e-ISSN:2582 - 7219

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 4, Issue 8, August 2021

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 5.928

International Journal Of Multidisciplinary Research In Science, Engineering and Technology (IJMRSET)

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

Cultivation, Conservation and Importance of Medicinal Herbs

Dr. Suman Panwar

Post Doctoral Fellow, ICSSR, Department of Geography, JNV University, Jodhpur, India

ABSTRACT: Biological conservation should be pursued across the landscape, especially at this time of climate change, to promote survival of genetic diversity, supplies of biotic resources for local needs, and delivery of ecosystem services. Conservation at this scale requires concomitant social engagement. A challenge for the conservationist is to identify features of local societies favourable towards conservation and then, where needed, find ways to encourage them. There are many botanical gardens and sustainable practices to conserve medicinal herbs. In situ conservation ie. Within the natural environ and ex-situ conservation ie. Outside the natural place and conserving in laboratory giving necessary conditions. Medicinal herbs are a useful resource and are traditionally used since times immemorial. They have been included in ayurveda, homeopathy and unani systems of medicines. More than one-tenth of plant species are used in drugs and health products, with more than 50,000 species being used. Varied medicinal plants are spread all over the world viz. Brazil, America, Tanzania, Austrailia, Columbia, India, Nepal, Srilanka, Bulgaria, Pakistan, Thailand, etc. Overexploitation, indiscriminate collection, uncontrolled deforestation, and habitat destruction all affect species rarity, but are insufficient to explain individual species susceptibility or resilience to harvest pressure. Many species of important herbs have become extinct due to over usage and non-conservation. Habitat loss of herbs has happened due to over population of humans and removing natural plants areas converting them to selfish utilities like homes, hotels, roadways, buildings etc. in situ conservation of herbal species in natural reserves and nurseries is done at present to save important species. Ex-situ conservation is by saving them in botanical gardens and seed banks. By good agricultural practices plants can be conserved and utilized as herbal medicines. The herbs have specific secondary metabolites which are the main source of medicines. Wild harvested plants are taken to private gardens and recovered by good cultivation practices. This includes organic farming where we use organic compounds for plants which do not undergo bioaccumulation and biomagnifications like DDT sprays done before. Certain chemical sprays like DDT is banned by the government because it enters the plant life cycle and in humans it increases in blood in ppm creating biomagnifications and diseases like cancer.

KEYWORDS : herbs, plants, conservation, organic farming, medicinal, humans

I. INTRODUCTION

Sustainability includes plant conservation of species in situ or ex situ for human benefit and medicinal use. Transgenic plants are created by bioengineering for obtaining useful species and inclusion of resistant genes for creating strong breeds and vigorous plant herbs. Tissue culture in vitro or micropropagation technology has a good scope for improving varieties at low cost and ecofriendly procedures. high regenerating species, hybrids, clones, better breeds, good yields and molecular marker based approaches are obtained at present by new scientific biotechnological approaches. [1,2]

Significant medicinal plants are usually known to even a common man like examples:-

- Herbs such as black pepper, cinnamon, myrrh, aloe, sandalwood, ginseng, red clover, burdock, bayberry, and safflower are used to heal wounds, sores and boils.
- Basil, Fennel, Chives, Cilantro, Apple Mint, Thyme, Golden Oregano, Variegated Lemon Balm, Rosemary, Variegated Sage are some important medicinal herbs and can be planted in kitchen garden. These herbs are easy to grow, look good, taste and smell amazing and many of them are magnets for bees and butterflies.[19]
- Many herbs are used as blood purifiers to alter or change a long-standing condition by eliminating the metabolic toxins. These are also known as 'blood cleansers'. Certain herbs improve the immunity of the person, thereby reducing conditions such as fever.

