

## CONSERVATION OF SCREW PINE “PANDANUS” IN KERALA, NEED FOR REESTABLISHMENT OF COMMUNITY – RESOURCE LINK

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*Pandanus* “Screw pine” is one of the Important “Keystone Plant”, next to bamboos & reeds, extensively used by the Coastal and Island people for their minor economic needs. The *Pandanus* groves are regarded as one of the important “Vegetation” of the coasts and islands especially associated with human settlements. A study conducted among the 400 people in 100 households of Mathilakam and Kaipamangalam panchayaths of Thrissur district of central Kerala during 2012 revealed that about the 52% individuals take part in the process of *Pandanus* mat weaving one decade ago and was reduced to 18% today. Reduction in the demand of *Pandanus* mats and crafts due to its substitute with plastic products, destruction water bodies, depletion of *Pandanus* groves and diversity and depletion of the community – screwpine resource link are the major reasons.

**Keywords:** *Pandanus*, Screwpine, Cottage industry, Coastal Kerala.

*Pandanus* “Screw pine” is a handsome tree, characterized by its green foliage with dichotomous like branching and pine like spreading, linear, long leaves. It is seen all over the tropics. One of the Important “Keystone Plant”, next to bamboos & reeds, extensively used by the Coastal and Island people for their minor economic needs. The *Pandanus* groves are regarded as one of the important “Vegetation” of the coasts and islands especially associated with human settlements.

The family Pandanaceae are represented by 3 genera, viz., *Pandanus* Park. (600-700 species), *Freycinetia* Gaudich. (c. 200 species) and *Sararanga* Hemsley (2 species); among them one genus *Pandanus* Park. occur in the Indian subcontinent. The genus *Freycinetia* Gaudich. is present in Andaman-Nicobar Islands and Srilanka. The genus *Pandanus* Park. occupies largest ranges, Paleotropical from W. Africa to Australia, Polynesia, New Zealand to Ryukyn island and Japan (Southern tip). (Stone, 1981).

Pandanaceae with its highly reduced floral structure and dioecious nature is regarded as one of the difficult family among monocotyledons. Very similarity in the vegetative structure of both sexes and between different species and the similarity in the staminate inflorescence make it a taxonomically difficult group. Pandanaceae is a clearly defined family whose relationship are not very clear, probably fairly ancient. Perhaps related nearly to palms, but not very close to *Typha*, perhaps related to Agavaceae. The genera are very distinct. *Pandanus* Park. occupies the largest range; Paleotropical from West Africa throughout Indo-Malaysia to S. China, Malaysia tropical Australia and tropical Pacific Islands. *Freycinetia* Gaudich. is enclosed within this area, except for the extension to New Zealand. *Sararanga* Hemsley is limited to Philippines, New Guinea, Manus and Solomon Islands.

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The members of the genus *Pandanus* Park. were poorly collected by routine collectors, since the specimen being bulky, and most of them with large thorny foliage.

Uncertainty about the fundamental floral structure in the *Pandanus* Park. has existed for a long time. Reasons for these were the highly reduced state of their flowers, their occurrence of condensed inflorescences, coupled with inadequate materials representing early stage of development and the sparse representation of the staminate inflorescences in herbaria (Stone, 1990). Prior interpretations of *Pandanus* Park. floral structure have been three basic notions. First hypothesis assume that *Pandanus* Park. are monocotyledonous angiosperms, and their ancestry is ultimately same as that of angiosperm as a whole this regards their flower their flower as unisexual through abortive or lacking perianth. The second hypothesis is that floral organization evolved during early history of angiospermae and primitive one. The third view regards the floral structure is to be demonstrated with new evidence (Stone, 1968). Later the floral structure as ascertained from the SEM studies of earliest primordial stages is consistent with the normal type in Monocotyledonae, and need not to be interpreted as a proto-flower or pseudo-flower (Stone, 1990).

### Pandanus in Kerala

In Kerala the Pandani were usually seen along the coastal sandy beaches and 'Riparian' & Wetland habitats from higher altitudes to sea level, also among mangroves. Some species are component of tropical rainforests, especially of the lowland rainforests. Others are Cultivated as hedges, and some as ornamental. The most common species in South India is *Pandanus odoratissimus* and is known in Malayalam as "Kaitha" (Kaida Rheede) and in Tamil as "Kaida".

Hooker (1894) reported two species to have there distribution in the Kerala region and also Gamble (1935) added two more species. However the common species of *Pandanus* seen through out the coasts of Kerala is *Pandanus odoratissimus* L.f.

A recent survey conducted throughout south India by us (Bachan & Pradeep, 2003-06) has got

collections of all the following species from the Kerala region.

