

“ Sheel, Sharir, Adhyayan ”
Aundh Shikshan Mandal, Aundh



Raja Shripatrao
Bhagawantrao
Mahavidyalaya, Aundh.
(Satara)

Experiential Learning

M.A. GEOGRAPHY

Aundh Shikshan Mandal, Aundh's

RAJA SHRIPATRAO BHAGAWANTRAO MAHAVIDYALAYA, AUNDH

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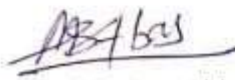
DECLARATION

*We hereby declare that the **study tour report** was written and submitted by each one of us, is an original work conducted under the guidance of Shri. Barkade J. D. Head of the the Department and Shri. Shinde S. M. (Assistant Professor), (Miss) P. Y. Kamble. Miss. A. B. Jagadale Department of Geography. the empirical finding in this report are based on our observations . I have not copied from any study tour report submitted to Shivaji University or any other Institutions.*

Place: Aundh

Date: March 2018

Student


(Atar Mosim Abbas)



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Tourism

Introduction

Tourism is a basic and most described human activity .it is a phenomenon of modern times it become a very complex activity in encompassing a wild variety of relationship of the world. Tourism is an industry considered to a destination transporting then housing filling and entertaining them upon travel. The money they spent and means which provides them foods, products. It is somewhat difficult to apply.

Tourism is a life industry requiring little capital investment; it can be considered as commodity of mass consumption. It is the only industry which can utilizing the includes of country.

Concept of Tourism:

Tourism is an activity of multi dimensional, multi faceted involving money lives and associated economic activity in other words it can be regarded as whole range of individuals host and guest business organization and places put together some characteristic manner to produce a travel experience.

1 One who travels for a period of 24 hours of more in country other than that in which he usually rises.

2, Hunziker and kraft: Tourism is the sum of relationship arising the travel and stay of non-residence in so far as they do not level to permanent residence and are not connected with any earning activity.

3, World Tourism Organization : Tourism is defined is the activity of a person travelling to a person outside there for less than a specific period of travel and whose main purpose of travel is

other than exercise is an industry remunerated from the place visited.

4. Tourism is an industry which attracts people to a destination, providing them with accommodation, food, entertainment, and other services. It is an industry which is primarily consumer-oriented. Tourist money and people provide goods and services.

Types of Tourism

- A. **Domestic Tourism:** It is also known as internal tourism as well as national tourism. In India, it is known as Deshatan. Generally, domestic tourism means the movement outside normal dwellings to other areas within the boundaries of the nation.
- B. **Dream Tourism, Farm Tourism, and Rural Tourism:** The term dream tourism is applied to a specific environmental-oriented segment of the tourism industry. Travel is proposed to getting back to nature. Rural tourism is normally promoted by public organizations, while farm tourism is supported by the farmer community.
- C. **Cultural Tourism:** Cultural tourism development is community-based and designed to improve the socio-economic well-being of local residents. It also pinpoints the need for careful planning to protect the integrity of sites and minimize harmful impacts.
- D. **Senior Citizen Tourism:** A newly emerging trend in tourism, basically for senior citizens or old people who live in isolation, especially in the west.
- E. **Educational Tourism:** Educational tourism is undertaken for seeking new things and for seeing new places. In other words, it is undertaken by those who acquire new knowledge through research and witness new places of importance.

F. **Group Tourism:** Group tours are undertaken by studies of by groups of employs working in office or by the workers of a factory. Railway authority concession for tourists.

G. **Sport Tourism:** Today we see an Increasing participant in many Sport activity. Such as maintaining, walking, sailing, fishing, sun bathing, trekking, boating, surf riding etc.

Significance of Tourism:

As already mentioned tourism is unique because in whole worlds industry without smoke, education without classroom integration without legislation and diplomacy without formality. Tourism has an educational significance. It has a beneficially effect which is brought about through contact between people of different race and nationalities. Tourism in whole world cultural exchanges results in cultural enrichment of thus travel as well as of the receiving and. Cultural fractures attracts tourists to designation, architecture, historical, monuments and birth places of famous man are often visited by tourist. Culture is tourism main attraction world heritage sides are nothing but cultural sites. Such as the pyramids, the tower of London, The Taj Mahal of India, The Great wall of China. Tourism is a political and social significance.

The main economic significance of tourism money earned in place of normal resident is spent in place visited is common to all tourism. Tourism is an internal part of modern life as a force for social changes tourism has had an impact of the same order . In the last decades tourism has transformed the way the old looks and works.

Tourism is the largest single item in the world's foreign trade and for some countries it is already the most important export earner of foreign exchange.

TOURISM IN MAHARASHTRA

Modern Maharashtra is not a bustle of industrial and agricultural activity or the frieze pursuit of wealth and progress alone. It is very much a part of the everyday scene, anywhere in the state: there are the signs of its great religious, cultural, historical and martial heritage.

In Maharashtra, hundreds of shrines of all faith are found everywhere in the states. The evidence of artistic skills of people whose cultural goes back to thousands of years as in the Ajantha and Ellora in dances, in paintings and sculptures, in architecture and handicraft. Maharashtra displays a fascinating variety of brilliant achievements that is however more evident than in its cave temples and Hindu shrines. Over all, Maharashtra is the relic of glorious history of great Shivaji, massive forts on hill tops and historic battle ships narrate the story of great nation rise from division of unity.

Maharashtra offers quite and beautiful hill stations like Mahabaleshwar, Panchgani, Lonavla, Khandala, Matheran, Chikhaldara and golden beaches lapped by the blue wather of the Arabian sea for such as Ganpatipule, Ratnagiri, Guhager, Tarkarli, Vengurle, Naigaon and Alibag. The wild life sanctuaries in Western ghat (Sahyadri) and in the Vidharbh region (Tadoba) increases the curiosity of the tourists.

Hundreds of shrines of all faith found every where in the state like lord Vitthal Temple at Pandharpur, Khandoba Temple at jejuri and pali(satara), TuljaBhavani Temple at Tuljapur, Trimbakeshwar Temple, Vani temple at Nashik, Bhimashankar Temple at Bhimashanmkar, Mahalaxmi Temple at Kolhapur, GanjananMaharaj Temple at Shegaon, Swami Samarth temple at Akkalkot, Saibaba temple at Shirdi, Gurudwara at Nanded etc. are

the important sites of great importance in Maharashtra. Every year millions of pilgrims visit these sites. And event like Kumbha-Mela at Nashik and various palkhi procession from all parts of Maharashtra to Pandharpur are also witness large pilgrim gathering.

Maharashtra has been the birth place and home of world reputed saints like Saibaba at Shirdi, Gajanan Maharaj of Shegaon, Saint Dnyaneshwar of Alandi, Saint Tukaram of Dehu, Saint Eknath of Palthan, Saint Meherbaba of Meherabad, Swami Samarth temple at Akkalkot, has become a place of world pilgrimage. The Sai baba temple in Shirdi is the second richest one in the country after the Lord Tirupati temple at Tirumala (Andhra Pradesh).

Maharashtra respects the varkari tradition, which is the single richest treasury of traditional Marathi literature and cultural. The varkaripanth and the palkhi pilgrimage is a symbol of modern day Maharashtra. It is continuity not only of the custom and rituals of a particular devotional sect but of a supremely important part of the history, character and spirit of the larger Maharashtra society. Hundreds of shrines of Saint of Varkari traditions found all over Maharashtra. Saint Dnyaneshwar at Alandi, Saint Tukaram at Dehu, Saint Sopankaka at Saswad, Saint Nivrutinath at Trimbakeshwar, Saint Eknath at palthan, Saint Damaji at Mangalveda, Saint Janabai at Jalgon and Mehun, Saint Savata Mali at Aran and so on.

The motive of the excursion is to study physical, social, economical and cultural aspects of the study region, in course of travelling. The excursion report is divided into three parts as follows.

1. Physical and climatic Environment.
2. Social and Cultural Environment.
3. Important Tourists Places.

I. PHYSICAL AND CLIMATIC ENVIRONMENT

PHYSIOGRAPHY

Introduction:

Physiography is the branch of geography which studies the present relief features of the earth surface or of natural features in their causal relationships. A rough estimate made by the census commission in 1951, Total plateau 27.7 (305 to 915 metre.) Maharashtra state is the surface features formation to shape present land from on the surface of the earth. Coastal plains have separate identity is Sindhudurg and Ratnagiri district called as South Konkan region. Peninsular plateau is a the Satara, Sangli and Kolhapur district called as Western Maharashtra.

1) North Konkan Region:

It is between the Sahyadri Mountain and Arabian Sea in South-North direction is called North Konkan Region. In Raigad and Pune districts geographical area 7,152 Sq.km. and 15,642 Sq.km. (total area is 22,794 Sq.km.) respectively It has some features of marine erosion including cliffs, shoals, reefs and Islands in the Arabian Sea. Konkan Coast has a series of small bays and coves lying between jutting head-lands containing beaches of sand. The Alluvial Coastal belt is a series parallel ridge reaching 500-600 mtr. In which rivers like the Patalganga, Amba, Kundalika, Kal, Savitri, Ghod etc. The lateritic hill rocks rise to 600 mtr. Above mean sea level. Resource of mineral two districts is Bauxite, Magnesium, Abhrak and Elmenight.

2)Western Maharashtra:

The satara and pune district are the geographical area in 10,480 Sq. km. 15,642 Sq.km. (total area is 26,122 Sq. km.) Maharashtra plateau is lies in Maharashtra and forms the Northern part of the Deccan Plateau. Much of the region is underlain by basaltic rocks of lava origin. The area looks like a rolling plain due to weathering. The horizontal lava sheets have led to the formation of typical Deccan Trap topography. The broad and shallow valleys of Krishna, Venna, Tarali, Nira, Ghod etc. The Western Maharashtra is the resource mineral of Bauxite but, low ratio.

3) Western Ghat:

The Sahyadri or Western Ghat is the Shambhu mahadev hill range satara to pune district. The Western Ghat is the hill range of rock structure. Forming the western edge of the Deccan tableland the Western Ghats run in north-south direction, parallel and close to the Arabian Sea coast. The Western Ghats abruptly rise as a sheer wall to an average elevation of 600 meter. From the western coastal plain and appear to be an imposing mountain. But, they slope gently on their eastern flank and hardly appear to be a mountain when viewed from the Deccan tableland. The Kolhapur district is influenced by great extent by Deccan traps.

CLIMATIC CONDITION

Konkan Region:

Generally the climate of konkan region his hot and humid. The region witness all climatic seasonal changes i.e. monsoon, winter and summer.

March to June hot and humid climate hottest month is usually April average temperatures for the summer season are between 32

to 40 degree c. From June to September generally konkan received rainfall between 1400 mm. up to 1800 mm. July and August are quite rainy and typically the wettest months of the year but by September the rainfall has weakened. South-west monsoon wind consider by the rainfall in Konkan. This region rainfall is highly rainy season. April to May rainfall is named by the Ambesari in received by the Konkan. October to February the temperature are a bit milder with less humid conditions day temperatures are moderate and cool nights (15degree c) average temperature between 20 to 25 degree c.

Western Maharashtra:

Westren Maharashtra in the generally dry and Arid climate. The seasonal climate changes in mansoon, winter and summer. March to June dry and arid temperature in western Maharashtra. The averge temperature of the 33 to 38 degree c. From June to Semtember generally western Maharsashtra resived average rainfall between 700 to 1200 mm in the western Maharsashtra. October to February the temperature is low 8 to 20 degree c in winter and the night of the temperature is cool in western Maharashtra.

Western Ghat:

The western Ghat in the generally humid and tropical type climate. The western ghat season wise deviation by following.

Western ghat summer season is the March to June. The temperature is the hot in western ghat. The average temperature is the western ghat 33 to 40 degree c. The western ghat June to September generally received average rainfall in 1600mm to 2000mm in the western ghat. In this area high rainfall. South-western monsoon wind stopped the western ghat in hilly area considered rainfall in western ghat. Winter season is the October to

February in the cool temperature in the 10 to 22 degree c in western ghat.

DRAINAGE PATTERN:

The drainage pattern is an geomorphology a drainage system is the pattern formed by the streams, rivers and lakes in a particular drainage basin. The length of konkan river are very less and also sahyadri hill have very steep slope due to this they are flowing very fast and meet to Arabian sea.

1) Koyana river :

The **Koyana River** is a tributary of the Krishna River which originates in Mahableshwar, Satara district, western Maharashtra, India. It rises near Mahableshwar, a famous hill station in the Western Ghats. Unlike most of the other rivers in Maharashtra which flow East-West direction, the Koyana river flows in North-South direction. The Koyana River is famous for the Koyana Dam and the Koyana Hydroelectric Project. Today the Koyana Hydroelectric Project is the largest completed hydroelectric project in India. The reservoir Shivasagar Lake, is a huge lake of 50 km. in length.

2) Krishna River :

The **Krishna River** is the fourth-biggest river in terms of water inflows and river basin area in India, after the Ganga, Godavari and Brahmaputra. The river is almost 1,300 kilometres (810 mile) long. The river is also called Krishnaveni. It is a major source of irrigation for Maharashtra, Karnataka, Telangana and Andhra Pradesh

NATURAL VEGETATION

Vegetation is an assemblage of plant species and the ground cover they provide. It is a general term, without specific reference to particular taxa, life forms, structure, spatial extent, or any other specific botanical or geographic characteristics. It is broader than the term flora which refers to species composition. Perhaps the closest synonym is plant community, but vegetation can, and often does, refer to a wider range of spatial scales than that term does, including scales as large as the global. Primeval redwood forests, coastal mangrove stands, sphagnum bogs, desert soil crusts, roadside weed patches, wheat fields, cultivated gardens and lawns; all are encompassed by the term vegetation.

Konkan region :

The konkan region is a coastal strip of land bounded by the sahyadri hills on east and Arabian sea on west. Konkan area consists of raigad district. The total area of konkan region is 30,746 kms. Konkan region has good potential for development of farm forestry and bamboo as most of forest land owned privately. There are 3 types of forests –

- 1) semi- Evergreen Forest,
- 2) Moist deciduous Forest,
- 3) Dry deciduous Forest.

1) semi- Evergreen Forest,

Tropical evergreen forests *tropical rain forests* are usually found in areas receiving more than 234 cm of rainfall and having a monthly mean temperature of 18 °C or higher in the coldest months. They occupy about seven percent of the Earth's surface and harbor more than half of the planet's terrestrial plants and

animals. Tropical evergreen forests are dense, multi-layered, and harbor many types of plants and animal.

2)Moist deciduous Forest,

Moist deciduous Forest foot hill region some places in this region soil is alluvium and fertile, red soil. Moist forest are medium density are found. There are shows kokum, areca palm, and supari etc. trees

3) Dry deciduous Forest:

Dry deciduous Forest are costal region. There are low densities of trees. There soil is sand mixed. Mangroves are found in coastal areas, Suruchi etc.

Western Maharashtra :

Western Maharashtra is a division of Maharashtra state in India. It would be considered as the heartland of Maharashtrian culture for many reasons, not the least of which is that Pune, the cultural capital of the state is located there. The western Maharashtra 3 types of forest is follow:

- 1) The Sub Tropical Semi-Evergreen Forests:
- 2) The Sub Tropical Moist Deciduous and Semi-Evergreen Forests:
- 3) The Dry Deciduous Forests

1) The Sub Tropical Semi-Evergreen Forests:

Forest of this type occur mostly on upper hill slope from 450 meters to 1050 metres above the m.s.l. in Western Ghats. The main species are Terminaliapaniculata (Kinjal), Memocylonumbellatum (Anjani), Terminaliachebula (Hirda), Syzigiumcumini (Jambul), Oleadiocea (Parjamun) and Mangiferaindica (mango), Actinodaphnehookeri (Pisa), etc.

2) The Sub Tropical Moist Deciduous and Semi-Evergreen Forests:

Important and valuable forests of the State from commercial view point, these are mainly confined to Project Tiger area in Melghat region of Amrawati district, Chandrapur, Gadchiroli and Thane districts with *Tectonagrandis* (Teak), the associates are *Terminaliatomentosa* (Amr), *Delbergialatifolia* (Shisham), *Adina cardifolia* (haldu), *Madhucaindica* (Moha), *Pterocarpusmarsupium* (Bijal), *Mitragynaparviflora* (kalam), *Salmaliamalabaricum* (Sema) and *Dendrocalamusstrictus*(Bamboos) etc

3) The Dry Deciduous Forests:

Principal species is *Tectonagrandis* (Teak) and the associates are *Unguentadalbergioides* (Tisavi), *Acacia catechu* (Khair), *Cinelaanarborea* (Shivan) and *Anogeissuslatifolia* (Dhawada) etc.

Western Ghat:

Western Ghats also known as Sahyadri (Benovolent Mountains) is a mountain range that runs parallel to the western ghat are found mainly 3 types of forest

- 1) Evergreen Forests,
- 2) Dry mixed deciduous forests,
- 3) Wet mixed deciduous forests,

In western ghat found trees are Arjari, Palas, Sandal wood, pimpaly, Teak, Jambhal, Nag, Chandan, Mango, Jackfruit, Toran, Aawala, and Coconut etc.

1) Evergreen Forests:

In Konkan region there are evergreen trees. Western ghat is various plant, western ghat highly distribution of forest because there are high rainfall in western ghat ranges.

2) Dry mixed deciduous forests:

The dry deciduous forests is found in ghat. Rainfall varies between 750 mm. to 1000 mm. Tarvad, Dhyati, Nirgudi, Babhul and grasses are prominent species of these forests.

3) Wet mixed deciduous forests:

Wet mixed deciduous forests are covered medium area. Rainfall found 1000 to 2000 mm. The common tree species are Teak, Kateshwar, Sandle wood, Pimpal, Dhyati (shrub) and rare climbers are observed.

SOIL

Soil is the important physical factors influencing the economical as well as social conditions of the people. In Maharashtra state different types of soil are found. They are characterized by their parent rock, climate and vegetation cover. They are categorizing on the basis of their physical characteristics.

WestrenGhat:

The western side of the western ghats is on the threshold of south-west monsoon and receives a rainfall of 203-234 cm and the eastern side lies in the rain shadow area of the peninsula. The main types of soils met with the Western Ghats

Konkan

The soil of the konkan is generally classified in 3 types i.e.

- 1) Laterite soil
- 2) Salty soil

3) The dry eastern zone with precarious rainfall is covered with medium black soil of varying depths.

2. SOCIAL AND CULTURAL ENVIRONMENT

Culture defined Culture is learned and it is dynamic, as it can change and be added to. It includes: visible daily behavior, e.g. body language, clothing, lifestyle, drinking/eating habits values and social morals, e.g. family values, sex roles, friendship patterns basic cultural assumptions, e.g. national identity, ethnic culture, religion. The factors that contribute to culture include: Aesthetics, Language, Religion, Law and Politics, Values and Attitudes, Education, Technology and Material Culture and Social Organizations. High and low context cultures There are two types of culture:

1. ACCOMMODATION

A dwelling A place of temporary lodging the technique of adaptation to local cultures that the Jesuits used in their missions to spread Christianity among non-Christian peoples. Reasonable accommodation, a legal doctrine protecting religious minorities or people with disabilities Accommodation (religion), a theological principle linked to divine revelation within the Christian church Accommodation is a judicial interpretation with respect to Church and state issues Accommodation (law), a term used in US contract law Accommodation (eye), the process by which the eye increases optical power to maintain a clear image (focus) on an object as it draws near.

Accommodation in psychology, the process by which existing mental structures and behaviors are modified to adapt to new experiences according to Jean Piaget. in the learning broader theory of Constructivism Accommodations, a technique for

3) Coastal alluviums

1) Laterite soil:

Laterite is a soil and rock type rich in iron and aluminium, and is commonly considered to have formed in hot and wet tropical areas. Nearly all laterites are of rusty-red coloration, because of high iron oxide content. They develop by intensive and long-lasting weathering of the underlying parent rock. Tropical weathering (laterization) is a prolonged process of chemical weathering which produces a wide variety in the thickness, grade, chemistry and ore mineralogy of the resulting soils. The majority of the land area containing laterites is between the tropics of Cancer and Capricorn.

2) Salty soil:

Soil salinity is the salt content in the soil; the process of increasing the salt content is known as salinization.^[1] Salts occur naturally within soils and water.

4) Coastal alluviums:

Alluvium (from the Latin *alluvius*, from *alluere*, "to wash against") is loose, unconsolidated (not cemented together into a solid rock) soil or sediments, which has been eroded, reshaped by water in some form, and redeposited in a non-marine setting.

Western Maharashtra

The soil of western Maharashtra is mainly derived from the trap, physiographically the western Maharashtra can be divided in to 3 broad soil zones.

- 1) The western zone of heavily rain fall is covered with soil.
- 2) The central part with more or less assured rainfall is covered with fertile well drained brownish soil of natural reaction.

education-related disabilities in special education services. Communication accommodation theory, the process by which people change their language behavior to be more or less similar to that of the people with whom they are interacting. Accommodation, a linguistics term meaning grammatical acceptance of unstated values as in accommodation of presuppositions. Biblical accommodation, the adaptation of text from the Bible to signify ideas different from those originally expressed.

2. TRANSPORTATION AND COMMUNICATION

The Transport and Communication functional constituency was in the elections for the Legislative Council of Hong Kong first created in 1995 as one of the nine new functional constituencies under the electoral reform carried out by the then Governor Chris Patten, in which the electorate consisted of total 113,957 eligible voters worked related to the transport and communication industry.

The constituency was abolished with the colonial Legislative Council dissolved after the transfer of the sovereignty in 1997.

NH -4 is joined through the Satara and Pune. District road well connected in followed by Satara, Pune, Raigad. Konkan Railway well developed in Mumbai to Kerala, Ratnagiri and Sindhudurg. Konkan Railway runs away from Chiplun, Sangmeshwar, Rajapur, Kankavli, Malvan, Kudal.

3) SCUBA DIVING

Scuba diving is a mode of underwater diving where the diver uses a self-contained underwater breathing apparatus (scuba) which is completely independent of surface supply, to breathe underwater. Scuba divers carry their own source of breathing gas, usually compressed air, allowing them greater independence and freedom of movement than surface-supplied divers, and longer underwater endurance than breath-hold divers. Open circuit scuba systems discharge the breathing gas into the environment as it is exhaled, and consist of one or

more diving cylinders containing breathing gas at high pressure which is supplied to the diver through a regulator.

4) WATER SPORT

There are dozens of commonly played sports that involve water. These include sports that are located underwater, over water, or in water. One-person recreational activities, such as scuba diving and swimming, as well as competitive sports, such as boat racing and underwater football, are all considered to be water sports.

5. PROVISION OF WATER FACILITIES

Drinking water supply and sanitation in India continue to be inadequate, despite longstanding efforts by the various levels of government and communities at improving coverage. The level of investment in water and sanitation, albeit low by international standards, has increased in size during the 2000s. For example, in 1980 rural sanitation coverage was estimated at 1% and reached 21% in 2008. Also, the share of Indians with access to improved sources of water has increased significantly from 72% in 1990 to 88% in 2008.

At the same time, local government institutions in charge of operating and maintaining the infrastructure are seen as weak and lack the financial resources to carry out their functions. In addition, only two Indian cities have continuous water supply and according to an estimate from 2008 about 69% of Indians still lack access to improved sanitation facilities. A study by Water Aid estimated as many as 157 million Indian or 41 percent of Indians living in urban areas.

HOUSE TYPES

A house is a building that functions as a home. They can range from simple dwellings such as rudimentary huts of nomadic tribes and the improvised shacks in shantytowns to complex, fixed structures of wood, brick, concrete or other materials containing

plumbing, ventilation, and electrical systems. Houses use a range of different roofing systems to keep precipitation such as rain from getting into the dwelling space. Houses may have doors or locks to secure the dwelling space and protect its inhabitants and contents from burglars or other trespassers.

- 1) Tiled Houses
- 2) Mud Houses
- 3) Conceit Houses
- 4) Steep Slope Roof Houses

Most conventional modern houses in Western cultures will contain one or more bedrooms and bathrooms, a kitchen or cooking area, and a living room. A house may have a separate dining room, or the eating area may be integrated into another room. Some large houses in North America have a recreation room. In traditional agriculture-oriented societies, domestic animals such as chickens or larger livestock (like cattle) may share part of the house with humans. The social unit that lives in a house is known as a household.

Most commonly, a household is a family unit of some kind, although households may also be other social groups, such as roommates or, in a rooming house, unconnected individuals. Some houses only have a dwelling space for one family or similar-sized group; larger houses called townhouses or row houses may contain numerous family dwellings in the same structure. A house may be accompanied by outbuildings, such as a garage for vehicles or a shed for gardening equipment and tools. A house may have a backyard or front yard, which serve as additional areas where inhabitants can relax or eat.

Architects of houses design rooms to meet the needs of the people who will live in the house. Such designing, known as "interior design", has become a popular subject in universities. Feng shui, originally a Chinese method of moving

houses according to such factors as rain and micro-climates, has recently expanded its scope to address the design of interior spaces, with a view to promoting harmonious effects on the people living inside the house, although no actual effect has ever been demonstrated. Feng shui can also mean the "aura" in or around a dwelling, making it comparable to the real-estate sales concept of "indoor-outdoor flow".

The square footage of a house in the United States reports the area of "living space", excluding the garage and other non-living spaces. The "square metres" figure of a house in Europe reports the area of the walls enclosing the home, and thus includes any attached garage and non-living spaces. The number of floors or levels making up the house can affect the square footage of a home.

LANGUAGE:

Language is a system that consists of the development, acquisition, maintenance and use of complex systems of communication, particularly the human ability to do so; and a **language** is any specific example of such a system. The scientific study of language is called linguistics. Questions concerning the philosophy of language.

Western Maharashtra

Western Maharashtra situated in the western part of the country. Maharashtra happens to be the third largest state in the nations and stands second in population among all Indian states .

Marathi language is exclusively spoken in Kolhapur and even English, Hindi, Urdu, Gujarati, are sparingly used. Puneri language telling in Pune district. The native language of satara is Marathi. Satara people use Marathi, Hindi languages for communication and official language is English.

God and Goddesses:

1. Vitthal

Vithoba, also known as **Vitthal** and **Panduranga**, is a Hindu god predominantly worshipped in the Indian states of Maharashtra, Karnataka, Goa, Telangana and Andhra Pradesh. He is generally considered a manifestation of the god Vishnu or his avatar, Krishna. Vithoba is often depicted as a dark young boy, standing arms akimbo on a brick, sometimes accompanied by his main consort Rakhumai.

Vithoba is the focus of an essentially monotheistic, non-ritualistic bhakti-driven Varkari faith of Maharashtra and the Haridasa faith of Karnataka. Vitthal Temple, Pandharpur is his main temple. Vithoba legends revolve around his devotee Pundalik, who is credited with bringing the deity to Pandharpur, and around Vithoba's role as a saviour to the poet-saints of the Varkari faith. The Varkari poet-saints are known for their unique genre of devotional lyric, the abhang, dedicated to Vithoba and composed in Marathi. Other devotional literature dedicated to Vithoba includes the Kannada hymns of the Haridasa and Marathi versions of the generic aarti songs associated with rituals of offering light to the deity. The most important festivals of Vithoba are held on Shayani Ekadashi in the month of Ashadha, and Prabodhini Ekadashi in the month of Kartik. Vithoba is known as many names including Vitthala, Panduranga, Pandharinath, Hari and Narayana.

2. Ekvira Devi:

The EkviraAaiMandir is a Hindu temple located near the Karla Caves near Lonavala in Maharashtra.

3. Khandoba:

Khandoba (Khaṇḍobā), **Martanda Bhairava** or **Malhari**, is a Hindu deity worshiped as a manifestation of Shiva mainly in the Deccan plateau of India, especially in the states

of Maharashtra and Karnataka Telangana. He is the most popular Kuladaivat (family deity) in Maharashtra. He is also the patron deity of select warrior, farming, herding and Brahmin (priestly) castes as well as several of the hunter/gatherer tribes that are native to the hills and forests of this region.

