

“Korangadu” – Traditional Dryland Grass Farming System in Semi arid Tropics of Tamil Nadu



Intoduction :

“*Korangadu*” is a traditional pastureland farming system existing in semi arid tract of Tamil Nadu state of Soth India viz., Dharapuram, Kangeyam, Palladam, Moolanur and Kallimanthayam areas. This region receives annual rainfall of 600 – 675 mm. The soil is laterite red soil or with gravel type and water will not stagnate on any amount of rainfall. The region situates in rain shadow region of westernghats. The majority of the rural population depends upon livestock; they are settled agro pastoralsits and allow their animals to graze in their own grassland paddocks confined to 1.5 - 4 ha size.

Korangadu has predominantly 3 major species of flora which are spatially in 3 tiers. The lower tier is grown with *Kolukattai* grass (*Cenchrus* sp.) ; tree species include *Acacia leucophloea* locally called as *Velvel* and land is fenced with thorny shrub locally called as *Kiluvai* (*Commiphora berryii*) as live fence.

Korangadu is owned privately by individual farmers and it is roughly estimated that there are about more than 50,000 individuals keeping their own paddocks of about 1-2 ha size of land. Approximately 50,000 ha. of *Korangadu* pasture land is noticed in 500 villages in Erode, Karur, Dindigul and Coimbatore Districts of Tamil Nadu State, Southern India. The size of individual paddocks of *Korangadu* land ranges from 1.5 ha to 10 ha depending upon the wealth status or ownership pattern by farmers. Farmers or landless livestock keepers keep sheep, cattle, buffalo and *Korangadu* provides baseline of livelihoods for them by feeding their animals.

How “Korangadu” System Evolved ? or Story behind Korangadu

Many centuries back farmers in Kangeyam, Dharapuram area engaged in farming after ploughing the land followed by sowing of dryland crops. Due to various reason some of the land portion which were not covered by crop farming left as such to have natural vegetation. Such uncultivated lands (but still owned by farmers) have spontaneous growth of natural plant species after the receipt of rains. Among the plant species predominant one was *Kolukattai* grass (*Cenchrus* sp).

Farmers have no option to allow their livestock in cropped area but allowed only in the uncultivated zones. Later on the utilization of uncultivated land was realized for effective grazing of their own animals. Such habits or practices might have encouraged the farmers to restrict animals of other farmers or individuals and then invention of fencing with “*Kiluvai*” thorny species around the natural pasture land. Thus grasslands are fenced with live species for confining their animals. It is a typical paddock system with a small bamboo gate to allow the animals to enter inside. The grassland is ploughed once in 2-3 years in order to break the clod and to enhance aeration and moisture conservation. Hardy legumes like *Naripayaru* (*Phaseolus trilobus*), *Kollu* (*Dolichos biflorus*) are sown in the grass land in order to enrich nutritional status of grassland. If the stand of grass is poor due to continuous drought over 2 – 3 years then re-sowing of *Kolukattai* grass seeds is practiced by the farmers.

In Tamil *Korangadu* means left over land (uncultivated /un ploughed / unsown land). In the *Korangadu* land natural vegetation of *Velvel* (*Acacia leucophloea*) is common in the tract where rainfall is minimal. The thorny tree escapes browsing by animals and dried pods obtained from grown up trees (after 7 – 8 years) are relished by livestock. Farmers by their wisdom arrived out a optimum size of 30 – 40 trees / ha which may not hinder the growth of grass species. In few places other trees like *Usilai* (*Albizzia amara*) is also grown which also a fodder tree. Finally *Korangadu* has been well structured with sound management practices developed over years and a code to select species, maintenance adopted to suit soil, climate and rainfall conditions of that area might have been accepted. Now a days *Korangadu* means any villager understands about established plant species, number of livestock to be allowed according to the size of paddock, re-seeding practice and even thinning of trees or planting trees and establishing live fencing, grazing system with rotation between paddocks, time of grazing etc.,

Plant Species in Korangadu

Korangadu is typically a mixture of grass, legumes and tree species including annual and perennials. During our documentation farmers have mentioned the following species and some have been scientifically identified in Madras Christian College. Earlier a study has been made by D. Pattabiraman, Director of Animal Husbandry, Chennai and various grass species have been studied. Recently scientists from Indian Grassland and Fodder Research Institute, Jhansi recorded various types of fodder species in the *Korangadu* pasture land. Major species include :