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

- Some herbs are also having antibiotic properties. Turmeric is useful in inhibiting the growth of germs, harmful microbes and bacteria. Turmeric is widely used as a home remedy to heal cut and wounds.[4]
- To reduce fever and the production of heat caused by the condition, certain antipyretic herbs such as *Chirayta*, black pepper, sandal wood and safflower are recommended by traditional Indian medicine practitioners.
- Sandalwood and Cinnamon are great astringents apart from being aromatic. Sandalwood is especially used in arresting the discharge of blood, mucus etc.
- Some herbs are used to neutralize the acid produced by the stomach. Herbs such as marshmallow root and leaf. They serve as antacids. The healthy gastric acid needed for proper digestion is retained by such herbs.
- Indian sages were known to have remedies from plants which act against poisons from animals and snake bites.[7]
- Herbs like Cardamom and Coriander are renowned for their appetizing qualities. Other aromatic herbs such as peppermint, cloves and turmeric add a pleasant aroma to the food, thereby increasing the taste of the meal.
- Some herbs like aloe, sandalwood, turmeric, sheetraj hindi and khare khasak are commonly used as antiseptic and are very high in their medicinal values.
- Ginger and cloves are used in certain cough syrups. They are known for their expectorant property, which promotes the thinning and ejection of mucus from the lungs, trachea and bronchi. Eucalyptus, Cardamom, Wild cherry and cloves are also expectorants.
- Herbs such as Chamomile, Calamus, Ajwain, Basil, Cardamom, Chrysanthemum, Coriander, Fennel, Peppermint and Spearmint, Cinnamon, Ginger and Turmeric are helpful in promoting good blood circulation. Therefore, they are used as cardiac stimulants.[6]
- Certain medicinal herbs have disinfectant property, which destroys disease causing germs. They also inhibit the growth of pathogenic microbes that cause communicable diseases.
- Herbal medicine practitioners recommend calmative herbs, which provide a soothing effect to the body. They are often used as sedatives.
- Certain aromatic plants such as Aloe, Golden seal, Barberry and Chirayata are used as mild tonics. The bitter taste of such plants reduces toxins in blood. They are helpful in destroying infection as well.[3]
- Certain herbs are used as stimulants to increase the activity of a system or an organ, for example herbs like Cayenne (Lal Mirch, Myrrh, Camphor and Guggul.
- A wide variety of herbs including Giloe, Golden seal, Aloe and Barberry are used as tonics. They can also be nutritive and rejuvenate a healthy as well as diseased individual.
- Honey, turmeric, marshmallow and liquorice can effectively treat a fresh cut and wound. They are termed as vulnerary herbs.[5]

II. OBSERVATIONS

Although there are around 8,000 medicinal plant species used by different communities in India across different ecosystems, only around 10% of them (880species) are in active trade. Among these, around 48 species are exported in the form of raw drugs and extracts, while around 42species are imported. The wild populations of about 100 of the traded species are known to have declined, thereby making them to be considered threatened. This is the situation of raw drug trade in India that unfolds. Before ascertaining the reasons for this, let us try to understand the "what", "where" and "how much" of these raw drugs.[10]

The following world-famous medicinal plants are listed: *Adonis vernalis* L., *Allium ursinum* L., *Asphodeline lutea* (L.) Reich., *Asplenium adiantum-nigrum* L., *Atropa belladonna* L., *Colchicum autumnale* L., *Galanthus nivalis* L., *Gentiana lutea* L., *Glycyrrhiza glabra* L., *Lycopodium annotinum* L., *Rhodiola rosea* L., and all species of the family Orchidaceae. A total of 102 species of medicinal plants are regionally rare, they are protected at the regional level and collecting their raw materials from the wild is banned in designated regions. Some of the species are rare in all regions, e.g. *Anemone sylvestris* L., *Hypericum humifusum* L., *Polemonium caeruleum* L. Other species, such as *Convallaria majalis* L., *Ledum palustre* L., and *Alnus incana* (L.)[8]

Forest conservation is also a key to conserving medicinal plants. Shannon–Wiener diversity, species diversity, and species richness indices are calculated. [Fig.1]

