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Introduction of Medicinal Plants in Narmada Basin

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INTRODCTION

Madhya Pradesh can easily be described as the best state of the nation, in terms of richness and diversity of tourism destinations. Madhya Pradesh is not called the ‘heart of India’ only because of its location in the centre of country. It has been home to cultural heritage of Hinduism, Buddhism, Jainism and Islam. The natural beauty of Madhya Pradesh is equally varied. Consisting largely of a plateau, the State has everything. Spectacular mountain ranges, meandering rivers, huge water bodies and miles of dense forests.

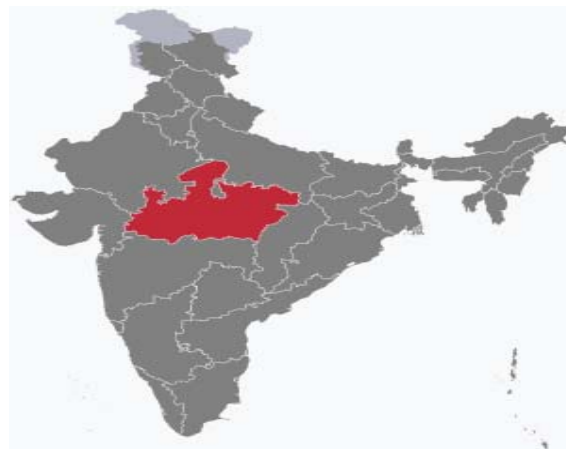


Fig. 1.1 Location Of Madhya Pradesh in India



Madhya Pradesh has lying between latitude 21° 04'N-26.87°N and longitude 74°02'-82°49' E, it is a reservoir of biodiversity. The geographical area of the state is 308,144 km² which constitutes 9.38% of the land area of the country. It is the second largest state in India. It is located in the Central India. The state is bound on the north by Utter Pradesh, the east by Chhattisgarh, the south by Maharashtra and the east by Gujarat and Rajasthan.

Madhya Pradesh has a subtropical climate. The average rainfall in about 1,370 mm(53.9in). Madhya Pradesh is divided into ten agro-climatic zones viz. Kaimur Plateau and Satpura Hills, Vindhyan Plateau (Hills), Narmada valley, Wainganga valley, Gird (Gwalior) Region, Bundelkhand Region, Satpura Plateau (Hills), Malwa Plateau, Nimar Plateau, Jhabua Hills. Each zone has specific edaphic and climatic conditions.

STUDY CASE OF NARMADA BASIN

Narmada River

The **Narmada River**, previously also known as *Narbada* or anglicised as *Nerbudda*, is the 5th longest river and overall longest west-flowing river in India. It is also the largest flowing river in the state of Madhya Pradesh. This river flows through the states of Madhya Pradesh and Gujarat in India. It is also known as the "Life Line of Madhya Pradesh and Gujarat" due to its huge contribution to the two states in many ways. The Narmada River rises from the Amarkantak Plateau in Anuppur district Madhya Pradesh. It forms the traditional boundary between North India and South India and flows westwards over a length of 1,312 km (815.2 mi) before draining through the Gulf of Khambhat into the Arabian Sea, 30 km (18.6 mi) west of Bharuch city of Gujarat.



Fig. 1.2 Maps showing the course of the Narmada, selected tributaries, and the approximate extent of its drainage area

It is one of only two major rivers in peninsular India that runs from east to west (longest west flowing river), along with the Tapti River. It is one of the rivers in India that flows in a rift valley, bordered by the Satpura and Vindhya ranges. As a rift valley river, the Narmada does not form a delta; Rift valley rivers form estuaries. Other rivers which flow through the rift valley include the Damodar River in Chota Nagpur Plateau and Tapti. The Tapti River and Mahi River also flow through rift valleys, but between different ranges. It flows through the states of Madhya Pradesh (1,077 km (669.2 mi)), and Maharashtra, (74 km (46.0 mi)), (39 km (24.2 mi)) (actually along the border between Madhya Pradesh and Maharashtra (39 km (24.2 mi)) and then the border between Maharashtra and Gujarat (74 km (46.0 mi)) and in Gujarat (161 km (100.0 mi)).

