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ARTICLES

சங்க இலக்கிய ஐந்திணைகளில் மனிதச் சூழலியல்: குடியிருப்பு, வாழ்வாதாரம், தகவமைப்பு மற்றும் நிலைத்த வாழ்வியல் – ஈரோடு மாவட்டப் பகுதிகளை மையமாகக் கொண்ட ஓர் ஆய்வு

Human Ecology in the Five Landscapes of Sangam Literature: A Study of Habitation, Livelihood, Adaptation and Sustainable Living with a Focus on the Regions of Erode District

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ABSTRACT

The central finding of this study is that the Aintiṇai (five landscapes) theory of Sangam literature presents the landscape not merely as a backdrop to human life but as an active ecological environment that shapes habitation, occupation, food, water resources, human–animal relationships and seasonal adaptation. Through the tripartite framework of mutaṟporuḷ, karupporuḷ and uripporuḷ formulated in Tolkappiyam, the five landscapes – Kurinji, Mullai, Marutham, Neithal and Palai – reveal a continuous relationship among land, resources, occupation, habitation and social relations. Integrating the human-ecology and ecocritical approaches, the study analyses selected poems from Kuruntokai, Natrinai, Ainkurunuru, Akananuru, Kalittokai, Purananuru and Pattuppattu, and reads their ecological elements comparatively with the present-day geography of Erode District: the Sathyamangalam–Thalavadi–Bargur hills and forests, the Cauvery–Bhavani–Noyyal riverine plains and the interior lands subject to seasonal drought. Because Erode is landlocked, Neithal is approached only as a comparative framework. Sangam society shows elements of sustainable living – a local-resource economy, seasonal shifts of occupation, dietary diversity, livestock–agriculture integration and habitation sited by water – expressed not in the modern vocabulary of "environmental conservation" but as practices of living in accordance with particular ecological conditions. This traditional ecological knowledge offers a comparative perspective on Erode's present challenges, including water scarcity, human–wildlife conflict and changing cropping patterns.

ஆய்வுச் சுருக்கம்

சங்க இலக்கியத்தின் ஐந்திணைக் கோட்பாடு, நிலத்தை மனித வாழ்வின் பின்னணியாக மட்டும் காட்டாமல், குடியிருப்பு, தொழில், உணவு, நீர்வளம், உயிரின உறவு, பருவநிலை சார்ந்த

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தகவமைப்பு ஆகியவற்றை வடிவமைக்கும் செயற்பாட்டுச் சூழலாகக் காட்டுகிறது என்பதே இவ்வாய்வின் மையக் கண்டறிதலாகும். குறிஞ்சி, முல்லை, மருதம், நெய்தல், பாலை ஆகிய ஐந்து திணைகளும் தொல்காப்பியம் வகுத்த முதற்பொருள்–கருப்பொருள்–உரிப்பொருள் என்ற மூவடுக்கு அமைப்பின் வழியாக, நிலம்–வளம்–தொழில்–குடியிருப்பு–சமூக உறவு ஆகியவற்றுக்கு இடையிலான தொடர்ச்சியான தொடர்பை வெளிப்படுத்துகின்றன. இவ்வாய்வு, மனிதச் சூழலியல் (Human Ecology) அணுகுமுறையையும் சூழலியல் திறனாய்வு (Ecocriticism) அணுகுமுறையையும் ஒருங்கிணைத்து, குறுந்தொகை, நற்றிணை, ஐங்குறுநூறு, அகநானூறு, கலித்தொகை, புறநானூறு, பத்துப்பாட்டு ஆகிய சங்க இலக்கியத் தொகுப்புகளில் இடம்பெற்றுள்ள தேர்ந்தெடுக்கப்பட்ட பாடல்களைப் பகுப்பாய்வு செய்கிறது. இப்பாடல்களில் பதிவாகியுள்ள சூழலியல் கூறுகள், ஈரோடு மாவட்டம் மற்றும் அதன் சுற்றுவட்டாரப் பகுதிகளான சத்தியமங்கலம்–தாளவாடி–பர்கூர் மலை மற்றும் வனப்பகுதிகள், காவிரி–பவானி–நொய்யல் ஆற்றுச் சமவெளிகள், பருவ வறட்சிக்கு உள்ளாகும் உள்நிலங்கள் ஆகியவற்றின் நவீன நிலவியலோடு ஒப்பீட்டு அடிப்படையில் வாசிக்கப்படுகின்றன. ஈரோடு மாவட்டம் கடற்கரையற்ற உள்நாட்டு மாவட்டமாக இருப்பதால், நெய்தல் நேரடித் தளமாக அல்லாமல், ஐந்திணை அமைப்பை முழுமையாகப் புரிந்துகொள்வதற்கான ஒப்பீட்டுத் தளமாக அணுகப்படுகிறது. சங்க வாழ்வியலில் உள்ளூர் வளங்களைச் சார்ந்த பொருளாதாரம், பருவநிலைக்கேற்ப தொழில் மாற்றம், பல்வகை உணவுமுறை, கால்நடை–வேளாண் ஒருங்கிணைப்பு, நீர்நிலை சார்ந்த குடியிருப்பு ஆகிய நிலைத்த வாழ்வியல் கூறுகள் காணப்படுகின்றன. இத்தகைய பாரம்பரிய சூழலியல் அறிவும் வாழ்வியல் தகவமைப்புகளும், இன்றைய ஈரோடு மாவட்டத்தில் காணப்படும் நீர்ப்பற்றாக்குறை, வன–மனித மோதல், பயிர் மாற்றம் உள்ளிட்ட சூழலியல் சிக்கல்களைப் புரிந்துகொள்வதற்கான ஒப்பீட்டுப் பார்வையை வழங்குகின்றன.

திறவுச் சொற்கள்: ஐந்திணை; மனிதச் சூழலியல்; சங்க இலக்கியம்; சூழலியல் திறனாய்வு; தகவமைப்பு; நிலைத்த வாழ்வியல்; ஈரோடு

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1. Introduction

Human ecology is the relationship between human beings and their environment. Natural ecology describes every aspect of nature – its character, its resources, pollution, scarcity and damage. Likewise, human ecology describes all the conditions that are basic to human life: the place where people live, the environment around them, the food they eat, their clothing, shelter and occupation. Sangam literature divided the lands of the Tamils, according to their structure, into four – *Kurinji*, *Mullai*, *Marutham* and *Neithal*. When *Kurinji* and *Mullai* depart from their nature and become waterless dry land, it is called *Palai*. The Tamils called these five divisions of land the five *tiṇai*. The people living in each region built their own civilisation – their settlement, food, clothing and occupation – to suit that region and the resources available there. For each *tiṇai*, the area where people lived, the structure of settlement, food habits, the clothing they wore, the work they did and their customs all differed.

In the Sangam age, people shaped their lives around the land in which they lived and joined themselves with nature. A life in which nature and people were interwoven – nature with people and people with nature – is the life of the five landscapes.

Just as a child suffers on being separated from its mother, a person who separates from nature and enters an artificial way of life must face many hardships and environmental problems. Although we live today in an age of

advanced science and technology, a peaceful, disease-free, healthy and prosperous life remains in question. The *aintiṇai* way of life of the Sangam people is itself the evidence that, by shaping their lives in harmony with the five landscapes and joining themselves to nature as a part of it, they lived peaceful, prosperous and harmonious lives, free from exploitation and want, sharing what they had and caring for all living beings.

This article studies the settlement, livelihood and adaptation of the people of the five landscapes – *Kurinji*, *Mullai*, *Marutham*, *Neithal* and *Palai* – in relation to the lives of people today, and particularly the people of Erode.

2. The Research Problem

Many studies have been undertaken in Tamil on the ecological thought found in Sangam literature. In them, natural elements such as land, water, plants, animals and biodiversity have been examined both individually and on the basis of the *tiṇai* theory. Yet, beyond the general idea that "the Sangam Tamils lived in harmony with nature", there are few studies that examine, from a specific human-ecology perspective, in which landscape and through which occupations and livelihoods they used natural resources, and what methods of adaptation they adopted in particular ecological crises.