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

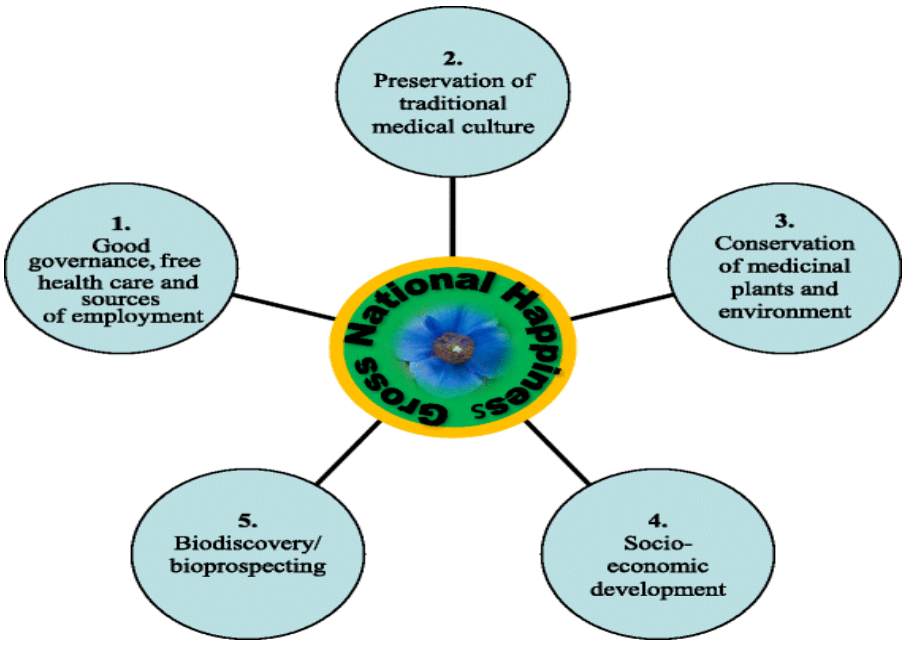

Fig.1: Cultivation and conservation of medicinal herbs is a good employment boon to farming systems also.

Table 1: This table shows some important aspects of herbs:

Medicinal plant	Family	Active Ingredients	Therapeutic uses
Atropa Belladonna L., *Datura strammonium* L.	Solanaceae	Atropine, Hyoscine, Hyoscyamine.	Antispasmodic, mydriatic.
Digitalis purpurea L.	Scrophula-riaceae	Purpurea glycoside A and B, digoxin, digitoxin	Myocardia / stimulant.
Ephedra sinice Sprag.	Ephedraceae	Ephedrine	For relief of asthma and hay fever
Zingiber officinale Roscoe	Zingiberaceae	Volatile oil; gingerol.	As condiment and medicinally as carminative and aromatic
Papaver somniferum L.	Papaveraceae	Morphine, codeine, thebaine, narceine, papaverine.	Narcotic; Analgestic.
Rauwolfia serpentine Benth or *R. vomiforia* Afz.	Apiaceae	Volatile oil	Used in psychiatric cases and antihyper tensive.
Carum carvi L.	Apiaceae	Volatile oil	Flavouring agent and carminative.
Ricinus communis L.	Euphorbiaceae	Fixed oil	Purgative; vehicle for eye drops
Cinnamonum zeylanicum Blume.	Lauraceae	Volatile oil, tannin.	Stimulant, astringent, antiseptic, carminative, stops vomiting.
Cinchona succiruba PAV and other species.	Rubiaceae	Quinine, quinidine.	Bitter tonic, quinidine for atrial fibrilation.

Several in vitro techniques have been developed for storage of vegetatively propagated and recalcitrant seed producing species.[Table 1] In general, they fall under two categories: (i) slow growth procedures, where germplasm accessions are kept as sterile plant tissues or plantlets on nutrient gels; and (ii) cryopreservation, where plant material is stored in

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

liquid nitrogen. Slow growth procedures provide short- and medium-term storage options, while cryopreservation enables long- term storage of the plant material.[9]

In the Indian Himalayan region, one of 36 global biodiversity hotspots, 1,748 medicinal plant species have been identified. But with increased commercial collection, unmonitored trade, habitat loss and unsustainable harvesting, 112 plant species are now threatened, the first extensive study across Indian Himalayan states has found. And of these, conservation plans are in place for just five.[11]

With the signing of GATT (general agreement on trade and tariffs) by more than 100 countries markets have opened up for international companies and intellectual property protection (IPR) issues have become a serious problem to protect indigenous knowledge on MPs and their traditional use from biopiracy. India has successfully digitized 220268 medicinal formulations employed in different systems of medicine through TKDL (Traditional Knowledge Digital Library) project . The project is continuing to include many more formulations of local communities. India is also helping other countries in inventorising their traditional knowledge. Globalization on the other hand opened plethora of opportunities to innovatively market MP products.[12]

Table 2: The characteristics and advantages of organic farming of medicinal plants

