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RESEARCH ARTICLE

HERBAL GARDENS: ROLE IN CURRENT SCENARIO FOR EX-SITU CONSERVATION OF MEDICINAL AND AROMATIC PLANTS

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ABSTRACT

Herbal Gardens are the center of ex-situ conservation of the Medicinal and Aromatic plants from varied sources. The development of Herbal Garden aimed for not only propagation/multiplications of the Medicinal and Aromatic plants but also for their ex-situ conservation to protect and maintain their existence in nature for future generation. Medicinal plants are integral components of the global biodiversity. Medicinal and Aromatic plants participating significant role in traditional health care among the rural peoples. Size, shape may be variable of the Herbal Gardens based on the availability of area as well as requirements. Development and proper care need for successful conservation of the important Medicinal and Aromatic plant species. These are developed following similar concepts marked for site of ex-situ conservation.

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INTRODUCTION

India is marked for its rich biodiversity due to varied climatic conditions. Plants are performing their presence in different ecological areas as per the climatic condition as well as plant adaptability to related zones. Plants always faces struggle in changeable environmental condition they always trying to live in the earth for long to long period. For above purpose plants are reproducing numerous seeds with unique and wide range of seed dispersal mechanisms. Seeds include resting embryo which efficiently develops in to new individuals of the plants like their parental ones. Production, dispersal, germination etc are key factors for development of a plant population in certain ecological areas. Among the diverse plant species some are remarkable for their multiplication by seeds but many of the plant are not producing seeds successfully are capable to develop a new plant using their vegetative parts. Many modifications of the vegetative parts of the plant like bulb, tuber, rhizome, corm etc are registered for origination of new plants as their parental ones.

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After above modes applied by the plants for their regeneration are helpful for their existence and for formation of the new plant population. These are important for generation for healthy biodiversity. As in nature every one organisms are interlinked so much diversity of the plants support the richness of the plants variable among the different ecological sites.

Each plants adaption capacity in natural sites their tolerance capacity etc are key factors for their presence and sustainability. Rich biodiversity support better regulation of the various ecosystems. Plant diversity is remarkable for above significant purposes. India is one country of 12 mega biodiversity centers which includes around 45000 plant species in which approx 15000 are flowering plants. Diversity of the species is responsible for formation of complex ecosystem in nature. Out of the rich plant diversity many of them are significantly used for varied purpose by the human beings. A group is also marked for their medicinal purpose used for the treatments of various disorders referred as Medicinal plants. Some plants includes aroma variable in plant to plant species are known as Aromatic plants. Association of the various Medicinal and Aromatic plants is remarkable for their use by the human beings in different localities. Around 80% human beings in the world utilizing medicinal plants for treatment of various disorders (Kamboj, 2000).

Due to day by day increasing population of human beings their requirements also parallel increases. For fulfillment of the basic requirements human beings directly or indirectly interfering the plant diversity. One side because of over exploitation, Forest fire, Population, Diseases, Introduction of the new species in certain ecological localities etc and secondly Destruction of the natural habitat are key factors for loss of the plan species from the nature. On the basis of above key points an urgent need for the conservation of biodiversity in required globally. Conservational study on Medicinal plants were carried out by the researchers like Adhikari *et al*. (2007), Ansari (1993), Deshmukh (2010), Kasagana and Karumuri (2011), Kayombo *et al*. (2013), Raina *et al*. (2011), Rajkumar *et al*. (2011), FRLHT (2006). Herbal Medicine for Market Potential in India: An Overview recorded by Sharma *et al*. (2008). Indige nous knowledge of medicinal plants marked by Geetha (2010). Mazid *et al*. (2012) focused on Medicinal Plants of Rural India: A Review of Use by Indian Folks. Raina and Gupta (1999) experimented on Increasing seed yielding in Glory lily (*Gloriosa superva* L.). Study related to Herbal Garden development and use was assessed by Heywood (1983), Rao and Das (2011), Stirton (1998), Thacker (1979). Plant/Floristic diversity made by Setshogo and Mbereki (2011), Uysal (2010). Shankar and Rawat (2013) recorded Conservation and cultivation of threatened and high valued medicinal plants in North East India.

