ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 18, Issue, 10, pp. 38578-38581, October, 2026
DOI: https://doi.org/10.24941/ijcr.51090.10.2026

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

THE AGRO- ECOLOGICAL PRACTICES OF ITTERI Forestry AND SUSTAINABLE RURAL DEVELOPMENT

[1]Mr. R. Deepak Kumar and [2]Dr. P. Balamurugan

[1]PhD Scholar, Centre for Rural Development, Annamalai University, Annamalainagar- 608002, Tamilnadu
[2]Director, Centre for Rural Development, Annamalai University, Annamalainagar- 608002, Tamilnadu

ARTICLE INFO

Article History:
Received 23rd July, 2026
Received in revised form
19th August, 2026
Accepted 22nd September, 2026
Published online 30th October, 2026

Key words:
Right to Education; Positive Obligations; Artificial Intelligence; Digital Educational Sovereignty; African Human Rights System.

***Corresponding author:**
Dr. P. Balamurugan

ABSTRACT

India is one of the most populus countries in the world which holds 17.8% of the population in 2.4% of the world geographical area. It engages almost two-third of workforce in agriculture which ensure food, nutrition and livelihood securities. Even though the significant progress made in agriculture sector during the past, presently facing numerous challenges including stagnation of net sown area, stagnating the yield level, plateauing net sown area, decrease in per capita land availability and most essentially there is an increase mean annual temperature and also increased frequency of extreme rainfall due to the climate change apart from increased human populations . Functionally, they provide broad spectrum of agro ecological services/ ecosystem services i.e., provisional, regulating, supporting and cultural services makes them unique land use systems. Provisional services provided by these agro

Copyright©2026, Deepakkumar and Balamurugan. *This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.*

Citation: ***Mr. R. Deepakkumar and Dr. P. Balamurugan.*** **2026.** "The agro- ecological practices of itteri forestry and sustainable rural development.*"*. *International Journal of Current Research*, 18, (10), 38578-38581.

INTRODUCTION

India is one of the most populus countries in the world which holds 17.8% of the population in 2.4% of the world geographical area. It engages almost two-third of workforce in agriculture which ensure food, nutrition and livelihood securities. Even though the significant progress made in agriculture sector during the past, presently facing numerous challenges including stagnation of net sown area, stagnating the yield level, plateauing net sown area, decrease in per capita land availability and most essentially there is an increase mean annual temperature and also increased frequency of extreme rainfall due to the climate change apart from increased human populations rate. Meanwhile, more than 60% of the net cultivated area under rainfed which is exposed to biotic and a biotic stress owing to climate variability. Additionally, more than 80% of the farmers were small and marginal farmers who are highly heterogenous and unorganised with poor coping capacity. Climate change and its variability are likely to aggravate the problem of future food and nutrition security by putting pressure on agriculture affecting its sustainability. Furthermore, it provokes implications to livelihoods of those dependents on the crops, livestock and fishascribable to rising market volatility, increased input costs, sluggish response to added external response, and more importantly deterioration of natural resource. Although, our country has achieved a record foodgrain production of 357.73 MMT with global top production in rice, wheat, pulses, millets, etc., after green revolution which ensured the calorie sufficiency through its subsidized programmes, around 71% of its population cannot afford a healthy and diverse diet. It has drives widespread malnutrition, poverty, hidden hungerwith high rates of child stunting (35%), wasting (18.7%), and severe anaemia affecting women and childrennutritional security remains challenge. At the same time, Indian agriculture sectors facing the dramatic groundwater depletion, depletion of natural resources,widespread soil and water toxicity from agrochemicals, a catastrophic loss of crop biodiversity, and heightened socioeconomic inequality. To address these challenges, we need to shift to our food production systems which produces more food sustainably with less impact on the environment and also most affordable to the lower of strata (FAO, 2018). On these lines, our government launched ambitious schemes such as the National Food Security Act, 2013, Pradhan Mantri Poshan Shakti Nirman (PM POSHAN), Food Fortification, Antyodaya Anna Yojana (AAY), National Food Security Mission (NFSM), Pradhan Mantri- Rashtriya Krishi Vikas Yojana (PM-RKVY) and most importantly Paramparagat Krishi Vikas Yojana (PKVY).

