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Traditional farming and post harvest processing of coconut by *Nicobari* tribe

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The *Nicobari* tribes are the largest tribal group inhabiting Nicobar Islands who are well educated and advanced than many of their counterparts in these Islands and in mainland India. The main economic activity of the *Nicobari* tribe is agriculture and coconut plantation occupies majority of the agricultural area in these Islands. The present study encompasses a glimpse of a folk knowledge gleaned through survey on farming and post harvest processing of coconut a main source of livelihood activity of the tribals. The knowledge gained and passed on to the generations is vital for their livelihood and some of them are found relevant even today. The tribals practice a form of natural farming with minimum disturbance to the soil and do replace the old and senile plants with new seedlings. In new plantation intercropping is allowed until the seedlings are established. They also have knowledge on different methods for drying copra based on the need and extraction of oil from coconut milk mainly used for sanitary purpose which is now called as virgin coconut oil.

Keywords: *Nicobari* tribe, Traditional knowledge, Coconut plantation, Land management, Drying, Oil extraction

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The Nicobar Islands are part of a great island arc created by the collision of the Indo-Australian Plate with Eurasia. These Islands are situated South East of Bay of Bengal 1200 km East of main land India between 6° - 10° N latitude and between 92° - 94° E longitude. They are separated from the Andaman group of Islands by 10° channel. The Nicobar group is having 22 islands of which only 12 are inhabited[1]. Though these islands are endowed with suitable agro climatic and land resources for agricultural development achieving self sufficiency in food production is a challenge[2]. However, in Nicobar group of Islands which is home to two tribes of Indo-Mongoloid origin, viz. *Nicobarese* and *Shompens* have survived for centuries on the available resources.

Out of these two the *Nicobarese* are the largest tribal group inhabiting 12 Islands with major concentration in Car Nicobar[3]. They are agriculturists and herders by tradition as they known to grow coconut and pig for centuries. Though they are educated and mingle with main stream of population, a vast majority of the *Nicobarese* still pursue their traditional occupation of coconut and areca nut plantation and rearing pigs. Some of them have also taken up rearing of goat and poultry. They have fair knowledge about the nature of resources under their possession and the ways to utilize them judiciously for their well being in the fragile island ecosystem. This knowledge might have evolved in the tribal community by practice and has been passed on by generations. The traditional knowledge is diminishing slowly owing to recent modernization and overall development of the Islands. Studies on material culture of aboriginals of Andaman and Nicobar Island are meager[4]. At this point it was felt essential to understand the traditional knowledge on farming which made the tribe to survive for centuries in this isolated place. Therefore, an attempt was made to document this knowledge, assess its effect on farm production and evaluate its relevance in the tribal areas.

Materials and methods

Study area

The Nicobar Islands are part of the union territory of Andaman and Nicobar Islands, India. The Islands experience tropical humid climate because of their location in equatorial zone surrounded by Andaman Sea and Bay of Bengal. The Islands receive copious amount of rainfall from both the South west and North east monsoon and measures around 2750 to

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3100 mm each year. The historical climatic data shows that the mean relative humidity is 79%, maximum temperature is 30.2°C, and minimum temperature is 23.0°C. Due to the favourable climatic conditions majority of the land area is covered under forest but the proportion of agricultural land to total area varies from island to island. In Car Nicobar and Katchal over 40.05% area is under crops and rest of the islands has cultivable area between 0-19 per cent[5].

Methodology

Stratified random sampling procedure was adopted to collect information on cultivation practices of the *Nicobari* tribal including both men and women. Remote sensing data was used to stratify the area based on the Physiography of the Islands. Tribal farmers were selected at random but different categories were covered. Field survey was also carried out to systematically assess the field condition, crop stand, harvesting of coconut and productivity. Soil samples were separately collected from the plantation areas to understand the fertility status. Similarly information on drying of coconut and oil extraction was recorded from seven respondents selected from different villages of Car Nicobar.

Tribal society

The tribal inhabited Islands are divided into two to 14 villages. In Car Nicobar the Island is divided into 14 tribal villages. Each village is composed of 5-10 *tuhets* which is nothing but a large joint family. Several individual families constitute one tuhet. Each *tuhet* is traditionally headed by *tuhet* or family head and each village is headed by tribal captain who is elected by the villagers. All the tribal captains constitute the tribal council which as an institution elects its chief[6]. The tribal council as an institution administers the affairs of the tribal people at higher level and the village captain and *tuhet* head manages the affairs at the local level.

Results

Coconut plantation

There are three different informal ways or segments by which the coconut plantations are maintained in Car Nicobar. In the central highland of the Island the coconut trees are mixed with dense forest and left undisturbed where natural crossing and selection is continuing. Next layers or segment is mostly used for copra production and large in number which is mostly unmanaged except little cleaning practises. Coconut plantations or land is earmarked and owned by each *tuhet*. *Nicobarese* collect the matured, fallen nuts; remove the husk before taking it to their home for further processing. It is also common that the fallen nuts establish itself as a second or third layer below the tall dense mother palm. The third segment comprises of coconut grown in and around their settlement which are normally used for tender coconut or for domestic purposes. Sometimes the tribal select best seedlings from their garden and plant it nearer to their home which allows some degree of selection. Some times shifting cultivation is practiced collectively by clearing of natural vegetations for growing of tubers and fruit crops but coconut seedlings are planted in between. People will leave the land once the coconut is established which later becomes a dense plantation.