Festivals:

A festival is an event ordinarily celebrated by a community and centering on some characteristic aspect of that community and its religion or cultures. It is often marked as a local or national holiday, mela, or eid. Next to religion and folklore, a significant origin is agricultural. Food is such a vital resource that many festivals are associated with harvest time.

Diwali:

Diwali or Deepavali is the Hindu festival of lights celebrated every year in autumn in the northern hemisphere (spring in southern hemisphere). It is an official holiday in Fiji, Guyana, India, Malaysia, Mauritius, Myanmar, Nepal, Singapore, Sri Lanka, Suriname, and Trinidad and Tobago. On the island of Jamaica, it is celebrated proudly by the Indo-Jamaican community, however in 2010 it was inaugurated as an official yearly event at the historic Devon House residence for the first time, in an effort to celebrate the country's Indian heritage on a national level. One of the most popular festivals of Hinduism, it spiritually signifies the victory of light over darkness, good over evil, knowledge over ignorance, and hope over despair.

Ganesh chaturthi

Ganesh Chaturthi (IAST: *GaṇēśaChaturthī*), also known as VinayakaChaturthi (*VināyakaChaturthī*) is the Hindu festival that reveres god Ganesha. A ten-day festival, it starts on the fourth day of Hindu luni-solar calendar month Bhadrapada, which typically falls in the Gregorian months of August or September. The festival is marked with the installation of Ganesha clay idols

privately in homes, or publicly on elaborate pandals (temporary stages). Observations include chanting of Vedic hymns and Hindu texts such as *Ganapati* *Upanshad*, prayers and *vrat* (fasting). Offerings and *prasada* from the daily prayers, that is distributed from the pandal to the community, include sweets such as modaka believed to be a favorite of the elephant-headed deity. The festival ends on the tenth day after start, wherein the idol is carried in a public procession with music and group chanting, then immersed in nearby water body such as a river or ocean, thereafter the clay idol dissolves and Ganesha is believed to return to Mount Kailash to Parvati and Shiva. Also known as dekhavas for 8 to 10 days.

Holi

Holi also known as the "festival of colours", is an Indian and Nepali spring festival celebrated all across the Indian subcontinent as well as in countries with large Indian subcontinent diaspora populations such as Jamaica, Suriname, Guyana, Trinidad and Tobago, South Africa, Malaysia, the United Kingdom, the United States, Canada, Mauritius, and Fiji. It signifies the victory of good over evil, the arrival of spring, end of winter, and for many a festive day to meet others, play and laugh.

Narlipournima

Purnima (also called **Poornima**, **Pournima**, Bangla: পূর্ণিমা, Sanskrit: पूर्णिमा (IAST: pūrṇimā)) is the Indian and Nepali word for full moon. The day of Purnima is the day (*Tithi*) in each month when the full moon occurs, and marks the division in each month between the two lunar fortnights (*Paksha*).

A full moon occurs when the Sun and the Moon appear separated by 180° . This lunar day is the considered auspicious for new beginnings. The Shukla ("bright")

Paksha is the fortnight before, and the Krishna ("dark") Paksha is the fortnight after Purnima.

Makarsankrant

MakarSankranti, also known as **MakaraSankrānti** (Sanskrit: मकरसङ्क्रान्ति) or **Maghi**, is a festival day in the Hindu calendar, in reference to deity Surya (sun). It is observed each year in January. It marks the first day of sun's transit into the Makara (Capricorn), marking the end of the month with the winter solstice and the start of longer days.

MakarSankranti is one of the few ancient Indian festivals that has been observed according to solar cycles, while most festivals are set by the lunar cycle of the lunisolar Hindu calendar. Being a festival that celebrates the solar cycle, it almost always falls on the same Gregorian date every year (January 14).

4. IMPORTANT TOURIST PLACES

1. AUNDH:

The town of Aundh is situated 26 mi. S.E. of Satara. Population (in 1911) about 3500, home of the Aundh State, a princely state (1699–1947). It is now part of Satara District in Maharashtra State.

Deepmal outside the Yamai temple

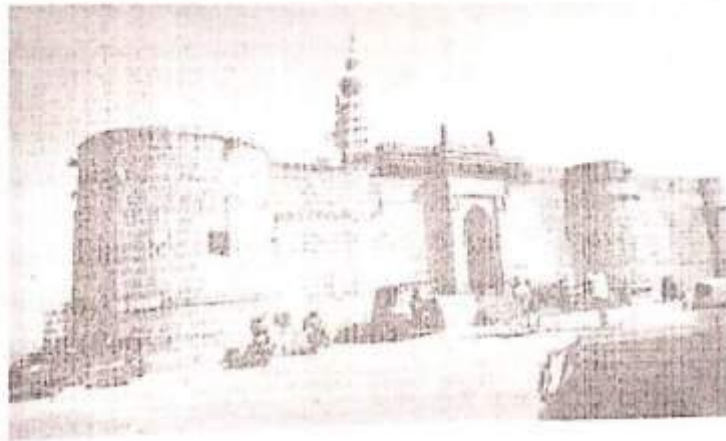
The town is known for its very old hill temple of the Devi Yamai. The Devi Yamai is the kuldaiwat of a large number of Marathi families. The top of the temple has images and idols of various Hindu Gods. The temple complex also contains the "Shri Bhavani Museum", with paintings drawn by various well-known Indian artists including Raja Ravi Varma and the famous "Mother and Child" stone structure by Henry Moore. The art collection was formerly owned by Shri Bhawanrao Pantapratidinidhi, the last ruler of Aundh. The present head of the former ruling family,

Gayatri Devi Pantpratinidhi has installed a 7 kg. solid gold 'Kalash' or crown on the pinnacle of the Yamai temple on the hill at Aurdh.

Another temple of Devi Yamai is located in the town; apart from the one on the hill.

The Yamai temple holds an annual fair (Yatra) in honour of the goddess Yamai on the Pournima (Full moon day) in the Shaka month of Paush (mid January). The yatra attracts thousands of devotees. One of the attractions of the fair is the lighting of the giant stone lamp stand (Deepmal). The fair includes food vendors, vendors selling local novelties, talent shows and movies.

The town falls under Satara District and has a Gram Panchayat (Parish council), with a member of the former ruling family serving as the Sarpanch (Head of the council).



2. HARIHARESHWAR:

Harihreshwar is a town in Raigad district, in Maharashtra, India. It is surrounded by three hills named Harihreshwar, Harshinachal and Pushpadri. The river Savitri enters the Arabian Sea from the town of Harihreshwar. Towards

the north of the town is the temple of Lord Harihareshwar, said to have been blessed by Lord Shiva. Hence Harihareshwar is often referred to as *Dev-ghar* or "house of God".

Besides a major pilgrimage center, Harihareshwar is a popular beach resort with two beaches, one to the north and the other to the south of the temple. Maharashtra Tourism Development Corporation has a resort on the south beach. Harihareshwar, along with Shrivardhan and Diveagar Beach forms a popular weekend beach destination from Pune (190 km) and Mumbai (210 km).

The Kalbhairav Jayanti Utsav (Festival on Birthday of Deity Kalbhairav) was initiated by Mr. Yashawant Balawant Nagle who was Sardar of Queen of Janjira Administering Harihareshwar village. He donated quite a large part of his property for funding the Temple management around the temple, along the sea shore. It is not advisable to go on this route during high tide. Harihareshwar is renowned tourist spot in Konkan for its temples and beaches. Moreover, it is said as Devbhumi or Temple Town. Harihareshwar alone have two beaches – one, straight beach about 2.4 km long in front of Harihareshwar Temple, and the other beach is about 2 km in an L shape just in front of MTDC Resort. Harihareshwar is an evergreen place and one may visit it in any season. It is placed in the heart of nature and bounded with Sahyadri's hills. One can spend his three or four days of holiday easily. There is no problem staying in Harihareshwar as there are MTDC (a Governmental body) and few private resorts, also some Bed and Breakfasts that provide stays in homes.^[1] Harihareshwar Beach is a well set up beach.



3. MURUD-JANJIRA



Murud-Janjira Fort is situated on an oval-shaped rock off the Arabian Sea coast near the port town of Murud, 165 km (103 mi) south of Mumbai. Janjira is considered one of the strongest marine forts in India. The fort is approached by sailboats from Rajapuri jetty.

MurudJanjira Fort View from ferry point in Rajapuri

The main gate of the fort faces Rajapuri on the shore and can be seen only when one is about 40 feet (12 m) away from it. It has a small postern gate towards the open sea for escape



The fort has 26 rounded bastions, still intact. There are many cannons of native and European make rusting on the bastions. Now in ruins, the fort in its heyday was a full-fledged living fort with all the necessary facilities, e.g., palaces, quarters for officers, mosque, two small 60-foot-deep (18 m) natural fresh water lakes, etc. On the outer wall flanking the main gate, there is a sculpture depicting a tiger-like beast clasp ing elephants in its claws.

The palace of the Nawabs of Janjira at Murud is still in good shape.

A special attraction of this fort are 3 gigantic cannons named Kalabangdi, Chavri and LandaKasam. These cannons were said to be feared for their shooting range.²² Another gate to the west is sea-facing, called 'Darya Darwaza'.

There is also another fortress, named Ghosalgad, which is located on top of the hill around 32 km (20 mi) east of Murud-Janjira, that was used as outpost for the rulers of Janjira.

4.KASHID BEECH

Kashid is a beach town on the shores of the Arabian Sea, in the North Konkan region of Maharashtra, India. It is located 30 km from Alibag and 135 km from Mumbai on the Alibag-Murud road.

Kashid can be reached from Alibag by road. The 30 KM drive is scenic and small winding roads pass through beautiful small villages.

If you're coming from Mumbai, then as soon as you enter Alibag, take the left road at the trisection with the temple, and take the first left. After some distance, a road will branch off towards the right. Take this road to go to Kashid. When the road emerges out of the villages, you will encounter a bridge after a toll post, with the VIKRAM ISPAT steel loading/unloading setup to your right and the plant to your left. Turn right immediately after you cross the

bridge. From here onward the sea and the trees will be on your right.

You can recognize Kashid by tall trees and an open view to the sea.

Buses plying regularly between Mumbai central - Murud halt at Kashid. Buses plying regularly between Thane - Murud halt at Kashid. A frequent service is available for Alibaug from Mumbai, Thane. From there



Ferry service from Gateway of India (Mumbai) to Mandava jetty. From Mandava jetty take the shuttle bus service (which is provided by the ferry operator itself and the cost is included in the ferry ticket) to Alibaug. From Alibaug bus depot, private shared tempo (mini bus, 20 seater) to a naka (road junction) near Kashid. It would take approximately 1 hour to reach here. From this naka change tempos to reach Kashid in 25 minutes. There are also plenty of rickshaws and some taxis at the bus station in Alibaug and will drive you there for fairly cheap. Be aware that it is approximately 35km to Kashid and many stretches of road are more pot holes than road. Traveling by rickshaw is very bumpy and often slow as rickshaws are small and lack suspensions. A larger vehicle can go a bit faster and provide a slightly more comfortable ride. If you go to Kashid on a weekday be aware that it is not as popular as the weekends and you

will likely have to wait by the roadside for a bit before you see a vacant rickshaw. Taxis are even rarer to see so it may be wise to hire a taxi that will wait and take you back, which is still relatively cheap.

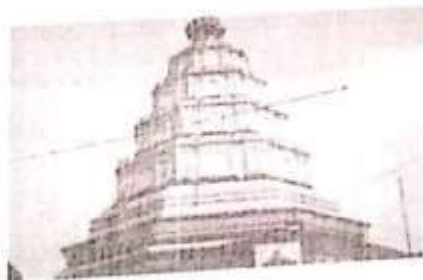
5. BALLALESHWAR PALI



Ballaleshwar (lit.: "Ballal's Lord") temple is one of the eight temples of Lord Ganesha. Among Ganesha temples, Ballaleshwar is the only incarnation of Ganesha that is

known by his devotee's name. It is located in the village of Pali which is at a distance of 58 km from Karjat in the Raigad district. It is situated between fort Saragad and the river Amba.

The original wooden temple was renovated in 1760 to make way for a new stone temple designed by Shri Fadnis. Built in the shape of the letter Shri, it was made by mixing lead with the cement during construction. The east-facing temple was carefully positioned so that, as the sun rises, sun rays fall directly on the murti during worship. The temple contains a bell that was brought back by Chimaji Appa after his defeat of the Portuguese in Vasai and Sasti.



The temple complex encircles two lakes and is tiled throughout. There are two sanctums in the temple, an inner and an outer sanctum. The inner sanctum is 15 feet (4.6 m) high, while the outer sanctum is only 12 feet (3.7 m) high. The outer sanctum contains a murti in the shape of a rat, holding modak in its hands while facing Ganesha. The main hall of the temple is 49 feet (12 m) long and 20 feet (6.1 m) wide and contains eight pillars resembling cypress trees.

The murti of Vinayaka sits on a stone throne, facing east with its trunk turned left and sitting against a background of silver which displays Riddhi and Siddhi waving chamaras. The murti's eyes and navel contain diamonds.

6. ALIBAG

Alibag is a coastal town and a municipal council in Raigad District of Maharashtra. It is the headquarters of the Raigad district and is south of the city of Mumbai. Alibag is a coastal town and municipal council in Raigad district of Maharashtra, India. It is the headquarters of the Raigad district. Raigad's first name was "Kulaba". It was developed in the 17th century by Sarkhel Kanhoji Angre the naval chief of King Shivaji's Kingdom.

Revdanda, Chaul, Nagaon, Akshi, Varsoli, Thal, Navgaon, Kihim and Aawas villages were known as "Ashtapare".

A naval battle was fought at Varsoli between Kanhoji Angre and Siddi of Janjira in 1706. In 1722 English and Portuguese jointly attacked on Kulaba fort, and they lost this war. At Chaul there was a battle between the English and Sakhoji in 1730. Sakhoji won and brought down the losing party along with their captain at Kulaba. Kanhoji even issued his own currency in the form of a silver coin called the Alibagirupaia.

Alibag and its surrounding villages are the historic hinterland of Bene Israeli Jews. There is a synagogue in the "Israel Ali" (Marathi इसाएलआळी meaning Israel lane) area of the town.

Alibag houses a magnetic observatory which was set up in 1904. It serves as one of the significant observatories forming part of a global network now run by Indian Institute of Geomagnetism. The observatory has two buildings; the first building has magnetometers that record changes occurring in the geomagnetic fields. The second building consists of precision recording instruments, which give data about geomagnetic storms caused by solar storms which is shared with other countries.

It is from years that the Alibag Region and Raigad district is headed and ruled by the BhartiyaShetkariKamgarPaksha (Peasants and Workers Party of India).

7.VARADVINAYAK MAHAD

Varadvinayak, also spelt as Varadavinayaka, is one of the Ashtavinayak temples of the Hindu deity Ganesha. It is located in Mhad village situated in Khalapur taluka near Karjat and Khopoli of Raigad District, Maharashtra, India. The temple was built (restored) by Peshwa General RamjiMahadevBiwalkar in 1725AD.

The idol of this temple VaradaVinayak is a swayambu (self originated) and was found in the adjoining lake in an immersed position in 1690 AD. This temple is said to be built in 1725AD by Subhedar RamjiMahadevBiwalkar. The temple premises are on one side of a beautiful pond. The idol of this temple faces the east and has his trunk turned to the left. There is an oil lamp in this shrine which is said to be burning continuously since 1892. This temple also has the idol of Mushika, Navagraha Devtas and Shivalinga. There are 4 elephant idols guarding the 4 sides of the temple. In this AshtaVinayak Temple devotees can enter the Garbagriha and pay their homage and respects to the idol personally. Devotees

visit the Varadvinayak shrine throughout the year. During festivals like the MaghaChaturthi huge crowds can be seen in this temple.



8.KARLA CAVES

The Karla Caves, Karli Caves, Karle Caves or Karla Cells, are a complex of ancient Buddhist Indian rock-cut caves at Karli near Lonavala, Maharashtra. The shrines were developed over the period – from the 2nd century BC to the 5th century AD. The oldest of the cave shrines is believed to date back to 160 BC, having arisen near a major ancient trade route, running eastward from the Arabian Sea into the Deccan.

The group at Karla is one of the older and smaller of the many rock-cut Buddhist sites in Maharashtra, but is one of the best-known because of the famous "Grand Chaitya" (Cave 8), which is "the largest and most completely preserved" chaitya hall of the period, as well as containing unusual quantities of fine sculpture, much of it on a large scale.^[1]



Many traders and Satavahana rulers made grants for construction of these caves. Karli's location in Maharashtra places it in a region that marks the division between North India and South India.^[2] Buddhists, having become identified with commerce and manufacturing through their early association with traders, tended to locate their monastic establishments in natural geographic formations close to major trade routes so as to provide lodging

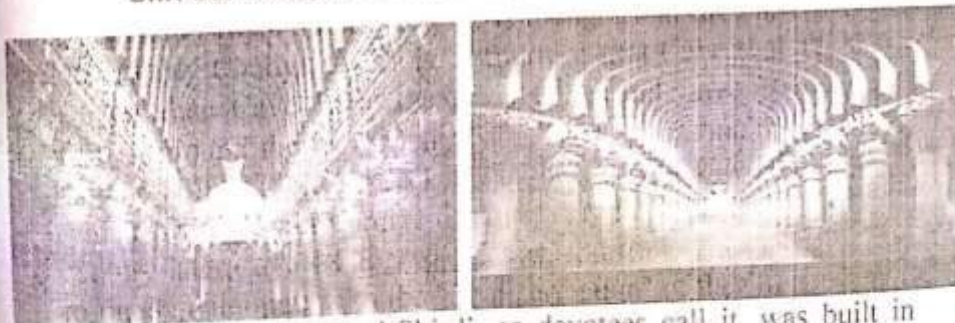
houses for travelling traders.¹¹ Today, the cave complex is a protected monument under the Archaeological Survey of India.

The main cave, called the Great Chaitya cave, or Cave No.8, features a large, intricately carved chaitya, or prayer hall, dating back to 120 CE. This is the largest rock-cut chaitya in India, measuring 45 metres (148 ft) long and up to 14 metres (46 ft) high. The hall features sculptures of both males and females, as well as animals such as lions and elephants. This Great Chaitya cave, the largest in South Asia, was constructed and dedicated in 120 CE by the Western Satraps ruler Nahapana.

The Great Chaitya cave of Karla follows, but improves upon, several other Chaitya caves which had been built in Western India under royal sponsorship. It is thought that the chronology of these early Chaitya Caves is as follows: first Cave 9 at Kondivite Caves, then Cave 12 at the Bhaja Caves and Cave 10 of Ajanta Caves, around the 1st century BCE. Then, in chronological order: Cave 3 at Pitalkhora, Cave 1 at Kondana Caves, Cave 9 at Ajanta, which, with its more ornate designs, may have been built about a century later, Cave 18 at Nasik Caves, and Cave 7 at Bedse Caves, to finally culminate with the "final perfection" of the Great Chaitya at Karla Caves.

SHIRGAON PRATI SHIRDI

Shri Sai Baba, the revered faqir of Shirdi, has found a second



home in Shirgaon. Prati-Shirdi, as devotees call it, was built in 2003 by Shri Prakash Deole, former legislative council member

and founder trustee of the Shri Sai Baba Temple Trust, Shirgaon. It was a miracle of sorts as Shri Deole, an active politician, turned to spiritualism and decided to build an inch by inch replica of the Shirdi Sai Baba Temple at this nondescript village of Shirgaon. Exactly nine months and nine days after the work on the temple began, the impressive shrine stands tall today amidst lush-green fields, far away from the hustle and bustle of the city. A perfect getaway for devotees seeking their beloved Baba's blessings!



Prati-Shirdi is a ditto copy of the Shirdi temple. Mr Deole has taken personal care and pains to ensure it resembles the original structure in every aspect. Be it the Gurusthan, Samadhi Mandir, Chavadi, Dwarkamai or the Dixit Wada, the accuracy with which every minute detail has been replicated leaves many a pundit in awe! The Annachatra, built in 2009, is a palatial edifice which can serve food to over 1500 devotees at a time.



Somatane is a village located in Maval of Pune district, Maharashtra with total 1159 families residing. The Somatane village has population of 5300 of which 2715 are males while 2585 are females as per Population Census 2011. One can make Entry and Exit for Mumbai Pune Expressway from Somatane Phata. Expressway exit road while coming from Mumbai connects to old

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MORPHOMETRIC ANALYSIS OF THE GANESHWADI
STREAM IN THE DECCAN TRAP REGION

A DISSERTATION SUBMITTED TO THE
SHIVAJI UNIVERSITY, KOLHAPUR
FOR THE DEGREE OF MASTER OF ARTS
IN GEOGRAPHY

BY

ATAR MOSIM ABBAS

UNDER THE GUIDANCE OF

DR. NAMDEV V. TELORE

DEPARTMENT OF GEOGRAPHY

RAJA SHRIPATRAO BHAGAWANTRAO MAHAVIDYALAYA,

AUNDH, DIST: SATARA

APRIL 2018

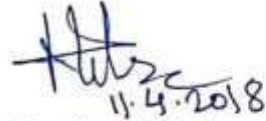


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CERTIFICATE

This is to certify that the work incorporated in this thesis entitled "Morphometric Analysis of the Ganeshwadi Stream in the Deccan Trap Region", submitted by Mr. Atar Mosim Abbas was carried out under my supervision. Such material as has been obtained from other sources have been duly acknowledged in the thesis.


11.4.2018

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ii

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Sincerely,

(Mr. Atar Mosim Abbas)

Place : Aundh

Date : 10th April 2018

CONTENTS

Sr. No.	Description	Page No.
	Certificate	ii
	Acknowledgements	iii
	Content	iv
	List of Tables	vii
	List of Figures	viii
	List of Photograph Plates	ix
	Abstract	x
Chapter 1	Introduction	1 - 5
1.1	introduction	1
1.2	objectives	2
1.3	Research Methodology	2
1.4	Study Area	2
1.5	Review of Literature	5
Chapter 2	Morphometric Analysis of the Yerla River Basin	7- 16
	Linear Aspects	7
2.1	Stream Order (No)	7
2.2	Stream Number	7
2.3	Stream Length (L)	7
2.4	Mean Stream Length	10

2.5	Bifurcation Ratio (R_b)	
2.6	RELIEF ASPECTS	10
2.7	Relief Ratio	10
	AREAL ASPECTS	
2.8	Drainage Area (A)	12
2.9	Basin Perimeter	12
2.10	Basin Length	12
2.11	Drainage Density (D_d)	13
2.12	Stream Frequency (F_s)	13
2.13	Drainage Texture (T)	14
2.14	Circularity Ratio (R_c)	14
2.15	Form Factor (F_f)	15
2.16	Compactness Coefficient (C_c)	15
2.17	Elongation Ratio (R_e)	15
2.18	Length of Overland Flow (L_o)	16
2.19	Cross Sections	16
Chapter III	RESULT AND CONCLUSION	25

	References	26

LIST OF TABLES

Table No.	Description	Page No.
Chapter 2		
2.1	Formulae for computation of morphometric parameters	9
2.2	Linear and areal aspects of the study area	10

LIST OF FIGURES

Figure No.	Description	Page No.
Chapter 1		
1.1	Location map	4
Chapter 2		
2.1	Cross section locations at Ganeshwadi	17
2.2	Contour map of the study area	18
2.3	Stream order map of the study area	19
2.4	Slope map of the study area	20
2.5	Aspect map of the study area	21
2.6	DEM of the study area	22

LIST OF PHOTOGRAPH PLATES

Plate No.	Description	Page No.
Chapter 2		
Plate 2.1	Plate 2.1 Photographs of Ganeshwadi Stream - I	23
A	On the way to study area	
B	Map reading	
C	Interaction with villagers	
D	Deep gorges in the source region	
E	Stony field in the upper reaches, area exhibits steep slope	
F	Block disintegration is common phenomenon	
Plate 2.2	Photographs of Ganeshwadi Stream - II	24
G	GPS location, note gully dimensions	
H	Calcareous content	
I	45 ft deep well exhibits no water in April 2018	
J	45 ft deep well exhibits no water in April 2018	
K	Existing CCTs	
L	Dry bed of lake in the middle reaches	

Morphometric Analysis of the Ganeshwadi Stream in the Deccan Trap Region

ABSTRACT

Morphometric analysis is significant for investigation and management of the watershed. This study depicts the morphometric analysis of Ganeshwadi tributary of the Yerla River basin, Satara district, Maharashtra, Central India using Geographic Information System (GIS) techniques. The study has been carried out through measurement of various aspects like linear, aerial and relief aspects of tributary. The drainage network of the study area is generated from SOI toposheet No. 47 K/7 using ESRI Software, ArcGIS (ver. 9.3). The analysis reveals that drainage pattern is dendritic and the stream order in the watershed varies from 1 to 2. The total number of stream segments of all orders counted as 6, out of which the majority of orders (783.33 %) was covered by 1st order streams and 2th order stream segments covers only 16.66 %. The bifurcation ratio reflects the geological and tectonic characteristics of the watershed and estimated as 1.41. Drainage density and stream frequency values of the study area are 2.18 km/km² and 1.53 streams/km² respectively indicates coarse texture due to highly resistant sub-soil material and low relief. The systematic analysis of various parameters in GIS helps in better understanding the soil resources distribution, watersheds prioritization, planning and management.

Keywords: Drainage basin morphometry, GIS, Deccan Traps, Ganeshwadi, Satara

x

Chapter I

INTRODUCTION

1.1 Introduction

In geomorphology the development of a landscape can be known by measuring morphometry of drainage and relief properties. Morphometric analysis is widely used to assess the drainage characteristics of the river basins for watershed management plans. Morphometry is the measurement and mathematical analysis of the configuration of the Earth's surface, shape and dimensions of its landforms (Clarke, 1966). It is the precise measurement of landforms (Strahler, 1969). Horton (1945) is the pioneer worker who introduced the natural composition of drainages which was further modified and developed by Strahler (1950), Schumm (1956), Chorley (1957) and others. The quantitative description of the geometry of the drainage basin and its network is helpful in charactering the drainage network, comparing the characteristics of several drainage networks and examining the effects of variables such as lithology, rock structure, rainfall etc. on the drainage network (Kale and Gupta, 2010).

Geomorphic analysis of various basins has been studied by many scientists using conventional (Horton, 1945; Strahler, 1957) and remote sensing and GIS methods (Agarwal et al., 2012). The basin characteristics is used in many of the successful implementation of watershed management programs (Chadha and Neupane, 2011; Unde and Telore, 2013). Geoinformatics techniques are essential for geomorphic analysis of basins for watershed management (Saptarshi and Raghavendra, 2009; Telore, 2015). Morphometric analysis of a drainage system requires delineation of all existing streams. The stream delineation of the study area has done digitally in GIS system using ArcGIS 9.3 software. All tributaries of different extents and pattern were digitized from Survey of India topographical sheets of 1:50,000 scale. Digitization work is carried out for an entire analysis of drainage morphometry. In the present chapter, the morphometric analysis of the Yerla River basin for the linear, relief and areal has been carried out using the mathematical formulae given in Table 2.1 and the results are summarized in Table 2.2.

1.2 Objectives

1. To derive the different drainage aspects of the study area.
2. To evaluate linear aspects of morphometric characteristics of the study area.
3. To evaluate areal aspects of morphometric characteristics of the study area.

1.3 Research Methodology

Topographical maps prepared by Survey of India on 1:50,000 scale are used to generate the base map of the study area. Morphometric analysis of a drainage system requires delineation of all existing streams. The study area is delineated with the help of ArcGIS 9.3 software. All tributaries of different extents and pattern were digitized from topographical sheets of 1:50,000 scale. Digitization work is carried out for an entire analysis of drainage morphometry. Various thematic maps such as drainage map, stream ordering map, contour map, elevation map, slope map, aspect map and DEM are prepared. Shuttle Radar Topographic Mission (SRTM) DEM data of 90 m spatial resolution is used to create digital elevation model (DEM) of the study area in ArcGIS 9.3, ERDAS IMAGINE 9.2 software. Ground realities are checked with the help of handheld GPS during field visits. These parameters are measured from the toposheets. The various linear, relief and areal morphometric parameters such as area, perimeter, stream order, stream length, stream number, bifurcation ratio, drainage density, stream frequency, drainage texture, length of basin, form factor, circulatory ratio and elongation ratio are computed based on the formula suggested by (Horton 1945; Miller 1953; Schumm 1956; Strahler 1964) given in Tables 2.1 and the results are summarized in Table 2.2 and 2.3.