<i>Velamaram</i> Tree	<i>Acacia leucophloea</i>
<i>Usilai</i> Tree	<i>Albizia amara</i>
<i>Kolukottai</i> Grass	<i>Cenchrus ciliaris</i> ; <i>Cenchrus setigerus</i>
<i>Kurutupul</i> Grass	<i>Cholris barbata</i>
<i>Cholapul</i> Grass	<i>Chrysopogon montanus</i>
<i>Ottanpul</i> Grass	<i>Setaria verticillata</i>
<i>Nathaichuri</i> Grass	<i>Borreria hispida</i>
<i>Hariyali</i> Grass	<i>Cynodon dactylon</i>
<i>Moongil</i> grass	?
<i>Seegam</i> grass	?
<i>Naripayathankodi</i>	<i>Phaseolus trilobus</i>
<i>Seppunerinji</i>	<i>Indigofera enneaphylla</i>
<i>Savarikodi</i>	<i>Trichosanthes tricuspidata</i>
<i>Poonapudukukodi</i>	<i>Crotalaria globosa</i>
<i>Kollu</i>	<i>Dolichos biflorus</i>
<i>Hadupudukanam /Kattukollu</i>	<i>Rhynchosia rufescens</i>
<i>Kiluvai</i>	<i>Commiphora berryii</i>
<i>Rayil Kattalai</i>	<i>Agave americana</i>

The flora of paddock can be classified under the following types :

<u>Type</u>	<u>Species</u>
A. Trees	<i>Velvel</i> <i>Usialai</i>
B. Grass	<i>Kolukottai pul</i> <i>Ottanpul, Kurutupul,</i> <i>Cholapul, Hariyali, Moongil pul, Seegampul</i>
C. Legumes and Herbs	<i>Naripayaru,</i> <i>Savarikodi,</i> <i>Seppunerinji, Kollu, Kattukollu</i>
D. Shrubs in Live Fence	<i>Kiluvai, Rayil Kattalai</i>

How to Establish Korangadu?

During summer season the land to be converted for *Korangadu* has to be ploughed. Sowing of *Kolukattai* grass has to be undertaken during the months of “*Purattasi – Iypassi*” (Sept – Oct). In order to cover 1 acre about 15 kg of *Kolukattai* grass will be sufficient and such seeds are harvested from the already established pasture land. Harvesting of seeds will be in the month of *Thai* (Jan – Feb). *Kolukattai* grass can also be mixed with *Naripayaru* seeds (*Phaseolus trilobus*) and *Kollu* (*Dolichos biflorus*) seeds at the rate of about 10 kg each for 1 acre. For one year after sowing, no grazing is permitted but allowed in the second year of establishment. In the established *Korangadu*, immediate after rains one month time will be given for not letting the animals and this is only to allow the grass and legumes to attain required growth stage and after that livestock will be allowed to enter inside the land for grazing purpose.

In order to protect the pasture land live fencing is undertaken by planting cuttings of *Mullukiluvai* (*Commiphora berryii*). About 4' length stumps of *Kiluvai* a thorny weed plant found in wastelands / jungles is cut with a thickness of 3 cm. These stumps or cuttings are planted in 1 feet depth by digging the soil with crow bar. Two rows of planting with such cuttings are completed during the month of *Ani - Adi* (July – Aug). The survival and establishment of planted stumps will be ensured with the onset of monsoon during *Purattasi – Iyppasi* (Sept. – Oct.) About 30 laborers are required to plant *Kiluvai* cuttings in 1 acre land to establish live fencing.

Every year the established fence has to be maintained by proper gap filling with fresh cuttings of *Kiluvai* and any such new plantings are to be performed only in the month of “*Ani – Adi*” (June – July). Sometimes natural growth of other plant species like “*Minnamaram*” will also be growing. (Farmers cut the branches, 7' height of “*Minnamaram*” and utilize them for making “*Tharambu*” (*Padal*) for constructing sheep shed locally called as “*Attupatti*”.