On the other hand, contemporary ecological studies centred on Erode District address various environmental problems, such as human–elephant conflict, river ecology and pollution, and the status of indigenous livestock breeds. The studies of Baskaran et al. (2024), Shameer et al. (2024), Johnpaul et al. (2024), Suresh et al. (2023) and Palanisamy et al. (2026) reveal such contemporary ecological dimensions. But the relationship between these contemporary ecological problems and the traditional knowledge of living recorded in Sangam literature – about land, water, climate, plants, animals, agriculture, animal husbandry and adaptation of habitat – has not been adequately studied. The main problem of this study, therefore, is to show, by comparing the traditional ecological knowledge recorded in Sangam literature with the contemporary local ecological knowledge and ecological conditions of Erode District, how the knowledge of living recorded in literature can help us understand today's ecological challenges and develop approaches to sustainable living.

2.1 Primary Objective

To examine the human–environment relationship revealed in the five landscapes of Sangam literature, in comparison with the geography of Erode and its surroundings, along four axes: settlement, livelihood, adaptation and sustainable living.

2.2 Secondary Objectives

- To identify the forms of settlement found in the five landscapes (*ciṟukuṭi*, *pāṭi*, *ūr*, *paṭṭiṉam*, *curam*).
- To classify, with textual evidence, the livelihoods that developed according to the type of land (hunting, gathering, grazing, ploughing, fishing, salt making, trade).
- To examine human adaptations to natural changes such as drought, seasonal change and migration.
- To explain human relationships with water, soil, forest, animals and plants.
- To identify the elements of sustainability found in Sangam life.

These are then compared with the contemporary ecological problems of Erode, and policy-related recommendations are offered.

2.3 Approaches of the Study

1. The *tiṇai*-theory approach
2. Textual-analysis approach
3. Cultural-ecology approach

4. Human-ecology approach
5. Comparative approach
6. Local-knowledge-tradition approach
7. Field-study approach
8. GIS-based geographical approach
9. Ecological-adaptation approach
10. Sustainable-living approach

2.4 Scope of the Study

This is a literary–comparative study, not a statistical field survey. Data relating to Erode are drawn from published studies and government data. The study does not enter into debates about the dating of Sangam poems or the identity of their poets; the ecological content of the poems is the focus of the analysis.

2.5 Review

Recent studies may be divided into three streams: (a) Sangam literary ecology and the *tiṇai* theory; (b) Sangam livelihoods, food and water management; and (c) the contemporary ecology of Erode and the western region. The three have developed separately, and studies connecting them are rare. This study attempts to connect them.

3. The Five Landscapes and Human Settlement

Food, clothing and shelter are the basic needs of human beings. Of these, shelter is not only a place for bodily protection; it is interwoven with human feelings, identity, culture and way of life. People regard the soil on which they were born and the land on which they live as the identity of their lives and form an emotional bond with it. Their occupations, social relations and practices of life are shaped by the natural environment of the land in which they live. In this sense, the structure of habitation reveals the human relationship with nature and human adaptation. The people of the Sangam age built their dwellings according to the nature of their land, its natural resources, the climate and their occupations. In this way they revealed a way of life integrated with nature and a culture that adapted itself to its environment. In the Sangam age, the places where people lived were mostly located beside water bodies. Mayilai Seeni Venkatasamy affirms this:

> *"History tells us that in every country of the world the places where human beings attained civilisation were the banks of rivers and lakes. This is indeed true." (Venkatasamy, 1974, p. 9)*

3.1 Settlements of the Kurinji People

Humans who had wandered as nomads built shelters in their habitat, the hills of the *Kurinji tiṇai*, using whatever was available there. They raised walls from bamboo, small branches and grasses found in the hills. People who had lived hidden in bushes, caves and behind fences to protect themselves from threatening animals began, by watching birds and animals, to build dwellings of their own; in the hills they also made shelters among the rocks. The *Kurinji* people built huts of hill grass and *ūkam* grass. The hut of the *kāṉavar* (forest dwellers) was low and squat. The people of *Kurinji* were called *kuṟavar*, *kāṉavar*, *veṟpaṉ* and *cilampaṉ*, and their settlements were called *pākkam*, *ciṟukuṭi*, *pāṭi* and *kuṟicci*.

தேம்பிழி நறவின் குறவர் முன்றில்

… the courtyard of the Kuṟavar, rich with toddy pressed from honeycombs …

— Akananuru 78.7

From this *Akananuru* poem, which speaks of the courtyard of the *kuṟavar* with toddy made by pressing sweet honeycombs, we learn that the *kuṟavar* built their houses with courtyards (*muṉṟil*).

புல் வேய் குரம்பை புலர ஊன்ற

... planting it upright to dry on the grass-thatched hut ...

— Akananuru 172.10

This poem describes the scene of a *kāṉavaṉ* with hands as strong as iron who fought an elephant that attacked him, brought back its white tusk and planted it upright on his grass hut to dry. We learn that the tribal people thatched the roofs of their houses with the grasses available to them.

3.1.1 Habitations of the Kurinji People of Erode District

The *Kurinji* people of the Sangam age lived in low huts and secure shelters (*kurampai*) built from materials naturally available in the hills, such as bamboo, branches, grass and stone. By comparison, there has been a notable change in the settlement pattern of the tribal people living today in the hill areas of Erode District, such as Sathyamangalam, Bargur, Thalavadi, Kadambur and Kongadai.

Whereas the Sangam age had huts built from natural materials, most dwellings today are built with modern materials such as mud, brick, stone, cement, tile and concrete. Through government housing schemes and programmes to improve basic amenities, many families have obtained permanent houses. Nevertheless, in some remote hill settlements, traditional elements of habitation continue – simple huts using natural materials, low roofs and houses built to suit the hill slope. The habitation of the present-day *Kurinji* people of Erode District thus reveals both a shift from the nature-based settlement tradition of the Sangam age towards modern permanent settlement and, at the same time, the continuity of traditional knowledge that adapts to landform, climate and local resources.

3.2 Settlements of the Mullai People

The *Mullai* people built houses somewhat taller than those of the *Kurinji* people. The doors of their houses were made of many sticks and poles, which made it easy to tie the goats and cattle they reared. In part of the house, or near it, they built a pen (*toḻuvam*) to keep goats and cattle. *Perumpanatrupadai* describes this:

குளகு அரை யாத்த குறுங்கால் குரம்பைச்

செற்றை வாயில் செறிகழிக் கதவின்

கற்றை வேய்ந்த கழித்தலைச் சாம்பின்

அதளோன் துஞ்சும் காப்பின் உதள

நெடுந்தாம்பு தொடுத்த குறுந்தறி முன்றில்

கொடுமுகத் துருவையொடு வெள்ளை சேக்கும்

இடுமுள் வேலி எருப்படு வரைப்பின்

Short-legged huts with frames bound by fodder leaves,

doorways of brushwood and doors of close-set sticks,

thatched with bundles of grass on pole-ends, where the herdsman sleeps on a hide on his guarded bed;

courtyards of short stakes tied with long ropes for the rams,

where curve-faced ewes rest with white goats

within thorn-fenced enclosures heaped with dung.

— Perumpanatrupadai 147–154

In the Sangam age, the herders (*āyar*) of the *Mullai* landscape lived in simple huts. Their houses were small huts thatched with straw, in which they slept on beds of animal hide. In the courtyard there were stakes for tying goats and a secure pen fenced with thorns.

3.2.1 Habitations of the Mullai People of Erode District

In present-day Erode District, although the habitation of the *Mullai* people differs from the Sangam hut, some of its basic elements of life continue. Those who rear livestock build a tethering ground (*kaṭṭuttarai*), cattle shed or livestock enclosure adjoining their farmhouse. This arrangement may be regarded as a modified form of the traditional method that joins human habitation and animal husbandry in a single living space. However, because today's houses are mostly built of modern materials such as brick, cement and concrete, the hut made of natural materials seen in the Sangam age has largely changed.