1.4 Study Area

Total geographical area of the study area is 3.90 km². It is located on the right bank tributary of Nani River, in the mid-western plateau region of the Yerla River basin (Figure 1.1). The study area covers an area of 3.90 km² of Aundh Hill of Mahadev Hill range of the Western Ghats. The area represents semi-arid condition. The study area lies between latitudes of 17°29'56" and 17°31'34" North and longitudes of 74°18'57" to 74°20'28" East and receives

543.07 mm average annual orographic type of rainfall. The study area lies 2.5 km south of Aundh village and 16 km south west of Vaduj town (Plate 2.1 A). Administratively area lies in Khatav Taluka of Satara District. The micro watershed rises on southern side of the Yamai Hill, Aundh. Aundh is a popular religious and historical tourist center of Maharashtra and it was a princely state in British India. The area receives 552.72 mm average annual rainfall. The drainage network is sub dendritic pattern (Figure 2.3). The area is covered by compact, fine grained, massive basaltic lavas of Upper Cretaceous to Lower Eocene age and represents step like topography. Stony field is found in the source region (Plate 2.1 E). The soils of the study area are residual, derived from the underlying basalts. Natural vegetation represents the southern tropical dry deciduous type. Ganeshwadi village is located in the middle reaches while Vadgaon (Jayaram Swami) village is located in the lower reaches of micro watershed. As per interaction with villagers the area is facing acute drinking water shortage almost throughout a year (Plate 2.2 I, J, L). Groundwater level is declined in the area due to scanty rainfall and heavy pumping (Plate 2.2 B, C, I). Millets like jowar, bajra and vegetables are cultivated prominently in the Kharif season. Cattle grazing is common in the scrub lands. Plate 2.2 H shows onion expholiation and calcareous content in the upper reaches Details of the morphometric parameters are given in Table 2.2, various maps are shown in Figure 2.2, to 2.6 and photographs are shown in Plate 2.2 I and Plate 2.2 II.

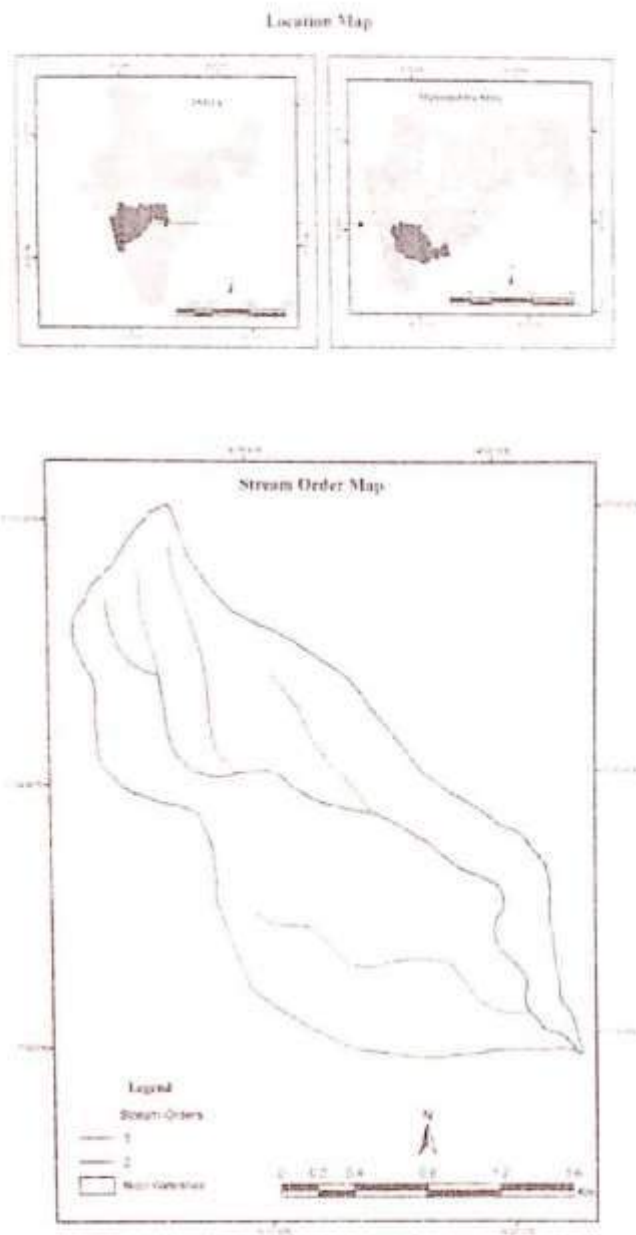


Figure 1.1 Location map

1.5 Review of Literature

The drainage basin analysis is important in environmental assessment. Geomorphologists have recognized that certain relations are most important between runoff characteristics and geomorphic characteristics of drainage basin systems. Various hydrologic phenomena can be correlated with the physiographic characteristics of drainage basins such as size, shape, slope of drainage area, drainage density, size and length of tributaries, etc. Detailed morphometric analysis of a basin is a great help in understanding the influence of drainage morphometry on landforms and their characteristics (Ahmed et al., 2010).

Lillesand et al. (2009) and Chang (2009) described that the availability of remotely sensed data and use of GIS has provided significant impetus to geomorphological analysis and design and their utilization in water resources management. Ravindran et al., (1997) analyzed that these two technologies together provide timely and reliable data, speedy spatial/non-spatial data processing and useful information essential for sustainable development and management.

Saptarshi and Raghavendra (2009) studied on GIS based evaluation of micro-watersheds to ascertain site suitability for water conservation structures. The remote sensing and GIS techniques can be utilized for identifying suitable sites for soil and water conservation measures in the micro-watersheds after formulating different criteria norms (Telore, 2015).

Ramotra and Gaikwad (2009) stated that rooftop rainwater harvesting techniques is useful to solve daily water problems of semi arid villages in drought-prone zones of Maharashtra. The integration of remote sensing and GIS techniques has emerged as a powerful tool for micro-watershed based conservation measures by suitably identifying sites for conservation structures (Singh et al., 2009; Unde and Telore, 2013).

Kondolf and Piegay (2003) reviewed the range of tools employed by geomorphologists in diverse fields. Ahmed et al. (2010) evaluated morphometric features and parameters derived from SOI toposheets of 1:50,000 scale, 90 m SRTM and 30 m ASTER DEM to assess the accuracy and suitability of using the satellite data. It is observed that SRTM data is very useful in morphometric analysis of this region or may be useful to other region. These studies are useful for environmental assessment of a region.

In arid and semi-arid countries where water resources are rare and disproportionately distributed, degradation of watersheds give rise to economic short-falls impairing the development of rural populations whose economic conditions oblige them to move from rural to urban areas (Gonene et al., 2008).

Morphometric analysis helps to understand the prevailing geo-hydrological characteristics of the drainage basin. It is inevitable in development and management of drainage basin. Topographical, geomorphological, hydrological and hydro-geological conditions play a significant role in planning and execution of artificial recharge in watershed development programmes. The interrelationship between rock type, structure and drainage network in different parts of India have been studied earlier by several workers (Vaidyanathan, 1962, 2010; Subramanyan, 1974).

Subramanyan (1974) carried out quantitative analysis of two drainage basins around Sagar on Malwa Plateau. On the basis of these data he found that the erosional development of the area by the streams has progressed well beyond maturity and that lithology has had an influence in the drainage development. Author founds that his data satisfy the various laws of morphometry viz. Horton's (1945) Law of Stream Number, Law of Stream Lengths and Law of Stream Slopes; Chorley's (1957) revised Law of Stream Lengths; Schumm's (1956) Law of Drainage Basin Areas and Law of Contributing Areas, as modified by Strahler (1956).

Chapter II

Morphometric Analysis of the Ganeshwadi Stream

LINEAR ASPECTS

Linear aspects that includes stream order, stream length, mean stream length, stream length ratio and bifurcation ratio were determined and results have been given in Table 2.2.

2.1 Stream Order (Nu)

Stream ordering is the first step of quantitative analysis of the basin. Horton (1945) introduced a simple stream ordering system to describe the position of a stream in the drainage network in terms of the number of tributaries received. The Horton's stream ordering method was further modified by Strahler (1952). Under the Strahler scheme all the fingertip tributaries are designated as first order stream, two second order stream produces a third order stream and so on. To determine the stream ordering system of the study area Strahler's (1952) stream ordering system has been used. The stream ordering map (Figure 2.3) shows that the study area is a second order stream. The number of streams (N) of each order (U) of the Yerla basin is shown in Table 2.2.

2.2 Stream Number

The total order wise stream segments are known as stream number. Horton (1945) stated that the number of stream segments of each order form an inverse geometric sequence with stream order number. The negative correlation observed between stream order and number of streams in the study area (Table 2.2).

2.3 Stream Length (L)

It is the total length of streams of a particular order. Stream length in the study area of various orders has been measured on topographical maps using ArcGIS software. The total stream length of the study area is 8.5 km (Table 2.2). It reveals that the total stream length 58.58 per cent is consist of the first order streams. Longer lengths of streams are generally indicative

of flatter gradient and coarse texture. Smaller lengths of streams are generally indicative of larger slopes and finer texture in the study area (Plate 2.1 E).

Morphometric Parameters	Formula	Reference
Stream Order (U)	Hierarchical order	Strahler (1964)
Stream Length (Lu)	Length of the stream	Horton (1945)
Mean Stream Length (Lsm)	$L_{sm} = L_u / N_u$ Where, L_u = Stream length of order 'U' N_u = Total number of stream segments of order 'U'	Horton (1945)
Stream Length Ratio (RL)	$RL = L_u / L_{u-1}$ Where, L_u = Total stream length of order 'U' L_{u-1} = The total stream length of its next lower order	Horton (1945)
Bifurcation Ratio (Rb)	$R_b = N_u / N_{u+1}$ Where, N_u = Total number of stream segment of order 'U'; N_{u+1} = Number of segment of next higher order	Schumn (1956)
Drainage Density (Dd)	$D_d = L/A$ Where, L = Total length of streams of all orders A = Area of the basin (km^2)	Horton (1945)
Stream Frequency (Fs)	$F_s = N/A$ Where, N = Total number of stream A = Areas of the basin (km^2)	Horton (1945)
Drainage Texture (Rt)	$R_t = N_u/P$ Where, N_u = Total number of streams of all orders P = Perimeter of the basin (km)	Horton (1945)

Circulatory Ratio (Re)	$Re = 4\pi A / Lp^2$ Where. A=Area of the basin Lp=Perimeter of the basin	Miller (1953)
Elongation Ratio (Re)	$Re = (2 \times (A / \pi)^{0.5}) / Lb$ Where. A=Area of watershed. $\pi=3.14$, Lb=Basin length	Schumm (1956)
Compactness Coefficients (Cc)	$Cc = 0.2821 P/A^{0.5}$ A = areas of basin (km ²), P = basin perimeter (km)	Horton (1945)
Basin Relief (Bh)	Vertical distance between the lowest and highest points of watershed	Schumm (1956)
Relief Ratio (Rh)	$Rh = H/Lb$ Where. H = Total relief (relative relief) of the basin in km; Lb = Basin length	Schumm (1956)
Length of Overland flow (Lg)	$Lg = 1/Dd^2$ Where. Dd = Drainage density	Horton (1945)
Chanel Sinuosity	Channel sinuosity = O_L / E_L Where, O_L = observed path of a stream; E_L = expected straight path of a stream	Schumm (1963)

Table 2.1 Formulae for computation of morphometric parameters

Slope (%)	Height (m)	Form Factor (Ff)	Circularity Ratio (Re)	Elongation Ratio (Re)
0-43.38	749-940	0.29	0.61	0.61

Drainage Density (Dd)	Stream Frequency (km/km ²)	Compactness Coefficient (Cc)	Length of Overland flow (Lg)
2.18	1.53	0.99	0.23

Area (km ²)	Basin Length (km)	Perimeter (P) (km)	Number of Streams		Stream Length (L _n)		Mean Stream Length (km)	Bifurcation Ratio (R _b)	
			I	II	I	II		I	II
3.901	3.68	8.99	5	1	4.98	3.52	4.25	1.41	

Table 2.2 Linear and areal aspects of the study area

2.4 Mean Stream Length

The mean stream length of the different order streams of the study area is presented in Table 2.2. The orderwise mean stream length varies from 4.98 km to 3.52 km. The positive correlation coefficient between stream order and mean stream length is observed. This strong positive correlation follows Horton's Law of Stream Length which expresses the length of stream of a given order in terms of stream order and takes the form of a direct geometric series (Horton, 1922).

2.5 Bifurcation Ratio (R_b)

Horton (1945) defined the bifurcation ratio as the ratio between the number of streams of any given order to the number in the next lower order. Table 2.2 contains the bifurcation ratio of the different order streams in the study area. Bifurcation ratio of the area is low i.e. 1.41 indicates the study area lies in the flatter surface.

2.6 RELIEF ASPECTS

Strahier (1968) stated that relief measures are indicative of the potential energy of the drainage system because of its elevation above the mean sea level. Absolute relief means the highest point on the basin. Absolute relief of the Yerla River basin is 940 m. Relative relief is the difference between the highest (940 m) and lowest (749 m) points in the basin. Relative relief of the Yerla River basin is 191 m indicates moderately high relative relief, which is well illustrated in Digital Elevation Model (DEM) in Figure 2.6. DEM is a digital representation of surface topography.

Slope map (Figure 2.6) illustrated that all the margins of plateau have greater slope between 0 and 43.58 degrees. Slope is decreasing from source to outlet region of the study area. Steep slope is observed in the source region of Ganeshwadi stream (northern part) (Photo 2.1 D, E).

The direction of the slope on the entire relief of the study area is illustrated in aspect map (Figure 2.5). The stream flows south to south east direction. Middle portion is covered by flat plateau surface. The relief measurement like relief ratio, basin length and total relief are tabulated in Table 2.2.

2.7 Relief Ratio

The elevation difference between the highest and lowest points on the valley floor of basin is known as the total relief of that basin. The relief ratio (Rr) of mainstream relief to horizontal distance along the largest dimension of the basin parallel to the principal drainage line is termed as relief ratio (Schumm, 1956) (Table 2.2). He observed direct relationship between the relief and channel gradient. There is also a correlation between hydrological characteristics and the relief ratio of a drainage basin. The relief ratio normally increases with decreasing

drainage area and size of basin of a given drainage basin. The value of the relief ratio of the study area is value of 191 m.

AREAL ASPECTS

2.8 Drainage Area (A)

The drainage area of a study area is the surface area located within the watershed basin boundary. A watershed drainage area can be quite small to the order of an acre or can be very large, encompassing thousands of square kilometers. The size of a drainage area has a significant impact on watershed management structures. Drainage area of the second order Gaueshwadi stream is 3.90 sq. km (Table 2.2). It is observed that mean areal extent of the drainage basin increases as the order of stream increases.

2.9 Basin Perimeter

Basin perimeter of the study area has been measured from the topographic sheets. The basin perimeter of the drainage basin is 8.99 km (Table 2.2). Generally, both drainage parameters, stream order and basin perimeter has strong positively correlated. Perimeter of the Yerla River increases as the order of the basin increases.

2.10 Basin Length

Maximum length between drainage basin reach and mouth has been considered as basin length. The basin length was measured of all the Yerla River basin from the SOI toposheets.

Table 2.2 shows basin length of the study area is 3.68 km. It is observed that basin length increases as stream order increases.

2.11 Drainage Density (Dd)

Drainage density is the sum of stream lengths per unit area (Horton, 1945). It expresses the closeness of spacing of stream channels. Density factor is related to climate, type of rocks, soil, infiltration capacity, vegetation cover, surface roughness and runoff intensity index. The amount and type of precipitation directly influences the quantity and characters of surface runoff. It is observed that greater the drainage density the faster is the runoff. Therefore flooding is more likely in basins with a high drainage density (Kate and Gupta, 2010). In a similar condition of lithology and geologic structure, semi-arid regions have a fine density texture than humid regions. Low Dd generally results in the areas of highly resistant or permeable sub-sol material, dense vegetation and low relief. High Dd is the result of weak or impermeable sub-surface material, sparse vegetation and moderate relief. Low drainage density leads to coarse drainage texture while high drainage density leads to fine drainage texture. Smith (1950) and Squires (1957) described drainage density values less than 5.00 as coarse, between 5.00 and 15.7 as medium, between 15.7 and 155.7 as fine and greater than 155.7 as ultra-fine.

The drainage density of the Varna River basin is low i.e. 2.38 km/km² (Table 2.2) indicating coarse drainage texture. Low drainage density of study area indicates highly resistant or permeable sub-sol material and low relief.

2.12 Stream Frequency (F_s)

Stream or channel frequency is the total number of streams per unit area (Horton, 1945). Scheldigger (1961) has suggested that stream frequency is related to drainage density. The

number of streams in a drainage basin has significance on landform development. Number of streams in a drainage basin also depends on superficial material, amount of runoff, vegetation and topographic slope. All of which contribute in geomorphic character of the area. Stream frequency of the area is computed from toposects as defined by Horton (1945). In general categories of stream frequency are very poor, poor, moderate, high and very high. The drainage density of the study area is 1.55 streams/km² indicating poor stream frequency (Table 2.2).

2.13 Drainage Texture (T)

Thornbury (1960) defined drainage texture as the relative spacing of drainage lines. According to Smith (1950) five different types of drainage textures have been classified based on the drainage density. The drainage density less than 2 indicates very coarse, between 2 and 4 is coarse, between 4 and 6 is moderate, between 6 and 8 is fine and greater than 8 is very fine. The drainage density values of the Yerla River basin is 2.18 indicating coarse drainage texture (Table 2.2).

2.14 Circularity Ratio (Rc)

The circularity ratio (Rc) has been used as an areal aspect and is expressed as the ratio of basin area of a circle having the same perimeter as the basin (Strahler, 1964). Circularity ratio values approaching one indicates that the basin shapes are like circular and as a result, it gets scope for uniform infiltration and takes long time to reach excess water at basin outlet. The circularity ratio is affected by geology, slope and land cover. The ratio is more influenced by length, stream frequency and gradient of various orders rather than slope conditions and drainage pattern of the basin. Basin shape determines how rapidly the runoff will reach the main river as well as the outlet. For elongated basins the runoff reaches slowly (longer delay) in the arrival of

flow after heavy rains. Studies by Hack (1957) indicate that as the basins enlarge, the stream length increases and the basins become narrower and longer. Therefore, a majority of rivers have elongated basins (Mulder and Syvitsky, 1996). Miller (1953) has described the basin of the circularity ratios which have a range of 0.4 to 0.7, which indicates strongly elongated and highly permeable homogenous geologic materials. The circularity ratio of the study area is 0.61 (Table 2.2).

2.15 Form Factor (Ff)

Form factor is defined as the ratio of basin area to the square of the basin length (Horton, 1945). The values of form factor would always be less than 0.7854 (perfectly for a circular basin). Smaller the value of Ff means more elongated will be the basin. The form factor ratio of the study area is 0.29 indicates that the whole basin has a elongated shape (Table 3.3).

2.16 Compactness Coefficient (Cc)

Compactness coefficient is used to express the relationship of a hydrologic basin with that of a circular basin having the same area as the hydrologic basin. A circular basin is the most hazardous from a drainage stand point because it will yield the shortest time of concentration before peak flow occurs in the basin. In the study area value of compactness coefficient is 0.99 indicates less hazardous basin (Table 2.2).

2.17 Elongation Ratio (Re)

Schumm (1956) defined elongation ratio as the ratio between the diameter of the circle of the same area as the drainage basin and the maximum length of the basin. Analysis of elongation ratio indicates that the areas with higher elongation ratio values have high infiltration capacity and low runoff. Circular basins are more efficient in the discharge of runoff than an elongated basins. The values of elongation ratio generally vary from 0.6 to 1.0 over a wide variety of climate and geologic types. Elongation ratio values can be grouped into three categories i.e. circular (> 0.9), Oval (0.9 to 0.8) and less elongated (< 0.7). Elongation ratio of the study area is 0.61 indicates that the basin falls in the less elongated category and showing high relief and steep ground slope (Table 2.2).

2.18 Length of Overland Flow (L_o)

It is the length of water over the ground before it gets concentrated into define stream channels (Horton, 1945) (Table 2.1). This factor basically relates inversely to the average slope of the channel and is quite synonymous with the length of sheet flow to a large degree. The length of overland flow (L_o) approximately is equal to half of the reciprocal of drainage density (Horton, 1945). The length of the overland flow of the study area is 2.23 km.

2.19 Cross Sections

First cross section is taken on the upper reaches on mainstream from 1.21 km from its source. The left bank is having steep slope than the right bank. Silts and clay contents are more on both banks occupied by agricultural lands. The channel width and depth of the area is 44.6 and 1.61 m respectively with 74.03 m^2 cross sectional area (Figure 2.1. CS1).

Second cross section is taken on first order east stream located from 0.55 km from the source of mainstream. Here, channel width and depth is 5.4 and 1.15 m, cross sectional area is 6.25 m^2 (Figure 2.1, CS2). Both banks has gentle slopes and occupied by agricultural land.

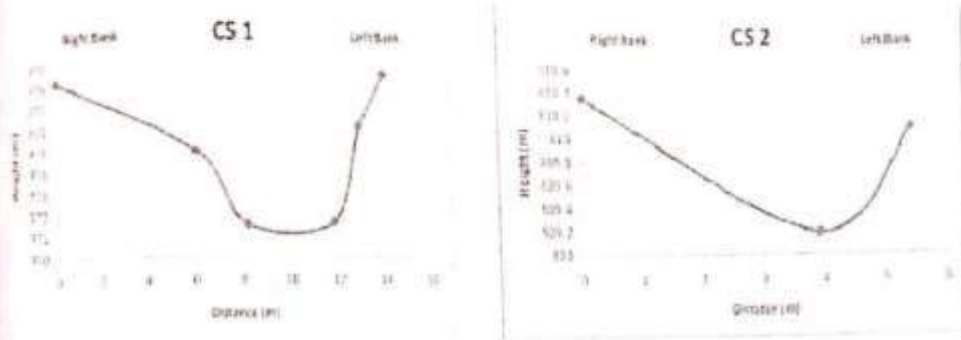


Figure 2.1 Cross section locations at Ganeshwadi

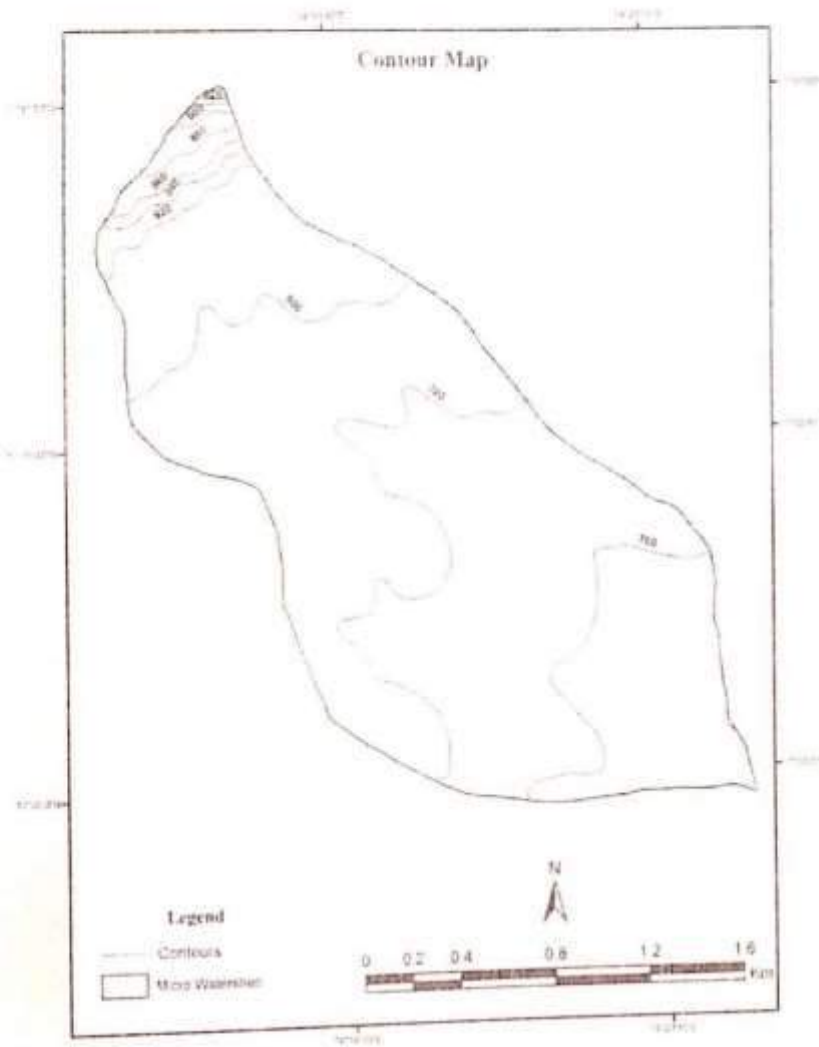


Figure 2.2 Contour map of the study area

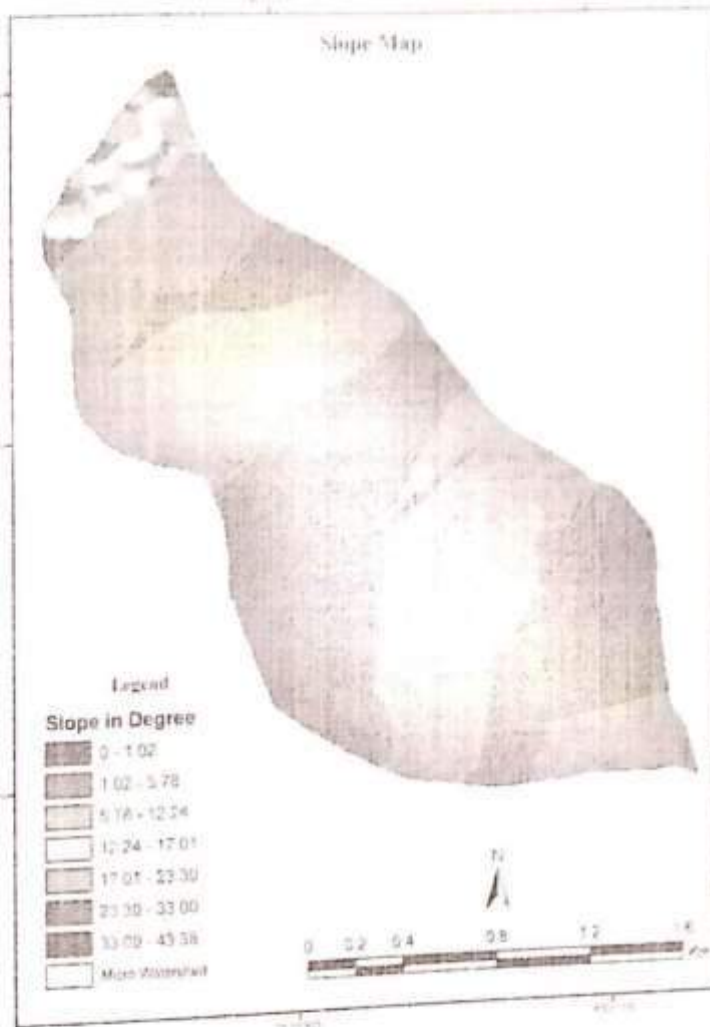


Figure 2.4 Slope map of the study area

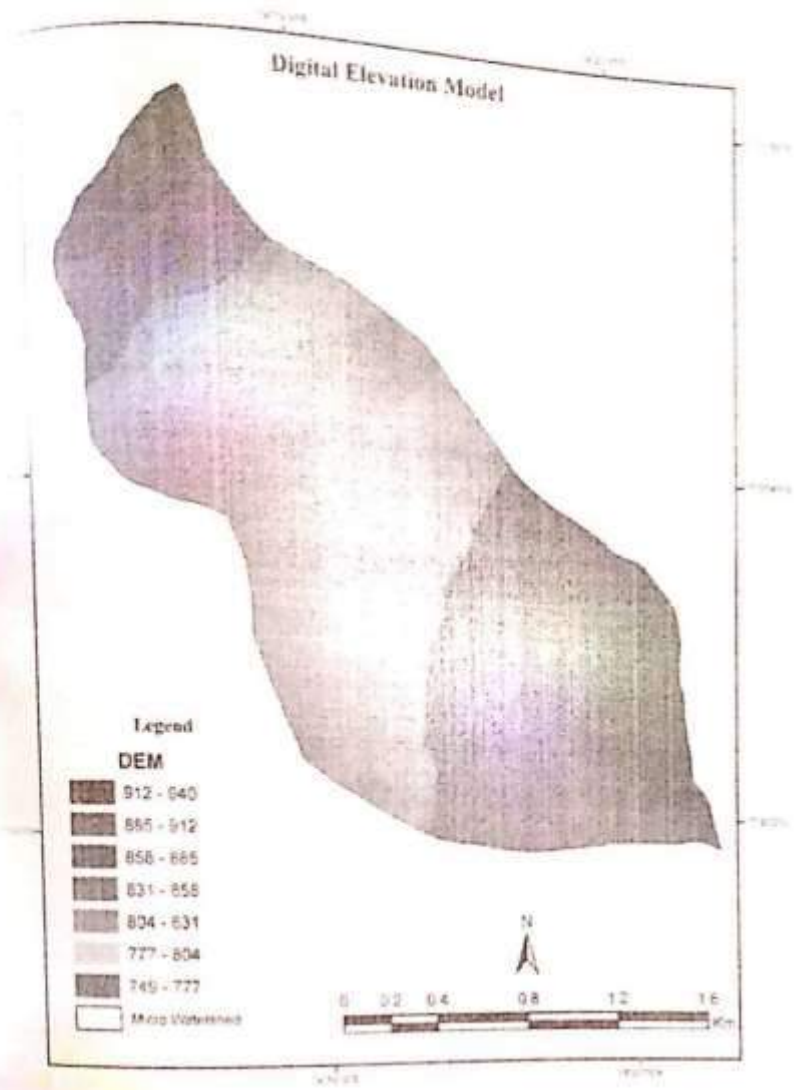


Figure 2.6 DEM of the study area



A. On the way to study area



B. Map reading



C. Interaction with villagers



D. Deep gorges in the source region

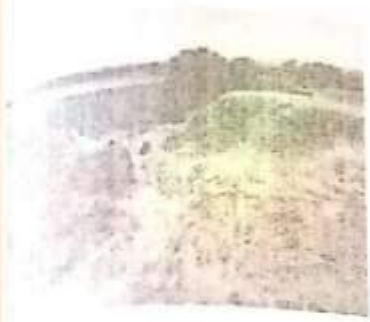


E. Stony field in the upper reaches, area exhibits steep slope



F. Block disintegration is common phenomenon

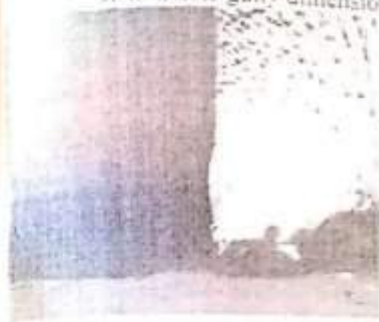
Plate 2.1 Photographs of Ganeshwadi Stream - 1