MATERIALS AND METHODS

Establishment of the Herbal Garden includes several Following requirements: -

Site for Development of the Herbal Garden

Site selection is the prime step for development of an Herbal Garden. Site for this purpose includes better soil quality, availability of the facilities needed for the plants, easy to reach or better transport connection for supply of the materials required for its development as well as plant parts supply for their further conservation.

Preparation and Designing of the selected site

Selection site preparation marked as the second one need for above purpose. Preparation of the field made by following Ploughing, Tillage, weeding, slope formation. After of these practices field need for well designed and determination/ preparation of the beds for individual species of the Medicinal and Aromatic plants.

Protection strategies – Fencing/Wall formation

Selected field for development og Herbal Garden need for better fencing or wall formation around the marked areas for protection of the introduced MAPs for their ex-situ conservation. Large gate helpful for entry of the materials related to the establishment of Herbal Garden and others also.

Arrangement of Water facilities

Better water facilities are urgent need in Herbal Garden. Water availability made for each beds/plants by providing water using small canals or by other modes.

Cultivation/Sowing of the Medicinal and Aromatic Plants

Collected/Selected plants/plant parts should be grown/shown in the prepared beds following distance managing from plant to plant and row to row. Vegetative parts like stem, leaf etc applied for generation of the new individuals as their parental ones. Modified vegetative plant parts like bulb, tuber, rhizome, corm etc and the seeds are directly grown/shown in the prepared locations of Herbal Garden or new plantlets developments was also done using the same parts of the plants in poly bags. After maturation of the small plants are carefully transferred in to the selected sites followed by supply of the facilities as par need of the plants.

Observation/Monitoring of the cultivated field/s

Cultivated/grown plants were daily monitored to examine the need of the plants and every possible effort was made to support the better plant growth and development. Initially newly developing plants were protected from high intensity of sunlight by covering paper/bamboo cartoons during day time and is opened at evening following till the establishment of new individuals in the field.

Management strategies of the Herbal Garden

Water – A water requirement for the plants is variable among the plant species and is also changeable of one plants different stages of life. Water is basic and prime need for regulation of the life system in nature. It is important for successful physiological activities in the plants that support better growth and development of the plants.

A moderate range of water is beneficial for the plants and is variable among the varied plant species. Excess water is responsible for water logging near the roots of the plants adversely affecting absorption of water, nutrients. It also disturbs soil aeration and finally being reason for death/decay of the plants.

Deficiency of water also adversely affecting the plant life showing their symptoms as wilting of aerial parts of the plant. Staying in such condition for long time leads to death of the plants. So water provide as per need of the plants grown for ex-situ purpose in Herbal Garden. Excess water need for removal from the field/beds to protect the plants against decay with the effect of water logging.

Weed – Weeds are undesirable association of the plants belonging to different families as well as habits. These are competing for light, space, nutrients etc with the grown plants in the field so need for removal for the field without damage of the grown Medicinal and Aromatic plants. Weeds removal made before their flowering to avoid their numerous seed production. Dry weeds burned.

Nutrients – For regulation of the various physiological activities and formation of varied compounds/parts nutrients are playing an important role in plants. Macro and micro nutrients supplied in the field as per need of the grown Medicinal and Aromatic plants.

Diseases – Plant diseases are abnormal conditions in the plants and can be observed by appeared symptoms. Proper diseases management helping to keep the plants healthy that further support better life pattern and leads much production/output.

Rodents – These are dangerous for the newly developing plants. They cut aerial plant parts and also the roots responsible for death of the plants. It can be controlled using suitable chemicals.

Insects and Pests – Insects are not always harmful for the plants. Among the rich diversity of the insects some are remarkable for their participation in pollination in the flowers needed for development of the seeds in plants. Seeds are important structure for further development of the plants as their parental ones. Harmful insects and pests should be avoid from Herbal Garden Their population controlled using chemicals. Alternate host plants/weeds removed from the field.