The Periplus Maris Erythraei (c. 80 AD) called the river the Namnadius (Ναμνάδιος), Ptolemy called it Namadus (Νάμαδος) and Namades (Ναμάδης)¹ and the British Raj called it the Nerbudda or Narbada. Narmada is a Sanskrit word meaning "The Giver of Pleasure



Fig.1.3 At Bhadraghat in Jabalpur, India Narmada basin



Fig. 1.4 Railway Bridge on river Narmada at Bharuch, Gujarat

The Narmada basin, hemmed between Vindhya and Satpura ranges, extends over an area of 98,796 km² (38,145.3 sq mi) and lies on the northern extremity of the Deccan Plateau. The basin covers large areas in the states of Madhya Pradesh (82%), Gujarat (12%) and a comparatively smaller area in Maharashtra (4%) and in Chhattisgarh (2%). 60% of the basin is made up of arable land, 35% is forest cover and 5% is made up of other types of land such as grassland or wasteland. In the entire course of the river of 1,312 km (815.2 mi), there are 41 tributaries, out of which 22 are from the Satpura range and the rest on the right bank are from the Vindhya range. Dhupgarh (1,350 m), near Pachmarhi is the highest point of the Narmada basin.

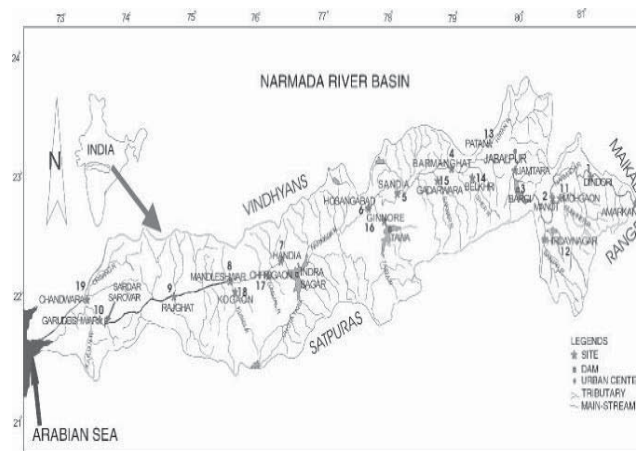


Fig. Location of Nardama River along with location number of gauging stations

The basin has five well defined physiographic regions. They are:(1) The upper hilly areas covering parts of Anuppur, Mandla, Dindori, Balaghat and Seoni, (2) The upper plains covering parts of Jabalpur, Narsinghpur, Chhindwara, Narmadapuram, Betul, Harda, Raisen and Sehore districts, (3) The middle plains covering parts of Khandwa, Khargone, Dewas, Indore and Dhar, (4) The lower hilly areas covering parts of Barwani, Alirajpur, Nandurbar, Chhota Udepur and Narmada, and (5) the lower plains covering mainly the districts of Narmada, Bharuch, and parts of Vadodara district. The hill regions are well forested. The upper, middle and lower plains are broad and fertile areas, well suited for cultivation. The Narmada basin mainly consists of black soils. The coastal plains in Gujarat are composed of alluvial clays with a layer of black soils on the surface.

The valley experiences extremes of hydrometeorological and climatic conditions with the upper catchment having an annual precipitation in the range of 1,000 mm (3.3 ft) to 1,850 mm (6.1 ft) and with half or even less than half in its lower regions (650 mm (2.1 ft)–750 mm (2.5 ft)); the diversity of vegetation from lush green in the upper region to dry deciduous teak forest vegetation in the lower region is testimony to this feature.

GENERAL INTRODUCTION OF MEDICINAL PLANTS



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NATURE always stands as a golden mark exemplify the outstanding phenomenon of symbiosis the biotic and elements of nature are all interdependent. Plants are indispensable to man the three important necessities of life namely food, clothing, shelter and most of other useful products are supplied to him by the plant kingdom. Nature has provided a complete storehouse of remedies to cure all ailments of mankind. The knowledge of drugs has accumulated over thousands of years as results of man's inquisitive nature so that today we possess many effective means of ensuring healthcare.

