

Domestication of wild plant diversity in home gardens for culinary and curative use by the tribal women farmers in Mizoram, India

Abstract

In India, women play a significant role in managing the biodiversity of their region to sustain their family livelihoods. This paper tried to study and document the domestication of certain wild plant diversity, which were used for food and medicine by the tribal women farmers in Mizoram state, and the contribution of women farmers in managing the biodiversity of their region. The study was conducted in three blocks in Serchhip and Kolasib districts of Mizoram and found out that, the tribal women farmers of Mizoram has domesticated seven different plant species in their home gardens / kitchen gardens , which includes four tree species, two shrubs and one fern, which were used for both food and medicine. The study documented the botanical name, family, local name, parts used and the purpose of use.

Keywords: conservation, food, medicine, kitchen garden, biodiversity, ethnobotany

Volume 4 Issue 4 - 2020

Saujanendra Swain,¹ Suhita Chakrabarty,¹
Zomuankima,² Vanlalhmangaia²

¹Department of Farm-Livelihoods, National Rural Livelihoods Mission, India

²Department of Farm-Livelihoods, State Rural Livelihoods Mission, India

Correspondence: Saujanendra Swain, National Resource Person, National Rural Livelihoods Mission, New Bus Stand, Old Town, Nayagarh District, Odisha State, India, Tel +91-7077577477, Email saujanendra@gmail.com

Received: July 06, 2020 | **Published:** July 27, 2020

Introduction

The food security of different communities is based on biodiversity in field and forests. Women in many societies play a significant role in managing the diversity of eco system, since they are responsible for sustaining the livelihood of the family. They used to develop multiple strategies for their farming system and most of these are based on a sophisticated management of genetic diversity.¹

Biodiversity is the foundation of the life on Earth. But the population explosion, habitat destruction, over harvesting, pollution, and limited resources has led to a serious loss of biodiversity. Women also perform many agricultural activities. They sow, weed, hoe and bind the stalks. They also grow a wide variety of vegetables, relish and condiments in their kitchen gardens. They also collect medicinal plants to cure various ailments. The knowledge of women about forest and forest products is tremendous and preservation of this knowledge is crucial for biodiversity. Their knowledge in biodiversity contains unique insights into local species and ecosystem gained from centuries of practical experiences. In most of the rural societies it is a common fact that women are invisible managers of local resources that include land, water, forest and wildlife. Most of them are poor and uneducated but they are the great sustainers of rural micro economic activities. Their traditional knowledge brings them in direct contact with the natural resources.¹

The traditional knowledge system has gained a prime importance in context with conservation, utilization and sustainable development of plant resources. The ethno-medicinal plants play a major role amongst the tribal and rural people in their traditional healthcare system.² This indigenous system of treatment based on wild edible plant is still an important part in *Mizo* social life and culture, but this traditional knowledge of the local people has been transferred orally from generation to generation without proper documentation. Therefore, the claimed therapeutic values of the reported species are to be critically studied to establish their safety and effectiveness and to preserve these high valued wild edible plant species.²

There were many works has been carried out on wild edible plants of Mizoram by Khomdram et al.,³ Angami et al.,⁴ Ramachandra et al.,⁵ Laha et al.,⁶ Kar et al.,⁷ Hazarika et al.,² and Rahmatullah et al.⁸ Similarly, the work on ethno-medicinal uses of wild plants among the Mizo tribes also studied by various authors namely Lalramnghinglova et al.,⁹ Lalfakzuala et al.,¹⁰ Rai et al.,¹¹ and Sharma et al.¹² It is observed from securitising these papers, that very sporadic works have been carried out on wild edible plants species of Mizoram and there was no study on conservation strategies adopted by the people particularly women to conserve the biodiversity of wild edible plants.

Therefore, the present study focuses on the domestication aspects of wild plant species of Mizoram, which are used as food as well as medicines by the tribal women farmers. The study was conducted as a part of the evaluation of the MahilaKishanShasaktikaranPariyojana (MKSP) project supported under National Rural Livelihoods Mission (NRLM) and implemented by Mizoram State Rural Livelihoods Mission.

NRLM

National Rural Livelihoods Mission (NRLM) was lunched by the Ministry of Rural Development (MoRD), Government of India in 2011 with partly investment support by the World Bank. The NRLM mission is to reduce poverty by enabling the poor households to access gainful self-employment and skilled wage employment opportunities, resulting in appreciable improvement in their livelihoods on a sustainable basis, through building strong grassroots institutions of the poor. The NRLM implements its programme through the State Rural Livelihoods Mission (SRLM).