Subjects	Characteristics and advantages of organic farming
Medicinal plants	To produce material in optimal quality and sufficient quantity
	To increase growth rate and biomass yield of medicinal plants
	To enhance the biosynthesis of efficacious substances
	To maintain the genetic diversity of medicinal plants
	To protect medicinal plants against pests and disease
Environmental effects	To prohibit the use of synthetic pesticides and fertilizers
	To promote sustainable use and proper care of production systems
	To enhance plant diversity and biotype conservation
	To protect wildlife habitats (e.g. micro-organisms, soil fora and fauna)
	To enhance soil rich in macro and microelements
	To conserve soil properties, fertility, productivity and system stability
	To use organic fertilizers and renewable resources to minimize all forms of pollution
Economic prospects	To increase market opportunity
	To maintain high market price
	To achieve optimal quality and economic returns
	To secure economic growth and social stability

III. DISCUSSION

We can prepare a data record as aims to conserve medicinal herbs.

1. Promotion of cultivation and conservation of Medicinal Plants. To identify the plants to be conserved/cultivated in-situ at the different agro-climatic regions of the State and those to be cultivated /conserved in the fields (Ex-situ).[Table 2]

2. To develop cultivation techniques (agro-techniques) including Quality Plant Materials, Irrigation, Fertilizer, Plant protection, Post harvest collection and Processing, which are cost effective in different agro- climatic regions of the State[13]

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

3. To employ latest techniques to improve the production system so that the medicinal plants produced in the State can compete in the international market. To identify a few medicinal plants at the first instance for ensuring its overall development in a particular region, since the performance of plants differ in different regions

4. Cultivation of some medicinal plants which fair well only in the forest ecosystem as inter-cropping in and around the forest areas.[14]

5. To develop effective micro-propagation system for cost effective quality plant materials emphasizing the proper tie up with growers / industries for mass production of tissue-cultured medicinal plants.

6. To propagate technical expertise and information at the village level and for this purpose self-help groups / Panchayats etc. can be utilized for proper cultivation / storing / marketing of the produces.[20]

7. To create optimum awareness and interest amongst the common people about Medicinal Plants

8. To create optimum interest and awareness amongst cultivators/farmers for the cultivation of Medicinal Plants

9. To enrich the cultivators' knowledge about the methods of cultivation and its schedules in respect of Medicinal Plants including it's processing.

10. To cultivate through organic farming and develop standardization through chemical and molecular marker.

11. To ascertain the demands for commercial cultivation and to sponsor mission mode projects to the entrepreneurs in different parts of the State with partial funding

12. To make an annual target including export of different herbal drugs and accordingly different schemes be adopted

13. To organize large scale farming through Entrepreneurs / NGOs / Local Self-Government Authorities including contract farming involving small, marginal and middle class farmers in their own land surrounding such large scale farming

14. To organize cultivation in wastelands / degraded / unutilized lands involving big Entrepreneurs / Industries / NGOs / Government Organizations / Semi-Government Organizations.

15. To create easily available financial assistance/loan/grant either through Banks, Financing Corporations or any other source of financing to work on any aspect of Medicinal Plants such as cultivation, formation of model gardens, establishment of herbarium and development of nurseries.[18]

16. To conserve the bio-diversity of Medicinal Plants in West Bengal.

17. To introduce the cultivation of more and more exotic medicinal plants to minimize the expenditure.

18. To strengthen the educational system and research on Medicinal Plants in different Universities and Educational Institutions of the State and to open one Bachelor and one Post-Graduate Course on studies of Medicinal Plants

19. To undertake Researches on the development and formulation of Herbal drugs in close collaboration with Universities, Research Institutions and industries[19]

20. To increase public awareness about the efficacies of herbal drugs

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

21. To identify (a) High (b) Medium & (c) Low consuming Medicinal Plants and Herbal Drugs.

22. To create organized markets for Medicinal Plants and Herbal Drugs both

23. To create a good export market for the herbal raw materials and the drugs[17]

24. To arrange special facilities for export of herbal products from State Government level.

25. To develop awareness for utilization of herbal medicines for home remedies.

26. To strengthen the drugs control administration through establishment of separate Drug Control Office for ISM Drugs including its Quality Control