In the *Korangadu* pasture land “*Velvela maram*” tree will be growing naturally and usually seeds of “*Velvel*” germinate from the animal dung. When cattle and sheep relish the pods of “*Velvel maram*” the seeds are passed undigested and spread through the dung. Farmers usually maintain optimum population of “*Velvel*” tree ; population will be around 20 trees in 1 acre or 60 – 70 trees in 2 ha land of “*Korangadu*”.

The grown up tree will bear fruits in the 6 – 7 years and pods fall on the ground during Feb – April. A grown up tree will yield 40 – 50 kg of pod and it serves as good feed during summer. During summer season when the rainfall is absent the growth of the grass is poor or almost not existent and at that time falling pods of “*Velvel*” tree will provide good fodder for animals.

Excess Pods will be collected from the field and stored. Such pods will be mixed with sorghum grain to feed young ones of sheep. Each lamb will take about ½ kg of such mixture and it is fed in the morning time.

Grazing System

The paddock provides grazing field for animals for atleast 5 months in a year. The growth of the grass is noticed immediate after the receipt of rainfall. Rain occurs during 3 distinct seasons as experienced in these places.

Rainy season	Period	Rainfall
South west monsoon	June – Sept.	191 mm
North east monsoon	Oct – Dec.	330 mm
Summer showers	Feb – Mar.	145 mm
Total rainfall		666 mm

(Source : Trivedi 2007)

About one month will be allowed for the grass to germinate and attain required growth and after that animals are taken into paddock for grazing. Grazing will be from morning till evening. Drinking water is taken and filled in the stone / cement troughs within the paddock so that animals will come and drink water as and when it needs. Drinking water is fetched from the village and carried or transported through bi-cycle or bullock cart to the paddocks .

During Dec. – Jan month if there is good growth of *Kolukattai* few farmers harvest them and store it as hay for feeding the animals during off-season. During summer animals are allowed to feed on the pods of *Velvel* trees. Farmers divide their lands into paddocks, and animals are allowed in rotation.

Four hectares of “*Korangadu*” grass land is sufficient to maintain 2 adult cows plus 4 calves or 40 sheep or 6 buffaloes or 20 goats. The animals will not have infertility problems if grazed in “*Korangadu*” pastureland. The “*Korangadu*” pastureland will provide grazing opportunities for the livestock for free grazing during October to January continuously due to growth of grass on the receipt of the north east monsoon. During March to June, when there is no grass in the pastureland the cattle feed upon the pods of *Acacia leucophloea*. Whenever summer rains or un seasonal rains occur this pasture land will have re growth of vegetation and thereby serve as fodder source for livestock. The growth of different local fodder species also spread in such a manner that it is likely to support the partial grazing of animals at least during 8 -10 months in a year. Farmers constructed water trough in the individual plots for providing drinking water for the animals. Animals are usually allowed for free grazing.

Tenancy System

Farmers who have lot of paddocks but owning few livestock or no animals lease the lands to landless livestock keepers who in turn pay lease fee of Rs.5000 2 ha paddock / per year. Sometimes *Korangadu* land is given for long term lease basis called “*Othi*” to livestock keepers for Rs.30,000 whenever the livestock keepers wants to close his grazing contract. The farmers are mostly belonging to “*Gounder*” community and land ownership of individual paddocks ranges from 0.5 ha to 10 ha. The dairy animals provide income to farmers through moderate milk yield. These communities are also maintaining sheep and goats and earn income by selling them. Tenure system of “*Korangadu*” grazing land is also practiced between owners and tenants where landless tenant keep livestock like sheep ; for example a tenant family pays Rupees 50,000/- (approximately US\$ 1,120) for keeping 2 ha of paddock and this money can be got back without interest after a period of 2 – 5 years depending upon the contract. The details of ownership pattern of “*Korangadu*” pastureland are shown in the Annexure – 4. Wealthy farmers who are leaving or reducing the area of agriculture and settling in cities are leasing their lands to livestock keepers on tenancy basis.

