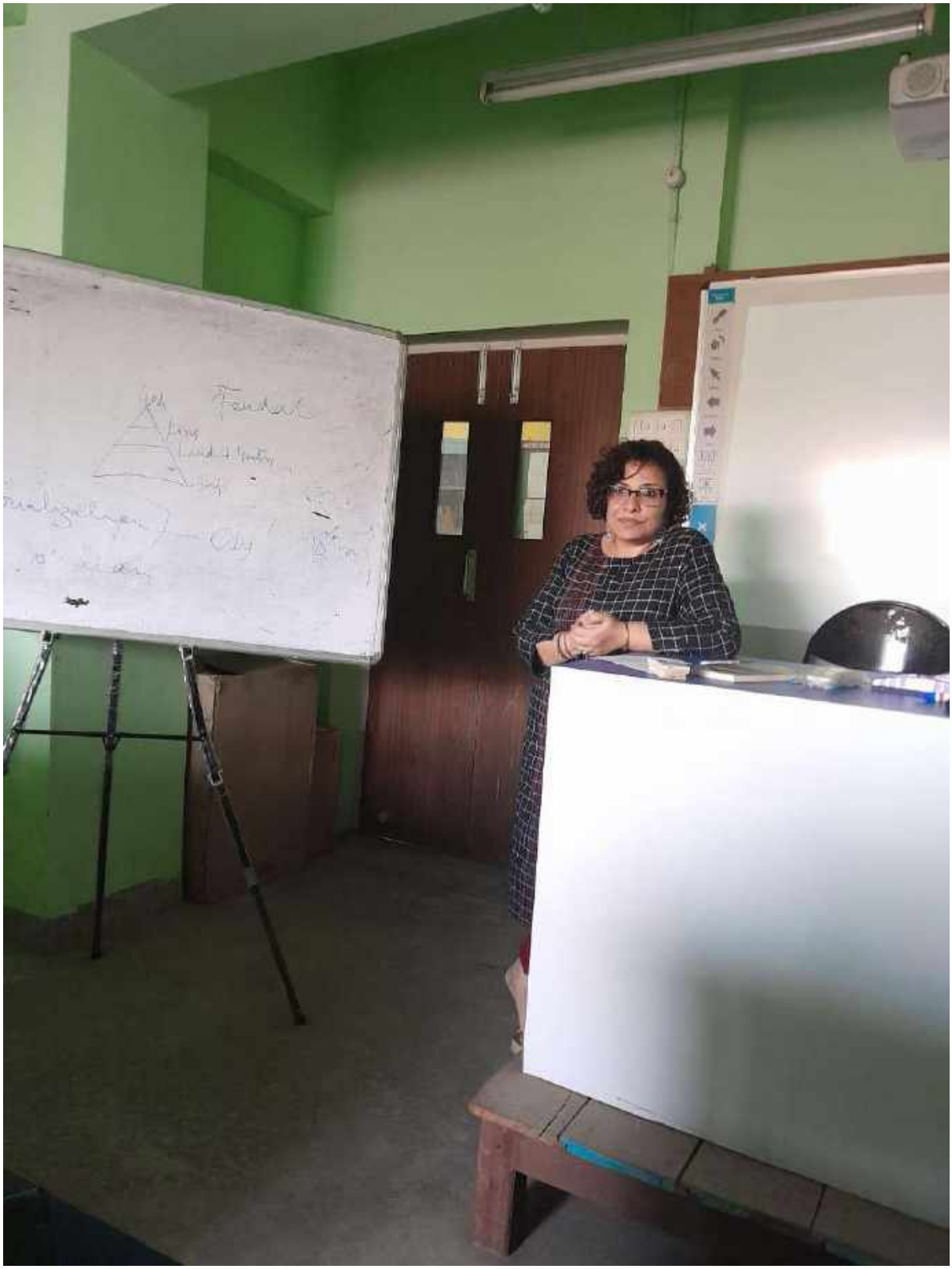
Title of the activity: Special Lecture

Topic: Historical Perspectives of Romanticism

Date: 2nd September 2022

Time: 2.30 p.m

Participants: 32 students



A Field Survey Report on the Basis of Epidemiological Studies on Human

- Semester: **VI (Under CBCS)**
- Subject: **Physiology (Honours)**
- Paper: **DSE-A-4 (Community and Public Health)**
- Year: **2023**
- Date of Report Submission: **June 2023**

Title

AN ERGONOMIC STUDY ON THE ONSET OF MUSCULOSKELETAL DISORDERS AMONG THE WORKERS ENGAGED IN HEAVY LOAD HANDLING AT THE HOTELS OF GANGTOK, SIKKIM

Survey Tenure: **25.03.2023 to 28.03.2023**

The study was carried out among the workers involved in heavy load handling at the Hotels of Gangtok, Sikkim. The purpose of the study was to bring to the forefront the contributing risk factors that lead to the onset of musculoskeletal disorders (MSDs) amongst these workers.