27. To develop a data bank of naturally grown medicinal plants in West Bengal and their dealers and users

28. To develop a data bank of medicinal plants grown by cultivation in the State.

29. To develop a data bank of Folk and Tribal Medicines used in West Bengal[15]

30. To develop an information Centre / Data Bank regarding (a) Macroscopical Characters (b) Microscopical Characters (c) Chemical Constituents (d) Cultivation and Harvesting Schedule (e) Plants with ambiguous / confused characteristics with the original and their distinguished points/features and (f) Medicinal efficacies of all Medicinal Plants in the State

31. To establish a State Level Library on Medicinal Plants

32. Documentation of the drugs and methods used by traditional healers.

33. To identity rare / endangered Medicinal Plants.

34. To preserve Intellectual Property Rights of Herbs and Herbal Medicines[16]

35. **Table 3: To amend the existing Acts and formulate new Acts in the following spheres of the Medicinal Plants**

i.	Medicinal Plants Protection (Specially for endangered and rare species of plants).
ii.	Medicinal Plants Dealing and Licencing of Dealers
iii.	Medicinal Plants Cultivation & Harvesting
iv.	Medicinal Plants Export & Import
v	Medicinal Plants Standardization / Quality Control.
vi.	Pesticide & Insecticide Control.

36. To create “Centre for Excellence.” on Medicinal Plants in Universities / Research Centers.

37. To create a constant interaction with other States, Centers and Global situation

38. To create employment facilities[Table 3]

39. To create different Boards, Bodies, Cells, Wings, to form a State-wide network for proper

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

implementation of the Policies[24]

This will be like rehabilitating the rare species and sustainable utilization of plants of medicinal importance.

India has 15 Agroclimatic zones and 17000-18000 species of flowering plants of which 6000-7000 are estimated to have medicinal usage in folk and documented systems of medicine, like Ayurveda, Siddha, Unani and Homoeopathy. About 960 species of medicinal plants are estimated to be in trade of which 178 species have annual consumption levels in excess of 100 metric tones.Medicinal plants are not only a major resource base for the traditional medicine & herbal industry but also provide livelihood and health security to a large segment of Indian population.
With a primary mandate of coordinating all matters relating to Medicinal Plants and support policies and programmes for conservation, cultivation, trade & export of Medicinal Plants, The State Medicinal Plants Board was constituted in year 2003. State Medicinal Plants Board provides for promotional activities like resource documentation in-situ conservation, research and development, ex-situ conservation of rare and endangered species, value addition, warehousing, capacity building and training of primary collectors and forest dwellers in good collection and sustainable and harvesting practices etc. In view of the increasing demands of herbal products, it is necessary that the primary production of medicinal plants is augmented and the entire process of collection, processing, storage, trading and marketing is made more efficient.[22]

Very often the objectives of biodiversity conservation do not allow commercial harvesting of Medicinal Plants. There are 7 Protected Areas have been declared in the state (1 National Park & 6 Sanctuaries). Thus with the ongoing efforts of biodiversity and wildlife conservation, the natural habitat for medicinal plants may expand but the actual commercial harvesting of medicinal plants from such areas would get shrunk. Cultivation of medicinal plants over non-conservation area such as private land, community land, and waste land will only solve problem of availability of raw material to meet the market demand in future.[Table 3]

IV. RESULTS

Study area and socioeconomic profile is necessary to maintain in records of medicinal plant cultivated places. Major concerns of users (e.g. farmers, traditional herbal healers, pharmaceutical industry) are resource availability (i.e. quantity and quality), accessibility, and cost-effectiveness of the product, and are encouraged for direct and short term monetary benefits. Ethnobotanical knowledge documentation should be done [21] viz.

(1) Interview with the informant while visiting the forest;

(2) Inventory of plant specimens and subsequent interviewing with informants requesting the names and uses of the plants collected; and

(3) Interactive discussion with various stakeholders such as traditional herbal healers (i.e. vaidyas), Ayurvedacharya, farmers, traders, scientists, forest officers, and medical doctors of different age groups.