Literary evidence indicates that among the *Mullai* people of the Sangam age there was a migratory way of life in which they moved with their livestock in search of pasture and lived in temporary huts. In present-day Erode District, such temporary migration has largely declined because of permanent settlements, roads, agricultural land use and changes in animal husbandry. Nevertheless, elements such as separate livestock enclosures, grazing activities and cattle sheds attached to houses continue in some areas.

The habitation of the present-day *Mullai* people of Erode District is therefore not a direct continuation of the form of the Sangam *Mullai* dwelling, but a continuation of a tradition transformed in response to changes over time in building technology, land use and ways of life. That the relationship among house, cattle shed, livestock and pasture persists in some areas makes it an important field for understanding the link between the *Mullai* habitation knowledge recorded in Sangam literature and contemporary local knowledge. In the Kongu region there is also the custom of calling the place where goats and cattle are penned, and the herders' settlements that grew around it, *paṭṭi*. The house structure of the *Mullai* people can be seen in places in Erode District such as Kavundapadi and Nerinjipettai (formerly Nerinjipadi), and in towns such as Anthiyur and Pavalathanpalayam.

3.3 Settlements of the Marutham People

Marutham is the land of fields and the area around them. Because it abounded in *marutam* trees, it was called the *Marutham* land, and its chief was called *ūraṉ*. A settlement comprising one or two villages was called an *ūr*, and one comprising many *ūr*s a town (*nakaram*); all these represent the growth of the *Marutham* landscape. Because the region was full of fields, an agricultural civilisation flourished here, and people lived in wealth and prosperity. The people living here built their houses with the clay and fired bricks available in the region, and roofed them with coconut fronds. Every house had pillars, a sloping veranda (*tāḻvāram*) and a raised platform (*tiṇṇai*). Literature speaks of "*teṟṟip pāvai taṉi maṇal āyirum*", the raised verandas (*teṟṟi*) of such houses.

எழுகாடு ஓங்கிய தொழுவுடை வரைப்பின் …

பிடிக்கணத்து அன்ன குதிருடை முன்றில்

களிற்றுத் தாள் புரையும் திரிமரப் பந்தர்

குறுஞ்சாட்டு உருளையொடு கலப்பை சார்த்தி

நெடுஞ்சுவர் பறைந்த புகைசூழ் கொட்டில்

பருவ வானத்துப் பாமழை கடுப்ப …

கருவை வேய்ந்த கவின்குடிச் சீறூர்

… enclosures with cattle sheds …

courtyards with granaries like a herd of she-elephants,

pandals on turned posts like the feet of a tusker,

smoky sheds whose long walls are worn where ploughs and small cart-wheels lean,

… like the spreading rain-clouds of the season,

the lovely little village of houses thatched with dry grass.

— Perumpanatrupadai 185–191

In the *Marutham tiṇai*, houses ceased to be merely for protection and were built to display wealth and for aesthetic pleasure. Marutham houses contained everything from tools used for ploughing to storehouses for grain and the threshing floor needed for harvesting and processing grain.

Erode District has an abundance of fertile fields. In the old *Marutham* villages, in the areas around Odanilai and Chennimalai, there are houses with thick walls built of clay and country-tile roofs laid on palmyra beams, which help to keep the house cool in summer. Houses with mud walls were once common, but today all that has changed and concrete houses have begun to appear in large numbers. Foreign contact, the growth of modern lifestyles and the development of science have brought many changes to houses as well. Houses once built in harmony with nature are now all built with artificial materials, based on ease of work and lower cost.

3.3.1 Marutham Settlements of the Sangam Age and of Present-Day Erode District

- **House–field relationship:** because *Marutham* settlements were located close to the fields, habitation, agriculture and animal husbandry were interconnected.
- **Internal divisions of the house:** parts such as the *tiṇṇai*, veranda, courtyard, kitchen and granary were arranged to suit the daily needs of the family.
- **Grain storage:** structures such as the granary (*kaḷañciyam*) or grain bin (*kutir*) for safely storing paddy and other produce were key elements of *Marutham* habitation.
- **Space for agricultural implements:** a separate space or shed was set aside for keeping the plough, yoke, tilling tools and carts.
- **Courtyard-based life:** the courtyard was used for many activities, such as drying grain, processing produce and household purposes.
- **Climate-appropriate construction:** mud walls, tiled roofs and thatched roofs acted as natural means of temperature control suited to Erode's hot climate.
- **Communal settlement structure:** not only individual houses but many interrelated houses grew together into communal settlements such as the *ūr*, the hamlet and the town.
- **Present-day change:** in modern houses, traditional elements such as the granary, a separate space for implements and the courtyard have declined, and the house has become mostly a place of residence alone. Although building materials and house forms have changed, the relationship among house, field, agriculture, storage and livestock can still be seen in some rural areas.

3.4 Settlements of the Neithal People

The *Neithal* people of the Sangam age built simple huts and dwellings from natural materials such as palmyra, grass and branches, suited to the maritime environment. Because present-day Erode District does not include a maritime *Neithal* landscape, *Neithal* settlements cannot be observed here directly. Only the riverside areas of Erode can be mentioned, on the basis of adaptation to a water-based habitat.

3.5 Settlements of the Palai People

Kurinji and *Mullai*, departing from their nature, become *Palai*. The *Palai* people, living in sun-scorched dry forests and sandy areas, built temporary, simple houses from branches and grasses.

முல்லையும் குறிஞ்சியும் முறைமையில் திரிந்து

நல்லியல்பு இழந்து நடுங்குதுயர் உறுத்துப்

பாலை என்பதோர் படிவம் கொள்ளும்

When Mullai and Kurinji depart from their proper order,

lose their gracious nature and inflict trembling distress,

they take on the form that is called Palai.

— Silappatikaram

So says *Silappatikaram*. In the *Palai* land, because of the intense heat, water bodies dry up, trees wither and the land loses its beauty. Without shade or water, the land is hot; literature calls it *iṉṉā vaippu* (a cruel place). The smell of meat always hung about these people's houses, for hunting was their main occupation.

நீள் அரை இலவத்து அலங்கு சினை பயந்த

பூளை அம் பசுங்காய் புடை விரிந்து அன்ன

வரிப்புற அணிலொடு கருப்பை ஆடாது

யாற்று அறல் புரையும் வெரிநுடைக் கொழுமடல்

வேல் தலை அன்ன வை நுதி நெடுந்தகர்

ஈத்து இலை வேய்ந்த எய்ப்புறக் குரம்பை

… where neither the striped squirrel – like the split green pod of the silk-cotton

on the swaying bough of the tall-trunked ilavam – nor the field rat plays;

the hut with a back like a porcupine's, thatched with wild-date leaves,

whose thick fronds are ribbed like ripples of river sand

and whose long tips are sharp as spearheads.

— Perumpanatrupadai 83–88

Perumpanatrupadai describes, in a dry setting of squirrels and field rats, the small, simple hut (*kurampai*) of the women of the Eyinar clan, thatched with long fronds sharp as spearheads and with wild-date leaves.

In Erode District, in Anthiyur and the surrounding areas, in times without rain or irrigation, one can see birds, animals and small creatures struggling for food. In this land, which looks like *Palai*, people engage in occupations such as herding cattle, collecting honey and hunting. In Tamil Nadu there is no separate *Palai* land as such; there

is only the dry state that follows the rains. Today theft has become an occupation that some take up because of economic hardship; although cattle lifting and highway robbery persist, they mostly take place at night. The houses of these people today mostly resemble those of the *Mullai* people.