The study was conducted among 20 male randomly selected hotel workers engaged in lifting and carrying heavy load in the hotels of Gangtok, Sikkim. Only those having a minimum experience of at least three years were selected for this study. The physical parameters and body composition of the subjects were analyzed. A comprehensive questionnaire study was carried out to ascertain the onset of MSDs. The physical activity level and physiological parameters were assessed. The handgrip strength was also taken into account during the study.

The subjects who participated in the study belong to the informal sector. Consequently, they are not entitled to leave benefits and other privileges. Moreover, as they hail from the poor socioeconomic strata, so more work provides them with the opportunity to earn more. Therefore, they indulge in strenuous load handling tasks for 12 hours a day and 7 days a week. It was further found that they have an average experience of about 12 years. Thus so many years of hardship for prolonged duration has definitely taken a huge toll on their physical and mental health.

The results revealed that the tasks performed by these hotel workers are extremely strenuous with many of them complaining of some sort of discomfort. Awkward working postures with lifting, frequent bending and twisting of different body segments lead to pain affecting the knees and low back.

The present study brings to the forefront the pertinent reasons behind the gradual onset of MSDs amongst these hotel workers. However, scarcity of alternative jobs in such hilly terrain where tourism is the primary earning source, compel them to remain in their profession. Therefore, it is imperative to reduce the burden of causative factors of MSD. Appropriate recommendations have been suggested for the holistic improvement of these hapless workers.

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Department of Zoology

Zoological excursion at Central Sericulture Research Institute, Murshidabad

Date- 05.01.2023

An Educational tour was organized by Department of Zoology, Vidyasagar metropolitan college, Kolkata to Central Sericulture Research Institute, Murshidabad where the silk industry has bloomed, flourished and reached its pinnacle.

The tour comprised of 5 students of B.Sc. Vth semester and accompanied by one faculty member, Prof. Parbati Chatterjee and one non-teaching staff, Sri Mrityunjoy Ganguly from Deptt. of Zoology. All the students were directed to gather at Kolkata station at 6 AM on 5th January 2023. Journey starts on 6.50 AM and arrived at Berhampore at 10.15 AM. and Institute at 10.30 AM. They provided us all the necessary information regarding construction of Rearing House, incubation of eggs and brushing, arrangement of Rearing stands, types of rearing trays, disinfection, Bedchanging during each moult, advantages of branch/ shoot feeding, mounting and use of chandrika for cocooning, harvesting of cocoon, grainage (storage and collection of cocoons) etc. After fruitful discussion and on-site visit we returned to Kolkata on that day by Hazarduari express at 9.30 PM.

Group Photo

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Department of Zoology

VISIT TO NATURAL HISTORY MUSEUM in PEMAYANGTSE MONASTERY, PELLING, SIKKIM

From 22.5.2033 to 26.5.2023

An Educational tour was organized by Department of Zoology, Vidyasagar metropolitan college, Kolkata to visit a natural history museum at Pelling which is a small town in the north-eastern Indian state of Sikkim. The tour comprised 17 students of B.Sc. IVth semester accompanied by faculty members, Prof. Damayanti Bakra and Prof. Madhusudan Saha from Deptt. of Zoology. All the students were directed to gather at Howrah station at 5 PM on 22nd May. We started our journey at 5.30 pm by Kamrup Express. We reached NJP station at 6.00 am. Then we started our journey by car and reached at Pemayangtse Monastery at 2 PM. There was a good collection of old items which includes some pictures, manuscripts, idols and statues. It was great experience for zoology students. Next day we went to visit bird sanctuary and other attractive locations. We returned to NJP on 25th May by car and then by train to Sealdah station on 26th May early morning.

Pemayangtse Monastery

At Pelling, Bhutan

Sidkeong Tulku Bird Park, Sikkim