Human beings appear to be afflicted with more diseases than any other animal species. There can be little doubt then that he, very early, sought to alleviate his sufferings from injury and disease by taking advantage of plants growing around him. In the past, almost the medicines used were from the plants, the plant being man's only chemist for ages. Today, a vast store of knowledge concerning therapeutic properties of different plants has accumulated. All phyla of plants viz. Thallophyta, Bryophyte, Pteridophyta and Spermatophyta (of which conservative estimate place the total number of known species at approximately 3,35,000) contain species that yield official and unofficial products of medicinal importance. By far, the greatest number of these is derived from plants and include three hundred or more recognized families of Spermatophyte.



The history of herbal medicines is as old as human civilization. The documents, many of which are of great antiquity, revealed that plants were used medicinally in China, India, Egypt and Greece long before the beginning of the Christian era. One of the most famous surviving remnants is *Papyrus Ebers*, a scroll some 60 feet long and a foot wide, dating back to the sixteenth century before Christ. The text of document is dominated by more than 800 formulae and 700 different drugs. The drugs such as acacia, castor oil and fennel are mentioned alongwith apparent references to such compounds as iron oxide, sodium chloride, carbonate and sulphur. Most of the medicinally active substances identified in the nineteenth and the twentieth centuries were used in the form of crude extract. In China, many medicinal plants had been in use since 5000 B.C. The oldest known herbal is *Pen-t'sao* written by

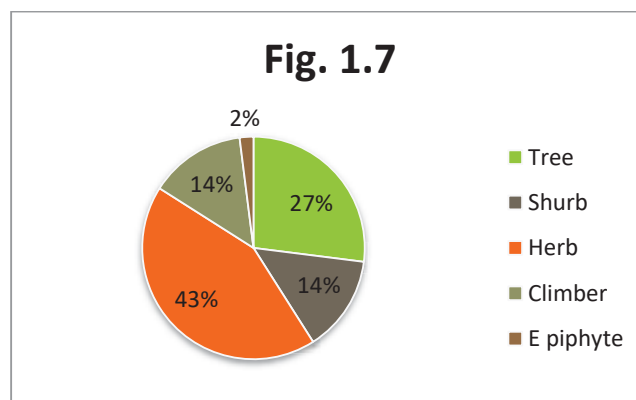


emperor Shen Nung around 3000 B.C. It contains 365 drugs, one for each day of the year. Indians also, worked meticulously to examine classify the herbs which they come across, into groups called Gunas. Charaka made fifty groups of ten herbs each of which, according to him, would suffice an ordinary physician's need. Similarly, Sushruta arranged 760 herbs in 7 distinct sets based on some of their common properties. A large portion of the Indian population even today depends on the Indian System of Medicine – Ayurveda, 'An ancient science of life'. The well known treatises in ayurveda are Charaka Samhita and Sushruta.

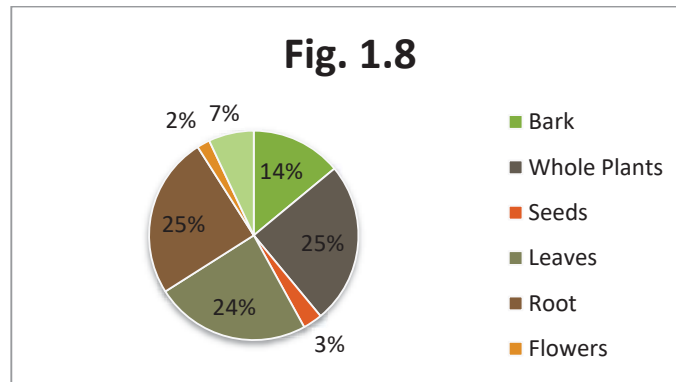
Status of Medicinal Plants in Narmada Basin

There are many medicinal plants found in Narmada Basin reason. The status of medicinal plants Narmada Basin shows in fig. 1.7.