- Pandanus odoratissimus* L.f.
- Pandanus kaida* Kurz.,
- Pandanus furcatus* Roxb
- Pandanus thwaitesii* Mart.,
- Pandanus canaranus* Warb.
- Pandanus amaryllifolius* Roxb.,
- Pandanus tectorius* Parkinson ex Z.
- var. *tectorius*
- var. *laevis*
- var. *Sanderi*

### Uses & Socio Economic Significance

*Pandanus* has great significance as they provide economic and livelihood support for local community. Its fine natural fiber, one of the best of its kind in the world, has been in use for centuries for making bedmats. Screwpine mat weaving is an ancient craft and cottage industry.

*Pandanus odoratissimus* and *Pandanus kaida* are socio economically very important. The leaves, which are the most useful part of the plant, and has been used for centuries for making mat and umbrella, and their fibres for cordage and fishing lines. The roots are used in basket and brush making. An aromatic medicinal oil is distilled from the spathes of *Pandanus odoratissimus*. The floral leaves are eaten (Gamble 1935). *Pandanus odoratissimus* is one of the most useful trees in Micronesia. The leaves, which are the most useful part of the plant are woven or plaited into mats, thatch, baskets, local fans, handicrafts and many other items. Tip of prop roots are eaten and often used as native medicine in Pohnpei and may be other Micronesian islands as well. The fruit is a major source of food in Micronesia, especially on the atolls. They can be eaten raw or cooked, either way, it is very healthy. Besides serving as a food, its fibers helps clean the teeth, and acts as a natural dental floss (Stone 1960-81).

*Pandanus amaryllifolius* is only scented species of *Pandanus* which is very popular as flavouring material to Asians used in many food preparations particularly in cooking rice desserts and drinks. Leaves are used in different culinary preparations. Juice extracts from fresh leaves are

well-loved flavoring by Asians used in preparing cakes, desserts and sweetened flavor meats. It is used as substitute to vanilla and gives the natural green food colouring as well. Boiled water with fresh leaves serve as a good drinking refresher. Fruits of pandani are eaten raw or cooked. Its fiber can serves a natural dental floss. It can be also used for medicinal purposes. Is has cooling effect as excellent for the treatment of internal inflammations, fever, sour throat, urinary infections, colds, coughs, measles, bleeding gums, and skin diseases. It helps to maintain heart and liver in good condition. It is also an ornamental plant.

The nutty, intensive taste of Pandanus reminds to the best aromatic rice cultivars (for example, Thai Jasmine rice known as khao hom mali) in South East Asia. Lesser rice varieties are often cooked with Pandanus leaves to stimulate the flavour of the expensive types.

In Thai Cuisine, Pandanus leaves are occasionally used as very fragrant wrappers. Pandanus chicken, gai ob bai toey, is a classical recipe and as eternal favorites in restaurants.

All over South East Asia, Pandanus leaves find their most important culinary application in desserts; In Thailand iced drinks from young with Pandanus flavour are popular, and in Indonesia, Pandan leaves are made in to ice cream like concoctions. Furthermore, Pandan leaves appear more frequently in sweet puddings or custard based on sticky (glutinous) rice.

The male flowers of pandanus is most valuable for its fragrance and is used as hair decorative. Also used for the preparation of “Kewda Attar” (perfume) and “Kewda water”. The pandanus leaves and floral parts have medicinal values also. The juice extracted from the inflorescence is used for rheumatic arthritis in veterinary medicine. Leaves used in leprosy, scabies, and disease of heart and brain. Anthers used for disease of blood.

### Uses

The following are some of the common uses of screw pines in Kerala

- Dried and processed leaves were used for the production of minor economic products – Plated or woven mats, thatch, umbrella, hats, basket, bags

etc.

- Fibers from stilt roots used.

- *P. amaryllifolius* Roxb. is used as spice, flavor obtained from leaves called 'ramphe'.

- Some species are ornamentals (vars. of *P. tectorious*)

- Some as living hedges, lining the water bodies and paddy fields and railway embankments in lower elevations. (*Pandanus canaranus* Warb. & *Pandanus kaida* Kurz.)

- The plants are used for, fencing, as hedges, lining water bodies etc.

- Likely to support aquatic diversity.

- fruits were eaten in some parts of the world.

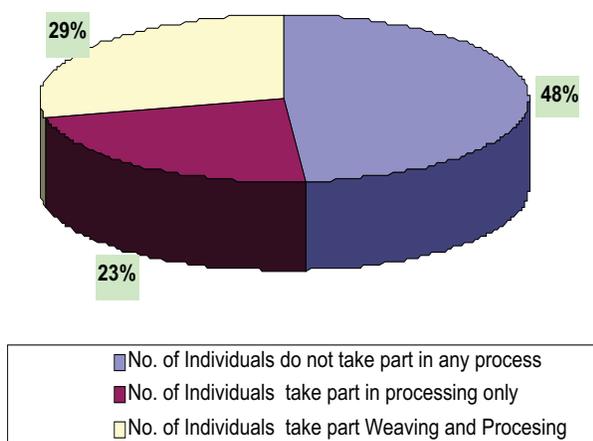
- In some, floral bracts were used as hair decorative by woman folk especially in south India. Perfued oils – 'Koera' Kewda –perfume, extracted from male flowers of *Pandanus odoratissimus*.