Mother nurseries should be developed through the participatory approach in village clusters for capacity building, demonstration, germplasm conservation, and seedlings distribution to farmers. Training programs for farmers should be organized on cultivation, harvesting, and marketing of selected herbal species. Seeds should be sown 2 cm deep and 15 cm apart in moist soil. Regular weeding and irrigation during dry periods are assured to optimize seed germination and the development of the seedlings. The stem cuttings, root/rhizome, and slips need to be cut into small pieces; each piece contained active buds and must be planted in the soil. The plot size for each species should be maintained. The pieces planted on well prepared soil using farmyard manure to improve soil fertility. The propagation studies are necessary to be conducted per the Randomized Complete Block Design methods using each location as replication . Data on percentage germination, sprouting, rooting, survival percentage, number of days from sprouting to flowering, plant height and yield of usable plant parts were obtained at different time durations.[23]

Facilitation for marketing cultivated herbal varieties is done and benefit for producer, consumer and conservation efforts are maintained. Meetings should beorganized with farmers, traders, herbal healers, public representatives,

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

experts, women self-help groups, and nongovernment organizations and officers from government departments.[Fig.2,3]

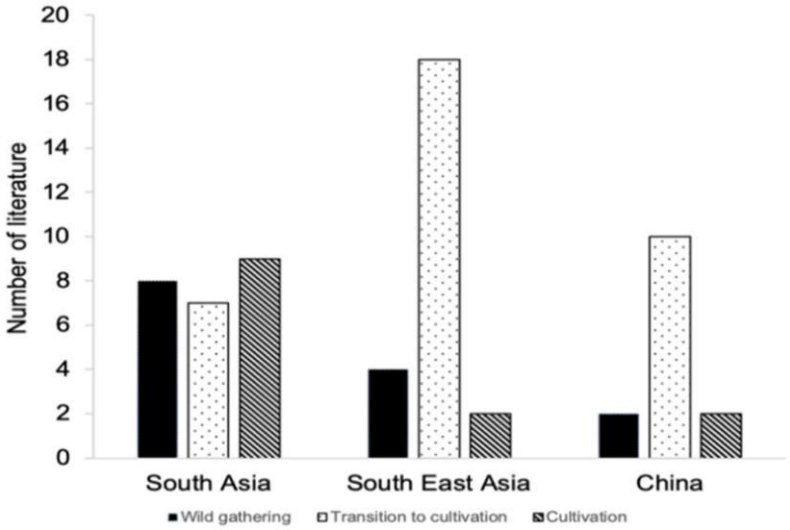

Fig.2: Gathering and cultivation of medicinal herbs.

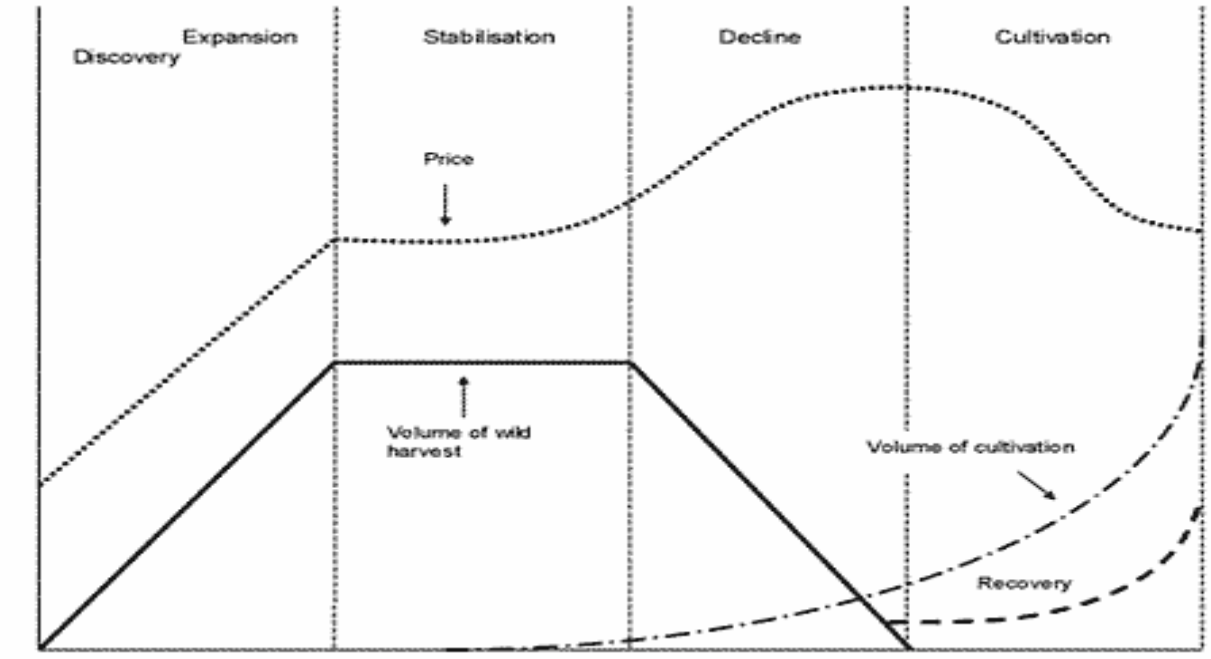

Fig.3: Impact of Cultivation and Gathering of Medicinal Plants and Herbs on Biodiversity