This reason is rich source of medicinal and aromatic plants (MAP) species due to its diversity in soil, climate, rainfall and geographical conditions. This reason is home to over 4,000 plant species, out of which approximately 300 possess disease diagnostic properties. Furthermore, to underscore the vital role of tribal communities in traditional healing practices, they have a long history of utilizing these medicinal plants. Their knowledge has been passed down through the generations, preserving the rich cultural heritage of the region, exemplified by the Satpuda and Vindhya forests.

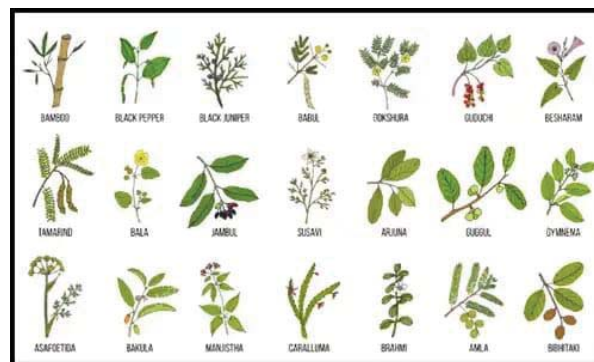


This fig. shows the status of medicinal plants in Narmada basin



This fig. shows the status how many part of medicinal plants use

These herbs serve as essential ingredients in Ayurvedic formulations, providing natural and holistic healthcare solutions. The abundant collection of medicinal plants and herbs holds not only cultural and ecological importance but also significant economic potential. Particularly in rural areas, the cultivation and collection of medicinal plants offer livelihood opportunities to many villagers.



Some of the significant medicinal plants include Bael (*Aegle marmelos*), Neem (*Azadirachta indica*), Annatto (*Bixa orellana*), Palash (*Butea monosperma*), Shatavari (*Asparagus racemosus*), Satyanashi (*Argemone mexicana*), Chironji (*Buchanania lanzan*), Aloe Vera (*Aloe barbadensis*), Sweet Flag (*Acorus calamus*), Sickle Senna (*Cassia tora*), Golden Eye-Grass (*Curculigo orchioides*), Turmeric (*Curcuma longa*), False Black Pepper (*Embelia ribes*), Mango (*Mangifera indica*), and Golden Shower Tree (*Cassia fistula*). These plants are



used in various forms, such as whole plants or plant parts like leaves, stems, barks, roots, flowers, fruits, seeds, and wood, for the treatment of various illnesses.

Analysis of Medicinal plants in Narmada Basin

INTRODUCTION OF MEDICINAL PLANTS



- ❖ NAME OF THE PLANT: AMLA (*Phyllanthus emblica*)
- ❖ FAMILY: Phyllanthaceae
- ❖ OTHER NAME: Malacca tree, Indian Gooseberry, Emblic, Emblic myrobalan
- ❖ CHEMICAL CONSTITUENTS: Hydrolysable Tannins, Phenolic compounds, Amino acids, Alkaloids
- ❖ USE:
 - It used to treat cardiac disease
 - Action on diabetes, and The blood sugar
 - Jaundice
 - Impedes constipation
 - Urinary problem
 - Respiratory disorder
 - Migraine
 - Immune system enhancer Anti-venom activity



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- ❖ NAME OF THE PLANT: **ACACIA** (*Acacia Aarabica*)
- ❖ OTHER NAME: Indian Gum, Gum acacia, Gum arabia, Acacia, Babul
- ❖ FAMILY: Leguminosae
- ❖ CHEMICAL CONSTITUENTS: Tannins, amino acids, Alkaloids, etc.
- ❖ USE:
 - Use in gum disease
 - Inflammation of the mucous membrane of the mouth and throat
 - Diarrhea
 - Vaginal secretions
 - Enema for hemorrhoids



- ❖ NAME OF THE PLANT: **SAL TREE** (*Shorea robusta*)
- ❖ OTHER NAME: Sakhua, Sarai, Shala, Jin, Agrs, etc.