- In Orissa 30 million inflorescence used annually to flavor food, tobacco, soap, hair oil etc.

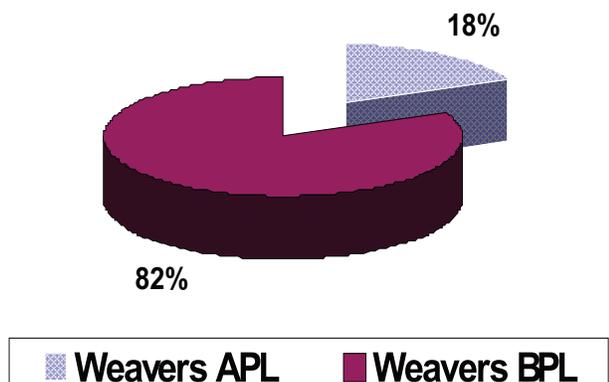
Coir industry is one of the important cottage industry of the coastal people of Kerala in an organized sector. Mat weaving with Pandanus leaves comes second to the coir sector as a cottage industry. About 90% of the ordinary people, of the coasts use or used to make mats with leaves of Pandanus. Being an unorganized sector Women's are more engaged in this job. The screw pines were planted along the margins of ponds, stream and river banks or as fences in almost all coastal districts of Kerala. It has been a traditional method to have Pandanus planted along the sides of the water bodies as well as hedge plant and it is very common in the coastal areas of central Kerala. Which is beneficial for the protection of the water bodies of the sandy coasts to prevent soil erosion through providing a living fence with less maintenance coast. At the same time the leaves are valuable for the economic and livelihood cottage industry. Pandanus leaves are source of income for the cultivars as well as for the mat weavers. This cottage industry has been remained unorganized as an organized cottage industry until very recent time. In the recent times some attempts were made to form “Tazhappaya Tohzilali Union” (Trade Unions). It is mainly for the protection of this job and it has not attained much momentum as gained by other cottage industries.

Now the alarming rate of destruction of water bodies, wetlands and modernization of the coasts is threatening the existence of the Pandanus groves.

A study conducted among the 400 people in 100 house holds of Mathilakam and Kaipamangalam Grama Panchayaths of Thrissur district of central Kerala during 2012 revealed that about the 52% individuals take part in the process of Pandanus mat weaving. Of which 85% are women and the men are associated mainly with process of harvesting of Pandanus leaves and transportation. Only a single man found to weave mats. It revealed that most of women in the coastal areas depend on Pandanus mat weaving process. And it is one of the incomes generating activity of the women folk.



### BPL-APL Ratio of the Weavers



### Process of Mat Weaving

Pandanus mat weaving is practiced

as a traditional craft, among the people all over the tropics. Besides mats other products like hat, basket etc were also made with the use of dried Pandanus leaves. It is seen most commonly among the people in the islands and coastal areas. In Kerala Pandanus mat weaving has a long tradition. It is well marked by many scientist including Rheede (1678-1693) in his work *The Hortus Malabaricus*. It is practiced mainly by woman folk from the socioeconomically backward communities and it is practiced as a group or collective activity. The mat weaving include following processes

#### 1. The Processing of Pandanus Leaves

Processing of pandanus leaves is a laborious process, which includes harvesting or cutting of fresh leaves, removal of spines, rolling of leaf ribbons and drying.

##### a. Harvesting and Transportation

Usually Pandanus leaves are harvested twice in a year that is one during April-May and latter during December-January. The leaves were cut very near to the stem leaving just leaf sheath covering the stem. Usually sickles are used for cutting of leaves. Sometimes a sickle tide on the tip of a long stick (*Thottiarival*) is used to cut from 8-20 feet high Pandanus plants. Leaves are cut down up to 15 from one side leaving the tender and young leaves at the tip. So up to 45 leafs will be obtained from a single plant (since the Pandanus leaves are arranged tristiquous spirals). The harvested leaves were made in to bundles.

The fresh leaves bundle with different size will be transport in to a common place, usually it would be one of the members house. These bundles were transported by woman in head-loads and they seek the help of their men and carts for a long distance transport. The harvested leaves were transported to the work place in the same day or within 1-2 days.

##### b. Removal of Spines to Make Ribbon

##### c. Rolling of Fresh Ribbon to Rolls

After the removal of spines the fresh ribbons were rolled one after another to make rolls of 30-75cm diameter with the use of long leaves they make large rolls (*Thazhamadi*) and with the use of small leaves they make small rolls.