RESULTS AND DISCUSSION

By following suitable methods an Herbal Garden has been developed for ex –situ conservation of the Medicinal and Aromatic plants from Chhattisgarh in central India. Where many important, rare, endangered species of the Medicinal and Aromatic plants were introduced for their long term presence and utilization purpose. For the channel under the development of the Herbal Gardens such type a structure has been established and named Herbal Garden. It is playing a significant role in the ex-situ conservation of the Medicinal and Aromatic plants of the state of Chhattisgarh in central India aimed for ex-situ conservation of the Medicinal and Aromatic plants. Cultivation of the MAPs is sustainable alternative for collection, propagation and conservation of the varied plants of traditional medicinal ant other important plants (Anon 2001). Herbal Garden playing a major role in ex-situ conservation of the MAPs of varied localities. It should be developed and managed in proper way for sustainable conservation of the plant species. Data base creation, digital herbarium preparation etc are important for circulation of the scientific knowledge on the Medicinal and Aromatic plants in wide range. It also helps for identification, further cultivation and conservation of the useful plants of medicinal values.

Conservation

It includes all the efforts for care, protection and management of specific species which support their proper growth/ multiplication. Types – Conservation of the species can be done in two forms such as

- In situ conservation – In this method species conservation done in their natural habitat by providing necessary requirements needed for protection and second one type is
- Ex-situ conservation – In this category the species are protected outside of their natural habitat like in Botanical Gardens, Herbal Gardens, Seed Bank, Gene Bank, Cryopreservation, Artificial seeds, MPCAs etc. In channel of ex-situ conservation of MAPs the role of Herbal Garden is remarkable and of great significance.

Herbal Garden: A Site for their Ex-situ Conservation

It is an example of Ex-situ conservation of MAPs. RET, Endangered, Valuable etc Medicinal and Aromatic plants are introduced in Herbal Garden for their conservation and for multiplication purpose.

Classification of the Plants in Herbal Garden

Categorization of the MAPs introduced in Herbal Garden done on the basis of their utility as well as their habits as Herb, Shrub, Tree, Climber, Creeper, Underground MAPs, Aromatic plants.

- Medium heighted trees and shrubs planted in Herbal Garden following certain distance.
- These helps the short herbaceous/climber plants in high temperature range during summer season.
- Based on importance and their population strength classification can be done.
- Rare, RET, Endangered MAPs applied for further protection in Herbal Garden.
- All the introduced MAPs protected from all biotic and abiotic factors which directly or indirectly affecting the plant life pattern.

MPCA - Medicinal Plants Conservation Areas

MPCA- Medicinal Plants Conservation Areas are the forest patches related for conservation as well as for supporting propagation of the prioritized, RET, Endangered and valuable Medicinal and Aromatic plants in different ecological areas. Suitable places of natural ecosystem/forest area are selected for above purpose. It includes the following characters

1. These are one type of Ex-situ conservation center.
2. Forest areas marked as MPCAs around of 200 ha.
3. It includes RET, Threatened and many valuable Medicinal and Aromatic plants.
4. It shows rich diversity of the Medicinal and Aromatic plants.
5. MAPs are introduced in MPCAs for their further conservation.
6. All efforts for conservation and propagation for the increasing /protecting the species of MAPs are carried out in this area.

Finally these areas are of a great significance of MAPs diversity in certain Ecological areas.

MAPs conservation: Challenges Ahead

The Conservation of Medicinal and Aromatic plants is a challenging task in current scenario due to following reasons

1. Over exploitation
2. Increasing Human population load
3. Destruction of natural habitat
4. Reduction of forest areas
5. Introduction of the new species
6. Environmental pollution

7. Forest fire
8. Less awareness about the valuation of the Biodiversity etc.

Conclusion Remarks/Suggestions

Finally it is concluded that the MAPs are of great significance due to presence of certain chemical compounds/aroma in their plant body which are variable among the plants and also variable in different ages of the same plants. Due to natural and manmade reasons these group of the plants comes under the boundary of endangerment. These plants should be conserved by all the possible strategy which provides better chance of propagation as well as protecting them to come near the line of endangerment. Sustainable utility, Pollution control, Forest protection etc are actively followed not only for conservation of the MAPs but also needed for their multiplication, dispersal and conservation of biodiversity in proper way. Above strategy support the formation of the healthy and sustainable biodiversity in specified ecological zones with their participation in environmental cleanup. Each institutes related to education should be initiated to form the Herbal Garden of different Sizes as per availability of the area. This step can help the Conservation/propagation of the

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REFERENCES

Adhikari, B. S., Babu M. M., Saklani P. L. and Rawat G. S. 2007. Distribution, Use pattern and prospects for Conservation of Medicinal plants in Uttaranchal State, India. *J. of Mountain Science* 4 (2): 155 – 180.