- ❖ FAMILY: Dipteroarpaceae
- ❖ CHAMICAL CONSTITUNENT: Essential oil, Cellulose, Natural Detergent fiber, Acid detergent fiber, Hemicellulose, Lignin
- ❖ USE:
 - Vaginal discharge
 - Anti-ulcer
 - Skin disease
 - Leprosy
 - Gonorrhoea



- ❖ NAME OF THE PLANT: **BAMBOO** (*Bambusa*)
- ❖ OTHER NAME: Bans, Bambusa tulda
- ❖ FAMILY: Poaceae
- ❖ CHEMICAL CONSTITUENTS: Cellulose, Holo-cellulose, Lignin
- ❖ USE:
 - Cardiovascular disease
 - Diabetes
 - Anti-Inflammatory
 - Anti-Microbial
 - Anti-Lipidemic



- Anti-Ulcer



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- ❖ NAME OF THE PLANT: **MAHUWA** (*Madhuca Longifolia*)
- ❖ OTHER NAME: Gudapuspa, Mahua, Mahuwa, Indian Butter tree, Mahawash tree
- ❖ FAMILY: Sapotaceae
- ❖ CHEMICAL CONSTITUENTS: Carbohydrates, Amino Acids, Vitamins
- ❖ USE:
 - Removing Intestinal warm
 - Diabetes
 - Dental-related problem
 - Rheumatism



- ❖ NAME OF THE PLANT: **SHISHAM** (*Dalbergia Sissoo*)
- ❖ OTHER NAME: Rosewood, Shisham



- ❖ FAMILY: Fabaceae
- ❖ CHEMICAL CONSTITUENTS: Cellulose, Lignin, Hemi-cellulose, Carbohydrate, Curde Protein, Fiber, Ash
- ❖ USE:
 - Treat sore throats
 - Dysentery
 - Syphilis
 - Bronchitis
 - Anti-inflammations
 - Skin diseases
 - Gonorrhoea



- ❖ NAME OF THE PLANT: **TEAK (*Tectona Grandis*)**
- ❖ OTHER NAME: Rangoon teak, Rosawa, Twkka, Sagon
- ❖ FAMILY: Dipterocarpaceae
- ❖ CHEMICAL CONSTITUENTS: Essential oil, Cellulose, Natural detergent fiber, Acid detergent fiber, Hemicellulose, Lignin
- ❖ USE:
 - Vaginal discharge
 - Anti-ulcer
 - Gonorrhoea



- Treat leprosy



- ❖ NAME OF THE PLANT: **KUSUM TREE** (*Schleichera Oleosa*)
- ❖ OTHER NAME: Kosum, Honey tree, Macassar oil tree, Poovanam, Luc tree
- ❖ FAMILY: Sapindaceae
- ❖ CHEMICAL CONSTITUENTS: Crude protein, Crude fiber, Gross energy
- ❖ USE:
 - Anti-inflammatory
 - Anti-ulcer
 - Skin disease
 - Leprosy



- ❖ NAME OF THE PLANT: **TENDU TREE** (*Diospyros Melanoxylon*)
- ❖ OTHER NAME: Kendu tree, Temburini, Coromandel ebony
- ❖ FAMILY: Ebenaceae



❖ CHEMICAL CONSTITUENTS: Carbohydrates, Phenol, Vitamin-C, Moisture

❖ USE:

- Night blindness
- Laxative
- Diuretic
- Styptic
- Carminative



❖ NAME OF THE PLANT: **NEEM TREE** (*Azadirachta Indica*)

❖ OTHER NAME: Nimba, Indin Lilac, Miracle tree

❖ FAMILY: Meliaceae

❖ CHEMICAL CONSTITUENTS: Sterols, Fatty acids, Triterpenoids

❖ USE

- Anti-bacterial
- Anti-inflammatory
- Anti-malarial
- Anti-pyretic
- Anti-diabetic
- Anti-viral