Most often, Government initiatives such as Mission Organic Value Chain Development for Northeastern Region (MOVCDNER), Paramparagat Krishi Vikas Yojana (PKVY), Andhra Pradesh Community Managed Natural Farming (APCNF), etc. are promoting chemical free or organic farming within the farms largely rather than between farms or village levels. Among various sustainable food production systems, *Itteri*is one of the agro ecological food production systems evolved traditionally over the time at between farm level or village level in northwestern and central regions of Tamil Nadu agricultural landscapes. *Itteri* is an assemblage of natural vegetation which includes thorny shrubs, herbs, lianas, and most importantly multipurpose trees growing in or adjacent to agricultural fields or roads and deliberately managed by family members of the farm holds (Deepakkumar, 2022). It is a vernacular name (in the Kongu Naadu region, South India) which means mixed trees alongwith bushes on sides of the bullock cart or walkable or motorable roads and sometimes along the seasonal streams. It was otherwise known as *Itteli* or *Itterai* or *Olungai* in the Kongu Nadu regions. *Itteri* is a part and parcel of traditionally evolved land-use systems that are known for their rich biodiversity, multi-tier structure, and multiple products and services at semiarid agricultural ecosystem in Northwestern Tamil Nadu since time immemorial. The composition of *itteri* is depends on the geographic location, adjacent natural forests, cropping pattern, livestock population and most importantly needs of farm household.*Itteri* are often imitates the nearby natural forests through combination of tree diversity and crops in a different tier. It acts as a shared, biophilic boundary that integrates forestry, agriculture, and social connectivity with three layers i.e., multi-purpose trees like Neem (Vembu), Yellow Kadamb (Manjakadambu), and Purai at canopy level which provide shade and windbreaks, Medicinal and pest-repellent plants like Nochi, Adathoda, and Aavarai form a dense physical barrier at shrub level and herbs such as eswaramooligai,erukku, Thumbai, in the lower layer. Sometimes intervened with creepers like Pirandai (Adamant Creeper) and Kovai (Ivy Gourd) weave through the hedges, accompanied by wild grasses.

Itteri TAFS provides a broad spectrum of ecosystem services to the people surrounding this region that are closely interlinked with the nutritional and livelihood security of small and marginal farmers. The choice of species and techniques adopted in such systems also reflect the accrued wisdom and insights of the traditional people who interacted with the environment for long time.It assumes the paramount importance on account of their increased food security and nutrition, financial viability, ecological soundness, biologically sustainable, resistant to environmental degradation, social and cultural acceptability. Functionally, they provide broad spectrum of agro ecological services/ ecosystem services i.e., provisional, regulating, supporting and cultural services makes them unique land use systems. Provisional services provided by these agro ecological systems that are closely interlinked with the nutritional and livelihood security of small and marginal population living in rural areas of Tamil Nadu. Carbon sequestration in woody tissue, maintenance of air quality, pollination, biological control of pest and disease, and soil, adaptation and mitigation of perceived climate change are prominent regulating services rendered by these traditional agro ecological systems. It supports wide range of supporting services such as habitat for the various species, soil and water conservation, and maintenance of genetic diversity.

Diversity of *itteri*is very high due to species having various life forms, height and canopy structure. The different layers of crops in these systems ensures the optimum utilisation of available natural resources i.e., sunlight, soil nutrients, soil moisture etc., thereby providing the ideal microclimate to the underneath which in turns offers a wide range functional products like food, fodder, fuel wood, medicines, manure, flowers etc. Also, the higher floristic and structural diversity have been shown support to greater faunal diversity through nectars, fruits, nesting sites, protection from predators, corridors between natural areas, perennial covers, etc., which offers an immense multitude functional services such as milk, meat, pollination, nutrient pumping, weed, pest and disease control, soil fertility, etc. Itteri TAES closely associated with the recreation, physical and mental health, aesthetic application and spiritual value in the region.However, the extend and knowledge on itteri were dwindling over the period of last three to four decades due to the number of factors.Even though, Itteri agroecological systems in the Northwestern regions in Tamil Nadu are known for their unique structural and functional diversity, most of them are undocumented. Many of ecosystem services provided by Itteri agroecological systems are unknown due to lack of inventory that are realized from and the costs that are input into these systems. Most often Itteri Agroecological systems are described as a unique agroforestry in details whose biophysical and socio-economic characteristics have not been extensively studied. Hence, there is an urgent need to conduct both economic and ecological analyses of these systems so as to understand the potential benefits and identify potentialrisks associated in practicing *Itteri*TAES.

Also, socio-economic and cultural factors that influencing *Itteri*TAES also need to be documented. Loss of this traditional knowledge would be disastrous to the culture that defined the evolution of Northwestern regions of Tamil Nadu farmers and their knowledge of the land. It's evident that the degradation or disappearance of *Itteri* Agroecological systems resulted in collapse of avian ecology, thereby increase of peafowl population. The increase in peafowl population leads to evolving the new kind of the man animal conflict. Hence, the conservation of *Itteri* Agroecological system will helps improve the agro ecology of the region through reducing the input and enhance output of agriculture without diminish.

