

RESEARCH ARTICLE :

Species diversity and richness among tribal homesteads of the Nilgiris district of Tamil Nadu

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SUMMARY : Agro-biodiversity in this study referred as, variety of components such as cereals and millets, vegetables, fruits, spices and condiments, plantation and livestock present in the tribal homesteads of The Nilgiris district. The study was conducted at tribal areas of Nilgiris district which is known as biodiversity hot spot. The list of tribal respondents from selected village was obtained from horticulture department. A sample size of 100 homesteads respondents were fixed for the study. The technique proportionate random sampling was followed for the selection of respondents from three habitations viz., kunjappanai, mantharai, thuthikarai. Two ecological indices were used to analyse the agro-biodiversity viz., Species diversity among tribal homesteads based on Shanon-Wiener index and species richness in tribal homesteads by using Margalef Index. Majority of the tribal homesteads had medium level of diversity and species richness. A participatory group approach is needed in the tribal areas to conserve agro-biodiversity.

KEY WORDS :

Agrobiodiversity,
Tribal homestead,
Species richness,
Diversity

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BACKGROUND AND OBJECTIVES

Agro-biodiversity in this study referred as, variety of components such as cereals and millets, vegetables, fruits, spices and condiments, plantation and livestock present in the tribal homesteads of The Nilgiris district. Species diversity was estimated in the tribals homesteads using Shanon-Wiener Index (Jayasree, 2013) and calculated the mean index separately for each homestead. Based on the mean score, tribal homesteads were categorized as low, medium and high levels of diversity and the results are given in Table 2 and pictorially illustrated.

RESOURCES AND METHODS

The list of tribal respondents from selected village was obtained from horticulture department. A sample size of 100 homesteads respondents were fixed for the study. The technique proportionate random sampling was followed for the selection of respondents from three habitations viz., kunjappanai, mantharai, thuthikarai from kothagiri taluk of Nilgiris district.

The Shannon-Wiener index :

The Shannon-Wiener index is a popular diversity index also known as Shannon-

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Weaver index and the Shannon entropy. The measure was originally proposed by Claude. Shannon -Wiener Index is the most commonly used diversity index in plant communities and it takes a value of zero when there is only one species in a community, and a maximum value when all species are present in equal abundance.

The following equation used for this study looks at the diversity of species in tribal homesteads.

$$H = -\sum_{i=1}^S p_i \ln p_i$$

where,

S= No. of species

i = No. of individuals

p_i = Proportion of species i relative to the total number of species

ln = Natural logarithm.

H= The Shanon-Wiener Index

The Margalef Index :

The index 'Margalef' is a commonly used index to assess species richness in plant communities. The following equation used for this study looks at the richness of species in tribal homesteads.

$$D_a = S-1/\ln(n)$$

where,

S= Total no. of taxa

N= No. of individual in all species

D_a = Margalef Index

After obtaining the Margalef Index values for each homestead separately, the mean index has been worked out in order to find the species richness.

OBSERVATIONS AND ANALYSIS

Species diversity and richness among tribal homesteads was analyzed by using the ecological indices viz.,

– Species diversity among tribal homesteads based on Shanon-Wiener index

– Table 2. Species richness based on Margalef index mean value and

– Occupational pattern of tribes based on their perception was also found in the research.

Species diversity :

It could be observed from Table 1 that, majority (43 %) of the tribal homesteads had medium level of diversity index (0.0.21 to 0.25) followed by 36 per cent of the

homesteads had low level of diversity and only 21 per cent of the tribal farmers had high level of diversity on their homesteads. It was noticed that besides other components, almost all the homesteads were covered with tree crops. Integrating trees on homesteads provides a viable solution for many problems in tribal areas such as depletion of agricultural lands and landslides. Tree crops serve as wind breaker, source of organic matter, shade and soil binder to prevent soil erosion while generating additional income.

Table 1 : Species diversity among tribal homesteads based on Shanon-Wiener index (n=100)

Sr. No.	Diversity category	Mean index	No. of respondents (%)
1.	Low level	0 to 0.20	36
2.	Medium level	0.21 to 0.25	43
3.	High level	0.26 to 0.28	21
Total			100

The moderate domination of fruit species over timber species may be attributed to the gardeners' general perception that fruit species would bring early return as well as the multipurpose nature of fruit species. Homestead garden could provide employment opportunities for both male and female members, resulting in increased family income for better livelihood to a large population in northern Bangladesh.

The finding of present study is in line with the findings of Bishwajit (2013) and Kumar (2011) who had also reported that planting tall growing tree crops on bunds is very common in tribal homesteads.

Cereals and millets and vegetables were not commonly grown in all the homesteads. The reason might be that, short duration crops like cereals and vegetables were not much preferred by the tribal's in their homesteads. Also, the tribal respondents expressed that cereals and millets required frequent care and intercultural operations which is very difficult in hilly areas. So they preferred to cultivate trees and other perennial crops.