3.5.1 Present-Day Dryland Settlements of Erode District

- **Climatic impact:** in periods of low rainfall and drought, settlements and ways of life change to suit water scarcity and high temperatures.
- **Continuity of the simple building tradition:** temporary huts of natural materials such as branches, grass and palm fronds have greatly declined, and permanent houses built of brick, cement and concrete have increased.
- **Mullai–Palai habitation link:** present-day houses in dry areas, especially among those who rear livestock, have a house-and-cattle-shed arrangement similar to *Mullai* settlements.
- **Livestock-based layout:** the practice of building a cattle shed or tethering ground beside the houses of those who rear goats and cattle continues.
- **Water-centred settlement:** trends such as settlements located near places where drinking water and water for livestock are available in dry periods, or changes in the use of the habitat according to water facilities, can be observed.
- **Occupation–habitation link:** a habitation pattern linked with occupations such as livestock rearing, honey collection and agricultural wage labour continues in some areas.
- **From natural to artificial environment:** settlements traditionally built with regard to the heat, water and resources of the environment have now changed under the influence of roads, electricity, drinking-water supply, economic conditions and modern building technology.

Rather than comparing present-day dryland settlements of Erode District directly with the temporary settlements of the Sangam *Palai* land, they may be compared on the basis of drought, water scarcity, occupation, livestock rearing, building materials and changes in habitation.

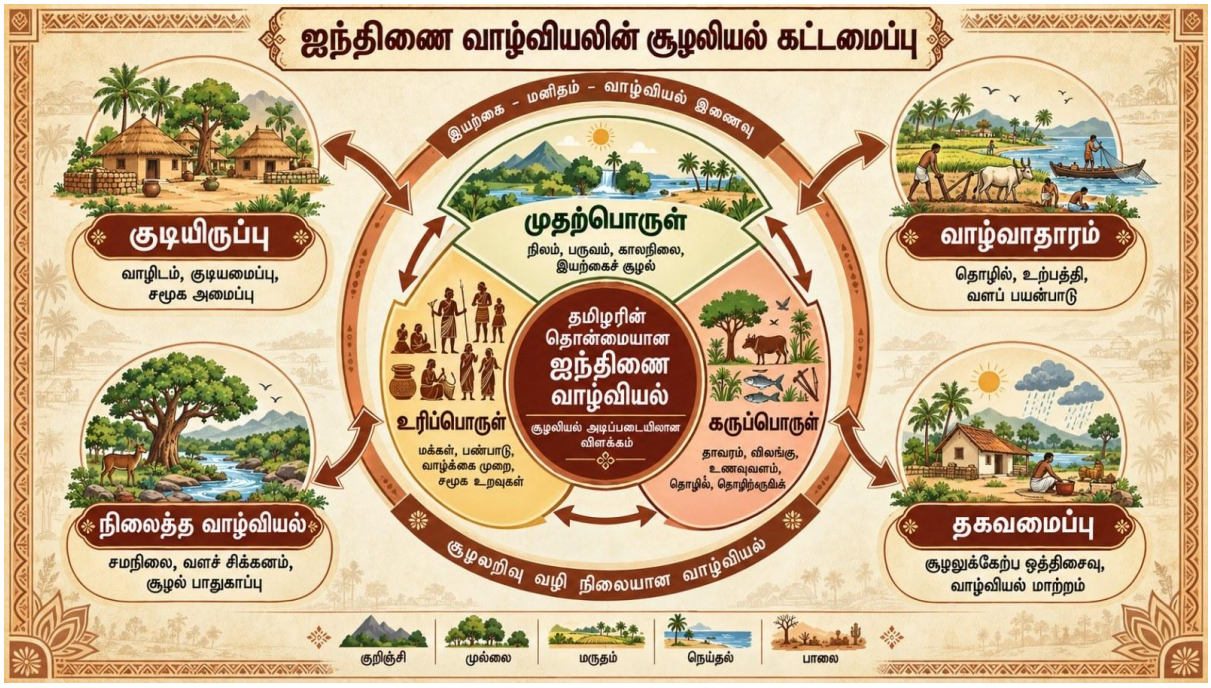

Figure 1. Conceptual framework of the study of human ecology in the five landscapes (infographic; labels in Tamil)

Figure 1 explains the ancient *aintiṇai* way of life of the Tamils on an ecological basis. Centred on the three great categories of *mutaṟporuḷ*, *karupporuḷ* and *uripporuḷ*, the diagram clearly shows their relationship with the four main components of the study: settlement, livelihood, adaptation and sustainable living.

4. Livelihood

4.1 Livelihood in the Kurinji Landscape

The livelihood of the *Kurinji* people was based on gathering many kinds of natural resources and cultivating millets. Various food resources – honey, tubers, jackfruit, bamboo rice and millet – ensured the food security and livelihood adaptation of the hill people, as this poem clearly records:

ஒன்றே, சிறியிலை வெதிரின் நெல் விளையும்மே

இரண்டே, தீஞ்சுளைப் பலவின் பழம் ஊழ்க்கும்மே

மூன்றே, கொழுங்கொடி வள்ளிக் கிழங்கு வீழ்க்கும்மே

நான்கே … திணி நெடுங் குன்றம் தேன் சொரியும்மே

First, the small-leaved bamboo yields its rice;

second, the jackfruit ripens with its sweet segments;

third, the lush valli creeper sends down its tubers;

fourth … the dense, lofty hill pours down honey.

— Purananuru 109

Further, the phrase

கருங்கோல் குறிஞ்சிப் பூக்கொண்டு

பெருந்தேன் இழைக்கும் நாடன்

… the man of the hill country, where bees build great honeycombs

from the blossoms of the dark-stemmed kuriñci.

— Kuruntokai 3

conveys the natural-resource chain of *kuriñci* flower, bee, honey and human being. Dietary diversity was thus a key foundation of the livelihood security of the *Kurinji* people.

4.1.1 Livelihood of the Kurinji People of Erode District

The livelihood of people living today in the hill areas of Erode District – Sathyamangalam, Thalavadi, Bargur and Kadambur – includes millet farming, animal husbandry, the collection of honey and some forest resources, and agricultural wage labour. Choosing occupations and crops to suit the landform, water resources and climate of the hills is their livelihood adaptation. Comparatively, then, the Sangam *Kurinji* people's dependence on diverse natural resources can be seen continuing, in altered form, in the livelihoods of the hill people of present-day Erode.

4.2 Livelihood in the Mullai Landscape

The livelihood of the *Mullai* landscape was based on a triangular relationship of forest, livestock and people. Forest grass served as fodder for livestock, and livestock provided resources for livelihood such as milk, curd,

ghee and manure. The shifting use of pastures according to season reveals the ecological adaptation of the *Mullai* people. Forest, livestock and human livelihood thus formed a continuous, interdependent system.

4.2.1 The Herdswoman and the Calf

சிறுதாம்பு தொடுத்த பசலைக் கன்றின்

உறுதுயர் அலமரல் நோக்கி ஆய்மகள்

நடுங்குசுவல் அசைத்த கையள் கைய

கொடுங்கோற் கோவலர் பின்நின்று உய்த்தர

இன்னே வருகுவர் தாயர் என்போள்

Seeing the pale calf, tied with a short rope, tossing in deep distress,

the herdswoman, her hands folded over her shivering shoulders,

says: "Your mothers will come at once,

driven from behind by the herdsmen with crooked staffs in their hands."

— Mullaippattu 12–16

In this poem we see a young calf, tied with a short rope, grieving for its mother, and the herdswoman consoling it. The cows returning in the evening from pasture, the calves tied near the house, and the herdsman's staff record the daily livelihood cycle centred on animal husbandry. This reveals how grazing, livestock care and settlement were interconnected.

4.2.2 Curd and Household Life

முளிதயிர் பிசைந்த காந்தள் மெல்விரல்

கழுவுறு கலிங்கம் கழாஅது உடீஇக்

குவளை உண்கண் குய்ப்புகை கமழத்

தான் துழந்து அட்ட தீம்புளிப் பாகர்

இனிது எனக் கணவன் உண்டலின்

நுண்ணிதின் மகிழ்ந்தன்று ஒண்ணுதல் முகனே

Her soft fingers, like kāntaḷ blossoms, had kneaded thick curd;

she wiped them on her garment and wore it unwashed;

with the smoke of seasoning wafting about her kuvaḷai eyes

she stirred and cooked the sweet-sour stew herself –

and when her husband ate it, saying it was delicious,

her bright-browed face glowed with a quiet joy.