Based on the above background, this study has chosen the topic entitled "*People's Practice and Sustainable Rural Development: A Case Study of Selected Itteri Agroecological Systems in Namakkal District, Tamil Nadu*."The objectives of the present study are

- To assess the various ecological diversity of *Itteri*agroecological systems for sustainable rural development.
- To depict the economic role of typical *Itteri*agroecological system in the context of people practicing in the region.
- To identify ecosystem services of *Itteri*agroecological systems
- To explicate the socio, economic and cultural profile of the people who surrounded with *Itteri*agroecological system for sustainable use.
- To identify the perception of adopting *Itteri*agroecological system for agro ecological based farming through effective people's participation to make rural development in a sustainable manner.

1. Roforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land management unit as agricultural crops and/or animals, either on the same form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components (Nair, 1984). These agroforestry practices are subtle differed from Traditional agroforestry systems (TAFS) due to notable difference in longevity and degree of intensification. Traditional agroforestry systems (TAFS) are set of age-old agroforestry systemswhich are generally devoid of intentional intensifiedcultivation of agricultural or forage crops and whichhave been practiced across the world with varyingstructure, function, socio economic attributes andecological services (Viswanath and Lubina, 2017). TAFS are spread across the globe mainly across Asia, Africa, Europe, North America, South America, and Pacific islands.
2. In India, traditional agroforestry systems in some form or other is practiced in almost all ecological and geographical regions. Many of these TAFS follows indigenous agricultural practices that are logical and rational, and have been followed for more than centuries. It ranges from less intensive scattered trees on crop fields like Babul (*Acacia nilotica)* System of Chhattisgarh,Khejri (*Prosopis cineraria*)System of Rajasthan, Ficus based system of Mandia, Karnataka, Korangadu (*Acacia leucophloea*) system of Kangeyam, Tamil Nadu, medium intensiveSoppinabettas (Foliage forest) of Malnad, Karnataka, Manga Bamboo (*Dendrocalamusstocksii*) in Konkan region and Bamboo in Rice paddies in Ziro Valley, Arunachal Pradesh, Coffee under native shade trees in South India and highly intensive home gardens in North Eastern states as well as Kerala. Also, shifting cultivation and taungya plantationsare practiced in eastern and southern parts of our country (Visawnath et al., 2018). So, these systems are vary significantly in their structural complexity, species diversity, productive and protective attributes and in socio-economic dimensions.
3. TAFS have peculiarfeatures such as wide range of products such food, wood, fodder, fuel wood, manure, shade, spices, medicinal plants, etc., enhanced resource productivity overtime, less chance of production failure due to presence of diverse species, ability to withstand adverse condition, potential to serve as reservoir of genetic diversity and tolerant against pests and disease outbreaks (Nair, 2016). Apart from this, TAFS has immense ecological sustainability which is evolved through social or cultural sustainability (Dhanya et al., 2012; Subu, 2017).National Agroforestry Policy 2014 indicated that agroforestry systems has the potential to achieve ecosystem sustainability while optimizing its agricultural productivity, profitability, and diversity, in addition to mitigating climate change impact (GoI, 2014). Agroforestry systems are recognised as an adaptation–mitigation strategy to tackle all five land challenges such as climate change mitigation, adaptation, desertification, land degradation and food security as mentioned in the special report of climate change and land (IPCC, 2022).

Diversity of Traditional Agro-Ecological Systems: TAFS are often imitates the nearby natural forests through combination of tree diversity and crops in a different tiers. Diversity of TAFS in a tropical regions is delineated to be very high due to species having various life forms, height and canopy structure. The different layers of crops in these systems ensures the optimum utilisation of available natural resources i.e., sunlight, soil nutrients, soil moisture etc., thereby providing the ideal microclimate to the underneath which in turns offers a wide range functional products i.e., food, fodder, fuel wood, medicines, manure, flowers etc. Also, the higher floristic and structural diversity have been shown support to greater faunal diversity through nectars, fruits, nesting sites, protection from predators, corridors between natural areas, perennial covers, etc., which offers an immense multitude functional services such as milk, fur, meat, pollination, nutrient pumping, weed, pest and disease control, soil fertility,etc. (Udawatta et al., 2019).The choice of species and techniques adopted in such systems also reflect the accrued wisdom and insights of the traditional people who interacted with the environment for longtime. Their structure depends on ecological, socio economic and cultural factors (Kumar and Nair, 2004). Also, the traditionally evolved tropical agroforestry systems in are known for their rich biodiversity, multi-tier structure and multiple products and services to rural households. Its assumes the paramount importance on account of their increased food security and nutrition, financial viability, ecological soundness, biologically sustainable, resistant to environmental degradation, social and cultural acceptability (Kunhamu, 2015; Saravanan and Berry, 2021).