V. CONCLUSION

In conclusion we can surmise that in general the two major threats to medicinal plants are: first, the loss of habitat (through land use conversion, agricultural expansion and so on) which results in the loss of both known and unknown species; and second, the overexploitation of known species as a result in increased demand.

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

There is a paradigm of species loss. First, there is a continuing loss of natural habitat, and especially moist tropical forest, ongoing . Second, there are reports of overexploitation of medicinal plant species. Scarcity at present is likely to be localised, but conditions exist which make overexploitation of certain species a possibility in the near future. [20]

There may well be a danger of over-romanticising the role of indigenous technical knowledge systems and traditional resource management regimes Many compounds found in herbal medicines have powerful pharmaceutical properties . Indeed, traditional knowledge has been sought by prospectors from multinational drug companies as a first lead to promising plant compounds, to the extent that herbalists are becoming suspicious of inquiries from outsiders about their remedies. Traditional medicine undoubtedly brings health benefits to many rural people, a large proportion of whom do not have access to biomedical services.[21]

A national institution to catalogue all genetic material indigenous to the country and effectively hold patents on any developments resulting from that material like a National Gene Bank, if effectively linked into a network of community-based activities, could serve as custodians of material for local users. For such an initiative to be successful, a national inventory of genetic resources is necessary. This study has highlighted the importance of medicinal plants to populations of developing countries, and their prospective role in primary health care. In addition, under favourable circumstances, medicinal plants could be useful components of a development strategy which enhances sustainable rural livelihoods. Economists argue that people will be motivated to conserve resources only when they are able to profit from their sustainable use, and thus benefit from their conservation. This is only possible if property rights are well-defined and are secure. The people who benefit from the conservation, those who profit from the exploitation, and those who hold guaranteed rights must be the same.[23]

VI. ACKNOWLEDGEMENTS

The author is highly thankful to ICSSR, New Delhi, for providing financial assistance as post doctoral fellowship for the project. Author is grateful to Dr. Jai Singh , Professor and Head, Department of Geography, JNV University, Jodhpur for his valuable guidance and supervision of work.

REFERENCES

1. Nalawade SM, Sagare AP, Lee CY, Kao CL, Tsay HS. Studies on tissue culture of Chinese medicinal plant resources in Taiwan and their sustainable utilization. *Bot Bull Acad Sin.* 2003;44:79–98. [Google Scholar]
2. Chen SL, Yao H, Han JP, Liu C, Song JY, Shi LC, Zhu YJ, Ma XY, Gao T, Pang XH, Luo K, Li Y, Li XW, Jia XC, Lin YL, Leon C. Validation of the ITS2 region as a novel DNA barcode for identifying medicinal plant species. *PLoS ONE.* 2010;5:e8613. doi: 10.1371/journal.pone.0008613. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
3. Chacko SM, Thambi PT, Kuttan R, Nishigaki I. Beneficial effects of green tea: a literature review. *Chin Med.* 2010;5:13. doi: 10.1186/1749-8546-5-13. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
4. Hamilton AC. Medicinal plants, conservation and livelihoods. *Biodivers Conserv.* 2004;13:1477–1517. doi: 10.1023/B:BIOC.0000021333.23413.42. [CrossRef] [Google Scholar]
5. Balunas MJ, Kinghorn AD. Drug discovery from medicinal plants. *Life Sci.* 2005;78:431–441. doi: 10.1016/j.lfs.2005.09.012. [PubMed] [CrossRef] [Google Scholar]
6. Cole IB, Saxena PK, Murch SJ. Medicinal biotechnology in the genus *scutellaria*. *In Vitro Cell Dev Plant.* 2007;43:318–327. doi: 10.1007/s11627-007-9055-4. [CrossRef] [Google Scholar]
7. Pimm S, Russell G, Gittleman J, Brooks T. The future of biodiversity. *Science.* 1995;269:347. doi: 10.1126/science.269.5222.347. [PubMed] [CrossRef] [Google Scholar]
8. Bentley R, editor. *Medicinal plants.* London: Domville-Fife Press; 2010. pp. 23–46. [Google Scholar]
9. Ross IA, editor. *Medicinal plants of the world (volume 3): chemical constituents, traditional and modern medicinal uses.* New Jersey: Humana Press Inc; 2005. pp. 110–132. [Google Scholar]
10. Heywood VH, Iriondo JM. Plant conservation: old problems, new perspectives. *Biol Conserv.* 2003;113:321–335. doi: 10.1016/S0006-3207(03)00121-6. [CrossRef] [Google Scholar]
11. Hamilton AC. Medicinal plants in conservation and development: case studies and lessons learned. In: Kala CP, editor. *Medicinal plants in conservation and development.* Salisbury: Plantlife International Publisher; 2008. pp. 1–43. [Google Scholar]