— Kuruntokai 167

This poem reveals how resources obtained from livestock, such as milk and curd, were bound up with the domestic food economy. In particular, the livelihood sequence livestock rearing → milk production → making curd →

family food can be seen through it. The livelihood of the *Mullai* landscape, therefore, was not dependent on animal husbandry alone but also included the household economy and food practices based on it.

4.2.3 Mullai Livelihoods in Erode District

In the hill and forest areas of present-day Erode District, including Sathyamangalam, Thalavadi, Bargur and Kadambur, animal husbandry, grazing, millet farming, and a milk and milk-based economy are found in ways comparable with the Sangam *Mullai* way of life. Livelihoods dependent on forest and pasture resources, and the care of livestock according to the season and water resources, are adaptive practices that continue today. In addition, subsidiary occupations such as the collection of forest resources and agricultural wage labour support livelihoods in some areas. The forest–livestock–human livelihood relationship of the Sangam *Mullai* landscape can be seen, comparatively, continuing in altered form in the lives of the people of the hill and forest areas of present-day Erode District.

4.3 Livelihood in the Marutham Landscape

In Sangam literature, the livelihood of the *Marutham* people centred on agriculture, irrigation, animal husbandry and ploughing. Rivers, ponds, fields and fertile soil formed the basis of agriculture. A *Purananuru* poem says:

நெல்லும் உயிரன்றே; நீரும் உயிரன்றே;

மன்னன் உயிர்த்தே மலர்தலை உலகம்

Rice is not the life of the world, nor is water;

the wide world has the king for its life.

— Purananuru 186

Here paddy and water are weighed against life itself, which indicates their importance. It reveals how water resources, agriculture and people's lives were interconnected in *Marutham* life.

4.3.1 Livelihood of the Marutham People of Erode District

In the plains of the Cauvery, Bhavani and Noyyal rivers in present-day Erode District, agriculture is the main livelihood. Crops such as paddy, turmeric, sugarcane, banana and coconut, as well as milk production and animal husbandry, form part of people's livelihoods. Agriculture is carried out using water sources such as river water, canals, wells and groundwater. In this way, the water-based agricultural livelihood of the Sangam *Marutham* landscape can be seen continuing in present-day Erode District with changed technologies.

4.4 Livelihood of Riverside People

The livelihood of the riverside people of Erode District depends mostly on agriculture, animal husbandry, fishing, sand and small river-based occupations. In the Cauvery, Bhavani and Noyyal river areas, water resources are the main basis of agricultural activity.

4.5 Livelihood in the Palai Landscape

In the Sangam age, the *Palai* people based their livelihood on hunting, occupations connected with travel, the search for wealth, animal husbandry and the use of available natural resources. They also adapted their livelihoods to water scarcity and intense heat.

நிலம் நீர் அற்று நீள் சுனை வறப்பக்

குன்று கோடு அகையக் கடுங்கதிர் தெறுதலின் …

As the land lost its water and the long springs dried,

as the fierce rays scorched until the peaks of the hills split …

— Akananuru 295

This poem portrays the *Palai* environment in which water bodies dry up and the land is parched by intense heat. In such an environment, adaptations such as knowing where water lies and changing livelihoods to suit travel were important.

4.5.1 Livelihood of the People of the Dry Areas of Erode

In present-day Erode District – in Bhavanisagar, Sathyamangalam, Anthiyur, Gobichettipalayam and the drought-prone interior areas – people take up, according to rain and water resources, crops with low water requirements such as sorghum, pearl millet, ragi, groundnut and tapioca, as well as animal husbandry, agricultural wage labour and seasonal occupations. They live by depending on water sources such as wells, borewells and ponds, and by changing their crops and occupations according to the rain. That the people of today's dry lands, like the *Palai* people of the Sangam age, adapt their livelihoods to water scarcity and climatic variation is a significant continuity.



Figure 2. Ecological zones of Erode District and the comparative sites for the five landscapes (illustrated map; labels in Tamil)

Figure 2 explains the geographical structure of Erode District. The hill areas of Sathyamangalam, Thalavadi, Bargur and Kadambur are identified as *Kurinji* and *Mullai* lands, and the plains through which the Cauvery, Bhavani and Noyyal flow as *Marutham* land. The excavation site of Kodumanal is also marked.

5. Adaptation

5.1 Adaptation in the Kurinji Tiṇai and among the Hill People of Present-Day Erode District

The *Kurinji tiṇai* denotes hills and the land around them. High hills, slopes, valleys, waterfalls, springs, caves, dense forests and wild animals are recorded in Sangam literature as the natural elements of this land. This geographical and climatic setting determined the occupations, food, settlement, use of tools, social relations and

cultural practices of the people who lived there. The life of the *Kurinji* people may therefore be regarded as an adaptive way of life integrated with the natural environment.

5.1.1 Occupational Adaptation to the Natural Environment

Because *Kurinji* had little land suitable for extensive agriculture as in the plains, the livelihood of the *kuṟavar*, *vēṭṭar* and *kāṉavar* who lived there was based on hill and forest resources. Hunting, collecting honey, gathering tubers and wild foods, and cultivating millets such as *tiṉai* were occupations suited to the hill environment. This produced a diversity of livelihood that did not depend on a single resource but used many natural resources.

The use of tools such as the bow, arrow and spear, needed for hunting and for travel along hill paths, also shows technological adaptation to that environment. Likewise, the use of honey, tubers, wild fruits, millet and hunted game reveals knowledge that turned the resources available in the hills directly into food.

5.1.2 Adaptation of Settlement

Patterns of settlement were also shaped by the landform of the hills, the climate and the threat of wild animals. There is literary evidence that caves, the feet of rocks and naturally protected places were used as shelters.

Huts built from local natural materials such as branches and grasses also show the hill people's economy of resources and their building knowledge suited to the environment. The settlement pattern of *Kurinji* is therefore regarded as an adaptation developed with locally available resources to suit the natural constraints of the hills.

5.1.3 Adaptation of Food

The diet of the *Kurinji* people was closely bound up with their ecological knowledge. Honey, tubers, wild fruits, crops such as *tiṉai* and hunted foods created their dietary diversity. Its special feature was the use of natural resources according to the season and their availability. The way food was obtained thus became an important ecological adaptation.

5.1.4 Social and Cultural Adaptation

In the hills, activities such as travel, hunting, protection from wild animals and gathering resources required group cooperation rather than individual action. Social structures such as kinship, group solidarity and mutual help therefore gained importance. Further, cultural practices such as the worship of Murugan as the god of the hills and the *veṟiyāṭṭal* (ecstatic dance) reveal the integration of the natural environment, belief and social life.

5.1.5 Adaptation in the Hill Areas of Erode District

Not every feature of the Sangam *Kurinji* land can be compared directly with a particular present-day landscape. Nevertheless, the natural environment found in the hill and forest areas around Sathyamangalam, Thalavadi, Bargur, Kadambur, Anthiyur and Gunderipallam in Erode District, and some of the practices of the people living there, can be compared with the ecological adaptation of the *Kurinji tiṇai*. On the basis of their relationship with their environment, the hill and tribal people living in these areas engage in livelihoods such as collecting minor forest produce, including wild honey, medicinal herbs and tubers, millet farming, animal husbandry and small-scale agriculture. Local knowledge handed down through generations about hill paths, springs, plants, animals and seasonal changes is also part of this way of life.

Choosing crops to suit the landform and the availability of water in the hills, carrying out agricultural activities according to the season, and using forest resources are regarded as adaptations based on the availability of natural resources. In this sense there are comparable features between the use of natural resources by the Sangam *Kurinji* people and some of the practices of the hill people of present-day Erode.