Structural Diversity: The farmers maintain the trees mainly on the bunds and boundaries, sometimes scattered way in farm for their food security, income generation, risk management, and also efficient utilisation of land, labor and capital. But, the composition, distribution, extent and type of tree species depends on the biophysical attributes,topography and socioeconomic condition of the farmers (Dhakal et al. 2012).Subba (2018) has observed that 3-5 layers of verticalstratification of vegetation with 142 plant species comprises of 72 trees, 55 herbs, 10 shrubs, 3 palm, and 2 bamboo species. Also, 60% of the sampled home gardenswere included cattle (cows and goats), pigs, poultry and birds (hens and ducks) in northern part of West Bengal.Dwivedi et al (2007) has identified that majority of the farmers practiced bund and boundary planting (78.1) followed by 21.9 % scattered planting with an averge stock of 15.6 per ha in western Uttar Pradesh. Gadekar et al., (2020) has enumerated 206 plant species including 88 tree, 48 shrub, 44 herb and 26 climber species from Konkan coast of Maharashtra whereas 114 bird species belongs to 51 families were detected in homegardens ecosystems in Maharastra.27 tree species (95 % are indigenous) belonging to 15 families with a mean density of 28.57 per ha were recorded in traditional based agroforestry systems under rainfed agroecological situation in north eastern part of Karnataka, India (Doddabasawa*et al*., 2018). Subu et al (2017) has conducted two stage stratified random sampling of homegardens in Thrissur district reveals that 122 trees species and 41 agricultural crop species. Midland region displayed highest tree species diversity (83 species) due to the high soil fertility and high population density followed by high land (76 species), coastal land (66 species) and periurban area (53 species). Whereas Varadaranganatha and Madiwalar (2010) has observed that higher tree density (53.70 per ha) in highland, followed by coastal area (38.70 per ha and lower elevation (23.45 per ha).Shial et al., (2022) has observed that *Acacia nilotica, Azadirachta indica, Borassus flabellifer, Terminalia arjuna, Butea monosperma etc.* are some of the prominent scattered trees in Coastal Odisha.

Jambulingam and Fernandes (1986) has documented more than 15 multipurpose trees which are intercropped with cereals and pulses under rainfed conditions. Depommier (2003) has observed that multipurpose trees such as Palmyra (*Borassus flabellifer*), Neem (*Azadirachta indica*), beefwood (*Casuarina equisetifolia*), and teak (*Tectona grandis*) are planted in the boundaries of dryland farms in Tamil Nadu. Sathiageetha (2014) has conducted study in homegardens of Agastheeswaram taluk of Kanyakumari district reveals that 348 plant species of which 66 were trees, 70 shrubs, 63 climbers/creepers including lianas, 128 herbs and 21 grasses. Kumar et al (2011) were estimated 8 species of perennial grasses, 6 annual grasses, 9 legumes and 16 forbs in the Kangayam grassland (a traditional Agroforestry System) in Tamil Nadu. For instance, Zimik, et al., (2012) identified five vertical strata (emergent, canopy, under storey, shrub and herb) in the studied homegardens with highest percentage of species in herb stratum (37%).

Functional Diversity: Functional diversity in traditional agroforestry systems is reported to be very high due to their multi-tier structure with diverse components offers innumerable benefits to mankind (Gbedomon et al., 2017).

The structure and functions of the traditional agroforestry systems varies from place to place depending upon the socio-economic and ecological conditions (Soemarwoto, 1987). Traditional agro-forestry systems play a vital role in providing various functional services such as firewood, fodder, nuts, gum, resins, medicine, fruit, oil, fiber, thatch, vegetables and timber which eventually helps to generation of the rural income, thereby improves the livelihood of rural household. In conclusion , the forestry resources are available in everywhere in almost all villages in semi-arid tropical parts of the countries. The forestry in agricultural field play a very vital role in climate resilience and resources sustainability. The iteri forestry promotes environmental sustainability and sustainable rural livelihoods, in terms of food security, water sustainability, proper conservation of natural resources. Hence, it is noted that iteri forestry promotes community resilience and environmental sustainability, our future generations shouls come forward to protect and conserve this type of iteri forestry for betterment in villages as green development of villages.

****