Species richness :

In this study, species richness is referred as number of different species present in the following components viz., cereals and millets, vegetables, fruits, spices and condiments, plantation and livestock in the tribal homesteads of The Nilgiris district.

Species richness was estimated in the tribal

homesteads separately by using Margalef Index and the results are given Table 2.

The Table 2 revealed that, majority (50 %) of the homesteads had medium level of species richness followed by low level (31%). Only 19 per cent of the tribal homestead had high level of species richness.

Table 2 : Species richness based on Margalef index mean value (n=100)

Sr. No.	Richness category	Mean index	No. of respondents (%)
1.	Low level	0 to 2.82	31
2.	Medium level	3 to 4.99	50
3.	High level	5 to 5.86	19
Total			100

During the survey it was observed that, different fruit crops were commonly found in most of the homesteads such as banana, mango, orange, papaya and jack. With regard to plantation crops, tea, coffee and silver oak trees were commonly grown in all the homesteads. Among all the spices and condiments, pepper, ginger, coriander, cardamom and turmeric were commonly cultivated in most of the tribal homesteads. The vegetable crops such as carrot, tapioca, chillies, beans, cabbage and brinjal were predominantly grown in tribal homesteads. The reason might be due to the suitable climate in the hilly areas to support cultivating those crops with minimal cultivation practices.

The rest of the crops particularly, cereals and millets were commonly cultivated in separate fields which are far-off from their homesteads. This might be the reason for the less species richness in the tribal homesteads.

Occupation pattern :

The occupational patterns of the tribal were studied for three generation.

The tribal farmers were asked about their occupational pattern from the known ancestral generation and the results were categorized as occupation of grandfather, father and self. The analysis was brought to light the shift of focus in occupation over the generations. The results are given in Table 3.

It could be observed from the Table 3 that grandfathers had practiced agriculture as major occupation (71.00 %) followed by their father (62.00 %) and current generation (46.00 %). The result revealed that, from third generations to the current generation's

Table 3 : Classification of respondents based on their occupation (n= 100)

Sr. No	Persons	Agriculture (%)	Agriculture-allied activities (%)	Other occupation (%)
1.	Grand Father	71	20	09
2.	Father	62	23	15
3.	Self (Current generation)	46	33	21

agriculture has been decreased among the tribal's as their occupation.

With regard to allied activities, current generation tribal's (33.00 %) were observed to be involved in agriculture allied activities followed by their fathers (23.00 %) and grandfathers (20.00 %). Thus, the income earned by current generation acted as an additional advantage to their family and served as an alternative source of income.

With respect to other occupation category, the 21 per cent of the current generation engaged in other occupation like construction, electrical etc., followed by their father and grandfather 15 per cent and 9 per cent respectively. The result shown that percentage of tribal's engaged in other occupation has been increased gradually from their grandfather to current generation. The current generation tribal's were not willing to encourage their children to do farming in future.

It indicates that current generations tribal were not completely involved in agriculture alone and only their fathers and grandfathers were actively involved in agriculture. The reasons might be due to lack of interest in agriculture, resources and climatic variations which includes monsoon failure and less rainfall occurrence, increasing temperature.

Tribal's homesteads are not only mere food suppliers but also generate income. The major advantage of family involvement in farming is providing nutritional security to individual households. The homestead farming system has developed over years and optimized production activities which satisfy the biophysical needs, socio-economic security and environmental requirements in which they live.

Practicing homestead farming not only benefits the farm family in terms of economic returns but it also helps to improve the biodiversity. The supportive policy frame work should be formulated to protect, sustain and augment the homestead farming system which in turn

improves the biodiversity.

Observation and analysis :

It could be observed from the research findings of the study that, majority of the tribal homestead had very low level of both species diversity and richness. It shows the declining face of agro-biodiversity in tribal homesteads farming. With regard to occupational pattern, the current generations tribal were not completely involved in agriculture and only their fathers and grandfathers were actively involved in agriculture. It indicated that agriculture facing a serious thread.

There was a lack of scientific knowledge of the gardeners, an absence of proper planning, and no specific objectives and goals. During the homesteads visit, it was learnt that most of the crop species were not utilized for the past few decades and led to species loss. A participatory approach is needed in the tribal areas to conserve agro-biodiversity in turn conserve, protect and practicing of agriculture for future generations

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REFERENCES

Bishwajit (2013). Status, Diversity and Traditional Use of Homesteads gardens in Bangladesh: A means of Sustainable biodiversity Conservation, ISRN Biodiversity, Volume 2013, Article ID 124103, 11 pages.

Jayasree (2013). Global Ecology and Biogeography, Global Ecol. Biogeogr.

Kumar (2011). The Economics of Ecosystems and Biodiversity (Earthscan, London, 2010).

Roy, Bishwajit, Rahman, Md. Habibur and Fardusi, Most. Jannatul (2013). Status, Diversity, and Traditional Uses of Homestead Gardens in Northern Bangladesh: A Means of Sustainable Biodiversity Conservation, Volume 2013, Article ID 124103, 11 pages <http://dx.doi.org/10.1155/2013/124103>.

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