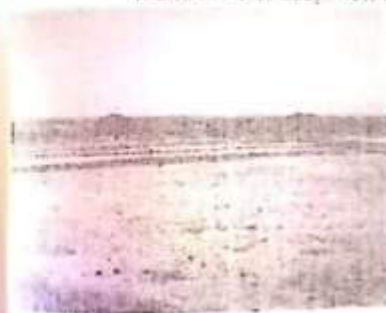
I. Section, note gully dimensions



H. Calcareous content



I. and J. 45 ft deep well exhibits no water in April 2018



K. Existing CCTs



L. Dry bed of lake in the middle reaches

Plate 2.2 Photographs of Ganeshwadi Stream - II

Chapter III

RESULT AND CONCLUSION

Ganeshwadi stream is developed on third order tributary of the Yerla River in the Deccan Trap region. Total geographical area of the study area is $3,90 \text{ km}^2$. Drainage density and stream frequency values of the study area are 2.18 km/km^2 and $1.53 \text{ streams/km}^2$ respectively indicates coarse texture due to highly resistant sub-soil material and low relief. The calculated Millers form factor ratio is 0.29 suggests the elongated shape. Circularity ratio of the area is 0.61 indicates elongated shape. Elongation value is 0.61 indicates less elongated shape. Compactness coefficient value of the study area is 0.99 indicates less hazardous micro watershed. Length of overland flow is 0.25 km. Minimum and maximum values of height varies from 749 and 940 m shows 191 m of relative relief, indicates moderately high relative relief. Absolute relief of the area is 940 m. The mean bifurcation ratio of the study area is 1.41 is low indicates that structure does not exercise a dominant influence of the drainage pattern. The area is characterised by an undulating topography with an average slope of about 5.22 percent. Slope of the area ranges between 0 to 43.38 degrees of which 90 percent area lies below 12.24 degrees. Aspect map shows slope is towards east and south east (Figure 2.). Figure 2.2 to 2.6 shows various maps of Ganeshwadi stream. Various geomorphic parameters are given in Table 2.1 and 2.2. Morphometric analysis is useful for the watershed management plan of the region.

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Department of Geography

LABORATORY CERTIFICATE

This is to Certify that Shri. / Kum. / Smt. Bhosale Rahul

Raju

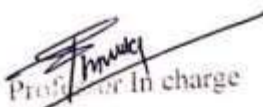
has satisfactorily carried out the required Practical work / Projected work prescribed by

SHIVAJI UNIVERSITY, KOLHAPUR

for the M.A./M.Sc. part II Semester H / H (IV) course in Geography and this Journal / Report represents his / her bonafide work in the year 2018-2019

Exam. Seat No. 190

Date:-


Professor in charge


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DECLARATION

We hereby declare that the study tour report was written and submitted by each one of us, is an original work conducted under the guidance of Shri. Barkade J. D. Head of the the Department and Shri. Shinde S. M. (Assistant Professor), Department of Geography. the empirical finding in this report are based on our observations . I have not copied from any study tour report submitted to Shivaji University or any other Institutions.

Place: Aundh

Date: March 2019

R. R. Bhosale

Student

(Rahul Raju Bhosale)

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Place: Aundh

Date: March 2019

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(Rahul Raju Bhosale)



CONTENTS

Unit No.	Name of Chapter	Page No.
-	CERTIFICATE	i
-	ACKNOWLEDGEMENT	ii
1	TOURISM	1-5
2	PHYSICAL AND CLIMATIC ENVIRONMENT	6-14
3	SOCIAL AND CULTURAL ENVIRONMENT	15-33
4	IMPORTANT TOURIST PLACES	34-44
-	REFERENCES	45

1. TOURISM

Introduction

Tourism is a basic and most described human activity. It is a phenomenon of modern times it become a very complex activity in encompassing a wide variety of relationship of the world. Tourism is an industry considered to a destination transporting then housing filling and entertaining them upon travel. The money they spent and means which provides them foods, products. It is some what difficult to apply.

Tourism is a life industry requiring little capital investment; it can be considered as commodity of mass consumption. It is the only industry which can utilizing the includes of country.

Concept of Tourism

Tourism is an activity of multi dimensional, multi faceted involving money lives and associated economic activity in other words it can be regarded as whole range of individuals host and guest business organization and places put together some characteristic manner to produce a travel experience.

1. One who travels for a period of 24 hours or more in country other than that in which he usually resides.
2. **Hunziker and Kraft:** Tourism is the some of phenomenon some of relationship arising from the travel and stay of non-residence in so far as they do not level to permanent residence and are not connected with any earning activity.
3. **World Tourism Organization:** Tourism is defined is the activity of a person travelling to a person outside there for less than a specific period of travel and whose main purpose of travel is other than exercise is an industry remunerated from the place visited.
4. Tourism is an considered with attracting people to destination transporting them their housing, feeding, entertaining they unable and writing them to their homes or it is an industry which being mostly if consumer. Tourist money and people which provide goods and service.



Types of Tourism

- A. **Domestic Tourism:** It is also known as international as well as national tourism. In India it is known as Deshatan. Generally domestic tourism means the moment outside normal domesil to other area within the boundaries of the nation.
- B. **Dream Tourism, Farm Tourism, and Rural Tourism:** The term dream tourism is applied to a specific environmental oriented run sector of tourism industry. Travel is proposed to getting back to nature. Rural tourism is normally promoted by public organization while farm tourism supported by farmer community.
- C. **Cultural Tourism:** Cultural tourism development is community based designed to important the socio-economic well-being of local residents to the concern in physical environment it also pin points the need for careful planning to protect the integrity of sites and minimize harmful impact.
- D. **Senior Citizen Tourism:** A newly emerging trend in tourism basically for senior citizen of old people who live in isolation especially in the west.
- E. **Educational Tourism:** Educational tourism is under taken for seeking new things and for seeing new place. In another words it is under taken who acquire new knowledge through research and witness new place of importance.
- F. **Group Tourism:** Group tours are undertaken by studies of by groups of employs working in office or by the workers of a factory. Railway authority concession for tourists.
- G. **Sport Tourism:** Today we see an Increasing participant in many sport activity. Such as mountaining, walking, sailing, fishing, sun bathing, trekking, boating, surf riding etc.

Significance of Tourism

As already maintained tourism is unique because in whole worlds industry without smoke, education without classroom, integration without legislation and diplomacy without formality. Tourism has an educational significance. It has a beneficially effect which is brought about through contact between people of different race and nationalities. Tourism in whole world cultural exchanges results in cultural enrichment of thus travel as well as of the receiving end. Cultural factors attract tourists to designation, architecture,

historical, monuments and birth places of famous man are often visited by tourist. Culture is tourism main attraction world heritage sites are nothing but cultural sites. Such as the pyramids, the tower of London, The Taj Mahal of India, The Great wall of China. Tourism is a political and social significance.

The main economic significance of tourism money earned in places of normal resident is spent in place visited is common to all tourism. Tourism is an internal part of modern life as a force for social changes tourism has had an impact of the same order. In the last decades tourism has transformed the way the old looks and works.

Tourism is the largest single item in the world's foreign trade and for some countries it is already the most important export earner of foreign exchange.

TOURISM IN MAHARASHTRA

Modern Maharashtra is not a bustle of industrial and agricultural activity or the frieze pursuit of wealth and progress alone. It is very much a part of the everyday scene, anywhere in the state; there are the signs of its great religious, cultural, historical and martial heritage.

In Maharashtra, hundreds of shrines of all faith are found everywhere in the state. The evidence of artistic skills of people whose culture goes back to thousands of years as in the Ajantha and Ellora in dances, in paintings and sculptures, in architecture and handicraft. Maharashtra displays a fascinating variety of brilliant achievements that is however more evident than in its cave temples and Hindu shrines. Over all, Maharashtra is the relic of glorious history of great Shivaji, massive forts on hill tops and historic battle ships narrate the story of great nation rise from division of unity.

Maharashtra offers quite and beautiful hill stations like Mahabaleshwar, Panchgani, Lonavla, Khandala, Matheran, Chikhaldara and Golden beaches lapped by the blue water of the Arabian sea for such as Ganpatipule, Ratnagiri, Guhager, Tarkarli, Vengurle, Naigaon and Alibag. The wild life sanctuaries in

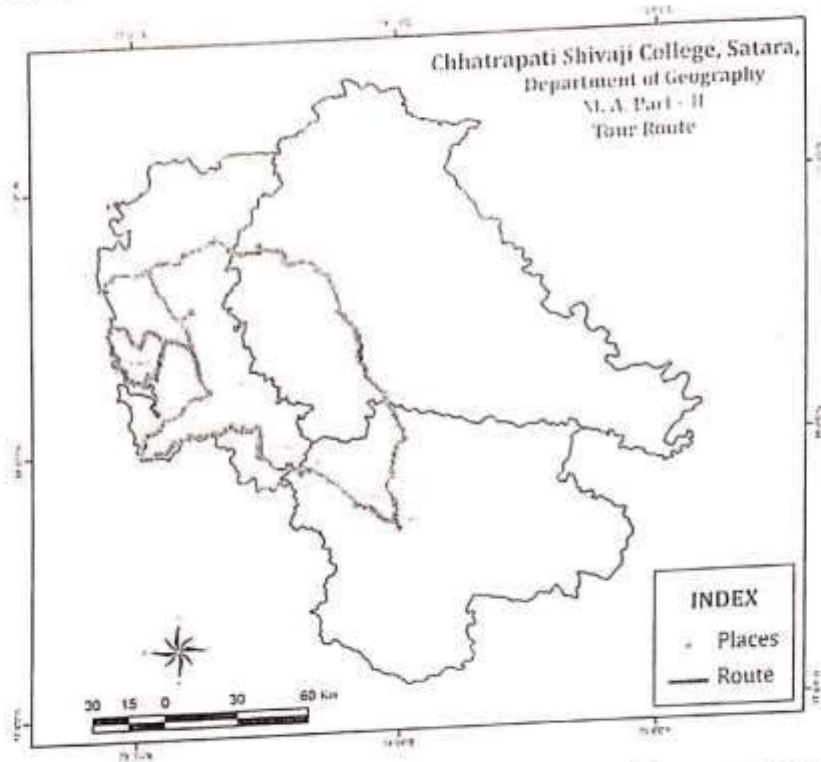
western ghat (Sahyadri) and in the Vidharbh region (Tadoba) increases the curiosity of the tourists.

Hundreds of shrines of all faith found every where in the state like lord Vitthal Temple at Pandharpur, Khandoba Temple at Jejuri and pali (Satara), Tulaja Bhavani Temple at Tuljapur, Trimbakeshwar Temple, Vani temple at Nashik, Bhimashankar Temple at Bhimashankar, Mahalaxmi Temple at Kolhapur, Gajanan Maharaj Temple at Shegaon, Swami Samarth temple at Akkalkot, Saibaba temple at Shirdi, Gurudwara at Nanded etc. are the import sites of great importance in Maharashtra. Every year millions of pilgrims visit these sites. And event like Kumbha-Mela at Nashik and various palkhi procession from all parts of Maharashtra to Pandharpur are also witness large pilgrim gathering.

Maharashtra has been the birth place and home of world reputed saints like Saibaba at Shirdi, Gajanan Maharaj of Shegaon, Saint Dnyaneshwar of Alandi, Saint Tukaram of Dehu, Saint Eknath of Paithan, Saint Meherbaba of Meherabad, Swami Samarth Maharaj of Akalkoth, has become a place of world pilgrimage. The Sai baba temple in Shirdi is the second richest one in the country after the Lord Tirupati temple at Tirumala (Andhra Pradesh).

Maharashtra respects the varkari tradition, which is the single richest treasury of traditional Marathi literature and culture. The varkari panth and the palkhi pilgrimage is a symbol of modern day Maharashtra. It is a continuity not only of the custom and rituals of a particular devotional sect but of a supremely important part of the history, character and spirit of the larger Maharastrian society. Hundreds of shrines of Saint of Varkari traditions found all over Maharashtra. Saint Dnyaneshwar at Alandi, Saint Tukaram at Dehu, Saint Sopankaka at Saswad, Saint Nivrutinath at Trimbakeshwar, Saint Eknath at paithan. Saint Damaji at Mangalveda, Saint Janabai at Jalgaon and Mchun, Saint Savata Mali at Aran and so on.

ROUTE MAP :



The motive of the excursion is to study physical, social, economical and cultural aspects of the study region, in course of travelling. The excursion report is divided into three parts as follows.

1. Physical and climatic Environment.
2. Social and Cultural Environment.
3. Important Tourists Places.



2. PHYSICAL AND CLIMATIC ENVIRONMENT

PHYSIOGRAPHY

Introduction:

Physiography is the branch of geography which studies the present relief features of the earth surface or of natural features of the earth surface or of natural features in their causal relationships. A rough estimate made by the census commission in 1951. Total plateau 27.7 (305 to 915 metre.) Maharashtra state is the surface features formation to various geological events. Both endogenetic and exogenesis force is working to shape present landforms on the surface of the earth. Coastal plains have separate identity is Sindhudurg and Ratnagiri district called as South Konkan region. Peninsular plateau is the Satara, Sangli and Kolhapur district called as Western Maharashtra.

North Konkan Region:

It lies between the Sahyadri Mountain and Arabian Sea in South-North direction is called North Konkan Region. In Raigad and Pune district geographical area 7,152 Sq.km. and 15,642 Sq.km. (total area is 22,794 Sq.km.) respectively. It has some features of marine erosion including cliffs, shoals, reefs and Islands in the Arabian Sea. Konkan Coast has a series of small bays and coves lying between jutting head-lands containing beaches of sand. The Alluvial Coastal belt is a series parallel ridge reaching 500-600 mtr. In which rivers like the Patalganga, Amba, Kundalika, Kal, Savitri, Ghod, etc. The lateritic hill rocks rise to 600mtr. Above mean sea level. Resource of mineral two districts is Bauxite, Magnesium, Abhrak and Elmenight.

2) Western Maharashtra:

The Satara and Pune district are the geographical area in 10,480 Sq.km. 15,642 Sq.km. (total area is 26,122 Sq.km.) Maharashtra Plateau is lies in Maharashtra and forms the Northern part of the Deccan Plateau. Much of the region is underlain by basaltic rocks of lava origin. The area looks like a rolling plain due to weathering. The horizontal lava sheets have led to the formation of typical Deccan Trap topography. The broad and shallow valleys of Krishna, Venna, Tarali, Nira, Ghod, etc. The Western Maharashtra is the resource mineral of Bauxite but, low ratio.

3) Western Ghat:

The Sahyadri or Western Ghat is the Shambhumahadev hill range Satara to Pune district. The Western Ghat is the hill range of rock structure. Forming the western edge of the Deccan tableland, the Western Ghats run in north-south direction, parallel and close to the Arabian Sea coast. The Western Ghats abruptly rise as a sheer wall to an average elevation of 600 mtr. From the western coastal plain and appear to be an imposing mountain. But, they slope gently on their eastern flank and hardly appear to be a mountain when viewed from the Deccan tableland. The Kolhapur district is influenced by great extent by Deccan traps.

CLIMATIC CONDITION

Konkan Region:

Generally the climate of konkan region his hot and humid. The region witness all climatic seasonal changes i.e. monsoon, winter and summer.

March to June hot and humid climate hottest month is usually April average temperatures for the summer season are between 32 to 40 degree c. From June to September generally konkan received rainfall between 1400 mm up to 1800 mm. July and August are quite rainy and typically the wettest months of the year but by September the rainfall has weakened. South-west monsoon wind consider by the rainfall in Konkan. This region rainfall is highly rainy season. April to May rainfall is named by the Ambesari in received by the Konkan. October to February the temperature are a bit milder with less humid conditions day temperatures are moderate and cool nights (15degree c) average temperature between 20 to 25 degree c.

Western Maharashtra :

Western Maharashtra in the generally Dry and Arid climate. The seasonal climate changes in monsoon, winter and summer. March to June dry and arid temperature in western Maharashtra. The average temperature of the 33 to 38 degree c. From June to September generally western Maharashtra received average rainfall between 700 to 1200 mm in the western Maharashtra. October to February the temperature is low 8 to 20 degree c in winter and the night of the temperature is cool in western Maharashtra.

Western Ghat:

The western ghat in the generally humid and tropical type climate. The western ghat season wise deviation by following.

Western ghat summer season is the March to June. The temperature is the hot in western ghat. The average temperature is the western ghat 33 to 40 degree c. The western ghat June to September generally received average rainfall in 1600mm to 2000 mm in the western ghat. In this area high rainfall. South-western monsoon wind stopped the western ghat in hilly area considered rainfall in western ghat. Winter season is the October to February in the cool temperature in the western ghat. Average temperature in the 10 to 22 degree c in western ghat.

DRAINAGE PATTERN

The drainage pattern is in geomorphology a drainage system is the pattern formed by the streams, rivers and lakes in a particular drainage basin. The length of konkan river are very less and also Sahyadri hill have very steep slope due to this they are flowing very fast and meet to Arabian sea.

Patalganga, Amba, Kundalika, Kal, Savitri, etc. these are flowing into Raigad district. Ghod, Krishna, Koyna, Tarli, Venna, etc these are river flowing through Pune and Satara district.

1) Koyana River:

The koyana river is the most important river in Maharashtra because the largest Hydrolic Project this river in Patan tahsil. This river origin in Mahabaleshwar and this river flow North South direction. The Krishna river in karad city. The impounded water of the koyana dam through has submerged a significant amount of rain forest of the western ghates. It has a helped lot to the surrounding forest by supplying water all round the year.

2) Krishna River:

Krishna is second important river, next to Godawari in Maharashtra. Its basin lies within Mahadeo hills in north. Source of Krishna is at Mahabaleshwar in Satara district, which is about 1220 mts. above mean sea level. Krishna flows through Maharashtra, Karanataka and Andra Pradesh and meets Bay of Bangal.

Length of Krishna is about 1280 kilometre, but only 282 kilometre, part of the river situated in Maharashtra.

NATURAL VEGETATION

The naturally growing plant cover without human aid is called natural vegetation. Maharashtra has 20.13% vegetation cover. The Sahyadri region fulfil with lots of biodiversity, various species of vegetations some area have deciduous forests and some evergreen forest regions. Vegetation plays an important role in human life. They provide oxygen, wood for fire, timber, furniture for building, paper industries. Some of them have a significance place in medical sciences. Forest provide primary occupation for some tribal community which is located in western region i.e. Katkari, Mahadevcoli etc. Natural vegetation divided by main 3 regions.

Konkan Region:

The Konkan region is a coastal strip of land bounded by the Sahyadri hills on east and Arabian Sea on west. Konkan area consists of Raigad district. The total area of Konkan region is 30,746 kms. Konkan region has good potential for development of farm forestry and bamboo as most of forest land owned privately. There are 3 types of forests-

- 1) Semi-Evergreen Forest,
- 2) Moist deciduous Forest,
- 3) Dry Deciduous Forest.



1. Semi Evergreen Forest:

Konkan region there is high density of semi evergreen forests. Evergreen forests grow in high rainfall areas. Konkan region high slope found in evergreen forest. It is a hilly region considered ghats.

2. Moist Deciduous Forest:

Moist deciduous forest foot hill region some places in this region soil is alluvium and fertile, red soil. Moist forest are medium density are found. There are shows Kokum, Areca palm, and Supari etc. trees.

3. Dry Deciduous Forest :

Dry deciduous forests are coastal region. There are low densities of trees. There soil is sand mixed. Mangroves are found in coastal areas, Suruchi etc.

Western Maharashtra:

Satara and Pune districts are occupies the western and central part of country. One of the more prominent physical features of Maharashtra is Deccan plateau which is separated from the Konkan coastlines by Ghats. The western Maharashtra 3 types of forest is follow-

- 1) The sub-tropical semi-evergreen forests,
- 2) The moist deciduous and semi-evergreen forest ,
- 3) The dry deciduous forest.

In sub-tropical evergreen forest the trees are found- Jaambhul, Anjan, Surangi, Jack fruit, Awala, Hirda, Kinja, Katak, Umber, Bibba etc. The ground covered with the flora mostly consists of karvi, Barchan and others. In moist deciduous forest we found Mango, Sissum, Asana, Kumbhi, Bhava, Kinjal, Ain, Kinnai, Bibba and others. The dry deciduous forest the above species are found in very little quantity. Other forest products like Kaju, Shikakai, Silver cotton, Wax etc.

1. The sub-tropical semi-evergreen forest:

In western Maharashtra semi-evergreen forests occur mostly on upper hill slope. There density of forest is high. The main species are kinjal, Anjani, Hirda, Jambhul, Parjamun, Mango, Pisa etc.

2. Moist deciduous and semi-evergreen forest:

In western Maharashtra forest occur on middle hill slope, medium density found forests. Main species is Teak, Ain, Shisham, Haldi, Moha, Bija, Semal, Bamboo, Behada, Jambhul etc.

3. The dry deciduous forest:

There are low forest slope, trees density is low. Main species being Teak, Timber, Khair, Dhawada, Bija, Sema, Behada etc.

Western Ghat:

The western Ghat also known as Sahyadri. It is one of the biodiversity hotspot. In western ghat are found mainly 3 types of forest-

- 1) Evergreen Forests,
- 2) Dry mixed deciduous forests,
- 3) Wet mixed deciduous forests.

In western ghat found trees are Anjan, Palas, Sandle wood pimpal, Teak, Jambhul, Sag, Sal, Chandan, Mango, Jackfruit, Toran, Aawala, and Coconut etc.

1. Evergreen Forest:

In Konkan region there are evergreen trees. Western ghat is various plant, western ghat highly distribution of forest because there are high rainfall in western ghat ranges.

2. Dry mixed deciduous forest:

The dry deciduous forest is found in ghat. Rainfall varies between 750 mm. to 1000 mm. Tarvad, Dhyati, Nirgudi, Babhul and grasses are prominent species of these forests.

3. Wet mixed deciduous Forest:

Wet mixed deciduous forest are covered medium area. Rainfall found 1000 to 2000 mm. The common tree species are Teak, Kateshwar, Sandle wood, Pimpal, Dhyati(shrub) and rare climbers are observed.

SOIL

Soil is the important physical factor influencing the economical as well as social conditions of the people. In Maharashtra state different types of soil are found. They are characterised by their parent rock, climate and vegetation cover. They are categorizing on the basis of their physical characteristics.


Western Ghat:

The western side of the western ghats is on the threshold of south-west monsoon and receives a rainfall of 203-234 cm and the eastern side lies in the rain shadow area of the peninsula. The main types of soils met with the Western

Ghats are red soils, laterites, black soils and humid soils. The red soils are developed on the Archean crystallines and are brown, grey and black is deficient in organic matter phosphoric acid and nitrogen. Evergreen forest of colophyllum, dipterocarpus ,hopeamyristica and xylid are characteristic of red soil areas. The laterites consists of 90-95% of iron, aluminium, titanium and manganese oxides and are deficient in lime and organic materiel an extend up to 1600 m in western ghatshorea and xylia are the dominant species in lateritic soil of western ghats. Black soil formed out of the Basaltic Deccan lava are deficient in organic matter, nitrogen and phosphoric acid but generally have enough lime and potash.

Konkan:

The soil of the Konkan is generally classified in 3 types i.e.

- 1) Laterite soil
 - 2) Salty soil
 - 3) Coastal alluviums
- 

1. Laterite soil:

The pre-dominant soil in the Konkan are laterite soils and extensive spreads of laterite are noticed throughout the Konkan. They very colour from red to brownish red owing to the preponderance of hydrated iron oxides. They are fairly well supplied with nitrogen and organic matter. Their texture is loamy. They are porous and not retentive of moisture. These soils are found in several grades, the main being rice soils are available on the slope of the hill and are partly eroded yellowish red and poor in fertility, further they are shallow in depth and coarse in texture.

2. Salty soil:

Due to the inundation of the part of the coastal soils has become salty. They are locally known as Khar or Khajan.

3. Coastal Alluviums:

The coastal strips have deep sandy looms and in these soils coconut and areca nut gardens thrive well.

Western Maharashtra:

The soil of the western Maharashtra is mainly derived from the trap. Physiographically the western Maharashtra can be divided into 3 broad soil zones.

- i) The western zone of heavy rainfall is covered with laterite soil.
- ii) The central part with more or less assured rainfall is covered with fertile well drained brownish soil of natural reaction and
- iii) The dry eastern zone with precarious rainfall is covered with medium black soil of varying depths.

Laterite soil occur mainly in the western hilly tracts of heavy rainfall on the hill tops which are not covered by forests. They are red to brownish red in colour mostly eroded and shallow. They are not retentive of moisture and yield mainly coarse hills millets. When terraced, application of nitrogen and phosphorous are found quite useful and in such cases paddy can also be taken from the soil.