These processes were take place continuously or simultaneously within 4-7 days. The fresh ribbon rolls were shared equally among the individual of the group. And the roll will dry on sunlight by spreading it on the bare ground. Correct drying is important for the correct processing of the material. The dried leaf rolls are preserved as raw material for the Pandanus mat weaving and also for other crafts using Pandanus leaves. The dried leaf rolls can be kept up to one year and can be used for weaving at required times.

**II. Weaving of Mats**

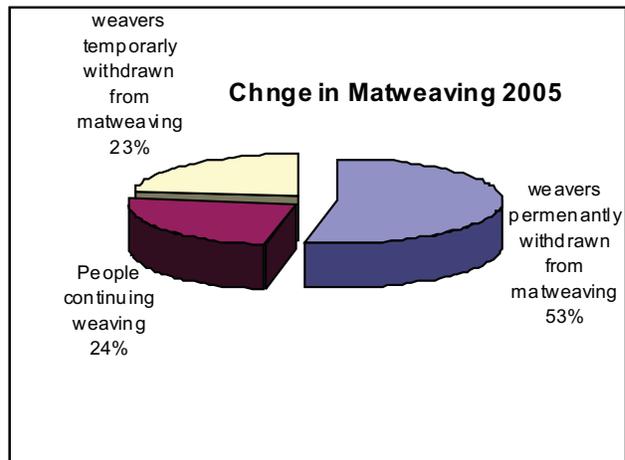
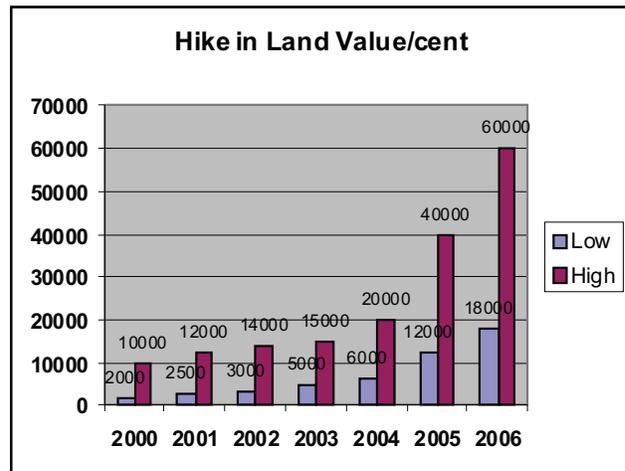
After drying the rolled leaves loosened and it is rolled in reverse order to straighten and flatten them. Later it is cut longitudinally in to required sizes depending on the size of the mats. Then it is interwoven in to mats using hand.

**Conservation of Pandanus groves – a long tradition of community resource link**

In the coastal zones of Kerala especially in central Kerala, costs of Thrissur district large patches of Pandanus can be seen throughout. It is conserved and maintained by the people as hedge plant around households or around water bodies. In these areas the Pandanus plants are not usually seen in wild thickets, but they are seen planted in the households or their agricultural lands and along the margins of water bodies. This art and craft of planting, conservation, harvesting and mat weaving using Pandanus has been an inherited custom of the people of the coastal Kerala from generations.

**The change**

Now the introduction of modern plastic material to the market has shifted common human choice to cheap and disposable materials. This has affected the value addition and marketing of Pandanus mat weaving cottage industry. At the same time shift from the agriculture sector to industrial or real estate has paved way to filling up and conversion of water bodies for various 'developmental' purposes. This also has affected the screw pine conservation.



**Conservation of Pandanus “Screw Pines” - Need forreestablishment of community– resource link**

In order to conserve the Pandanus groves of the coasts of Kerala reestablishment of the community resource link is very important. The dependence of the women folk on the screw pines for their minor economic needs through mat weaving, dependence of the land owners and people on these plants for the protection of their water bodies, the use of each and every household for fencing etc were the unseen links that has helped to maintain, protect and conserve Pandanus groves in a thickly populated land. The whole mechanism of conservation has been maintained by the community itself and was beneficial not only for the Pandanus mat weavers, but also supported local biodiversity, natural water bodies, traditional aquaculture and aquatic diversity.

The depletion in the demand of Pandanus

mats, destruction water bodies etc, and depletion of Pandanus groves and diversity are related. The only sustainable solution for the conservation of this Pandanus diversity is the reestablishment of people-resource link. Value addition and proper marketing as a "Natural fiber products" could be one option. This can be achieved through empowering woman self help groups, giving training to them for product diversification and marketing of the products as eco-friendly products.

Awareness, implementation of legal procedures especially Coastal Regulation Zone Act and monitory support to people for the

conservation of wetlands and water bodies can support the conservation of 'Screw pines". The value addition of the products and the support mechanism can help to reestablish the people –resource link for sustainable resource management and conservation.

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