MahilaKishanShasaktikaranPariyojana (MKSP)

The MahilaKishanShasaktikaranPariyojana (MKSP) is a sub-component of National Rural Livelihoods Mission. The major objective of the MKSP is to empower women in agriculture by making systematic investments to enhance their participation and productivity, as also create and sustain agriculture-based livelihoods

of rural women. One of the focused activities of MKSP is to establish Home Gardens/ Kitchen gardens/ Nutri-gardens in the backyard of women farmers without application of any chemical fertilizer and pesticides.

Mizoram SRLM

Mizoram State Rural Livelihoods Mission is established in the year 2013 to implement the NLRM activities in the state of Mizoram. At present, the SRLM works in six districts of Mizoram covering 17 rural development blocks.

About Mizoram

Mizoram is a landlocked country located in the extreme north-eastern part of India. It is located between $21^{\circ}58'$ & $24^{\circ}35'$ N latitude and $92^{\circ}15'$ & $93^{\circ}29'$ E longitude. The total geographical area of the state is 21,081 sq.kms. it is bordered by Myanmar in east, Bangladesh and Tripura state in the west, Assam state in north and Myanmar in south. The state is divided into 8 districts and 26 rural development blocks. The total population of the state is 10,91,014; of which 94.7% are tribal. The sex ratio of the state is 975 females per 1000 male. The literacy rate of the state is 91.85%, the second highest in India. The annual average rainfall of the state is 2500 mm. The temperature of the state varies from 11°C to 30°C . The state has 90.68% of forest cover and harbours 2200 flowering plant species. Soil type of the state varies from sandy loam, clayey loam to clay.

Study area

The study was conducted in 12 villages located under three community development blocks of Serchhip and Kolasib districts of Mizoram state, India (Figure 1).



Figure 1 Serchhip and Kolasib districts of Mizoram state, India.

Materials & methods

The study was conducted from 10th to 20th January 2020 as a part of evaluation of the MahilaKishanShasaktikaranPariyojana (MKSP) project implemented by Mizoram SRLM, which was operated in four blocks of Serchhip and Kolasib districts. The study was based

on extensive field surveys, plant collection and the interviews with the local tribal women farmers. Structured personal interviews were conducted with 43 tribal women farmers, the community resource persons, the village council members and other elderly people of the village through a format. One focus group discussion was also conducted per village to validate the information collected through personal interviews. Samples of different plant species were collected to prepare herbariums adhering to the norms of standard herbarium techniques for proper botanical identification. The local name of the plant species was recorded along with the habits of the plants, its distribution. Visits were made to few home gardens/ Kitchen gardens developed by the tribal women farmers to see, where these wild edible plants were planted. Photographs of each of these plant species were collected from the field sites. The herbariums and the photographs were made into a repository and kept at Mizoram State Rural Livelihoods Mission office for future references. The plant species were identified at Regional Plant Resource Centre, Bhubaneswar, Odisha for its proper botanical name and family.

Result & discussion

Seven plant species belonging to 5 family were recorded from the field, which were used both as food and medicines by tribal women farmers of Mizoram (Figure 2).

Out of the total 7 plant species, three are trees, three are shrubs and one is fern. The documented families are Araliaceae, Athyriaceae, Fabaceae, Meliaceae and Verbenaceae. The Family Fabaceae and Verbenaceae has two species each, whereas the rest three families are having single species only. Details of all the plant species recorded, their common name, English name, botanical name, family and habits are provided in Table 1. It was observed that each of the tribal women farmers have planted at least one or two of the above species in their home garden for their daily needs for vegetables and medicines.

The tender leaves of five plants are used as vegetable, whereas one plant, the pods are used as vegetables and the flowers of two plants is used as vegetables. Details of the plant species and the parts used as vegetables are provided in Table 2.

All these seven plants are used to treat common diseases like blood pressure, colic, diabetes, diarrhoea, dysentery, easy delivery, fever, hypertension, itches and scabies, indigestion, skin diseases, stomach-ache and worm infection. Out of all the diseases listed above, the common diseases treated through these plants are diabetes, diarrhoea and skin diseases. In 90% of the cases, the leaves are used to treat the diseases, whereas in some cases either the pod or the root is used for medicine. Details of the plant species used as medicine along with the parts used and diseases treated are provided in Table 3.

Plant species those belongs to Fabaceae family, naturally fixes atmospheric nitrogen into the soil, there by enriching the soil with nitrogen.¹³ These species help the home garden/ Kitchen garden in enriching the soil with atmospheric nitrogen, which means there is no need for application of external of nitrogen in the kitchen gardens or home gardens.