In the valley laterite soils are mixed with trap soils. They vary in colour from brown to black are fairly deep and retentive of moisture. Brown soils are found in the central zone. They are mainly derived from trap and are dark brown in colour with reddish tint. They are rich and fertile with excellent granular structure almost as this zone receives moderate and fairly regular rainfall.

Medium and deep black soils are found in the eastern zone. They are also derived from trap and vary considerably depth. Medium deep soils are grey in colour with good granular structure and drainage. The deeper soils are more black in colour and more clay.



3. SOCIAL AND CULTURAL ENVIRONMENT

POPULATION:

According to the 2011 censuses Satara District has a population of 30,03,922 population growth rate over the decade 2001 to 2011 was 6.94 percent. Raigad has population of 26,35,394 people. Population constitute 2.68 percent of the total population of Maharashtra. According to 2011 censuses, Pune has population of 94,26,959 people.

FACILITIES AND AMINITIES:

All type of facilities are included in this aspect. Hospitals, Health centre, Hotels, Motels, Youth hostels, Holiday centres, Travelling vehicles, Car, Motor, Government buses, Airplane Education, School, College, MTDC Area etc.

1. ACCOMMODATION

Accommodations are a vital and essential part of the tourism and hospitality industry. Due to the increasing volume of tourist travelling, government should provide proper infrastructure to boost tourism. More hotels must be built to keep up with demand. The Dictionary defines hotel as, place supplying board and lodging. Today, the hotel provides not only accommodation and meals but also various other services as per the needs of the needs of the guests such as massage parlours and cultural programmes. Accommodation in the form of low budget lodges to world-class luxury hotels is available at all major tourist destination to provide a home away from home to the travelling public.

There are many hotels developed in Konkan because many tourist visits in Kokan. Recently many foreigner people to see these places. There are many good hotels in the Alibag, Murud, Pali to stay and lots of temples, Places, and Beaches around the city to see. In this way many hotels are provided to help you make your booking decision. Room furnished with modern amenities and style, A.C., Non A.C. and economy rooms available, hotels, provided complimentary facilities such as TV, car parking, hot and cold water, Telephone etc. i.e. In Kashid beach also provide household hotels. A.C., Non A.C. and Economy room are available. Hotels are providing complimentary facilities. The rate of these hotels for economy room Rs. 1000-1500 and A.C.room Rs. 2000-3000.

We have provided a list of almost places in Satara to stay the rates and availability, quality of hotel rooms etc. should be confirmed by the guest personally we are only trying to facilitate your comfortable stay as far as possible Satara and Pune have many three star , one star and budget hotel are found in Pune discounted rates, well furnished rooms with complimentary facilities are feature of Pune hotels.

2. TRANSPORTATION AND COMMUNICATION

Transportation is one of the basic components of tourism. A tourist, in order to get to his destination, has to travel and therefore, some mode of transport is necessary to make possible this travel. In fact, transport is the necessary to make possible this travel; as the matter of fact it is difficult to think tourism sector without Transportation.

NH-4 is joined through the Satara and Pune. District Road well connected in followed by Satara, Pune, Raigad. Konkan railway well developed in Mumbai to Kerala. Ratnagiri and Sindhudurg, Konkan railway runs away from chiplun, Sangmeshwar, Rajapur, Kankavli, Malvan, Kudal.

3. SCUBA DIVING

Scuba diving and is a popular recreational activity. Scuba diving locations the primary appeal is the opportunity to observe underwater life in a natural setting without the complicated equipment. Around the globe people are engaging in inspiring activities to learn about sea; from watching to scuba diving tourism is the country main industry with the rich marine environment inviting snorkelling and scuba diving.

4. WATER SPORT

Today there are a number of water based sports and activities available in many region the best season for enjoying water sport is from October to May when the skies here are cloudless and the water Fairley placed. Windsurfing, scuba diving , water skiing , water scooter , swimming, these are the water sport activity. For adventure water sport lovers, snorkeling and scuba diving facilities are also available at North Konkan region. For novice, well trained snorkeling guides will

guide snorkelling trip ensuring safety and make it sure that one can have the first and finest ever experience of marine life.

5. PROVISION OF WATER FACILITIES

Water and especially fresh water is one of the most critical natural resources. The tourism industry generally over uses water uses of hotels, swimming pools, golf courses and personal use of water by tourists. Tourism is both depend on fresh water resource and an important factor in fresh water use to tourist need.

Rivers are main sources of water in Western Maharashtra. There are two major rivers found in Satara district i.e. named as Krishna and Koyana, and also found in various small rivers like Urmodi, Mand, Tarli etc. In Eastern part of Satara district there were found large no. of well boar-well and canal. Krishna, Koyana all these river originated in the sahyadri range. So in that particular region most of the people depends on wells, and boar-well, Boar-well provided sweet water in that region.

HOUSE TYPES

The food, cloth, shelter this are the basic needs of human. Simply shelter means house, in which human are leave. This row or shelters are based on natural resource and climate. In India these are different types of houses. This is different in region to region. In Maharashtra there are main 4 types of houses i.e. given bellow.

- 1) Tiled House
- 2) Mud House
- 3) Conceit House
- 4) Steep Slope Roof House

During the study tour we found that there are different varieties in houses. In western Maharashtra we found that there are mainly three type of houses. One is Tiled house second is R.C.C concerti houses and third is mud houses. In urban areas like Satara, Pune, Raigad in such cities there are near about 50 % - 60% homes is made by conceit and other 50 % - 40% houses are tiled houses. Around that urban area there are some small villages are found. In that villages we saw that there are many tiled houses. Because in the particular are annual average rainfall in

50 – 80 cm and 25 – 27.5^o C annual average temperature found. On the east side of Satara and Pune district 50 - 60 cm annual average rainfall and temperature in between 25 – 32^o C. Therefore in this side we found more number of mud houses.

In Western Maharashtra we found that in front of many houses, there is one small sacred basil plant called as '*Tulasi*'. Front of house daub with cow's much/dung. They also make dung-cake for fuel of a stove / hearth. In house there is one room which is outside in this are some chairs & table. On this table present one small round pot (*Tambya*). This room is known as meeting hall (*BaithakKholi*). Near to this room there are some reservoir (*Houdh*) which is used to stored food grain. In some houses there is one special storage of food which is present is underground that is called as *Pev*.

Tiled houses are made or built from Bricks, tiled (*Benglorikaul*, *Kumbharikaul*), cement, sand, wood, steel. And cement, steel, bricks, trades, sand these things are used for the built conceit houses. Mud houses are very simple; it contains only mud, wood, stoat or rocks. The walls of mud houses of very thick and roof is flat. Because of thick wall of mud house in side that houses temperature maintain.

In Western Ghat there is primarily steep slope roof houses found. Because in this area annual average rainfall 100 – 200 cm and annual average temperature in about 22.5 – 25 oc. In Western Ghat the annual average rainfall is high as compare to Western Maharashtra. That's why the houses in Western Ghat are small in height and small is size. In this area we particularly sow that some houses have wind us but small and they store their food material such as grain, beans, peanut, firewood etc. on the attic or loft which is create inside the house in size and some houses have 1 or 2 window because the average rainfall in very high in this area. For this type of houses basically rock, brick, red soil, wood, paddy stack these things are needed to build. This type of house is typically seen in western side of Maharashtra.

As we move towards the Konkan area we saw that there are steep sloped roof houses. Because their annual average rainfall is about 200 – 500 cm and annual average temperature in 25 – 27.5^o C. This houses are big in size because there is different parts of house contain sofa, big drawing room, big kitchen and

also big bathroom. In Konkan we observed that there are two special kitchen one kitchen is used for vegetarian food & other one is used for non-vegetarian food. For the non-vegetarian food there is separate stove / hearth behind the house. There is one nice thing that is one open space which is called *parasbag*. In this garden variety of plants or different type of plants are planted. In is mainly coconut, mango, lantern these tree are present 2 or 3 no of these type of plants are present in every *parasbag*. In our Indian culture the place which is in front of our house in very important place. In Konkan this open place is decorated by different colorful types of flower plants. And one important plant i.e. *Tulsi* (Sacred Basil Plant) is present in front of every Hindu house. *Tulsi* concerned as god's tree or plant so every Hindu women make worship of that plant in the every morning. They depending on the free space available in front or behind the house there is one well (*Aad*). From this well it supply water which is used for their daily work and also for plants present in the *parasbag*. For this type of houses red rock (*Chire*), wood, coconut leaps, cement and one important thing is that sea sand which is carried from sea. This type of houses found in Kokan region. In this area red rock is used widely because they are available every were in Konkan. Now days in Konkan large no of concrete houses we have seen.

LANGUAGE:

The language is essential to every aspect and interaction in our everyday, lives. Language is obviously a vital tool. Not only is it a means of communicating thoughts and ideas, but it forges friendship, cultural ties and economic relationship. The language is found in different region to region. Language is the light of the mind.

Western Maharashtra

Western Maharashtra situated in the western part of the country. Maharashtra happens to be the third largest state in the nations and stands second in population among all Indian states.

Marathi language is exclusively spoken in Kolhapur and even English, Hindi, Urdu, Gujarati, are sparingly used. Puneri language telling in Pune district. The native language of Satara is Marathi. Satara people use Marathi, Hindi language for communication and official language is English.

WESTERN GHAT

The Western Ghat, also known as the Sahyadhri Hills, This region where mostly Speak in Marathi language of the majority. I.e. AmbaGhat, PhondaGhat.

KONKAN REGION

I) Marathi Konkani

The language spoken by East Indians usually classified as Kokani. It is a collection of dialects of Marathi. Konkani language spoken in the Konkani region is referred to as Maharashtraian Konkani. The sub - dialects of Konkani gradually merge from standard Marathi into Konkani from North to South region. i.e. Alibag, Harihareshwar.

II) Goan Konkani

The sub-dialects of Konkani gradually merge from standard Marathi into Goan Konkani from North to South konkan. The various sub-dialects are Parabhi, Koli, Kiristanv, Kunbi, Agari, Dhangari, Thakri, Karadhi. Aagri and Thakri spoken by the found in konkan region.

OCCUPATION:

Raigad District

Most people in this district are engaged in agriculture beside this people are also engaged in making article, leather, iron earthenware etc.

Rice is the main crop in the district (puffed rice) and pohe (Rice and lakes) are made from rice. There are rice takes mills in many places. There are many floor mills too extracting oil from coconut making ropes, brushes, mats from coir as also brooms from the veins of the fronds & decorative articles from coconut related industries found in Tahsils of Mahad, Mangaon, Alibag, Murud, etc.

Alibag Fort

The main occupation here is Fishing most people are engaged in fruits agriculture there are many various types of fruits available mango, coconut etc.

Satara District

The main occupations of Satara district are agriculture & milk it shows the favorable condition of the sugarcane, paddy, groundnut etc. Which has promoted sugar industry, Rice mills and edible oil mills etc. The implementation of national industry policy resulted in the establishment of MIDC & the industrial Estates in the various part of Satara district. Hotel business is the most important there are many various types hotels. The main firstly occupation of Satara district are tourism. The district are agriculture economic life follow deal at length with industries, banking, trade and commerce communication & miscellaneous occupations. Industrial sector is also developed in Satara. The district has taken a quantum leap in dairy production & development.

Pune District

The main occupations of Pune district are fruits agriculture there are many various type of the fruits is one of the most important cash crops of the district, Pune district was very backward in the industrial field silver business is the popular business in Tulsibag in Pune.

Life Style:

India is a one of the differential variation. In here every aspect looking a variation. Similarly in clothes various types. In Maharashtra region different wear cloths of traditionally.

The Satara, Pune and Raigad District are included in western Maharashtra. Satara district Hindus may be said to dress in much the same style as the Hindus elsewhere in Maharashtra. The most distinguishing and common article of apparel for the male is dhotar. This article still continues to be worn by all whether in the rural or urban areas. Formaly, the male upper garments were upane, sela, sadara, pairan, bandi, kudta, kopri, kabja, angarkha, serwani, and dagala. It is fashionable to go bare-headed or under the Gandhian influence, the male ensemble consists of dhotar a pyjama, a long Sadara called 'Nehru shirt' and 'Gandhi cap'. The old footwears have also gone. It is now a Chappal, Slippers or Shoes, which became fashionable under the British rule has also disappeared.

of gold and and Silver. But leaving children without ornaments is becoming more fashionable.

RELIGION:

Maharashtra people of Hindu religion found in western Maharashtra. In Hindu religion mainly barter system are found, but this system slowly destroyed. That is Islam religion peoples are lowest of Hindu but Islam people are largely another religion the religion Islam is large because in coastal part konkan religion Siddhi Zohar's camps are there. This people are helps nawadi peoples and there cast of Mahadev Koli peoples less than living.

It is one of the most common and main religions in western ghat, Hindu are supported to cover about 75% of the entire population and then Islam are supported to cover about 19.7% Christians comprise about 5.3% of entire Marathi population konkan comprise another part of Christian are mostly the converts from Hinduism and Islam. In Hindu religion barter system to find including caste, sub-caste to be visible.

FOOD:

Human do daily different types of work So, human body needs lot of energy and this energy came from different types of food. Basically large scale of diversity of foods is in India. It is mainly because of climatic variations and availability of food sources. In Maharashtra too different types of food habits are found.

People from Satara, Pune and Raigad districts (Western Maharashtra) jowar roti, chappati, rice, bajara roti and various types of vegetables. Vegitable includes potato, brinjal, lady finger, cabbage, drumstick, gram, pea, fenugreek, coriander etc. They also it green leafy vegetables. Turdal, mugdal, hqarabara dal, is commonly as daily food. Western ghats local people eating rice, chapatti, and nachani bhakari.

God and Goddesses:

1. Vitthal

Vithoba also known as Vitthala. Vitthala as Hindu god, worshipped predominantly, in the Indian states of Maharashtra, Karnataka, Goa, Telangana and Andhra Pradesh. He is generally considered god Vishnu or his avtar Krishna. Vithoba is often depicted as a dark young boy standing arms akimbo on a brick, some times accompanied by his main consort Rakhumai (Rukmini).

Vithoba is a focus of the monotheistic non-Brahmanical. Varkari sector of Maharashtra and the Haridas sector of Karnataka border. Vithoba legends revolve around his devotees Pundalik, who is created with bringing the deity to Pandharpur and around Vithoba's role as a savior to the poet Saints of the varkari faith. The varkari poet saints are known for their unique genre of devotional lyric the Abhanga dedicated to Vithoba and composed in Marathi. The most important festival of Vithoba are held on the eleventh (Ekadashi) day of Hindu lunar months shayani Ekadashi in the month of Ashadha and Prabodhini Ekadashi in the month of Kartik. Vithoba is known as many names including Vitthala, Panduranga, Pandharinath, Hari and Narayana.

2. Ekvira Devi

The Ekvira Aai mandir is a Hindu temple located near the Kerala caves near Lonavala in Maharashtra.

3. Khandoba

The foremost center of Khandoba worship is Jejuri in Maharashtra. In Pali the ritual of the marriage of Khandoba with Mhalsa is annually performed. Khandoba is one of the important gods worshipped by Dhangar, the oldest tribes in Maharashtra, Karnataka and Andhra Pradesh. Jejuri is popular for its old deep mala.

Festivals :

The people are festive people by nature. Their love for celebration is deeply rooted in their culture and it finds its expression through the various festivals.

celebrated through the year some of the festivals celebrated in the western Maharashtra region are :

Diwali

Diwali is an ancient Hindu festival celebrated in autumn every year. The festival spiritually signifies the victory of light over darkness. The festival has parathons and rituals typically extend over a five day period, but the main festival night of diwali coincides with the darkest, New moon night of the Hindu Lunar calendar month Kartika.

Ganesh chaturthi

Ganesh chaturthi held in honor of Lord Ganesha is one of most popular Hindu festival in Maharashtra. Ganesh chaturthi is celebrated from 2 to 11 days. It is also the time for cultural activities like songs and Bhajan. Lord Ganesha is the most respected god in Maharashtra, so as the ganesh chaturthi, most important festival, the festival falls on the 4 day of the bright fortnight of bhadrapada. Puja can be simply performed with family members within the household or by a priest. Modak is special cuisine for ganesh chaturthi celebrations. Aarti is performed morning and evening as long as the ganesh idol is at home. Huge ganesh idols are worshipped at nicely decorated pandals, also known as dekhans for 2 to 10 days.

Holi

This is the interesting traditional festival of Konkan region. The day is also popularly called 'chhoti holi' or the small holi. According to Narad purana this day is celebrated in the memory of prahlad's victory and the defeat of his aunt Holika. Then old men from the people pray in the form of Garhane which is most famous pray type of Konkan after every sentence the people gathered. Around the holi support the Garhane by loudly saying hoy maharaja and the end.

Narli purnima

The full moon day of the month of shraavan is celebrated in different parts of maharashtra known as, the Narli purnima. Account day is dedicated to the sea god varuna. This festival marks the end of the monsoons and is celebrated by the fisherman of north Konkan. Narli purnima also marks the advent of the new

fishing season. Garlands made of flowers are also affixed to the boats to mark the beginning of a new fishing season. As per the tradition the first coconut is offered from the people of the Sea coastal region. In the early days a gold plated coconut was offered.

Makar sankrant

This festival specially for women. Makar sankrant usually falls on 14th of January every year on this day the sun comes across the north of equator sankrant means the passing of the sun from one zodiac sign. In western maharashtra on the makara sankranti day people exchange multi coloured. Halwa and tilGul Ladoo. Gulachi poli/Puran poli and some gram flour, which has been toasted to golden in plenty of pure ghee, are offered for lunch. While exchange til-gul as tokens of good will people greet each other with the words "til-gul ghyaa ani goad bola." meaning accept this tilgul sweet and utter sweet words.

Dussehra

Vijaya dashmi also known as dussehra is one of the most important Hindu festivals.

Gudi Padawa

The holy festival which marks the beginning of the new month, new year, new day for Hindus, focus on chaitra, shukla, pratipada (the first day of the bright fortnight of hindu lunar month of chaitra).

Akshya Tritiya

On Akshay Tritiya which falls on third day of the bright fortnight of the Hindu lunar month of Vaishakha, the combined frequencies of deity Brahma and shree Vishnu descend on earth from the positive spiritual planes.

Raksha Bandhan

This festival of Raksha Bandhan celebrated on the full moon day of the Hindu lunar month of Sharvana. On this day, a sister waves a platter with a ghee lamp on it, in front of brother and ties rice, gold and white mustard in a pouch making a raksha. Rakhi and then ties it to her brother's wrist.

Standard of living:

Generally Konkani and western Maharashtra region totally different living condition. Konkani's people use of clothing, food, house, and occupation are different for the western Maharashtra people. Change the standard of living periodically. Factors affecting the standard of living that is people education and all over there social, economically and physically condition.

Konkan people

Konkani people change the life style in change time to time. 20 century clothing of female in konkan region Kashtta and choli and male use of clothing short dhoti and bandi, but 21th century there are change of clothing and use different type clothing.

Before the 20th century Konkani's people depend on agriculture and fishing activity, but new generation totally change their activities condition. They started the tourism marketing and provide different tourism facilities and services by the tourist industry of natural food material. So, this people developed personally economic growth. And modify the standard of living.

20 th century social and cultural standard is backward but after 20 th century it means that beginning of 20 th century, there cultural and social standard change because of their rise in tourism industry and a lot of young generation involve in this industry. It include their favourite local food, and there dressing and hotels, there services and facilities provide by the tourist people. Maharashtra government provide to the policy by the tourist industry and this all over condition situation effect on the local people. Rise in per capita income and rise in standard of living in there people.

Western Maharashtra people

Western Maharashtra region invole the college tour Satara and Pune district some portion. There main source of economic agriculture and small business. There social and cultural condition well developed and attractive in this region.

The western Maharashtra (Satara, Pune) are developed the agricultural belt. There cash crops sugarcane and turmeric is growing. In this region Pune-

Bangalore(NH-4) highway in city of Satara, Pune so development of transportation, communication as well as any facilities available in city. Industry sector develop in western Maharashtra fruits and milk companies develop in Pune district. There people economical conditions well develop in total western Maharashtra.

Social and cultural condition western Maharashtra people always good condition. Continually change social and cultural condition some distance. This people clothing and food, clothing is pant and shirts always use and food Bhakari and Bhaji, Rice. This region many religious people are living and difference religions various festivals are celebrate. This people always busy to much small business. So there, automatically change standard of living in this region.

ECONOMIC SETUP:

The study region is mostly hilly and densely forest cover so there is lack of factories. The most of the industries depend upon forest material such as furniture, timbers, playing materials, toys etc. Also collection of honey, gum, medicinal imp plant etc. Mahabaleshwar, Harihareshwar, Janjira, Alibag, etc are the most tourist places. So the tourism is most important occupation in this region. The economy of tourist destination is depending upon Hotels, Restaurant and Lodges. So Strawberry fields are dominant in Mahabaleshwar due to suitable climate for this fruit. In this region all known Mapro factory has located which prepare various food products like fruit juice, jelly chocolates etc.

1. Agriculture

Agriculture is the backbone of Indian economy. It play very important role in nation's economy. About 70% population engaged in agriculture and related occupation agriculture is also important occupation of Maharashtra state.

The study area which we visited is come into Konkan region so rice is the dominant crop in this region. Near about 80% population ion Konkan engaged in agriculture. Agriculture is depend upon soil, climate, water resources. Instead of rice there are various crops are taken in the Konkan region such as Alphanso cashew nut, Ragi, Vegetables, some fruits.

In hilly slope area there is terrace farming which is important for fruit farming like Mango, cashew nut, Alphonso and in Pune, western Satara and Kolhapur region we found rice sugarcane, Ragi, Jawar, Wheat, etc. Due to seasonal rivers the agriculture is mostly depend upon Monsoon rainfall.

CROPS:

In Konkan there are mostly two types of crops have been taken Kharip and Rabbi. Kharip season depend upon monsoon rainfall. In this season farmer takes Rice, Groundnuts, cereals etc. In Rabbi season wheat is Ragi, Jawar, Chilly, Strawberry are important crop, carrot, cabbies, colif lower, Radish, Matter Rajama, Potato, Tomato, Brindles, ladyfinger also taken in this region. Mango, Fanas, Castueanut, coconuts, supari, Spices are found in Konkan region.

Fruit Farming:

1] Mango

Mango is one of the important crops of this district and occupied about 60% of the total area under fruits. Hill slopes near the coast where drainage is assured and climatic conditions are ideal, present most suitable site for mango cultivation. Planting is generally not done during heavy rains in June and July, because on low-lying lands water remains stagnant which the mango plants cannot tolerate. Nearly 90% of the area under mango is under Alphonso which is considered to be the best variety among mangoes and possesses very delicious taste, inviting fragrance, the best keeping quality and is fiber less.

2] Kaju

Cashew-nut stands next in importance to mango and occupies nearly one third of the total area under fruits. Masala, Alibag, Uran, Panvel, etc tahsils having a coastal climate, the red laterites and an abundant rainfall averaging 125 inches a year provide ideal conditions for its growth. Sometimes seedlings are also prepared and then planted at the beginning of the monsoon or just after the heavy showers i.e. in August. The plants are generally planted around the field or on the borders or on slopy soils, but very few cultivators have planted cashew-nut in a systematic manner.

The major operations in cashew-nut cultivation are planting, watching and harvesting. The cost of planting and raising the seedling in its initial stages comes to Rs.60 to Rs.70 per acre, harvesting and watching costs Rs.40 to Rs.50 per acre every year. The cashew-fruit consist of the cashew Apple and the cashew-nut. The Fruit when ripe is plucked for eating or for sale and the nut dried in the sun and stored. Sometimes the nuts in green condition are decorticated and sold in the local market.

3] Banana

Banana is grown on a small scale planting is done during July and August. The land is well suited to the cultivation of this variety and its production can be increased considerably if market and adequate watering facilities are available other varieties grown are rajeli, rasbeli, kanher, sahasraphal, mendal, velchi and lalkel. They begin to Flower in eight to ten months time. The flower spike (kel-ful) and unripe fruit are used as vegetable. Leaves of banana plant are used for serving meals. They are also used for bid making. Its stem fibre, known as sopat, is used for securing grafts.

2. Tourism

Tourism industry is now grown with fast speed compared to other sectors. This region is gifted with natural beauty different kinds of vegetation and animal species are found here. All kind of places like coasts beaches hill station's cultural, historical places supports the tourism. Tourism for enjoyment also for study takes places in this region. Beaches provides recreational activities and water sports like surfing under water swimming etc.

3. Transport

Transportation roots plays a role like a vains in human body. There are various transportation ways like roadways, railways, waterways. NH4 and NH17 play imp role in this region. Konkan railway play imp role for the development of this region which travels through new Mumbai, Raigad, Satara, Pune district. Bor ghat, Kelghar ghat, Ambenali ghat Khumbatki ghat are main ghats which connect the konkan region with plateau region.

4. Tourist Guide

Guides means a person's which provides line to you any space and is most important in tourism the guide is necessary to visit any because his historical place because his studies on that place and given information to you so we can able to know a more information about any historical places.

There is important in due to the less information of historical places which in a tourist so to described that specific historical places which in a tourist so to described that specific historical place we most have parsons which is aware about the various part of the tourism place so we are able to understand all happiness at our visit.

There a some season which are good for a tourism place and tourist. The provides for Nov to Feb are for a tourism so many people visit the tourism place at that time the school and college are also arranged their trips that's why there is a traffic of people in tourism place but the no of guide is limited so at that time we are not getting a specific/separately guides.

5. Fishing

KOKAN RIGION

Fishing is the main occupation of the Konkan region. Because the coastal area, good climate for the fish. Harihareshwar, Murud, Janjira, Alibag, etc mainly fishing is the main occupation of the people. Fishing is the dominant activity in Konkan region. The commercially important varieties of fish available in quantities are Ravas, Ahol, Karli, Dhoma, Zinga, Bangada, poplet.etc.

WESTERN GHAT

The fishing is the occupation of peoples the western ghat the fishing is Rivers, lakes, the western ghat the fishing is the very short time do. Vam, Vadshi, Alkut, Dandvam, Mahasheed, Catla, Hohu, Mirgal, Valshivadu Shingalu and Gorami are a few of the important fish. In this region Krishna, Koyna this rivers a considerable quantity of water is retained in the River.

6 Forest collection

Western Maharashtra

In Satara, Pune vegetation cover is medium most trees are big and use for shadow other uses of these trees are wood, gum, and for medicinal. Neem, Banyan, Pimpal, Karanj and other large trees contains several types of oils, powder, which are used to manufacture soaps, cosmetics etc. The trees used made by furniture. In Ayurvedas used some trees like Nee, Nitgeri, Karanj, etc. These trees use for construction buildings and some other work in satara, sangai vegetation cover is medium but Kolhapur is shows high vegetation.

Western Ghats

In western ghats sag, sal, Ae, Jau, these trees are mostly available because western ghats climate is favorable for grow. The in trees sag trees is very useful for made to furniture and they economic advantage. An available fruit and wood from jamun trees. The Jamun trees is most important in ayurvedas. In western Ghats large amount of found in vegetation.

Konkan Region

In this region climate is hot and humid. In region forest is evergreen because high rainfall in this region. There are various types fruits and species in available in this region like cashew, Mango, Kokam, Supai, Tad, Jackfruit, Shind, Coconut, Jayfal, Dalchini, Tamalpatra, etc. This species is some part available. These trees available in this region because climate is favorable. There are various type of Mango and Jackfruits, Mango, Cashew, Coconut these fruits are most important for export.

The majority of these species are found in nature as wild mangoes. Mango is a juicy stone fruit belonging to the genus *Mangifera* consisting of numerous tropical fruiting trees. Cultivated mostly for edible fruit. The cashew evergreen that produces the cashew tree is a tropical evergreen tree and the cashew apple. Cashew nuts are a popular snack and food source.

7. Cottage Industries

In Konkan having large natural resources, so there big scope of cottage industries. In this cottage industries based on mango, coconut, jack fruit, cashew etc. Tress cottage industries main sources occupation in Konkan region. Government provides market for Cottage Industries. So this Industry growing day by day. Cottage Industries manufacture various types product through the various plants these are given blow. Coconut is the one of the most import which is found in konkan. Coconut trees provide big amount of a raw material in cottage industries form the coconut tree. They make different types of product. Form the coconut leaves make Broom, form the coconut rope locally known as kathya, suthali etc. This entire coconut product is very useful for human daily life. This types of Cottage Industries found in wild range konkan area.