Anon., 2001. Cultivation of Medicinal plants. National Medicinal Plants Board. Deptt. Of Ayush. Ministry of Health and a Family welfare, Govt. of India.

Ansari, A. A., 1993. Threatened medicinal plants from Madhauli Forests of Gorakhpur. Journal of Economic and Taxonomic Botany17: (10) 241.

Deshmukh, B. S. 2010. Ex-situ conservation studies on ethno-medicinal, rare, endemic plant species from Western Ghats of Maharashtra. 1 (2): 1 – 6.

FRLHT, 2006. Conservation and adaptive management of Medicinal plants- A participatory model: Medicinal plants Conservation Areas and Medicinal plants Development Areas. FRLHT, Banglore, India, pp 58.

Geetha, R. M. 2010. Indigenous knowledge of Medicinal plants among tribals of Pachamalai hills. *Indian Journal of Traditional Knowledge*. 9 (1): 209 - 215.

Heywood, V. H. 1983. Botanic Gardens and Taxonomy – Their economic role. *Bull. Bot. Surv*. India. Vol 25 pp 134 – 147.

Kamboj, V.P., 2000, "Herbal Medicine-some comments", *Curr.Sci*., 78(1), pp. 35 - 39.

Kasagana, V. N. and Karumuri S.S., 2011. Conservation of medicinal plants (Past, Present and future trends). *Journal of Pharmaceutical Science and research*. 3 (8): 1378 – 1386.

Kayombo, E. J., Mahunnah R. L. A. and Uiso F. C. 2013. Prospects and challenges of Medicinal plants conservation and Traditional medicine in Tanzania. Agro technology. 1 (3): 2 - 8.

Mazid, M., Khan T. A. and Mohammad F. 2012. Medicinal Plants of Rural India: A Review of Use by Indian Folks. *Indo Global Journal of Pharmaceutical Sciences*, 2012; 2(3): 286 - 304.

Raina, R. and Gupta L. M. 1999. Increasing seed yielding in Glory lily (*Gloriosa superva* L.). Experimental Approaches. Acta Horticulture. 502: 175 – 179.

Raina, R., Chand R. and Sharma Y. P. 2011. Conservation strategies of some Medicinal Plants. *International Journal of Medicinal and Aromatic plants* 1 (3): 342 – 347.

Rajkumar, M. H., Sringeswara A. N. and Rajanna M. D. 2011. Ex-situ conservation of Medicinal plants at university of agricultural sciences, Bangalore, Karnataka. *Resent Research in Science and Technology*. 3 (4): 21 – 27

Rao, N. S. and Das S. K. 2011. Herbal Gardens of India: A statistical analysis report. *African Journal of Biotechnology* Vol. 10(31), pp. 5861-5868.

Setshogo, M. P. and Mbereki C. M. 2011. Floristic Diversity and Uses of Medicinal Plants Sold by Street Vendors in Gaborone, Botswana. *The African Journal of Plant Science and Biotechnology*. 5 (1): 69 – 74.

Shankar, R. and Rawat M. S. 2013. Conservation and cultivation of threatened and high valued medicinal plants in North East India. *International Journal of Biodiversity and Conservation*. 5 (9): 584 – 591.

Sharma, A., Shanker C., Tyagi L. K., Singh M. and Rao C. V. 2008. Herbal Medicine for Market Potential in India: An Overview. *Academic Journal of Plant Sciences* 1 (2): 26-36.

Stirton, C. 1998. Education for sustainability – A Garden for a sustainable future. Root. (Dec) pp 38 – 41.

Thacker, C. 1979. The history of Gardens: Beckenham: Croom Helm Publication Ltd.

Uysal, I. 2010. An overview of plant diversity of Kazdagi (Mt. Ida) forest National Park, Turkey. *Journal of Environmental Biology*. 31: 141.

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