5.1.6 Change over Time and Change in Adaptation

From the Sangam age to the present, significant changes have taken place in the lives of hill people. Forest protection laws, administrative practices, roads and transport, education, market links, modern medicine, government welfare schemes and new employment opportunities have changed traditional livelihoods. As a result, although some old practices that depended directly on natural resources have changed, the relationship with the environment continues to be expressed in food, agriculture, occupation, plant knowledge, the use of forest resources and experiential knowledge of the seasons.

5.2 Adaptation in the Mullai Tiṇai and Mullai Life in Present-Day Erode District

The *Mullai tiṇai* denotes the forest and the land around it. Rain, green pastures, shrubs, trees, forest streams and water bodies were its natural elements. The main livelihood of the people who lived in this environment was animal husbandry. The *āyar*, *iṭaiyar* and *kōvalar* made grazing livestock, protecting them and using milk products the main elements of their life. Sangam literature contains many names for herders and many records of herds of livestock.

5.2.1 Occupational Adaptation to the Natural Environment

The natural setting of the *Mullai* land, combining forest and grassland, was suited to animal husbandry. The economic life of its people therefore centred on livestock such as cattle, goats and buffaloes. Taking livestock out to graze, bringing them back to the settlement in the evening, and searching for water and green fodder required knowledge based on continuous observation of the natural environment. This can be seen in the following *Akananuru* poem:

முல்லை வியன்புலம் பரப்பிக் கோவலர்

குறும்பொறை மருங்கின் நறும்பூ அயரப்

பதவு மேயல் அருந்து மதவு நடை நல்ஆன் …

மன்று நிறை புகுதரும்

Where the herdsmen, spreading the herds over the wide mullai land,

deck themselves with fragrant flowers beside the low hillocks,

the fine cows of stately gait, having grazed on the grass, …

come in to fill the common ground.

— Akananuru 14

The poem points to the *mullai* plants spread across the *Mullai* land, the presence of herdsmen, and the cows grazing on grass and returning towards the common ground (*ma<u>n</u>ru*) in the evening.

This evidence reveals a nature-based way of life: pasture, herding and bringing the herd back to the settlement. Adaptation in the *Mullai* land is therefore understood not merely as animal husbandry but as a knowledge of living that integrates pasture resources, water, climate and the movement of livestock.

5.2.2 Seasonal Adaptation

The rainy season was important in the life of the *Mullai* land. After the rain, the forest turned green, water bodies filled and grasses grew, increasing the pasture available for livestock. The arrival of the monsoon was therefore directly connected with the activities of animal husbandry.

A *Mullai* poem in *Akananuru* records in detail the natural change by which the forest flourishes after rain:

முல்லை வைந்நுனை தோன்ற இல்லமொடு

பைங்காற் கொன்றை மென்பிணி அவிழ …

கருவி வானம் கதழ் உறை சிதறிக்

கார் செய்தன்றே கவின்பெறு கானம்

As the sharp-tipped buds of the mullai appear,

and the green-stemmed konrai loosens its soft buds together with the illam …

the sky with its massed clouds has scattered swift drops,

and the lovely forest has made the rainy season.

— Akananuru 4

The poem points to the forest becoming beautiful and the plants flourishing because of the rain. From it we can understand the ecological chain of rain, plant growth, pasture and livestock life. The life of the *Mullai* people was therefore an adaptive life in which they understood the seasons and organised their occupation accordingly.

5.2.3 Protecting Livestock and Migration

For people who lived with herds of livestock, their protection was important. Practices such as grazing the herd together, choosing safe pastures and moving to areas where water and fodder were available are regarded as adaptations that developed to suit the environment.

The life of the *Mullai* people may not have been entirely settled; it may have involved movement depending on the availability of pasture. Such movement is understood as an adaptation to spatial and seasonal changes in natural resources.

5.2.4 Adaptation of the Milk-Based Economy

Livestock were not only a grazing resource but also a food and economic resource. Milk products such as milk, curd, buttermilk, butter and ghee were used in food and in exchange.

திண்கால் உறியன் பானையன் அதளன்

நுண்பல் துவலை ஒருதிறம் நனைப்பக்

கால் ஊன்றிய தனிநிலை இடையன்

மடிவிடு வீளை கடிது சென்று இசைப்பத்

தெறிமறி பார்க்கும் குறுநரி வெரீஇ …

The lone herdsman with his strong-corded sling, his pot and his hide,

standing on one leg while fine drizzle wets one side of him,

lets out a whistle through curled lips that carries swiftly,

and the small jackal eyeing the leaping lambs takes fright …

— Akananuru 274

The poem mentions the milk pot and the sling (*uṟi*), tied with strong cord, that holds it. Animal husbandry was thus not merely an occupation but a livelihood that integrated food security and economic security.

5.2.5 Integration of Agriculture and Livestock

It would be inappropriate to regard *Mullai* life as dependent entirely on livestock. Millet cultivation and animal husbandry supported each other. Millets such as *varaku* and *cāmai* were cultivated. Because crop residues from agriculture served as fodder for livestock, and livestock dung as manure for the land, an agriculture–livestock cycle was created.

This may be regarded as a form of traditional ecological knowledge that reused resources without waste.

5.2.6 Mullai Adaptation in Erode District

It is not appropriate to identify the Sangam *Mullai* land as it was as a geographical unit in Erode District. However, some elements of the *Mullai* way of life can be compared in areas where forest, pasture, agriculture and animal husbandry are combined.

That animal husbandry is carried out together with agriculture in the rural areas of Anthiyur, Bhavanisagar, Gobichettipalayam, Thalavadi and their surroundings makes them a field for studying modern forms of *Mullai* adaptation.

Livestock–agriculture integration. In Erode District, animal husbandry is bound up with the agricultural life of many families. Cattle, buffaloes, goats and sheep serve as sources of food, income and agricultural support. Crop residues from the fields, such as straw, sorghum stalks and sugarcane trash, are used as fodder. In turn, livestock dung is used as natural manure, supporting the fertility of the land. A resource cycle is thus created: agriculture, fodder, livestock, natural manure and again agriculture.

Water and fodder adaptation. In some parts of Erode District, monsoon variability and drought periods affect animal husbandry. Practices such as storing fodder, storing water and using available pasture therefore gain importance. These can be compared with the seasonal movement of livestock and the use of pasture by the Sangam *Mullai* people. Rather than concluding that the two are in direct continuity, however, it is more appropriate to call them similar adaptations that arise from ecological need.

Local ecological knowledge. One of the important adaptations of the *Mullai* people was the knowledge of observing nature and using its resources. Whether generational knowledge about fodder plants, water sources, seasonal changes, pastures and the care of livestock exists among the hill and rural people of present-day Erode can be recorded through fieldwork. In this way, the *Mullai* ecological knowledge recorded in Sangam literature and present-day local knowledge can be compared at three levels: continuity, change and reconstitution.

Social adaptation. Animal husbandry is not only an individual activity; it also requires the cooperation of the family and the community. Activities such as caring for the herd, grazing, arranging water and fodder and protecting livestock create social ties. This can be compared with the group-based pastoral life of the Sangam *Mullai* people.

5.2.7 Change in Mullai Adaptation over Time

The adaptation of the Sangam *Mullai* people had a direct relationship with natural resources. In present-day Erode that relationship has not disappeared entirely; it has taken a new form, combined with modern agriculture, the market economy, veterinary medicine, transport, dairy systems, government livestock schemes and changes in land use.

When the adaptation of the Sangam *Mullai* and the *Mullai*-related life of present-day Erode District are compared, therefore, rather than saying "the same life continues", we may say that "knowledge of living based on natural resources has been reshaped into new forms in response to change over time".

5.3 The Marutham Adaptation of the Sangam People and Marutham Life in Present-Day Erode

The *Marutham tiṇai* is a system of life based on plains of fields and riverbanks enriched by water bodies such as rivers, ponds, tanks and canals. The natural environment of this land made agriculture the main occupation and involved many adaptations: storing water, using irrigation, choosing crops, employing livestock in agriculture and siting settlements around food production. The adaptation of the *Marutham tiṇai* may therefore be called "water-centred agricultural adaptation".