4. IMPORTANT TOURIST PLACES

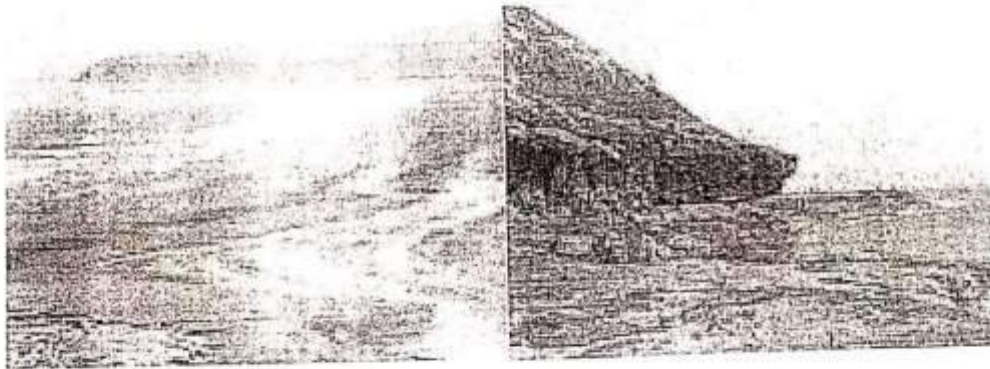
1. HARIHARESHWAR

Harihareshwar is a town in Raigad district, in Maharashtra, India. It is surrounded by four hills named Harihareshwar, Harshinachal, Bramhadri and Pushpadri. The river Savitri enters the Arabian Sea from the town of Harihareshwar. Towards the north of the town is the temple of Lord Harihareshwar, said to have been blessed by Lord Shiva. Hence Harihareshwar is often referred to as *Dev-ghar* or "house of God". Besides a major pilgrimage center, Harihareshwar is a popular beach resort with two beaches, one to the north and the other to the south of the temple. Maharashtra Tourism Development Corporation has a resort on the south beach. Harihareshwar, along with Shrivardhan and Diveagar Beach forms a popular weekend beach destination from Pune (190 km) and Mumbai (210 km).

The Kalbhairav Jayanti Utsav (Festival on Birthday of Deity Kalbhairav) was initiated by Mr. Yashawant Balawant Nagle who was Sardar of Queen of Janjira Administering Harihareshwar village. He donated quite a large part of his property for funding the Temple management. Harihareshwar Temple complex has two adjacent temples. The smaller Kalbhairav temple is expected to be visited first, before entering the main Harihareshwar temple housing an ancient Shiva Linga. A pradakshina route goes around the temple, along the sea shore. It is not advisable to go on this route during high tide.

Harihareshwar is renowned tourist spot in Konkan for its temples and beaches. Moreover, it is said as Devbhumi or Temple Town. Harihareshwar alone have two beaches - one, straight beach about 2.4 km long in front of Harihareshwar Temple, and the other beach is about 2 km in an L shape just in front of MTDC Resort. Harihareshwar is an evergreen place and one may visit it

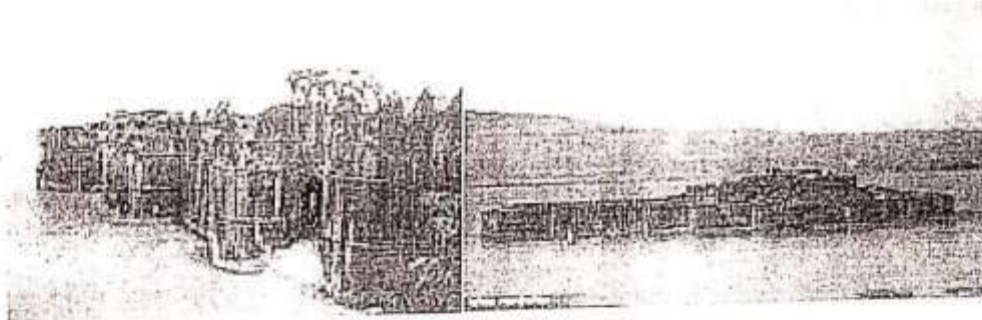
in any season. It is placed in the heart of nature and bounded with Sahyadri's hills. One can spend his three or four days of holiday easily. There is no problem staying Harihareshwar south beach in Harihareshwar as there are MTDC (a Governmental body) and few private resorts, also some Bed and Breakfasts that provide stays in Homes. Harihareshwar Beach is well set up beach.



2. MURUD-JANJIRA

Murud-Janjira Fort is situated on an oval-shaped rock off the Arabian Sea coast near the port town of Murud, 165 km (103 mi) south of Mumbai. Janjira is considered one of the strongest marine forts in India. The fort is approached by sailboats from Rajapuri jetty. The main gate of the fort faces Rajapuri on the shore and can be seen only when one is about 40 feet (12 m) away from it. It has a small postern gate towards the open sea for escape. The fort has 26 rounded bastions, still intact. There are many cannons of native and European make rusting on the bastions. Now in ruins, the fort in its heyday was a fullfledged living fort with all the necessary facilities, e.g., palaces, quarters for officers, mosque, two small 60-foot deep (18 m) natural fresh water lakes, etc. On the outer wall flanking the main gate, there is a sculpture depicting a tiger-like beast clasping elephants in its claws.

These 4 elephants symbolize Shivaji's major enemy dynasties on which he possessed control – Adil shahi, QutbShahi, Mughal shahi and Nizam shahi, whereas the tiger-like beast symbolizes control of Shivaji on these. There are prominent Ashok Chakras on all major gates of the fort Janjira. There are images of playing elephants, lions, etc.



3. KASHID BEECH

Kashid is a beach town on the shores of the Arabian Sea, in the North Konkan region of Maharashtra, India. It is located 30 km from Alibag and 135 km from Mumbai on the Alibag -Murud road. Kashid is popular mainly because of its white sand, blue seas, green mountains, paddy fields, and rivulets. Kashid has a 3 km stretch of beach tucked in between two rocky hillocks with Casuarinas groves all along the seashore. This is by far the best beach in this part of the Konkan region and, though absolutely deserted on weekdays, the town can attract its fair share of week-end holiday makers. There are a few small hotels in Kashid as the rest of the area is privately owned. Best option to stay here to stay in cottages owned by local people. It costs 1000 Rs for a room on weekends. They offer konkani fish thali which is very sumptuous.

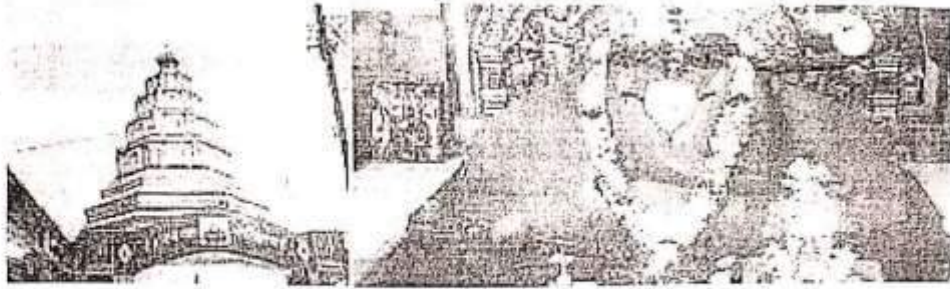


The waves here are unusually high and can be a paradise for surfing. The waves can reach a height of 5–6 feet even during the non-monsoon months. However they are dangerously high during the monsoons and surfing is not recommended during the months of June to September. Kashid was not known as a tourist attraction till the mid90s. It was only after travellers to Murud Janjira started stopping to spend some time after noticing the beauty of the beach.

4. BALLALESHWAR PALI

Ballaleshwar temple is one of the eight temples of Lord Ganesha. Among Ganesha temples, Ballaleshwar is the only incarnation of Ganesha that is known by his devotee's name. It is located in the village of Pali which is at a distance of 30 km from Karjat in the Raigad district. It is situated between fort Sarasgad and the river Amba.

The original wooden temple was renovated in 1760 to make way for a new stone temple designed by Shri Fadnis. Built in the shape of the letter Shri, it was made by mixing lead with the cement during construction. The east-facing temple was carefully positioned so that, as the sun rises, sun rays fall directly on the murti during worship. The temple contains a bell that was brought back by Chimaji Appa after his defeat of the Portuguese in Vasai and Sasti.

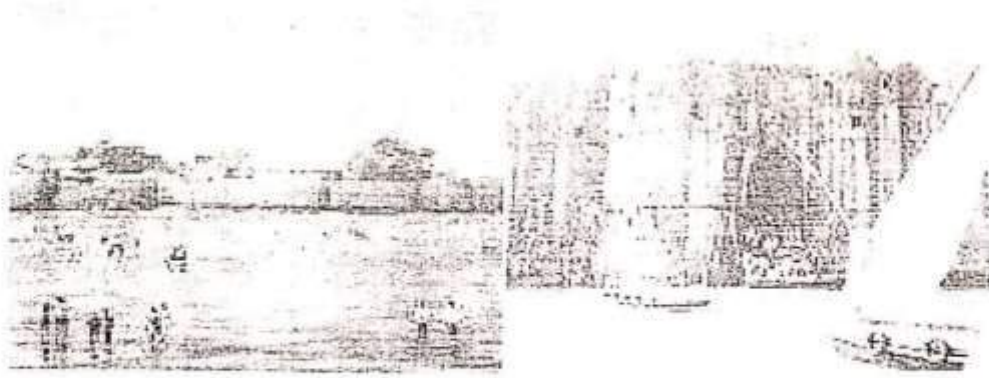


The temple complex encircles two lakes and is tiled throughout. There are two sanctums in the temple, an inner and an outer sanctum. The inner sanctum is 15 feet (4.6 m) high, while the outer sanctum is only 12 feet (3.7 m) high. The outer sanctum contains a murti in the shape of a rat, holding modak in its hands while facing Ganesha. The main hall of the temple is 40 feet (12 m) long and 20 feet (6.1 m) wide and contains eight pillars resembling Cyprus trees.

The murti of Vinayaka sits on a stone throne, facing east with its trunk turned left and sitting against a background of silver which displays Riddhi and Siddhi waving chamaras. The murti's eyes and navel contain diamonds.

5. ALIBAG

Alibag (also spelled as Alibaug) is a coastal town and a municipal council in Raigad District of Maharashtra. It is the headquarters of the Raigad district. Alibag was developed in the 17th century by Sarkhel Kanhoji Aangre the naval chief of King Shivaji's Kingdom. Alibag is a coastal town and municipal council in Raigad district of Maharashtra, India. It is the headquarters of the Raigad district. Raigad's first name was "Kulaba". Today's Ramnath was the main village. Abene Israelite named Ali used to live there at that time. He was a rich man and owned many plantations of mangoes and coconuts in his gardens. Hence the locals used to call the place "Alichi Bagh", or simply "Alibag", and the name stuck.



Alibag Fort: Alibag is the seat of District Administration of Raigad (formerly Kolaba) district since 1852. The name Kolaba is attributed to a sea fort built by Shivaji the great in 1680 to fight the mighty naval prowess of the Siddis (Abyssenians) of Janjira and the British of Mumbai. Kolaba fort is famous for many battles, between Siddis and Kanhoji Angre, the British and the Portuguese.

Alibag beach: This is the main beach. A very flat stretch makes for a long walk. It is reasonably clean and has thin crowds during the week. The sand has a hard texture and is a shade of black. It is not easy to create sandcastles. The tide rolls in from all sides: You may have to wade through water on the way back.

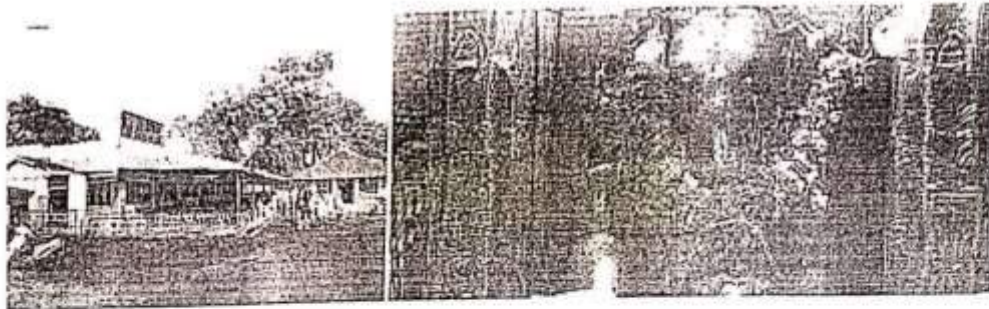
Siddheshwar Mandir near Khandale: This is a famous Shiva temple near picturesque hills near village Khandale just 4 km from Alibag-Pen state highway. You can drive your vehicles near to hillocks and with a small trek you can reach this beautiful temple. The beauty is awesome during Shrawan month when hundreds of people throng to worship here during Shrawani Somwars. If you travel further you can see the remains of an ancient fort called "Sagargad".

6. VARADVINAYAK MAHAD

Varadvinayak, also spelt as Varadavinayaka, is one of the Ashtavinayaktemples of the Hindu deity Ganesha. It is located in Madh village situated in Khalapur taluka near Karjat and Khopoli of Raigad District, Maharashtra, India.

The temple was built (restored) by Peshwa General Ramji Mahadev Biwalkar in 1725AD.

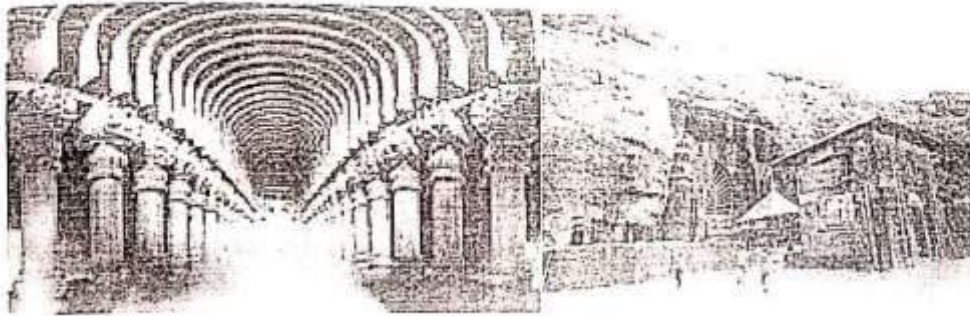
The idol of this temple Varada Vinayak is a swayambu (self originated) and was found in the adjoining lake in an immersed position in 1690 AD. This temple is said to be built in 1725AD by Subhedar Ramji Mahadev Biwalkar. The temple premises are on one side of a beautiful pond. The idol of this temple faces the east and has his trunk turned to the left. There is an oil lamp in this shrine which is said to be burning continuously since 1892. This temple also has the idol of Mushika, Navagraha Devtas and Shivalinga. There are 4 elephant idols guarding the 4 sides of the temple. In this Ashta Vinayak Temple devotees can enter the Garbagriha and pay their homage and respects to the idol personally. Devotees visit the Varadvinayak shrine throughout the year. During festivals like the Magha Chaturthi huge crowds can be seen in this temple.



7. KARLA CAVES

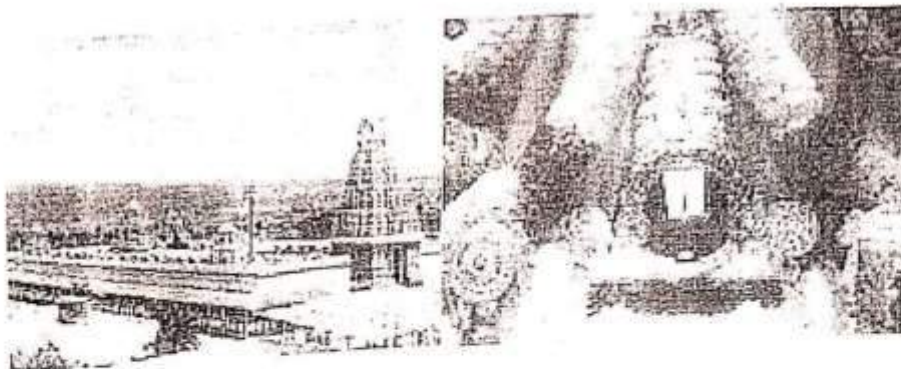
The Karla Caves or Karle Caves or Karla Cells are a complex of ancient Indian Buddhist rock-cut cave shrines located in Karli near Lonavala, Maharashtra. The shrines were developed over the period – from the 2nd century BC to the 5th century AD. The oldest of the cave shrines is believed to date back to 160 BC, having arisen near a major ancient trade route, running eastward from the Arabian Sea into the Deccan. Karli's location in Maharashtra places it in a region that marks the division between North India and South India. Buddhists, having become identified with commerce and manufacturing through their early association with traders, tended to locate their monastic establishments in natural geographic formations close to major trade routes seas to provide lodging houses for travelling traders. Today, the cave complex is a protected monument under the Archaeological Survey of India. The karla cave complex is built into a rocky hillside around 60 kilometres (37 mi) from Pune, with large windows cut into the rock to light the cave interiors. The caves are believed to be some of thousands of similar caves excavated in the Sahyadri Hills in the early 1st millennium AD.

The main cave features a large, intricately carved chaitya, or prayer hall, dating back to the 1st century BC. This is among the largest rock-cut chaityas in India, measuring 45 metres (148 ft) long and up to 14 metres (46 ft) high. The hall features sculptures of both males and females, as well as animals such as lions and elephants. Within the complex are a great many other carved chaityas, as well as viharas, or dwelling places for the caves' monks. A notable feature of these caves is their arched entrances and vaulted interiors. The outside facade has intricate details carved into it in an imitation of finished wood. The central motif is a large horseshoe arch. There is an Ashokan pillar at the front, with a closed stone facade and torana in between.



8. BALAJI / PRATI BALAJI TEMPLE, KETKAWALE

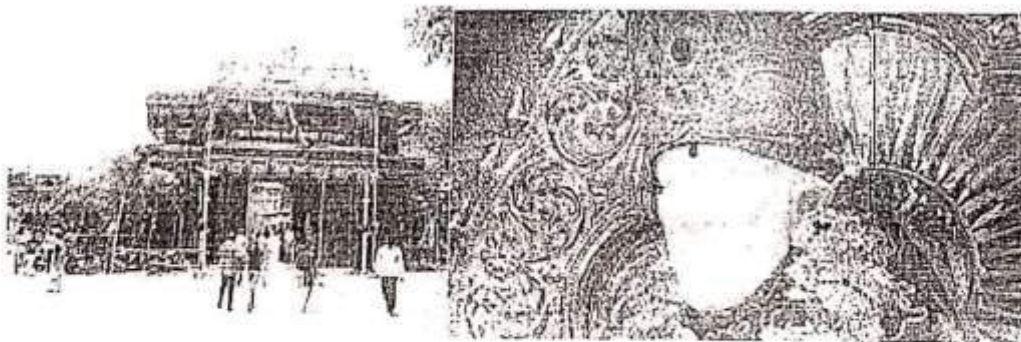
Balaji temple, ketkawale is situated on offshoot of sahyadri range. It is nearly 38 km from Pune and three kilometers from Kapurhol. It is situated near Pune-Satara highway to South of Pune. Shri Balaji Mandir trust has constructed a temple of Shri Balaji of Tirupati. The temple is exactly the replica of Shri Tirupati Balaji temple. The ritual ceremony is also performed according to Tirupati temple. Balaji temple has four doors on four sides. Magnificent Gopuram, big halls, ovaries and idols of different goddesses have been established in it. The significance of this place is that the complex is very clean and peaceful atmosphere gives pleasure to tourists. The temple is open from 5am to 8 pm for Darshan, Pooja is performed three times, in the morning and two times, in the evening.



In the night, attractive flood lights of various types increases the pleasure of devotees. The temple provides food and accommodation facilities for their devotees. Transportation facilities are inadequate. It is observed that most of the devotees visit this place by private vehicles MSRTC has to do some special provision through Saswad Depot or Bhore Depot on both sides. MSRTC Pune can take lead in this aspect. A point to be noted is that who do not get an opportunity to go Tirupati in Andhra Pradesh, may go Ketkavale and take Darshan of Tirupati Balaji.

9. SHIRGAON PRATI SHIRDI

Shirgaon is popularly known as Prati-Shirdi among Sai devotees. Shirgaon is situated off old Bombay-Pune highway. It's around 32 km from Pune railway station. Shri Saibaba temple was established here on 11th June 2003 by Mr Prakash Keshavrao Dcole. The building work was completed in nine months with the blessing of Shri Saibaba. These was considered to be one of the miracles. The people working at the temple site experienced various chamaltaras during these nine months. Now Shirgaon is known for the Sai temple . These are lot of similarities in Shirgaon and Shirdi. The name itself resembles to Shirdi to great extent.



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**PARTICIPATORY WATERSHED MANAGEMENT IN SEMI
ARID KHABALWADI MICRO WATERSHED OF SATARA
DISTRICT**

A DISSERTATION SUBMITTED TO THE
SHIVAJI UNIVERSITY, KOLHAPUR
FOR THE DEGREE OF MASTER OF ARTS
IN GEOGRAPHY

BY
MR. BHOSALE RAHUL RAJU
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AUNDH, DIST: SATARA

APRIL 2019



CERTIFICATE

This is to certify that the work incorporated in this thesis entitled '**Participatory Watershed Management in Semi Arid Khabalwadi Micro Watershed of Satara District**', submitted by **Mr. Bhosale Rahul Raju** was carried out under my supervision. Such material as has been obtained from other sources have been duly acknowledged in the thesis.



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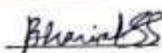
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Sincerely,

Mr. Bhosale Rahul Raju 

Mr. Bahirat Swapnil Sudnyan 

Place : Aundh

Date : 3rd April 2019

Contents

Sr. No.	Description	Page No.
	Certificate	ii
	Acknowledgements	iii
	Content	iv
	List of Tables	vi
	List of Figures	vii
	List of Photograph Plates	viii
Chapter 1	Introduction	1 -9
1.1	Introduction	1
1.2	Why people's Participation?	2
1.3	Some Participatory Experiences	3
1.4	Objectives	3
1.5	Research Methodology	3
1.6	Study Area	4
1.7	Review of Literature	7
1.7.1	Literature on Watershed Management	7
1.7.2	People's participation in watershed management	9
Chapter 2	Participatory Watershed Management	11- 17
2.1	Introduction	11
2.2	Water Budget of the Khabalwadi micro watershed	11
2.2.1	Water Availability (Approximate) in the study area	12

2.2.2	Water requirement (Expenditure)	14
2.3	Survey Outcomes	16
2.4	Watershed Management Structures	17
Chapter III	Result and Conclusion	29-31
	References	32
	Annexure I	36

LIST OF TABLES

Table No.	Description	Page No.
Chapter 2		
2.1	Watershed management structures constructed by <i>Shramdan</i> during April –May 2018	9
2.2	Watershed management structures constructed by machineries during April –May 2018	10
2.3	Total rainfall water	
2.4	Water Distribution	
2.5	Watershed Management Structures	
2.6	Total water stored in structures	
2.7	Available Water	
2.8	Requirement of drinking and domestic water	
2.9	Requirement of drinking and domestic water for animals	
2.10	Water requirements for agriculture	
2.11	Water requirement for industries	
2.12	Total domestic water requirement	
2.13	Water balance sheet	

LIST OF FIGURES

Figure No.	Description	Page No.
Chapter 1		
1.1	Location map	6
Chapter 2		
2.1	Contour map of the study area	20
2.2	Stream order map of the study area	21
2.3	Slope map of the study area	22
2.4	Aspect map of the study area	23
2.5	Physiography map of the study area	24
2.6	Watershed Management Structure map	25
2.7	Watershed structure map of the study area	26

LIST OF PHOTOGRAPH PLATES

Plate No.	Description	Page No.
Chapter 2		
Plate 2.1	Plate 2.1 Photographs of Ganeshwadi Stream - I	23
A	Interaction with villagers on participatory watershed management	
B	Bhairavnath Temple located in the center of town	
C	Bird eye view of Khabalwadi village	
D	Bird eye view of Khabalwadi village	
E	Source region (Jungla) exhibits steep slopes	
F	Upper reaches of study area, note dry deciduous vegetation	
Plate2.2	Photographs of Ganeshwadi Stream - II	24
G	GPS location of earthen check dam	
H	Percolation tank near the outlet	
I	Red bodes are commonly observed of 0.10 m to 3 m height	
J	Red bodes are commonly observed of 0.10 m to 3 m height	
K	Ancient well exhibits low water level	
L	Construction of new well	
Plate 2.3	Photographs of Ganeshwadi Stream - III	24
M	Scrub land is major land use category, note 'Yamai Hill' in the background	
N	CCT's in middle reaches	
O	Stony fields are common phenomenon, onion exfoliation is observed.	
P	Field excursion. Wind mills on the ridge area	

Chapter I

INTRODUCTION

1.1 Introduction

Watershed is the area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community (J.W. Powell). Watersheds come in all shapes and sizes and they cross sectorial boundaries like district, state and country. Worldwide, watersheds supply drinking water, provide recreation and respite, and sustain life. Watersheds are rich in natural capital, producing goods and services for broad geographical areas. As we all live in a watershed our individual actions can directly affect it. In India water conservation and management have been mentioned in the ancient scripts-Vedas, around 3000 B.C.

Watershed management means the process of creating and implementing plans, programs and projects to sustain and enhance watershed functions that affect the plant, animal and human communities within a watershed boundary. Watershed management is not so much about managing natural resources, but about managing human activity as it affects these resources. The drainage area of the river provides the natural boundary for managing and mitigating human and environmental interactions.

Watershed development refers to an integrated scientific management of land, soil, water, vegetation, animals and human population within a natural geographic unit. Its broad objective is to maximize net social benefits to the people living in the watershed area. Therefore, people become the focal point and their involvement in the watershed management is imperative. Based on the successful experience of the people's participation in model Watershed Development Projects of Indian Council of Agricultural Research, the Government of India started National Watershed Development Programme for Rainfed Areas (NWDPA) in various districts

of different states in the 7th Five Year plan and onwards. The World Bank funded Integrated Watershed Development Projects (IWDP Hills and IWDP Plains) are also in operation in 7 states since 1990. Though there has been progressive expansion of the programme, most of the schemes remain fragmented in terms of funding sources and implementation responsibility as well as the approach in the watershed development programme.

Voluntary agencies would be involved in awareness creation, group formation, training and preparation of training materials. There are no two opinions about the potential benefits of the programme, provided it is implemented as per the guidelines. But in spite of the elaborate planning and allocation of huge funds, the programme is not achieving the stipulated success. In most of the locations, the programme is running on adhoc basis. After the government agencies withdraw their support, the programme collapses. The innovative idea of ensuring people's participation remains unsolved. The soil and water conservation goals of watershed projects are of long terms. For the sustainable development of the watershed programme, the people living in the watershed who are responsible for the situation, who are affected by the situation and who would be benefited by the programme, become very important and they should definitely be involved in the programme right from the planning to implementation and monitoring stages.

1.2 Why people's Participation?

Participation as a process is a dynamic, non-quantifiable and essentially unpredictable element. As a process, participation will change the life of the project into a permanent dynamic movement. Participation may not be seen merely as a managerial technique, but more as a technique to enable rural people to have a more direct involvement in development projects. The critical elements in this process are those of awareness creation, local capacity building, liberation and empowerment. Participation if mobilized in this context, leads to greater control of the poor over their own life situation. Through the acquisition of knowledge and local capacity building, they will be able to understand the cause of their poverty and are in a better position to mobilize and utilize available resources to improve their situation either through individual or collective efforts. More generally, participation as an end involves the notion of "bottom up" or

the existing institutional arrangements.