Species belonging to the family of Meliaceae and Verbenaceae has the potency of insecticidal effect for the pests/ insects.¹⁴ Planting of these species in home gardens/ kitchen gardens helps in eradication of pests/ insects and act as an insect repellent.^{15,16}



1. *Clerodendrumcolebrookianum* Walp.



2. *Clerodendruminfortunatum* L.



3. *Diplaziumesculentum*(Retz.) Sw



4. *Dysoxylumgobara*(Butch.-Ham) Merr



5. *Parkiaroxburghii*G.Don



6. *Senegaliapennata*(L.) Willd.



7. *Trevesiapalmata*(Roxb. ex Lindl.) Vis.

Figure 2 Seven plant species belonging to 5 family were recorded from the field, which were used both as food and medicines by tribal women farmers of Mizoram.

Citation: Swain S, Chakrabarty S, Zomuankima, et al. Domestication of wild plant diversity in home gardens for culinary and curative use by the tribal women farmers in Mizoram, India. *Biodiversity Int J.* 2020;4(4):155–159. DOI: 10.15406/bij.2020.04.00178

Table 1 List of wild plant species those are domesticated by tribal women farmers in Mizoram

| Sl | Local name Mizo) | English name | Botanical name | Family | Habit |
|----|------------------|------------------------|---|-------------|---------------------|
| 1. | Phuihnam | East India Glory bower | <i>Clerodendrumcolebrookianum</i> Walp. | Verbenaceae | Perennial shrub |
| 2. | Phuihnam-chhia | Hilly Glory tree | <i>Clerodendruminfortunatum</i> L. | Verbenaceae | Shrub or small tree |
| 3. | Cha-kawk | Vegetable fern | <i>Diplaziumesculentum</i> (Retz.) Sw | Athyiaceae | Fern |
| 4. | Thingthupui | Dysox | <i>Dysoxylumgobara</i> (Butch Ham.) Merr. | Meliaceae | Tree |
| 5. | Zawngtah | Tree bean | <i>Parkiaroxburghii</i> G.Don | Fabaceae | Tree |
| 6. | Khang hu | Climbing Wattle | <i>Senegaliapennata</i> (L.) Willd. | Fabaceae | Shrub/small tree |
| 7. | Kawh-te-bel | Snowflake plant | <i>Trevesiapalmata</i> (Roxb. ex Lindl.) Vis. | Araliaceae | Tree |

Table 2 List of wild plant species those are used as vegetables by tribal women farmers in Mizoram

| Sl. | Botanical name | Parts used |
|-----|---|--------------------------|
| 1. | <i>Clerodendrumcolebrookianum</i> Walp. | Tender Leaves |
| 2. | <i>Clerodendruminfortunatum</i> L. | Tender Leaves |
| 3. | <i>Diplaziumesculentum</i> (Retz.) Sw | Tender Leaves |
| 4. | <i>Dysoxylumgobara</i> (Butch.-Ham.) Merr. | Tender leaves & Flowers |
| 5. | <i>Parkiaroxburghii</i> G.Don | Pods |
| 6. | <i>Senegaliapennata</i> (L.) Willd. | Leaf Shoots |
| 7. | <i>Trevesiapalmata</i> (Roxb. ex Lindl.) Vis. | Flower bud, young fruits |

Table 3 List of wild plant species those are used as medicines by tribal women farmers in Mizoram

| Sl. | Botanical name | Parts used | Diseases |
|-----|---|------------|--|
| 1. | <i>Clerodendrumcolebrookianum</i> Walp. | Leaf | Hypertension, diabetes, colic |
| | | Root | Diarrhoea and Dysentery |
| 2. | <i>Clerodendruminfortunatum</i> L. | | Fever, Skin diseases, worm infection |
| 3. | <i>Diplaziumesculentum</i> (Retz.) Sw | Leaf | Skin diseases, Diabetes, Easy delivery |
| 4. | <i>Dysoxylumgobara</i> (Butch.-Ham.) Merr. | Leaf | Diarrhoea and Dysentery |
| 5. | <i>Parkiaroxburghii</i> G.Don | Pod | Itches and scabies. |
| 6. | <i>Senegaliapennata</i> (L.) Willd. | Leaf | Indigestion |
| 7. | <i>Trevesiapalmata</i> (Roxb. ex Lindl.) Vis. | Leaf | Stomach-ache, Blood pressure |

Conclusion

There is a lack of proper study on how these plants helped in ecosystem services like increase in soil fertility, act as pest/ insect repellent and their nutritional value. However, detail study was conducted only for *Parkiaroxburghii*. There is an urgent need to develop the protocol for mass multiplication of these wild plant species, so that this can reach to maximum women farmers for domestication and to reduce pressure on the forest.