- ❖ NAME OF THE PLANT: **BAEL TREE** (*Aegle Marmelos*)
- ❖ OTHER NAME: Bilwa, Stone apple, Bhel, Bili
- ❖ FAMILY: Rutaceae
- ❖ CHEMICAL CONSTITUENTS: Moisture, Crude protein, Ask, Crude fiber, Crude fat, TSS- Brix
- ❖ **USE**
 - Diabetes
 - Diarrhea
 - Peptic ulcers
 - Anti-microbial activity
 - Asthma
 - Blood Pressure
 - Digestion



- ❖ NAME OF THE PLANT: **SAJ TREE** (*Terminalia Tomentose*)
- ❖ OTHER NAME: Black murdah, Indian laurel, Asana, Sadad Asan



- ❖ FAMILY: Combretaceae
- ❖ CHEMICAL CONSTITUENTS: Crude protein, Crude fiber, Natural detergent fiber, Acid de
- ❖ Use:
 - Anti-tumor
 - Anti-microbial
 - Ant-diarrheal
 - Anti-diabetic
 - Anti-oxidant



- ❖ NAME OF THE PLANT: **BAHEDA TREE (*Terminal Bellirica*)**
- ❖ OTHER NAME: Bahera, Beleric, Bastard myrobalan, Aksha
- ❖ FAMILY: Cambretaceae
- ❖ CHEMICAL CONSTITUENTS: Tannin, Fats, Carbohydrates, Fiber, Proteins
- ❖ USE
 - Use to treat Hepatitis
 - Bronchitis
 - Asthma
 - Eye diseases
 - Anti-pyretic
 - Astringent
 - Anthelmintic



- ❖ NAME OF THE PLANTS: **ARJUN TREE** (*Terminalia Arjuna*)
- ❖ OTHER NME: Arjuna, Indradru, Partha, Veeravriksha
- ❖ FAMILY: Combrataceae
- ❖ CHEMICAL CONSTITUENTS: Moisture, Fibers, Lignin, Cellulose, Tannins
- ❖ **USE:**
 - Use to treat Anginal pain
 - Hypertension
 - Congestive Heart failure (CHF)
 - Dyslipidemia



- ❖ NAME OF PLANT: **MYROBALAN** (*Terminalia Chebula*)
- ❖ OTHER NAME: Black or Chebulic Myrobalan, Harad, Haritala,
- ❖ FAMILY: Combretaceae
- ❖ CHEMICAL CONSTITUENTS: Moisture, Fibers, Tannins, Fats, Proteins, Carbohydrates



❖ USE:

- Use to treat Bleeding gums
- Anti-analgesic
- Anti-inflammatory
- Ulcerated oral cavity
- Dental caries
- Hemorrhoids
- Ophthalmic

COCLUSION

"In conclusion, the Narmada Basin stands as a crucial reservoir of biodiversity, housing a rich variety of medicinal plants. The extensive study of the Narmada River and its basin has unveiled not only the geographical and climatic diversity but also the significant role it plays in preserving traditional healing practices. The vast array of medicinal plants, such as Amla, Neem, and Mahuwa, highlights the region's unique contribution to Ayurvedic formulations. The Narmada Basin, with its 41 tributaries and diverse physiographic regions, showcases a remarkable balance between hilly areas, plains, and forested regions. The symbiotic relationship between the indigenous tribal communities and these medicinal plants underscores the cultural heritage embedded in the Satpuda and Vindhya forests. Moreover, the economic potential of these medicinal plants, providing not just healthcare solutions but also livelihood opportunities, adds another layer to the region's significance. As we delve into the depths of the Narmada Basin, it becomes evident that this region's environmental and cultural tapestry holds immense value for both conservation efforts and sustainable development. The study not only sheds light on the status of medicinal plants but also emphasizes the need for continued research and conservation to preserve this natural pharmacy. Harnessing the knowledge passed down through generations and combining it with modern scientific advancements can unlock further potential for healthcare, economic growth, and ecological balance in the Narmada Basin."



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