1.3 Some Participatory Experiences

The people's participation in the development programmes in the past has been sought through establishing self-reliant groups, farmer to farmer exchange of ideas and through developing local action groups. In Maharashtra, local people themselves were involved in surveying the village resources and planning the programme activities. In Karnataka, local people organized into subgroups were given separate responsibilities and formed their own rules and regulations to carry out the programme. All these success stories emphasize the point that people's participation in watershed management is a must for its success and sustainability. At the same time it is true that in majority of the programmes, we are not able to utilize local people and their involvement in the project. In Gujarat PRA techniques were used by the extension volunteers selected from the village. The village institutions helped in organization of the activities of the project. In Tamil Nadu, non-formal classes were used to create awareness and for organizing people into village 'Sanghas' or committees to carry out the programme activities. Local songs and stories were used to mobilize people.

1.4 Objectives

1. To study watershed management structures implemented in the study area.
2. To study water budget of the study area.
3. To study socio-watershed related issues of the study area.

1.5 Research Methodology

Present study is based on primary and secondary data. Survey of India topographic sheet no. 47 K/10 of 1:50,000 scale is used to generate the base map of the study area. The study area is delineated with the help of ArcGIS 10 software. All tributaries of different extents and pattern were digitized from topographical sheet. Digitization work is carried out for an entire analysis of study area. Various thematic maps such as drainage map, stream ordering map, contour map,

digital elevation map (DEM), slope map, aspect map and land use and land cover maps are prepared using ArcGIS software. Resourcesat-2A medium resolution LISS-III sensor with 23.5 m spatial resolution is used to create digital elevation model (DEM) of the study area. Ground realities are checked with the help of handheld Garmin GPS during field visits. Water budget data has been taken from Department of Agriculture, Government of Maharashtra (2018). Questionnaire is used to collect watershed management data. Present study is based upon 90 questionnaires, which were filled during field visits. Random sampling method is used for the study. Water budget results are summarized in Table 2.1 to 2.12.

1.6 Study Area

Total geographical area of the study area is 3.90 km². It is located on the left bank tributary of the Krishna River basin (Figure 1.1). The Khabalwadi stream drains into the Krishna River at Kameri near Rahimatpur. The study area covers an area of 512 Ha of Aundh hill in Satara district of Maharashtra. Aundh hills are part of Mahadev Hill range of the Western Ghat. The area represents semi-arid conditions and receives 350 mm average annual orographic type of rainfall. The study area lies between latitudes of 17°32'48.93"N to 17°34'20.45"N and longitudes of 74°17'16.63"E to 74°17'37.36"E. The study area lies 4 km north west of Aundh village and 10.6 km east of Rahimatpur town. DEM shows that height of the area is located between 763 m to 918 m above sea level. As per 2011 census total population of village is 450 in 105 families. Total men population is 51.9% and women population is 49.1%. Administratively area lies in Khatav Taluka of Satara District. Aundh is a popular religious and historical tourist centre of Maharashtra and it was a princely state in British India. The drainage network is sub dendritic pattern (Figure 2.3). The area is covered by compact, fine grained, massive basaltic lavas of Upper Cretaceous to Lower Eocene age and represents step like topography. Stony field is found in the source region (Plate 2.3O). The soils of the study area are residual, derived from the underlying basalts. Natural vegetation represents the southern tropical dry deciduous type (Plate 2.1 F). Khabalwadi is located in the middle reaches of micro watershed. As per interaction with villagers the area is facing acute drinking water shortage almost throughout a year (Plate 2.2 A, B). Groundwater level is declined in the area due to scanty rainfall and heavy pumping (Plate 2.2 K, L). Jowar, Bajra, Wheat, Soyabean, Cereals, Harbhara, Ground nut, Mung, Vegetables,

Maze, Onion, Sugarcane, Chilly (Kharif), Ginger and Potato are cultivated prominently in the Kharif season (Table 2.10). Cattle grazing are common in the scrub lands. Stony field and onion exfoliation is commonly found in the upper and middle reaches (Plate 2.3 O). Plate 2.2 I, J shows red boles are commonly found in the upper reaches of 0.10 to 3 meter thickness in the study area. Details of the water budget are given in Table 2.1 and Table 2.13 respectively; various maps are shown in Figure 2.2, to 2.7 and photographs are shown in Plate 2.2 I to Plate 2.2 III.

LOCATION MAP

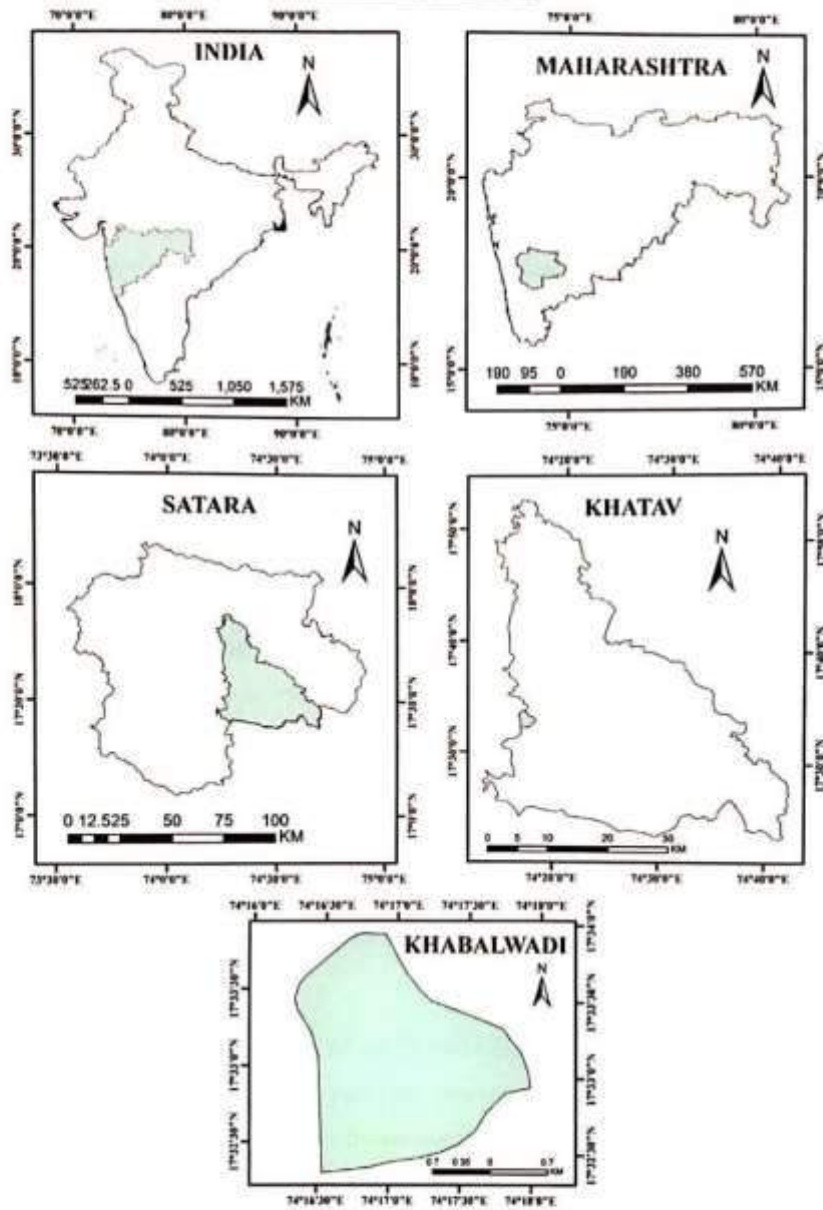


Figure 1.1 Location map

1.5 Review of Literature

1.5.1 Literature on Watershed Management

Tideman (2007) stated that in view of planning and management of natural resources, the catchment remains very important area, proper treatment of which offers a solution for meeting the frequent drought situation.

DhruvaNarayana et al. (1990) and Sharda et al. (2008) contributed on soil and water conservation research at watershed level and stated that for successful development of any watershed soil and water survey and analysis is a key deciding factor.

CSE (2009) and WOTR (2010) reports on the result of comprehensive watershed development programme through voluntary organizations at different villages shows that watershed management is essential for overall development of basin.

Schwab et al. (1996) highlighted a need of soil and water survey, study of rainfall, various parameters associated with rainfall like pattern, intensity and duration of rainfall and estimation of runoff generated from these rains for effective watershed development.

Schultz and Engman (2000) intended to provide methods to help the water managers solve their own problems in water management and also reports on number of successful international watershed examples from Brazil, USA, China, European Union, NE Asia and African countries using remote sensing.

Juyal and Sharda (2010) provided basic resource surveys, use of modern tools like GIS and remote sensing, participatory approaches and PRA, watershed hydrology and engineering, impact assessment and economic analysis etc. Case studies of some model projects also provided by authors.

United Nations Educational, Scientific and Cultural Organization (UNESCO) has placed increasing emphasis on the urgent need for alternative sources of water in the arid regions around, as a part of the Water for Life International Decade for Action 2005-2015.

Chadha and Neupane (2011) provide technique for optimum utilization of the available runoff at different locations within the watershed based on stream ordering and geomorphic analysis of the drainage area.

Chandrasekar et al. (2005) has been completed satellite remote sensing based performance evaluation of Krishna irrigation command in Maharashtra State.

Pareta and Pareta (2012) stated that the erosional development of the area by the streams has progressed well beyond maturity and that lithology has had an influence in the drainage development.

Telore (2015, 2016) carried out studies of the semi-arid Yerla River basin and found that micro watershed management is a way to solve water scarcity. Telore and Unde (2017) carried out morphometric analysis for sustainable watershed management. Telore (2019) identified potential sites for micro watershed management in the semi-arid Deccan Trap region.

Kumar (2010) stated that in effective watershed planning use of remote sensing and GIS techniques is essential. Such planning involves management of land, water, energy and vegetation resources with relevant scientific inputs, appropriate to its socio-economic background for a pragmatic development.

Sankhua (2012) provides GIS technological advances in managing water system information and provides exhaustive coverage of the practical GIS applications in water sector.

Ghare (2000) stated that participatory watershed development programmes are fruitful for rural development. Author provides comprehensive data on various dimensions of participatory watershed development including watershed development concept, funding agencies, different types of survey, technical agricultural programmes and suggestions for watershed project maintenance.

Dikshit et al. (1993) have shown the significance of small reservoirs in the context of water management practices in India from ancient to current period and analysed the structural, financial and institutional aspects of small reservoirs.

Gavade et al. (2011) used criteria like rainfall, stream order, slope angle, soil type and settlement for suggesting suitable sites for soil and water conservation structures in semi arid part of Solapur District.

The Ministry of Agriculture, Government of India estimated in 1985 that over 100 million ha of India's geographical area is affected by soil erosion due to surface runoff (DhruvaNarayana, 1993).

1.5.2. People's participation in watershed management

Sharma and Hooja (1981) concluded that active involvement and participation of the people was the only solution to the problem of drought, flood and for sustainable economy in the watershed areas.

Hegde and Pandurangaiah (1989) concluded that successful achievement of results in Mittemari ORP watershed was due to close involvement of people through establishing "Village Resource Management Society". The beneficiaries were involved in various educational activities and meetings.

Singh *et al.* (1989), in their study on Bunga ORP watershed in Haryana, observed that involvement of people in watershed programme was one of the reasons for successful achievement of objectives through establishment of "Hill Resource Management Society" in watershed villages.

Deshpande and Rajashekar (1995) quoted that for successful watershed development programme, it was essential that the beneficiaries contribute either in terms of labour or share the expenses of the treatments. Such participation can be accomplished by initiating "Watershed panchayat" which was similar to or a part of the village panchayat.

For projects like watershed management, active participation of masses at all levels is of utmost importance. People's participation implies participation at all stages of the programme viz., planning, formulation of programme, implementation, decision making, sharing the benefits of development, monitoring and evaluation of the programme (Dhillon and Hansra, 1995).

Gupta (1995) concluded that an approach to participative watershed development implies attention to intersectional linkages, which manifest in the form of interactions among enterprises and social classes over time and space. The participation in people's plans requires giving due respect to their knowledge and experimental ethic.

Maitra (1995) viewed that community participation in watershed management in the present context as generating and supporting a process, where the associated communities were motivated to function and contribute as a group to perform a series of tasks to derive equitable benefits for the community through sustainable management of their land, water and other common property resources.

Padmaiah (1995) reported that people's participation in different stages of watershed development programme such as bench mark survey, planning, execution and monitoring and evaluation stages was very poor.

Shivasharanappa (1995) conducted a study in watershed in Bijapur district of Karnataka. The results revealed that negligible per cent of localites, rural leaders and village institutions had participated in the activities of the project planning process such as (i) creation of awareness, (ii) problem identification and (iii) formation of local management committee.

Nandakumari (1998) reported that success of the watershed programme implemented by Samuha (N.G.O) and Government of Karnataka in Kushtagitaluk in Karnataka, was due to collective participation of villagers in the programme. Each village has gramasamithi and Jana samuha organized themselves into a watershed implementation committee for effective implementation of the programme.

From the above reviews, it is evident that people's participation in the watershed programme is key factor for its success. Formation of self-help groups, watershed associations, watershed committees and credit management groups in villages help ineffective implementation of the programme and to achieve more benefits.

Chapter II

Participatory Watershed Management

2.1 Introduction

Water scarcity is a natural as well as man-made condition. People's efforts can solve the crisis of water through watershed management. Khabalwadivillage was participated in the Paani Foundation's Satyamev Jayate Water Cup 2018 competition, which was held from 8th April to 22nd May 2018. During this tenure huge participatory watershed management works were carried out by villagers for the sustainable development of this semi-arid region. Paani Foundation is a not-for-profit company set up in 2016 by the team of the TV series Satyamev Jayate to fight drought in rural Maharashtra. In this core chapter detail of water budget and survey output has been given.

2.2 Water Budget of the Khabalwadi micro watershed

A water budget is an accounting of the rates of water movement and the change in water storage in all or parts of the atmosphere, land surface and subsurface. In the present study water budget study is calculated annually. Table 2.3 to Table 2.7 shows approximate water availability in the study area and Table 2.8 to Table 2.12 shows water requirement (expenditure) in the town, which was made available by Department of Agriculture, Government of Maharashtra.

Sr. No.	Structure	Numbers	Work Implemented (Cubic Meter)
1	Continuous Contour Trenches (CCT)	29	196.93
2	Compartment Bunds	14	1556.21
3	Loose Boulder Structures	15	164.26
4	Earthen Dam (small)	13	353.41
5	Earthen Dam	1	3696.03
6	Farm Pond	1	871.10

Total	6837.94
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Table 2.1 Watershed management structures constructed by *Shramdan* during April –May 2018

Sr. No.	Structure	Numbers	Work Implemented (Cubic Meter)
1	Deep Continuous Contour Trenches	147	3757.77
2	Continuous Contour Trenches	147	1511.05
3	Compartment Bunds	10	3896.08
4	Farm Pond	11	34701.31
5	Earthen Dam	8	27742.77
6	Cement check Dam	1	3307.5
7	Nala Deepening (Excavation of mud)	15	22417.25
	Total		97333.73

Table 2.2 Watershed management structures constructed by machineries during April –May 2018

2.2.1 Water Availability (Approximate) in the study area

Studies of water availability are essential for water budget in the area. Table 2.1 shows that total 6837.94 Crore Ltr water is made available due to watershed management structures constructed by *Shramdan*(participatory) and Table 2.2 shows total 97333.73 Crore Ltr water made available due to watershed management structures constructed by machineries during April –May 2018. Total availability of water is 179.20 croreltr in the wadi (Table 2.3). 100 % water distribution is shown in Table 2.4. Details of watershed management structures are shown in

Table 2.5. Water stored in watershed management structures is 7.85 croreltr (Table 2.6). Table 2.7 shows that 138.070 Crore Ltr water available in the study area.

Area (Ha)	× Rainfall (mm)	÷1000	179.20 Crore Ltr
512	350	÷ 1000	

Table 2.3 Total rainfall water

Sr. No.	Runoff Water	35%	62.72 Crore Ltr
1	Evaporation	20%	35.84 Crore Ltr
2	Soil Moisture	30%	53.76 Crore Ltr
3	Ground Water	15%	26.88 Crore Ltr

Table 2.4 Water Distribution

Sr. No.	Structures	Numbers	Storage Capacity	Total Storage
1	Continuous Contour Trenches	00	0.027	0.00
2	Deep CCT	00	0.240	0.00
3	NalaBunding	60	0.045	2.70
4	Farm Pond	04	0.220	0.88
5	Earthen Dam (Small)	00	0.0002	0.00
6	Earthen Dam	12	0.600	7.20
7	Cement Check Dam	04	1.400	5.60
8	Percolation Tank	04	10.000	40.0

9	K.T. Weir	01	1.050	1.05
Total Water Availability		57.430 Crore Ltr.		

Table 2.5 Watershed Management Structures

Water stored in watershed management structures	7.85 Crore Ltr
-------------------------------------------------	----------------

Table 2.6 Total water stored in structures

Total rainfall	- Runoff	- Evaporation	+ watershed management works	= Available Water
179.20	62.72	35.84	57.430	138.070 Crore Ltr

Table 2.7 Available Water

2.2.2 Water requirement (Expenditure)

Table 2.8 to 2.12 shows that water requirement i.e. expenditure of the study area. Total 0.66 croreltr water is required for human beings for drinking and domestic purpose. Table 2.10 shows 141.37 Crore Ltr Water is required for agriculture. In this region single industrial activity found i.e. construction of houses, which requires 141.37 Crore Ltr water (Table 2.11). Total domestic water requirement is 144.81 Crore Ltr for population (daily needs), animals, agriculture and industries (Table 2.12). Table 2.13 shows water balance sheet of village. In this town 138.07 croreltr water is available and water consumption is 144.81 Crore Ltr. Total water deficit is 6.74 croreltr of the study area (Table 2.13).

Population	× 40ltr	× 365 days	+ 10000000	0.66 Crore Ltr
450	× 40ltr	× 365 days	+ 10000000	

Table 2.8 Requirement of drinking and domestic water

Number of animals	× 40	× 365	+ 10000000	1.28 Crore Ltr
875	× 40	× 365	+ 10000000	

Table 2.9 Requirement of drinking and domestic water for animals

Sr.No.	Crop	Area (Hect)	Need /Hect	Total Need
1	Jowar	70	0.40	28.0
2	Bajra	05	0.25	1.25
3	Wheat	15	0.40	6.00
4	Soyabean	87	0.30	26.10
5	Cerels	85	0.30	25.50
6	Harbhara	13	0.25	3.25
7	Ground but	06	0.45	2.70
8	Mung	05	0.30	1.50
9	Vegetables	18	0.45	8.10
10	Maze	10	0.40	4.00
11	Onion	11	0.70	7.70
12	Sugarcane	1	2.10	2.10
13	Chilly (kharip)	1	0.55	0.55
14	Ginger	03	1.00	3.00
15	Potato	33	0.65	21.45
16	Mango	1	0.17	0.17
Total water requirement for crops			141.37 Crore Ltr	

Table 2.10 Water requirements for agriculture

Construction	1.5	141.37 Crore Ltr
Other Industries	-	

Table 2.11 Water requirement for industries

Human	Animal	Agriculture	Industries	
0.66	1.28	141.37	1.5	144.81 Crore Ltr

Table 2.12 Total domestic water requirement

Available water	Water requirement (consumption)	Water deficit 6.74 Crore Ltr.
138.07	144.81	

Table 2.13 Water balance sheet

2.3 Survey Outcomes

Total population of the Khabalwadi is 450 as per 2011 census. 90 questionnaires are filled by random sampling method. Villagers have been given answers to all questions (Plate 2.1 A). Details of survey questions and outcomes have given below.

1 Sources of domestic and agriculture water?

91 % villagers use Govt. Scheme (Grampanchayat), 6 % uses well water and 3 % villager's uses bore well water for domestic needs. Agriculture has been done in Kharif season. Well and bore well water uses by 9 % farmers during Rabi Season.

2 How much distance you travel to brought drinking water?

In the rainy season there is no issue of water deficit for drinking purpose. But in the months of December to early June, every year water deficit is common issue in the village. During this tenure 73 % villagers travel 1 to 2 km distance and 27 % villagers travel 2-3 km distance to brought drinking water.

3 Migration of members in family?

Yes. Migration is a common issue due to semi-arid region. Almost 67 % people migrated due to work purpose. No migration found due to drinking water purpose in this town.

- 4 **In which season agriculture has been done?**
100 % farmers done agricultural activities in Kharif season, only 9 percent farmers carry agricultural activities in Rabi Season.
- 5 **Method of irrigation for applying water to crops?**
In Kharif season furrow irrigation is common in farmers. Only 4 % farmer's uses sprinklers and 2 % farmer's uses drip irrigation techniques.
6. **Are you participated in Paani Foundation activities in 2018:**
Almost entire village (97 %) is participated voluntarily in the Paani Foundations Satyamev Jayate Water Cup competition 2018 in the above said period. 3 % villagers can't participate due to health and migration issues.
7. **Any social issues occurred due to water scarcity?**
64 % villagers replied, yes. Water scarcity creates marriage, health, crisis with neighbor and other problems.

2.4 Watershed Management Structures

Following structures are found in the study area. It is possible due to the participatory watershed management approach (Figure 2.7, Table 2.1, Table 2.2)

2.4.1 Contour Trench

Contour trench (CT) is a trench dug along a contour line. CT's are constructed in the ridge area, basically located in upper reaches of a micro watershed. This structure is checking soil erosion, slowing down the velocity of runoff and improving soil moisture profile. (i) 5.71 to 14.04 degree slope area is suitable for this structure. (ii) If the slope is more than 14.04 degrees do not make contour trenches because of digging in high slope cause soil erosion. (iii) If the slope is less than 5.71 degrees do not make contour trenches because in comparison to CT other structures are best for this place (Govt. of India, 2007). In the present study contour trenches are suggested than the continuous contour trenches (CCT) because CCT's can be burst by number of reasons.

2.4.2 Loose Boulder Structure

(i) The structure can be constructed in upper reaches of watershed to reduce gully erosion. (ii) It can be constructed in areas where boulders are available in radius of 1 km of structure. Area above the structure is upto 5 hectares for small structures and 5 to 10 hectares for big structures. (iii) Vertical distance between two structures should be above 1 meter. (iv) Height of small structure of 5 hectare watershed area upto 0.75 m and of 5 - 10 hectare watershed area upto 1 m. (v) It should be constructed above farm pond, check dams and percolation tanks. (vi) According to necessity galvanized iron should use to protect loose boulder structures.

2.4.3 Farm Pond

(i) The farm pond should be prepared in the areas of less percolation. (ii) Black cotton soil area is ideal for pond structure because it has minimum seepage loss. (iii) Pond can be constructed on first order tributaries, it can be constructed on junction of site. (iv) Pond can be constructed on flat terrain. Large natural depression should be preferred for pond site. (v) The drainage area above the pond should be large enough to fill the pond. (vi) Ponds are proposed on the area having upto 1.72 degrees slope and care should be taken where other structures are not proposed. (v) Topography affects on the dimensions of farm pond, i.e. length, width and depth is 20 X 20 X 3 m or 40 X 20 X 2.5 m, etc. (vi) It has storage capacity of ~ 1000 TCM. (vi) Ponds are not proposed where canal irrigation system is existing and in area where salinization occurs.

2.4.4 Farm Bund

i) Farm bunds are proposed in the plateau reaches of micro watershed on agricultural land or non agricultural land to minimize soil erosion and improve soil moisture profile. Bunds can support to increase groundwater level. ii) Farm bunds are proposed on contour lines. iii) In some cases it becomes inconvenient to farmers, so bunds are suggested on field boundary. iv) Distance between bunds must be 30 to 80 m, depending upon slope of the area. v) Bunds are proposed in the area where slope is less than 5.71 degrees. vi) In comparison to contour trenches farm bunds effective means of checking runoff and soil erosion.

2.4.5 Check Dam

(i) Earthen or cement check dams can be constructed across bigger first order or second order streams. (ii) It should be constructed in areas of gentle slopes (less than 1.72 degrees). (iii)

Depth of nala should be more than 1 m. (iv) The soil downstream of the bund should not be prone to water logging. (v) Vertical distance between two check dams should be more than 1 m. (vi) It can be constructed in area which having mix material.

2.4.6 Percolation Tank

(i) The tank can be located across streams by creating low elevation. (ii) Terrain with high fractured and weathered rock for speedy recharge. (iii) Submergence area should be uncultivated. (iv) Rainfall pattern based on long-term evaluation is to be studied so that the tank gets filled up fully during monsoon, preferably more than once. (v) Soils in the catchment area should be of light sandy type to avoid silting of the tank bed. (vi) The location of the tank should preferably be downstream of runoff zone or in the upper part of the transition zone, with a gradient of 1.72 to 2.86 degrees. (vii) Tanks can be constructed in middle or lower reaches of watershed.