***Korangadu* Pasture Land and Livestock Keeping**

Farmers and agricultural labourers are keeping cattle, buffalo, sheep and goat. They depend upon *Korangadu* pasture land for day to day grazing of animals. In the drought prone region livestock keepers are maintaining animals for their livelihood. The area is typical dry land with rainfall less than 700 mm. Now-a-days the erratic rainfall forced the farmers to solely depend upon animal husbandry for the livelihood leaving agriculture which is gamble of monsoon. Therefore there is a good scope for developing pasture land which is insurance

against recurrent drought. Due to this many farmers are interested to switch over to animal husbandry activity and convert the dry land agriculture into *Korangadu* pasture land. During our survey with 2564 families we noted that there are 6505 cattle, 1365 buffalo, 30936 sheep are maintained by them. On an average, a farmer in *Korangadu* region owns about 2-3 cattle, upto 1 buffalo and 12 to 15 sheep per landholding of 8 acres of pastureland (refer Annexure – 4). Approximately 2 ha of pastureland will support 25 sheep together with 2 cattle. They derive income by selling milk and also disposing male sheep. Rearing sheep is the major source of income; it yields 3 lambs in 2 years. Male calves of *Kangeyam* cattle breed are grown with special care and sold as young bullocks. They fetch a premium price in annual cattle fairs / village sandies like Kannapuram, Tripur, Avinashi, Anthiyur villages in Tamil Nadu State.

Cost of Development of *Korangadu* model of Pasture land

During our discussion with farmers and also our own estimate it has been arrived at Rs.7,500/- per acre for developing new *Korangadu* pasture land in new area. For improving the existing degraded *Korangadu* pastureland the cost will be Rs.5,000/- per acre. We have conducted a survey in 4 panchayats viz Nallampalayam, Kolathupalayam, Moolanur, and Punjaithalaiyur in Dharapuram Taluka of Erode district. A total of 2564 families who are farmers and some are agricultural labourers (on tenancy basis) are interested to undertake developing *Korangadu* pasture land in their own or leased out land.

Development of <i>Korangadu</i> pasture land in new areas	–	3,458 acres
Development of pasture land in existing <i>Korangadu</i>	–	20,470 acre
Total lands identified for <i>Korangadu</i> Development land	–	23,928 acres (9,688 ha)

(Farmers own land = 15,500 acres; tenant land for agricultural labourers 8,428 acres).

Economics of *Korangadu* Pasture land

We have analyzed how farmers / livestock keepers are secured in their life even during the periods of drought or scanty rains. A farmer with 2 ha of pasture land and with animal population of 20 sheep + 2 cows + 1 buffalo is able to derive a net income of Rupees 182,000 or US\$ 4000 in 10 years time. The details of income and expenses are given in Annexure 1.

Threats and Challenges

Farmers convert *Korangadu* lands into mono cropping by raising crops like cotton, maize, horticultural species etc., by putting deep bore wells (exceeding 300 meters) and also for establishing industrial units. The announcement of a land ceiling by the government has discouraged some farmers from keeping large areas of grazing land. The pastureland development in private farmer's lands is crucial in sustaining the low input livestock production while conserving indigenous animal breeds; this is question of survival verses environmental degradation. The population size of true to type of "*Kangeyam*" cattle breeding bulls is about 60. This is just 2 percent of the original population of 2,000 bulls during 1950's. These bulls are maintained in Nathakadayur village by Pattayakar families.

The total “*Kangeyam*” cattle population is estimated to be about 4, 70,000. For survival of indigenous animal breeds “*Korangadu*” pasture land is very crucial.

Failure of monsoon continuously for 2–3 years leads to drying of the live fence which in turn facilitates invading of other animals into the pasture land. There exists water scarcity also.

A parasite known as “*Thangakodi*” (*Striga lutea*) inhibits the growth of grass and leguminous plants. Severe infestation of “*Thangakodi*” (*Striga lutea*) causes reduction in the yield of grasses and legumes which leads to great loss to the owners.

Policy and Development Relevance

The traditional grassland system provides income security to the local livestock keepers, conserves domestic animal biodiversity and the sound management practices are rooted through the indigenous knowledge system. It also conserves ground water table and contribute to the ecology of the region and preserving local culture and life style of livestock keepers. Therefore awareness have to be generated at local, regional, national and international level for initiating or replicating such time tested models in main stream development.