5.3.1 Agricultural Adaptation to the Fertility of the Land

In the Sangam age, people understood the nature of the land and organised their occupations and livelihoods accordingly. Because *Marutham* was regarded as a fertile plain, paddy cultivation became its main emblem. In the *Marutham* section of *Ainkurunuru*, the abundance of paddy, water bodies, buffaloes and the field environment are portrayed continuously. In a *Marutham* poem, the prayer

நெல் பல பொலிக; பொன் பெரிது சிறக்க

May paddy flourish in plenty; may gold greatly abound.

— Ainkurunuru 1

indicates that paddy production was associated with the prosperity of the society of that time.

In a *Purananuru* poem,

நெல்லும் உயிரன்றே; நீரும் உயிரன்றே;

மன்னன் உயிர்த்தே மலர்தலை உலகம்

Rice is not the life of the world, nor is water;

the wide world has the king for its life.

— Purananuru 186

paddy and water are set beside life itself. These lines reveal the fundamental importance given in Sangam society to food production and water resources. It may therefore be said that the adaptation of the *Marutham* people involved a continuous ecological relationship: using land, obtaining water, cultivating, producing food and creating social prosperity.

5.3.2 Water Management and Irrigation Adaptation

Agricultural production in *Marutham* depended on water. Farmland was made productive using water sources such as rivers, ponds, tanks and canals. That water and paddy are shown in Sangam literature as interconnected is excellent literary evidence of this. We thus learn that protecting water resources and using them for agriculture held an important place in the ecological knowledge of the *Marutham* people. This water–agriculture relationship later grew stronger in Tamil social thought as well. The *Thirukkural* affirms the importance of ploughing:

உழுதுண்டு வாழ்வாரே வாழ்வார்; மற்றெல்லாம்

தொழுதுண்டு பின்செல் பவர்

Those who live by the plough alone truly live;

all others eat by bowing to them and follow in their train.

— Thirukkural 1033

The adaptation of *Marutham*, therefore, was not only for individual livelihood; it also functioned as a production system that fed the whole of society.

5.3.3 Agricultural Implements and the Adaptation of Livestock

Implements such as the plough (*ēr*, *kalappai*) were used to till the land, and livestock such as bullocks in ploughing. This created an agricultural method that combined human labour with animal power. Harvesting, processing grain and storage were also continuous parts of agricultural production. The adaptation of the Sangam *Marutham* people thus appears at three levels: knowing the land, using implements and livestock, and storing the produce. Although it depended directly on natural resources, it reveals practical knowledge that used them in a planned way.

5.3.4 From Agriculture to Settlement and Social Development

The rich agricultural production of *Marutham* was the basis for the growth of permanent settlements. Because continuous food production supported the population, villages, markets, crafts and administrative institutions developed. *Marutham* thus became not merely farmland but a habitat in which production, settlement, trade and social organisation were interconnected. Because the farmer is regarded as one who provides food not only for himself but for others, agriculture rises from an individual occupation to the basic production system of society.

5.3.5 The Transformed Adaptation of the Marutham Tiṇai in Present-Day Erode

The natural foundations of the Sangam *Marutham* landscape can be seen continuing in particular parts of present-day Erode District. Although Erode is a landlocked inland district, the Cauvery, Bhavani and Noyyal rivers, together with various dams, canals and reservoirs, are important sources for agriculture. According to the district administration, the Bhavani, Cauvery and Noyyal are its main rivers, and the Bhavanisagar dam and its canal systems play an important role in irrigation. Rather than calling the *Marutham* adaptation of present-day Erode a continuation of Sangam *Marutham* life, we may say that its basic natural relationships continue, transformed with modern technology.

5.3.6 Change in the Choice of Crops

Whereas paddy was the main crop of the Sangam *Marutham* landscape, the cropping pattern of present-day Erode has diversified. According to current information from the district agriculture department, paddy, turmeric, banana, millets, pulses, oilseeds, cotton and sugarcane are cultivated, and about 70% of agricultural crops are grown with irrigation.

Turmeric is the distinctive agricultural and economic emblem of Erode, in which cultivation, processing, marketing and trade are interconnected.

The basic knowledge of "cultivating according to the land" seen in the Sangam *Marutham* landscape has thus changed in present-day Erode into a broader adaptation of "land + water + market + technology".

5.3.7 The Modern Form of Irrigation Adaptation

The *Marutham* way of life, which in the Sangam age centred on natural water sources, has expanded in present-day Erode with dams, canals, wells and modern irrigation methods. The Lower Bhavani Project, the Thadapalli–Arakkankottai canals, the Kalingarayan canal and the Mettur West Bank canal are important in the district's

irrigation system. The water-dependent agricultural adaptation of the Sangam age has thus expanded today into an engineering-based irrigation adaptation that distributes water in a planned way.

5.3.8 From Agriculture to Market and Industrial Adaptation

In the Sangam age, agricultural production fostered settlements and exchange. In present-day Erode, its modern forms include farmers' markets (*uḻavar cantai*), regulated markets, the turmeric trade, rice mills, oil mills and food-processing industries. Farmers' markets operate in many places in the district, and there are also institutions that connect agricultural producers with markets and trade. We can thus see a shift from the production-centred life of the Sangam *Marutham* landscape to the integrated agriculture–market–industry life of present-day Erode.

5.4 Adaptation in the Neithal Landscape

The *Neithal* people, who depended on the sea and the coast, took up occupations such as fishing and salt making suited to the maritime environment, and built simple dwellings from natural materials such as palmyra, grass and branches.

5.4.1 Riverside Adaptation in Erode

Because there is no maritime *Neithal* land in Erode District, *Neithal* adaptation cannot be referred to directly. Nevertheless, the people living along the banks of the Cauvery, Bhavani and Noyyal have adapted themselves to agriculture, animal husbandry and river-based occupations on the basis of water resources.



Figure 3. Settlements of the five landscapes: Sangam literature and their comparable forms in Erode (infographic; labels in Tamil)

Figure 3 compares the settlements of the five landscapes described in Sangam literature with their modern forms in the present-day Erode region. It clearly explains how the building materials, water sources and occupations of the hill hut, the house with cattle shed, the field-side settlement, the coastal hut and the temporary shelter have changed.

5.5 Adaptation in the Palai Tiṇai and in the Dry Areas of Present-Day Erode District

5.5.1 Adaptation in the Sangam Palai Landscape

Palai is regarded as land into which *Kurinji* or *Mullai* has been transformed, parched by intense heat and the absence of rain. The *Palai* people adapted their way of life to water scarcity, high temperatures, long journeys and the dangers of the road. Knowing and using water sources such as springs and pools, using resources that can survive on little water, arranging in advance the resources needed for long journeys, and using knowledge of directions and routes were their main adaptations.

விளங்குபகல் உதவிய பல்கதிர் ஞாயிறு

வளங்கெழு மாமலை பயங்கெடத் தெறுதலின்

அருவி ஆன்ற பெருவரை மருங்கில்

சூர்ச்சுனை துழைஇ நீர்ப்பயம் காணாது …

Because the many-rayed sun that brings the bright day

scorched the rich great hill till its yield was ruined,

searching the god-haunted pools on the flank of the great peak, where the waterfalls had ceased,

and finding no water …

— Akananuru 91

This points to a situation in which, because of intense heat, the waterfalls and pools of the hill dried up and no water could be found. From it we learn that knowing where water lay, coping with drought and planning journeys around water sources were important ecological adaptations of life in *Palai*. Further,

நிலம் நீர் அற்று நீள் சுனை வறப்பக்

குன்று கோடு அகையக் கடுங்கதிர் தெறுதலின் …

As the land lost its water and the long springs dried,

as the fierce rays scorched until the peaks of the hills split …

— Akananuru 295

clearly records the *Palai* environment in which the land is without water, the long pools have dried and the fierce sun strikes the land.