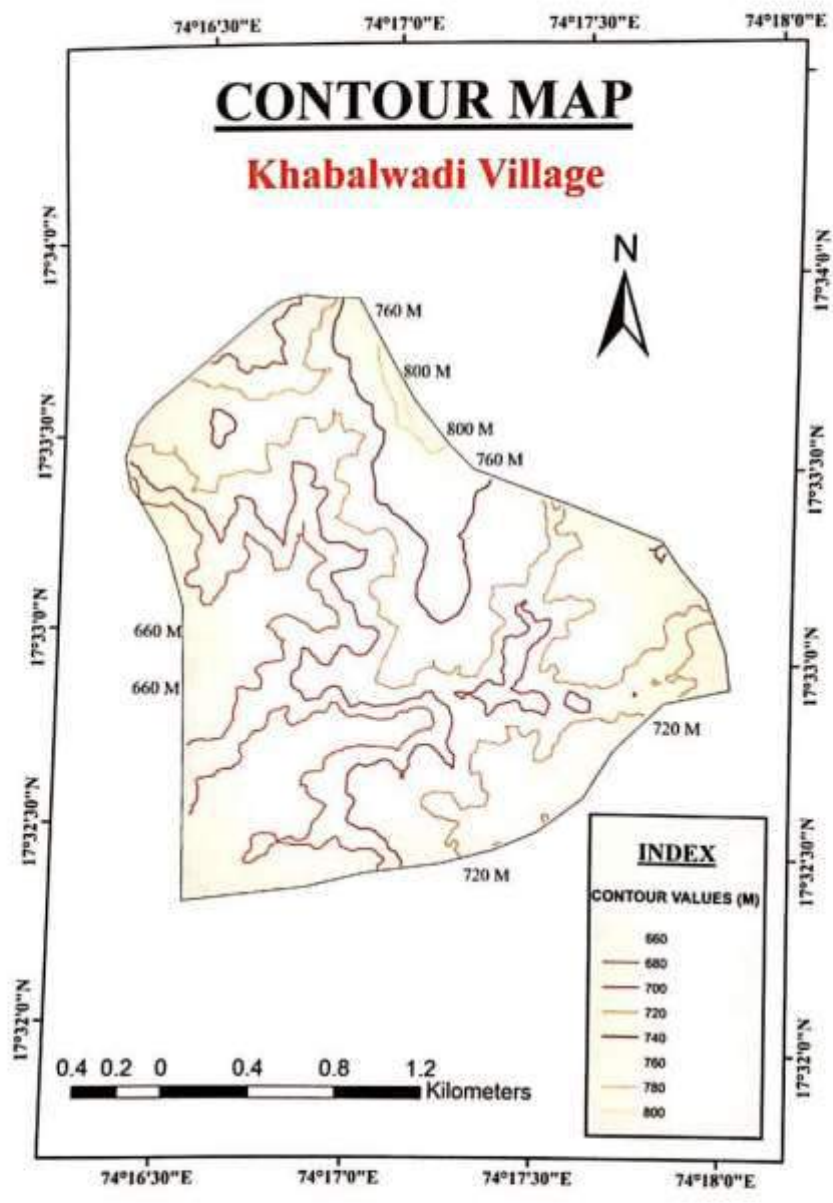


Figure 2.2 Contour map of the study area

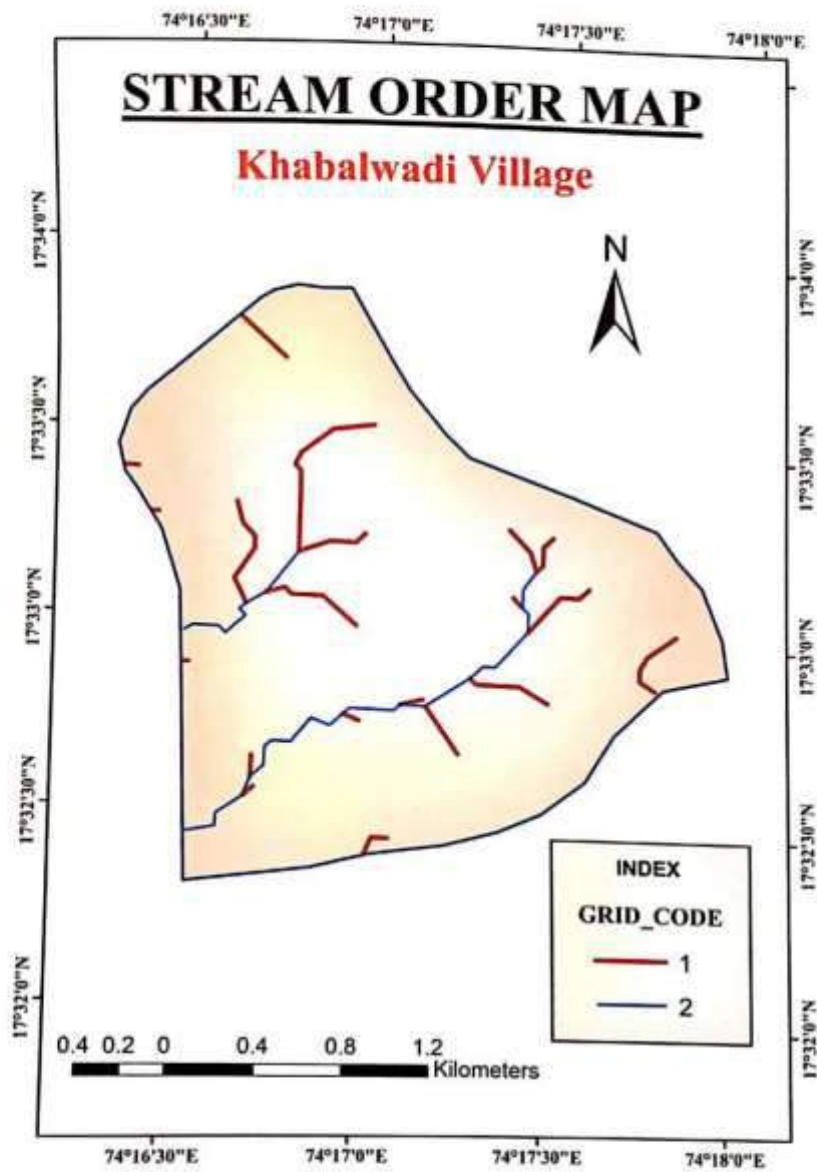


Figure 2.3 Stream order map of the study area

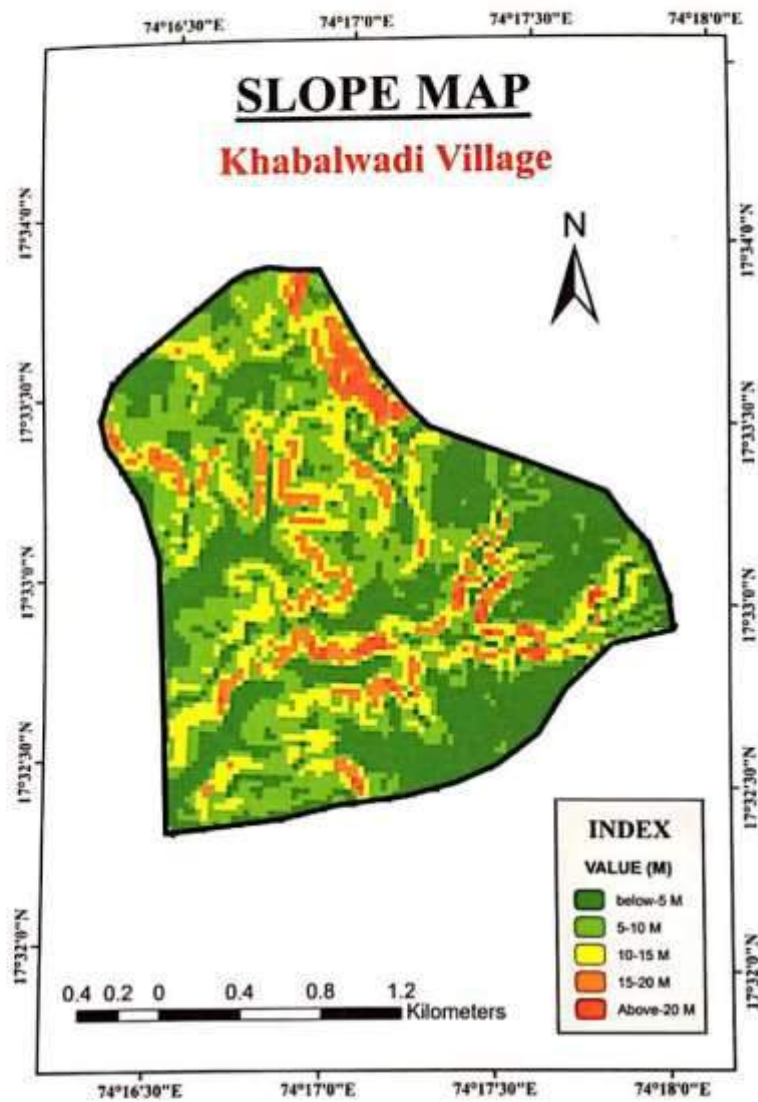


Figure 2.4 Slope map of the study area

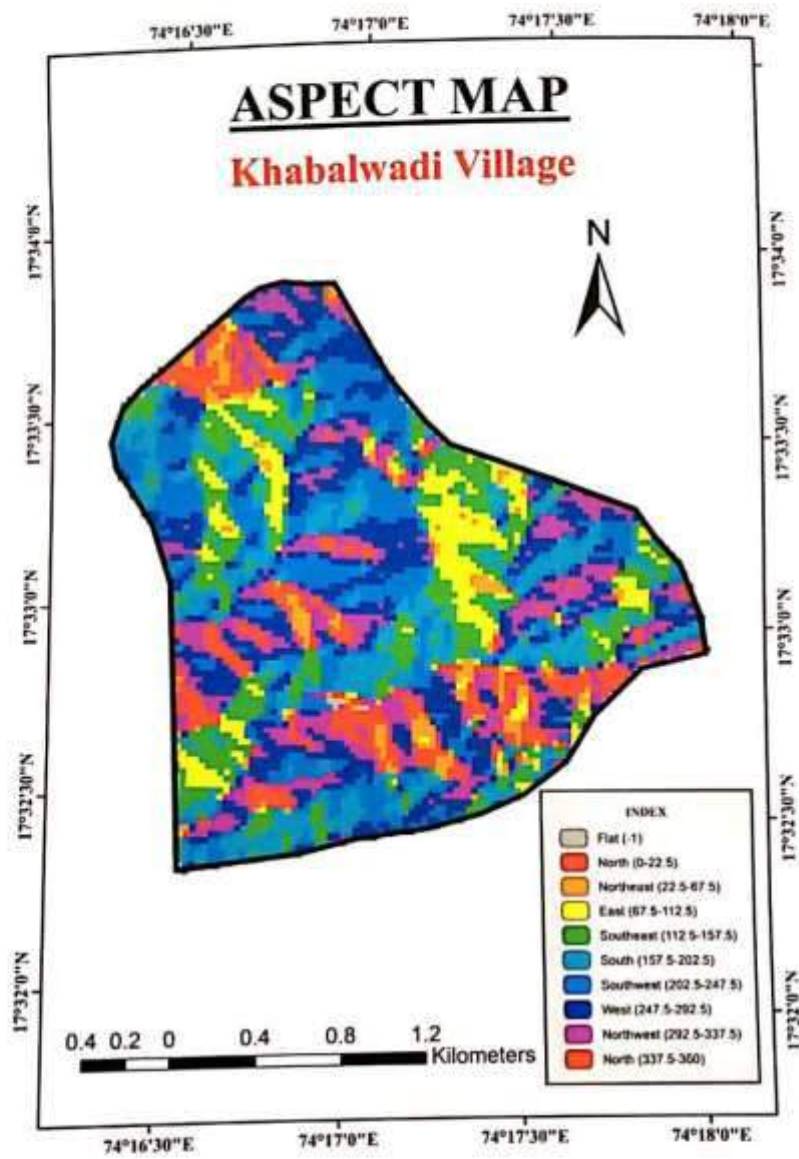


Figure 2.5 Aspect map of the study area

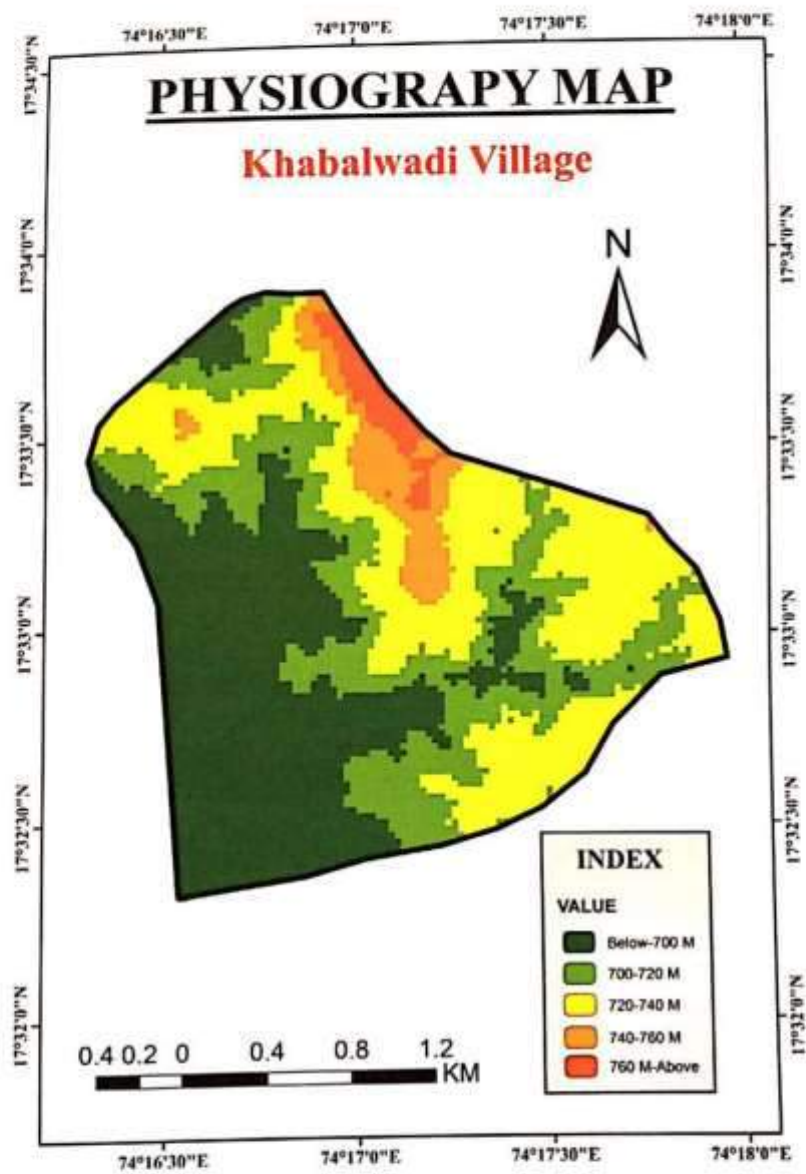


Figure 2.6 Physiography map of the study area

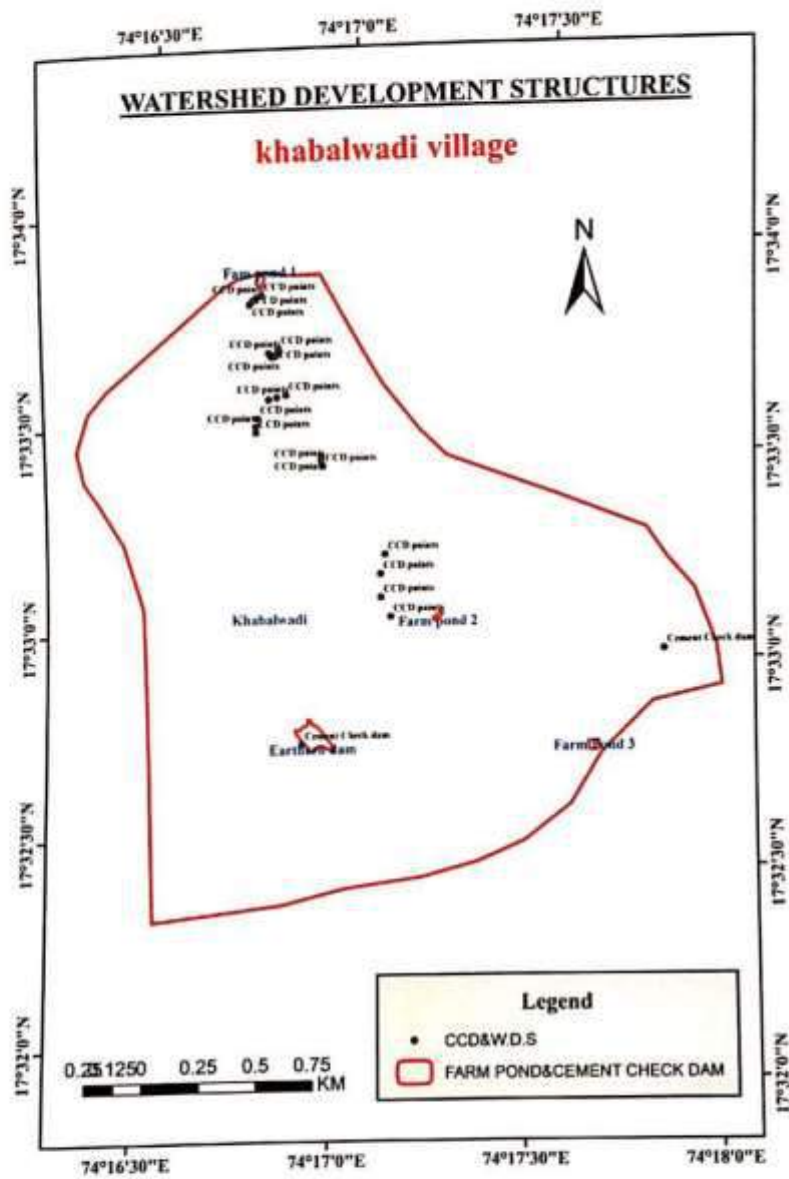


Figure 2.7 Watershed structure map of the study area

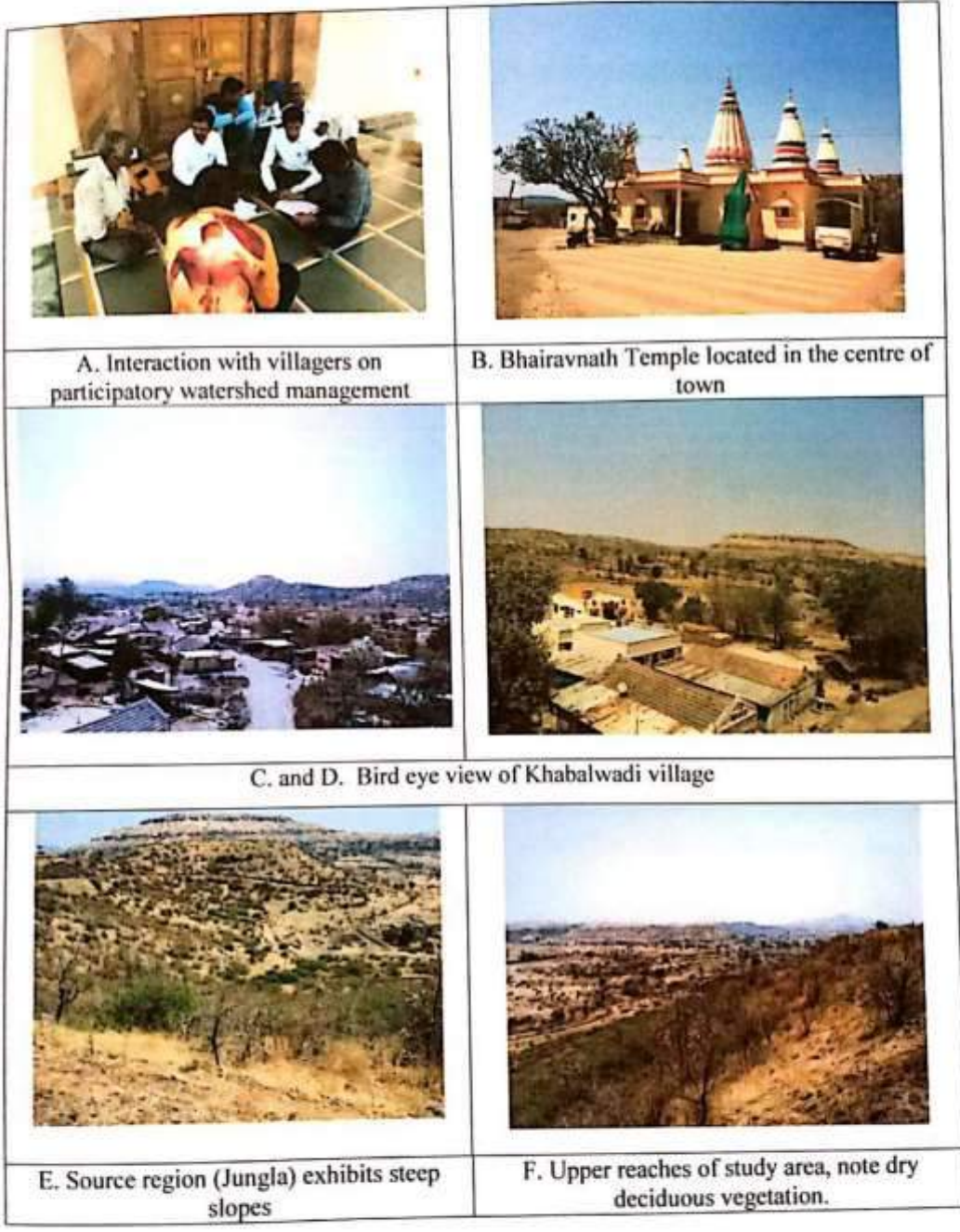


Plate 2.1 Photographs of Khabalwadi micro watershed - I

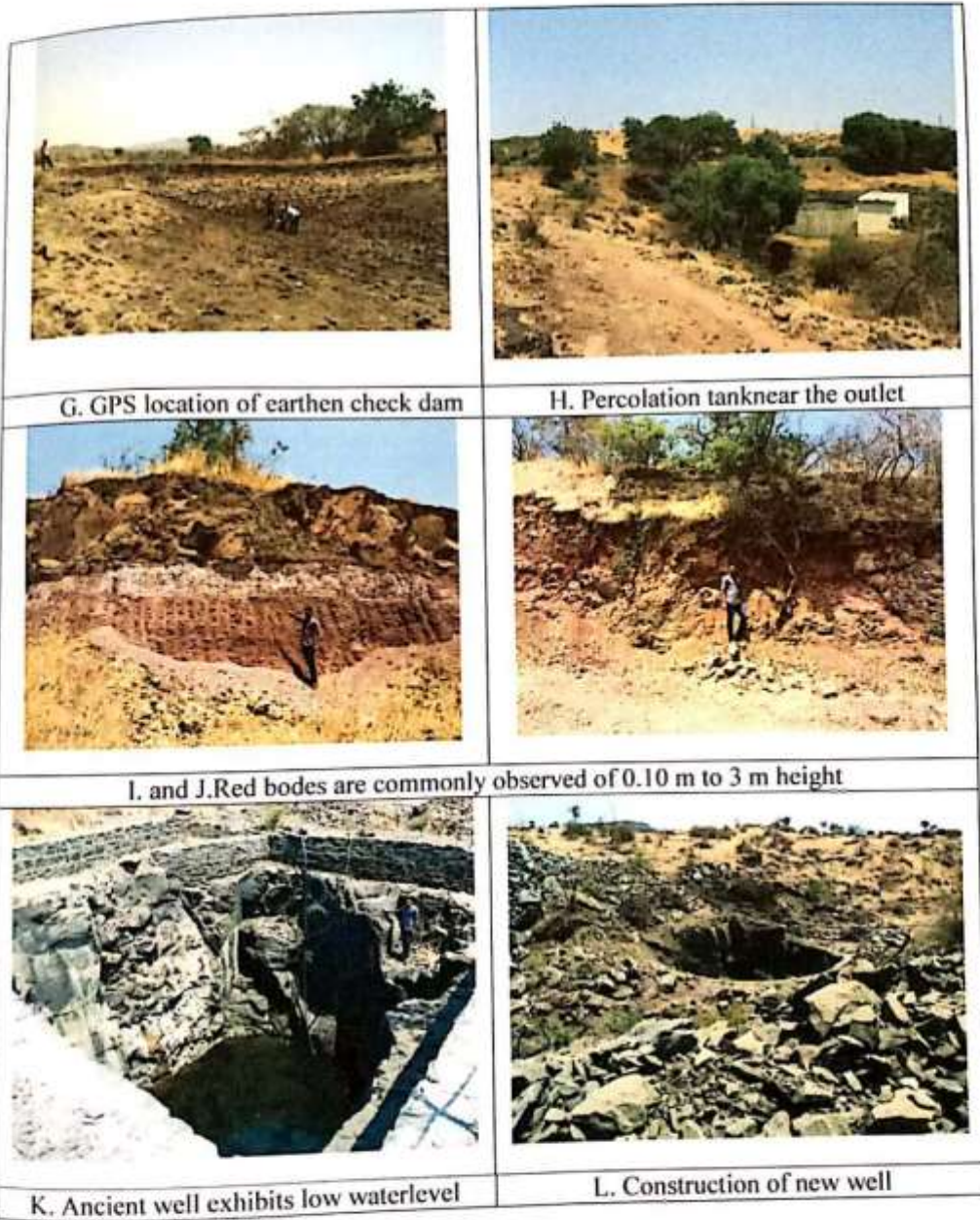


Plate 2.2 Photographs of Khabalwadi micro watershed - II

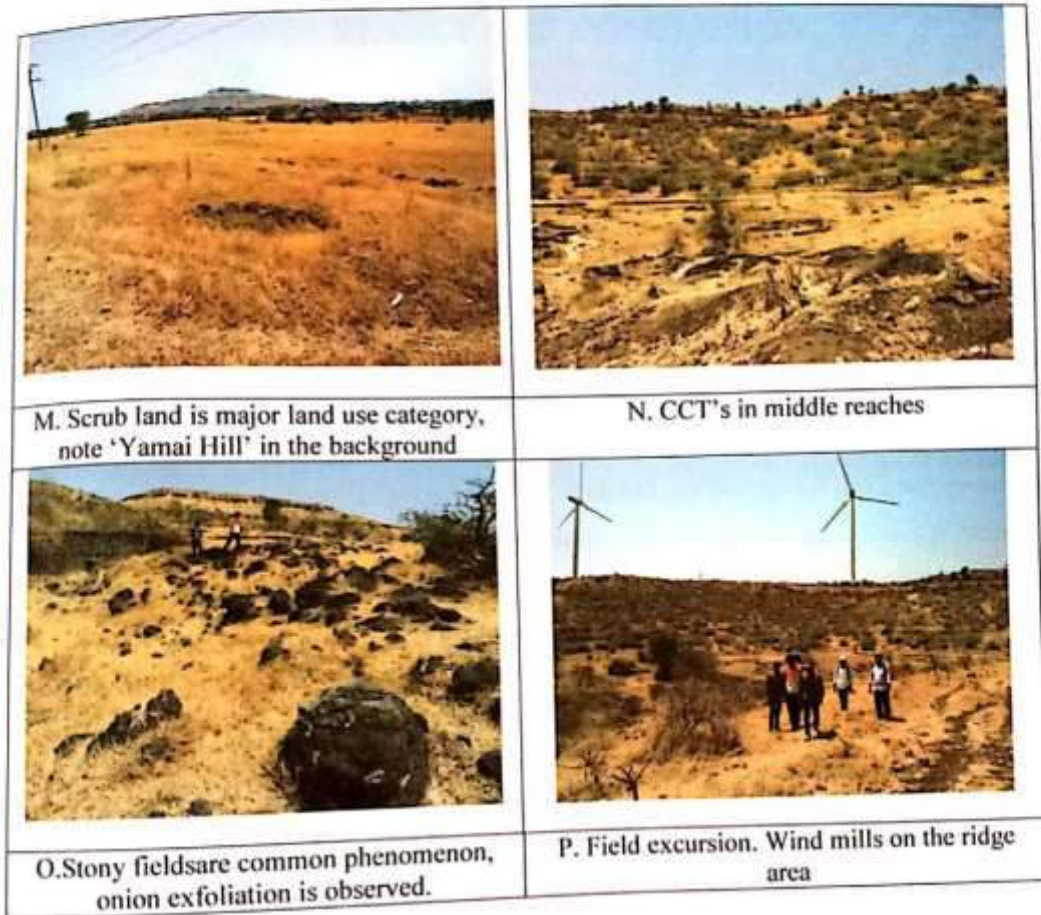


Plate 2.3 Photographs of Khabalwadi micro watershed - III

Chapter III

RESULT AND CONCLUSION

Khabalwadistream is developed on second order tributary of the Krishna River in the Deccan Trap region. Objectives of the study are to study watershed management structures implemented in the study area, to study water budget of the study area and to study socio-watershed related issues of the study area.

Present study is based on primary and secondary data. The study area is delineated with the help of ArcGIS 10 software. All tributaries of different extents and pattern were digitized from topographical sheet. Digitization work is carried out for an entire analysis of study area. Various thematic maps such as drainage map, stream ordering map, contour map, digital elevation map (DEM), slope map, aspect map and land use and land cover map are prepared using ArcGIS software. Resourcesat-2A medium resolution LISS-III sensor with 23.5 m spatial resolution is used to create physiography map of the study area. Ground realities are checked with the help of handheld Garmin GPS during field visits. Water budget data has been taken from Department of Agriculture, Government of Maharashtra (2018). Questionnaire is used to collect watershed management data. Present study is based upon 90 questionnaires, which were filled during field visits. Random sampling method is used for the study.

Studies of water availability are essential for water budget in the area. Table 2.1 shows that total 6837.94 Crore Ltr water is made available due to watershed management structures constructed by *Shramdan* (participatory) and Table 2.2 shows total 97333.73 Crore Ltr water made available due to watershed management structures constructed by machineries during April –May 2018. Total availability of water is 179.20 Crore Ltr in the Khabalwadi (Table 2.3). 100 % water distribution is shown in Table 2.4. Details of watershed management structures are shown in Table 2.5. Water stored in watershed management structures is 7.85 Crore Ltr (Table 2.6). Table 2.7 shows that 138.070 Crore Ltr water available in the study area.

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Present study shows that participatory watershed management is an ideal way for watershed management in arid and semi-arid regions to reduce water scarcity for domestic and agriculture. Geoinformatics tools are helpful for such studies.

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Aundh ShikshanMandal's
Raja ShripatraoBhagawantrao Mahavidyalaya,
Aundh, Dist: Satara, Dist Satara.

MA (Geography) – II Sem. – IV
Paper No. GCP 408

Participatory Watershed Management in Semi arid Khabalwadi Micro
Watershed of Satara District

Questionnaire

Name :-

Address :-

Contact Nos. :-

Number of persons in family:-

6 Sources of domestic and agriculture water?
a. Well b. Borewell c. Stream d. Govt. Scheme e. Tanker

7 How much distance you travel to brought drinking water?
a. 0-1 km b. 1-2 km c. 2-3 km d. Above 3 km

8 Migration of members in family?

If Yes, reason _____

9. In which season agriculture has been done? .

- a. Kharip b. Rabbi

10. Method of irrigation for applying water to crops?

- a. Furrow irrigation b. Sprinkler irrigation c. Drip irrigation
-

8. Are you participated in Paani Foundation activities in 2018:

9. Any social issues occurred due to water scarcity?