Home gardens/ Kitchen gardens are the laboratory for these women farmers, where they try to carry out experiment to domesticate various wild plants those are used as food as well as medicines. The convention on biological diversity (1992) recognises women's role that they play "in the conservation and sustainable use of biological diversity". These women are conserving public good at a personal cost. There is an urgent need to identify such unsung heroines of

Mizoram state and recognise & reward them for their selfless effort in conservation of Biodiversity.

Acknowledgments

The authors would like to pay sincere gratitude to NRLM, MoRD, Govt. of India for providing necessary financial support to carry out the study. We would also like to thank the management of NRLM (RC) Guwahati, Assam for providing necessary logistical support. Our sincere thanks go to Madam H. Lalchhandami, CEO of Mizoram State Rural Livelihoods Mission for her kind administrative support during the study. A special bunch of thanks goes to the tribal women farmers of Mizoram, for their selfless effort in conserving, maintaining and judiciously using the local plant biodiversity. Our sincere gratitude goes to Mr. Alok De, Lead- Farm Livelihoods, NRLM, MoRD for his constant guidance and encouragement in studying the traditional knowledge systems of India.

Conflicts of interest

There is no conflict of interest exists.

References

1. Sarke T. Biodiversity: The Role of Women in North East India. *Journal of Research in Humanities and Social Science*. 2017;5(7):71–74.
2. Hazarika TK, Lalramchhana, Nautiyal BP. Studies on wild edible fruits of Mizoram, India used as ethno-medicine. *Genet Resour Crop Evol*. 2012;59:1767–1776.
3. Khomdram SD, Fanai L, Yumkham SD. Local knowledge of edible flowers used in Mizoram. *Indian Journal of Traditional Knowledge*. 2019;18(4):714–723.
4. Angami T, Bhagawati R, Touhang L, et al. Traditional uses, phytochemistry and biological activities of Parkiatimoriana (DC.) Merr., an underutilized multipurpose tree bean: a review. *Genetic resources and crop evolution*. 2018;65:679–692.
5. Ramachandra L, Lalhriatpuia, Lalremruata PC, et al. Forest wild vegetable used by the Lai tribe in Lawngtla district of Mizoram, India. *International Journal of Life Sciences Research*. 2018;6(3):212–221.
6. Laha R, Lalhriatpuia, Lalmuangpui R, et al. Diversity and ethnobotanical uses of wild edible fruits in Mizoram, northeast India. *International Journal of Pharmacy and Biological Sciences*. 2018;8(2):132–142.
7. Kar A, Bora D, Borthakur SK, et al. Wild edible plant resources used by the mizos of Mizoram, India. *Kathmandu University Journal of Science, Engineering and Technology*. 2013;9(1):106–126.
8. Rahmatullah M, Jahan R, Saful Azam FM, et al. Folk medicinal uses of Verbenaceae family plants on Bangladesh. *Afr J Tradit Complement Altern Med*. 2011;8(5 Suppl):53–65.
9. Lalramnghinglova H. Documentation of medicinal plants based on traditional practices in the Indo-Burma hotspots region of Mizoram, North East India. *Emerg Life Sci Res*. 2016;2(1):10–45.
10. Lalfakzuala R, Khongsai M, Kayang H, et al. *Ethno-Medicinal plants and their uses in western Mizoram*. In: Kharbuli B, et al editors. Biodiversity of North-east India. North East Hill University, Arunachal Pradesh. 2012;78–98.
11. Rai PK, Lalramnghinglova H. Ethnomedicinal Plant Resources of Mizoram, India: Implication of Traditional Knowledge in Health Care System. *Ethnobotanical Leaflets*. 2010;14:274–305.
12. Sharma HK, Chhangte L, Dolui AK. Traditional medicinal plants in Mizoram, India. *Fitoterapia*. 2001;72:146–161.
13. Roy SS, Sudhir K, Sharma SK, et al. Tree Bean (Parkiaroxburghii): A Potential Multipurpose Tree Legume of North East India. *Proceedings of National Symposium on Vegetable Legumes for Soil and Human Health*. 2016;201–208.
14. Noraini MT, Norhayati I, Jamilah MS. The effectiveness of toonasinenensis (Meliaceae) as insect repellent. *Journal of Tropical Forest Science*. 1996;9(1):80–87.
15. Anonymous. Forest at a glance, FSI India State of Forest Report, Department of Environment & Forest, Government of Mizoram. 2011.
16. Lalremruata J. Studies on Non-Timber Forest Products (NTFPs) of plant origin and livelihood strategies in northern Mizoram, India. University of Mizoram. 2012.