Constraints in *Korangadu* Management

Prolonged dry spell or continuous 2 drought years lead to complete drying of grass. During that time animals are to be necessarily fed with sorghum, straw or groundnut hay purchased from outside farmers or region leading to increase the cost of maintenance of livestock. In such drought affected places resowing of *Kolukattai* seeds is essential. In addition the live fencing there will be more gaps due to drying of *Kiluvai* bushes. Even if such gaps are planted with cuttings of “*Kiluvai*”, establishment of newly planted cuttings will be poor. This situation leads to entry of animals from other herds and leads to poor management or create difficulties for the owner of the pasture land.

Nowadays ‘*Korangadu*’ pasture land is slowly converted into industrial purpose or garden land and commercial horticulture or monoculture with cash crops is being encouraged without understanding the fragile ecosystem where groundwater table is very low. So far traditional grassland system has not been incorporated in the mainstream watershed development programme. However if “*Korangadu*” pasture land is promoted it will provide income security to resource poor families while the system enhance conservation of local livestock breeds. Local tenure system encourages landless families access to grasslands which in turn sustain their livestock keeping / settled pastoral life.

Local Livestock Breeds in the *Korangadu* Pasture Land

The *Korangadu* pasture land is existing in more than 500 villages in a compact or contiguous area (4,000 sq km) and the total grassland area is about 50,000 ha. This grassland area is known for the breeding tract of “*Kangeyam*” cattle, indigenous local cattle which supply good quality plough and draught bullocks; local buffaloes and native breeds of sheep (“*Mayilambadi* and *Meicherry*” breed).. During earlier days, this *Kangeyam* breed was used for draught purpose to draw water from open wells and for ploughing dry land. Presently they are being used for ploughing and transporting agricultural produce through bullock cart.

Now the population of the *Kangeyam* cattle is coming down in a alarming rate due to introduction of tractor in these area. However the *Korangadu* pasture land is well utilized for maintaining sheep and dairy animals. The animals which graze on *Korangadu* pasture land are in good healthy appearance and growth rate. The dairy animals will not usually get infertility problem as seen in other areas where stall feeding of animals is predominant. There are many natural growth of fodder species which provides good nutrition for the animals. The seeds of the fodder species is resown naturally through cow dung as manure is left as such in the field itself. Therefore *Korangadu* pasture land is rich in biodiversity with different species of flora. *Korangadu* is maintained naturally without any artificial fertilizer except dung of the animal left in the field while grazing. This semi arid tract n is also natural rain water harvesting place and therefore it conserves ground water in the entire tract of *Korangadu* pasture land.

Steps taken by SEVA for Conservation of *Korangadu*

SEVA has conducted a survey of 36 villages in Karur and Erode districts where *Korangadu* pasture land is existing in 472 ha with a livestock population of 6427. We have promoted 2 association / groups of *Korangadu* pasture land dependent livestock keepers in Nallampalayam and Palanigoundanvalasu villages in Dharapuram Taluka of Erode District, Tamil Nadu state. From SEVA a revolving fund of Rs.10,000 has been given to these groups for purchase of livestock or improving *Korangadu* pasture land.

We have requested the Erode District Collector to notify Erode District under Watershed Development Programme and refer it to District Watershed Development Agency so that this will be recommended to State Level Tamil Nadu Watershed Development Agency, Chennai and also to NABARD Regional Office, Chennai for including this tract under Watershed Development Programme implemented by NABARD and other Government agencies.

Workshop on Conservation and Promotion of *Korangadu* Pasture Land

During 2004 SEVA has organized a workshop at Nallampalayam village, Dharapuram Taluka of Erude District on 29 May 2004 on the importance of conservation and promotion of *Korangadu* pasture land in Erode district. During 2005 we have organized a one-day Workshop on “Conservation of *Korangadu* Pastureland (Traditional Dry land Silvipasture System)” at Nallampalayam village, Dharapuram Taluka of Erode District, Tamil Nadu on 10 December 2005. The workshop was presided over by Mr S Kuppusamy Gounder, President of Kamdhenu Traditional Pastureland and Livestock Keepers Association and inaugurated by Mrs Priya Mahesh, Project Associate, Centre for Environment Education, Bangalore. Government officials, representatives of NGOs, SHGs, pastureland farmers and volunteers numbering 41 participated in the workshop. The proceedings of the workshops are given in Annexure –2 and 3.