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928|

| Volume 4, Issue 8, August 2021 |

|DOI:10.15680/IJMRSET.2021.0408021 |

12. Zerabruk S, Yirga G. Traditional knowledge of medicinal plants in Gindeberet district, Western Ethiopia. *S Afr J Bot.* 2012;78:165–169. doi: 10.1016/j.sajb.2011.06.006. [CrossRef] [Google Scholar]
13. Larsen HO, Olsen CS. Unsustainable collection and unfair trade? uncovering and assessing assumptions regarding Central Himalayan medicinal plant conservation. *Biodivers Conserv.* 2007;16:1679–1697. doi: 10.1007/s10531-006-9039-4. [CrossRef] [Google Scholar]
14. Uprety Y, Asselin H, Dhakal A, Julien N. Traditional use of medicinal plants in the boreal forest of Canada: review and perspectives. *J Ethnobiol Ethnomed.* 2012;8:1–14. doi: 10.1186/1746-4269-8-1. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
15. Huang H. Plant diversity and conservation in China: planning a strategic bioresource for a sustainable future. *Bot J Linn Soc.* 2011;166:282–300. doi: 10.1111/j.1095-8339.2011.01157.x. [PubMed] [CrossRef] [Google Scholar]
16. Rafieian-Kopaei M. Medicinal plants and the human needs. *J Herb Med Pharm.* 2013;1:1–2. [Google Scholar]
17. Hamilton A. *Medicinal plant and conservation: issues and approaches.* UK: WWF; 2003. [Google Scholar]
18. Marcy J, Balunasa A, Kinghornb D. Drug discovery from medicinal plants. *Life Sci.* 2005;78:431–441. doi: 10.1016/j.lfs.2005.09.012. [PubMed] [CrossRef] [Google Scholar]
19. Srujana ST, Babu KR, Rao BSS. Phytochemical investigation and biological activity of leaves extract of plant *Boswellia serrata*. *Pharm Innov.* 2012;1:22–46. [Google Scholar]
20. Schippmann U, Leaman DJ, Cunningham AB, Walter S. Impact of cultivation and collection on the conservation of medicinal plants: global trends and issues. III WOCMAP congress on medicinal and aromatic plants: conservation, cultivation and sustainable use of medicinal and aromatic plants; 2005. Chiang Mai.
21. Deeb T, Knio K, Shinwari ZK, Kreydiyyeh S, Baydoun E. Survey of medicinal plants currently used by herbalists in Lebanon. *Pak J Bot.* 2013;45:543–555. [Google Scholar]
22. Figueiredo MSL, Grelle CEV. Predicting global abundance of a threatened species from its occurrence: implications for conservation planning. *Divers Distrib.* 2009;15:117–121. doi: 10.1111/j.1472-4642.2008.00525.x. [CrossRef] [Google Scholar]
23. Wagh VV, Jain AK. Status of threatened medicinal plants of Jhabua district, Madhya Pradesh, India. *Ann Plant Sci.* 2013;2:395–400. [Google Scholar]
24. Andel TV, Havinga R. Sustainability aspects of commercial medicinal plant harvesting in Suriname. *Forest Ecol Manag.* 2008;256:1540–1545. doi: 10.1016/j.foreco.2008.06.031. [CrossRef] [Google Scholar]

INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 5.928

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

9710 583 466 9710 583 466 ijmrset@gmail.com

www.ijmrset.com