5.5.2 Adaptation in the Dry Areas of Erode District

In the dry and semi-arid areas of Erode District, people adapt their way of life to ecological challenges such as water scarcity, high temperatures, rainfall variability, drought-season farming and the care of livestock. Present-day adaptations include choosing crops with low water requirements; using water sources such as wells, borewells, ponds, check dams and rainwater harvesting; following drought-tolerant farming methods; caring for livestock; and migrating for seasonal employment when necessary.

Knowledge of water sources, the capacity to cope with drought, economical use of resources and shaping livelihoods to the environment were important in the adaptation of the Sangam *Palai* people. Among the people of the dry areas of present-day Erode District, too, adaptations such as water storage, crop choice, economy of resources, livestock care and livelihood change continue. Although time and technology have changed, adaptive

knowledge that changes human ways of life in response to drought and water scarcity appears as a basic continuity in both periods.

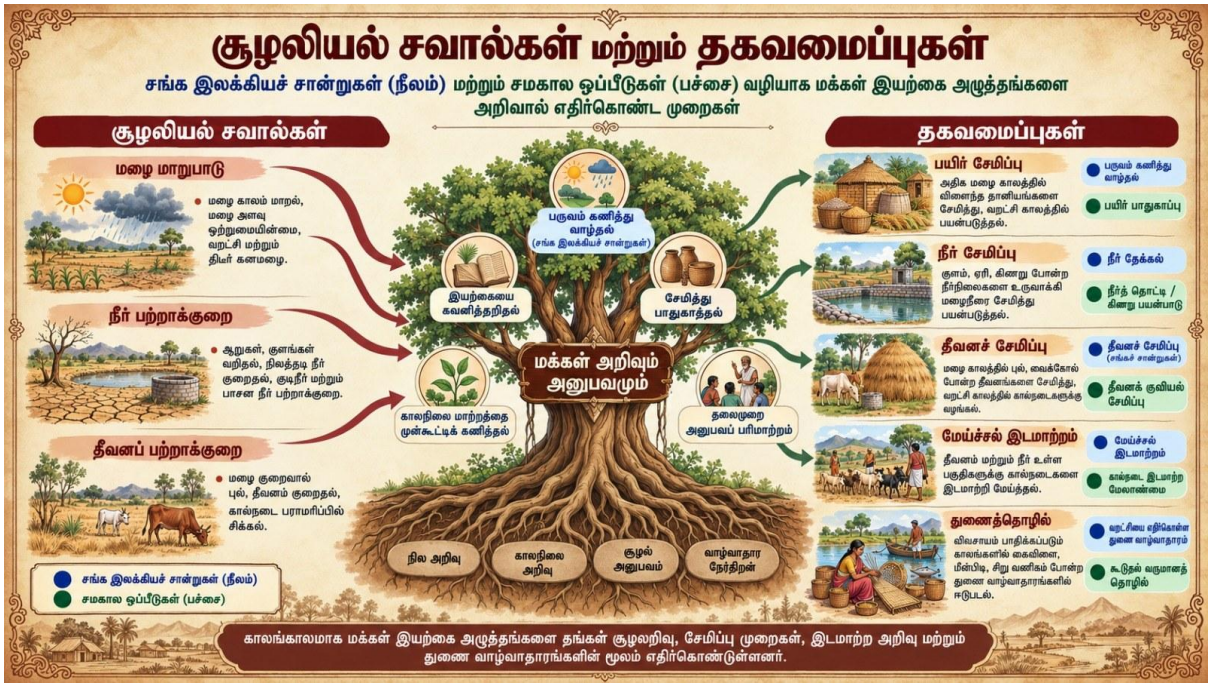

Figure 4. Ecological pressures and livelihood adaptations in the Sangam age and today: a branching diagram (infographic; labels in Tamil)

Figure 4 links ecological challenges (rainfall variability, scarcity of water and fodder) with adaptations (storage of crops, water and fodder; shifting of pastures; subsidiary occupations). Through Sangam literary evidence (blue) and contemporary comparisons (green), the diagram explains how people have, through the ages, met natural pressures with their knowledge.

6. A Comparative View of the Five Landscapes

Table 1.A comparative view of the five landscapes

Tiṇai	Natural environment	People	Main occupation	Key adaptation
Kurinji	Hills and hill slopes	Kuṟavar, vēṭuvar	Hunting, collecting honey, growing millet	Gathering hill resources; life in caves and huts
Mullai	Forest and pasture land	Āyar, iṭaiyar	Animal husbandry	Mobile pastoral life; milk-based economy
Marutham	Fields, rivers, plains	Uḻavar, uḻattiyar	Agriculture	Irrigation; ploughing implements; permanent settlement
Neithal	Sea and seashore	Paratavar, fishers	Fishing, salt making, maritime trade	Boats and nets; knowledge of sea signs

Tiṇai	Natural environment	People	Main occupation	Key adaptation
Palai	Dry, hot land	Maṟavar, eyiṉar, travellers	Hunting, travel, warfare	Water storage; knowledge of directions; temporary camps

7. The Sustainable Living of the Sangam People of the Five Landscapes

The life of the people of the five landscapes in the Sangam age was integrated with the nature of land, water, climate, natural resources and occupation. Their adaptation of occupation, food, settlement and the use of resources to the land reveals their thinking about sustainable living.

நீரின்று அமையா யாக்கைக்கு எல்லாம்

உண்டி கொடுத்தோர் உயிர் கொடுத்தோரே

For all bodies that cannot exist without water,

those who gave food have given life itself.

— Purananuru 18

These lines convey that water and food are the foundation of human life. The protection and careful use of natural resources may therefore be regarded as an important element of Sangam life.

7.1 Sustainable Living in Erode District

In present-day Erode District, water-saving agriculture suited to the land, rainwater harvesting, the use of local water sources such as ponds and wells, animal husbandry, millet cultivation and livelihoods based on local resources continue as elements of sustainable living. Especially in the dry and hill areas, practices that integrate water, soil, livestock and crops can be seen. The Sangam tradition of the people of the five landscapes – living according to the land – reveals a continuity that can be studied comparatively with the practice of the people of present-day Erode of living by using natural resources economically.



Figure 5. Agriculture–livestock integration and the sustainable resource cycle (infographic; labels in Tamil)

Figure 5 explains how agriculture and animal husbandry depend on each other to create sustainability. Crop residues become fodder for livestock, and livestock dung becomes natural manure that improves soil fertility and again increases crop production. Water and fodder storage act as important supporting components.

8. Conclusion

The *aintiṇai* theory of Sangam literature does not see human beings and land as separate elements; it portrays them as an interdependent system of life. The hill environment of *Kurinji*, the forest and pastoral environment of *Mullai*, the water and agricultural environment of *Marutham*, the maritime environment of *Neithal* and the drought environment of *Palai* are key factors determining the settlement, occupation, food, economy, social relations and adaptation of the people of each land. In this way, the threefold scheme of *mutaṟporuḷ*, *karupporuḷ* and *uripporuḷ* laid down by *Tolkappiyam* is shown in this study to be a model of the ancient Tamils' ecological thought, explaining the mutual relationship among environment, resources and human behaviour.

The hill and forest areas of Erode District, the Cauvery–Bhavani–Noyyal river areas, the agricultural plains and the drought-prone lands form a suitable field for comparing the Sangam *aintiṇai* way of life in a modern context. In particular, Kodumanal, on the bank of the Noyyal, provides archaeological evidence of the settlement, crafts and economic activity of Sangam-age Kongu Nadu, and so makes it possible to understand the land–life relationship recorded in literature in combination with historical and cultural evidence. On this basis, the *aintiṇai* way of life of Sangam literature is not merely a literary theory denoting divisions of land; it is also human-ecological knowledge that reveals the integrated relationship of land, resources, people, livelihood and adaptation. Approaching this knowledge in comparison with the local environment and practices of present-day Erode District helps us understand the continuity and change of traditional ecological knowledge and develop new research perspectives on sustainable living.

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Use of Artificial Intelligence Tools

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