Soil management

The soil is never tilled or disturbed except for very few purposes qualifying it to be called as zero tillage. *Nicobarese* allow the natural vegetation to come up in the coconut plantation used for copra production in which incidentally many of the leguminous green manures also grow in addition to certain cover crops. The tribals slash the vegetation very rarely and bury it around the palm. In addition they also keep bio fence in certain locations and plant tuber crops in the inter spaces of coconut trees. The soil is always covered with vegetation. However, not many rills or erosion features are found inside the coconut garden. It is found that the *Nicobari* language is enriched with most of the plants, animals and natural things used in the modern day concept of organic and sustainable agriculture.

Collection of nuts

Copra production is the main source of income for the *Nicobari* tribe, the entire plantation in the Island is divided among them (*tuhet* wise) making the natural resources available to every one. But, the head of the *tuhet* owns the land and forest and only usufructuary rights are with the individuals[7]. Each family collects the nuts from their earmarked coconut trees but no marking or boundary exists on the ground. Even then sometimes the nuts were collected by all *tuhet* members collectively (Fig. 1; 1a). During summer months or after rainy season the de-husking was done by traditional de-huskers made up of small iron rod (Fig. 1b). After de-husking, the coconut husk is left in the garden itself either spread in the field or put in a

Fig. 1(a-f) —Methods of copra production (a) Collection of Coconut; (b) Coconut dehusker; (c) Coconut drying stage (*machan)*; (d) A close look at the dryer; (e) Direct drying in the *machan* and (f) Sun drying in the open

small heap. All other organic waste are cut and placed around the palm or spread across the field. No organic waste is taken out of the field. The *Nicobari* male do climb the tree and harvest tender coconut either for them selves or to treat guests and the nuts for home consumption. In addition limited quantity of toddy is also tapped which is consumed by the male members.

Drying

After removal of the husk, the nut is broken into two pieces and the water is poured out. The broken nuts are kept upside down to allow the water to drain before it is arranged in a layer over a stage called *'machan'* specially made for drying (Figs. 1 c-d). The *machan* is a raised platform measuring 3 m x 2m x 1m size and it is covered all the three sides with tin sheets. At the top, steel rods are placed over a frame so as to hold the coconuts and allow the heat to pass through from below. The copra is dried by burning the coconut husk and other biomass from below for 4-5 hrs mostly in the evening. The process is repeated for 2-3 days until the moisture content is reduced to safer level (5-7%). Drying may continue during rainy season till it is ready for oil extraction (Fig. 1e). But during summer months after one day of drying in the '*machan'* the kernel portion is taken out of shell and

Fig. 2—The petiole of *Calamus andamanicus* (Arecaceae) is used as a coconut scrapper

kept for sun drying (Fig. 1f). This copra is used for oil extraction commercially. Mostly men are involved in the collection, de-husking and drying of nuts.

Virgin coconut oil extraction

The tribal have the knowledge on virgin coconut oil extraction directly from the coconut milk. The virgin coconut oil is extracted by traditional equipment called *Kintan tavi-i* and the kernel is scrapped using the petiole of *Calamus andamanicus* Kurz which has spines on it (Fig. 2). There are two methods of extracting the virgin oil, *viz.* Sun Dry Method and Hot Water Extraction Method. In the first method the scrapped coconut kernel is pressed in *Kintan tavi-i* to get coconut milk, which is then boiled to obtain the oil. This oil is mostly used for toiletry purpose. In another method, the coconut milk obtained by pressing scrapped coconut in *Kintan tavi-i* is mixed with hot water and kept open in a vessel over sunlight for separation of oil (Figs. 3 a-d). However, realization of oil in both the methods is only around 25 - 32% of the kernel content.

Discussion

It is well established that the *Nicobarese* were the last indigenous people to arrive on these Islands and are well developed among all the tribal groups of Andaman and Nicobar islands[7]. The knowledge of coconut cultivation and other crops might have evolved over a period of time and transferred by generations. In general they are agriculturists practicing natural farming but live in higher stage of economy. Their management of coconut garden paved the way for both natural evolution as well as human selection for superior genotypes of coconut. Most importantly they recognized the importance of maintaining the soil health by recycling of organic wastes and minimising the erosion of soils. It is

Fig. 3(a-d)—Methods of extraction of virgin coconut oil by indigenous method (a) Scrapping matured fresh coconut; (b) Pressing in *kintan tavi-I* for milk ; (c) Sun drying for extraction of virgin oil and (d) Virgin coconut oil

understood that by maintaining more organic materials in the garden the moisture holding capacity of the sandy and coastal soils are increased. It also increases the soil organic carbon value which are found to be in the range of 0.75 – 1.4%. Organic cultivation was a tradition among Indian farmers[8]. In addition, obstruction to the runoff water by the dense roots and the organic debris present in the field enhances the infiltration of rainwater as much as possible in to the ground water.

The tribals collect the matured nuts, de-husk it and dry it immediately by using *machan* (*chullas*). This is deliberately done because in a humid tropical island conditions, if the copra is not dried quickly to safe moisture level it will be infected by saprophytic fungi and fully covered with thick mycelial growth. At the same time they are clever by going for sun drying during summer months after a brief drying in the *machan*. Similarly they are mastered in the art of virgin coconut oil extraction which is a recent concept in the coconut post harvest processing industry. This oil is used for home consumption as well as in the medicinal preparations by the tribes for long time now.

In conclusion, it is clear that the knowledge of natural farming and post harvest processing of coconut has evolved in the *Nicobari* society which made them to meet most of their needs and helped their economic advancement. Though many of the coconut plantations are very dense and senile, they do replace it gradually and the tribals give more importance to natural resource conservation than the economic benefit. Realizing the potential of these Islands for organic cultivation the Andaman and Nicobar Administration has declared Nicobar as organic islands and all the synthetic chemical use are banned in agriculture to maintain the pristine state. Introduction of efficient coconut dryers and improving upon the traditional skills of making virgin coconut oil is expected to improve the quality of the produce and fetch a premium price in the market.

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