

COCONUT HARVESTING PRACTICES IN INDONESIA

ROLE OF THE PIG-TAILED MACAQUE MONKEY

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ABSTRACT

Coconut harvesting practices vary in different countries. In most Pasific islands, ripe fruits are allowed to be shed on their own and collected periodically. Pole-harvesting is adopted in most estates of Sri Lanka. In other countries, man climbs the coconut, with or without ankle and waist rings, for harvesting fruits or leaves. In parts of Malaysia and Thailand even a sturdy monkey is trained to harvest coconuts. All these practices are followed in different regions of Indonesia. In West Sumatra, macaque monkey harvests about 70 percent of coconut palms. An account on how this human ancestor is caught, looked after, trained and deployed for harvesting coconut and other fruits as well as botanical specimens, is given in this paper.

RINGKASAN

Cara memanen buah kelapa di berbagai negara adalah berbeda-beda. Di kepulauan Pasifik umumnya buah kelapa dibiarkan tua betul, sehingga berjatuhan dengan sendirinya, kemudian secara berkala dikumpulkan. Memanen buah dengan menggunakan galah lazim dilakukan orang di perkebunan-perkebunan di Sri Lanka. Di negara-negara lainnya pemetikan buah kelapa serta menurunkan pelepah daunnya dilakukan dengan memanjat pohonnya dengan menggunakan atau tidak menggunakan lingkaran tali, masing-masing dipasang pada mata kaki dan pada pinggang. Di beberapa daerah di Malaysia dan Thailand orang dapat melatih monyet yang kuat untuk memetik buah kelapa. Semua cara-cara tersebut dilaksanakan pula di berbagai daerah di Indonesia. Di Sumatera Barat sekitar 70 persen dari jumlah pohon-pohon kelapa yang buahnya dipetik dengan menggunakan beruk. Informasi bagaimana cara menangkap monyet tersebut, memelihara, melatih serta menggunakannya untuk menurunkan buah kelapa dari tandannya atau memanen buah-buahan lainnya meliputi berbagai *spesimen botani* disajikan pula dalam tulisan ini.

INTRODUCTION

Coconut is the most important industrial crop grown in the over 13 thousand islands that constitute the Republic of Indonesia. As the soil and climatic conditions as well as the habits of the inhabitants vary between islands, coconut cultivation and harvesting practices also differ widely. When harvesting practices are considered, perhaps all the different methods employed in major coconut growing countries for harvesting the coconut are followed in different regions of Indonesia. In Sabang Ie. of Aceh Province (Sumatra), ripe fruits are allowed to be shed on their own, which are

collected periodically. This is the only practice to be noticed in most Pacific Islands. Maintaining the garden clear of weeds and brambles is a necessity to recover all the shed nuts. Bamboo- or pole-harvesting as followed in coconut estates of Sri Lanka (also used for harvesting tall oil palms) is the sole method employed at the Beji Coconut Estate near Jepara, Central Java. In parts of West Kalimantan and in the vicinity of Medan too, poleharvesting the coconut is a fairly common practice. In most provinces, man climbs the coconut for harvesting fruits or leaves. Here too, there is considerable variation in the mode of climbing, as in some parts, no accessories for climbing are used, while in other areas, certain climbing aids are used. In Bali for example, the professional climber shins even a smooth trunk devoid of any notches. He uses neither an ankle ring nor a hand rope. These climbers are extremely skilled as they can descend the trunk holding coconuts in both their hands. Comparable expert climbers are also to be seen in Kerala, India. Especially in North Sulawesi, regular steps are cut on the trunk to help easy climbing. In this province, the professional men climb without using a ring, or occasionally resort to a hand rope as the *Borassus* tappers in Madura Ie. use for climbing the sturdy lontar palms. In North Sumatra, coconut climbers use rope both for the feet and hands. In West Java and Central Sulawesi, bamboo ladders are commonly used for climbing coconuts. No aerial rope-ways or bamboo-ways are provided between palms in Indonesia as the toddy tappers of Sri Lanka and the Philippines use. This is because of the fact that coconut is not tapped for toddy in this country. In three provinces of Indonesia, even a monkey is trained to pick coconuts. A brief account is given below on how man makes use of a near ancestor for harvesting fruits and leaves.

MONKEYS MORE USEFUL THAN HUMAN CHILDREN ?

In West Sumatra, Jambi and Riau provinces of Indonesia, East Cost of Peninsular Malaysia and to a lesser extent, in Thailand and Southern Burma, monkeys are trained to harvest coconut and areca palms. Here man is enlisting the monkey as he had been doing with other animals like the bullock, horse, elephant and the camel to help him in agriculture and to do his domestic chores. A monkey is more intelligent than a horse, bullock or camel and it can be made to imitate the actions of man. So if a man climbs a coconut tree, plucks and drops coconuts, the monkey can easily be taught

to do the same. Later, by a series of incentive rewards and/or punishments, the animal is made a veteran harvester of coconuts and arecanuts as well as other fruits and even botanical specimens for the plant collector.

The primate most commonly employed for harvesting nuts is the robust pigtailed macaque (*Macaca nemestrina*) (DAVIS, 1970). In some houses of South East Asian countries, trained monkeys are maintained to pick fruits of tall trees like the coconut, durian, papaya or mango. SKAFTE (1964) in his 'Rhino country' describes what he witnessed as he entered an Indonesian Chief's house as the following: "A monkey clung to the beams under the roof, now and then uttering shrill screams in order to attract attention. It was not the least important member of the household, for it was trained to climb the tall coconut palms, pick the big, heavy nuts and throw them down to Palewah (Chief) and his sons". In the coconut-studded regions of the sultry tropics, house-wives usually serve visitors with tender coconut water. It is the most pure and refreshing drink about which CHARLES DARWIN (1950) wrote thus, "Those alone who have tried it know how delicious it is to be seated in such shade (under the coconut tree) and drink the cool pleasant fluid of the coconut". Under such emergencies, the housewife is greatly helped by a trained monkey in plucking tender coconuts. Many owners of trained monkeys will agree that the macaques are more useful to them than their own children.

COCONUT HARVESTING IN WEST SUMATRA PROVINCE

Coconut is an important crop also for West Sumatra Province. Most of the about sixty thousand ha coconut gardens are being harvested by trained monkeys maintained by contractors. While in Thailand and some regions of Malaysia, utilising monkeys for harvesting coconut and areca/pinanga palms may be partly for fun and entertainment, along the East Coast of Malaysia and in West Sumatra, the monkey is the main agent for harvesting the coconut. According to Harrisons Fleming Advisory Services Ltd's Report and Recommendation for Small-holders Coconut Production, West Sumatra' 1974, the monkey deployed for the purpose is the pig-tailed *Macacus nemestrina*. The contractor is paid at the rate of 10 % of total value of crop harvested either in cash or crop. The number of harvesting pattern appears to be irregularly practised. The report says that the interval between rounds is considered inadequate, an estimated 12.5% of fresh nuts were found to be under-ripe and a similar portion over-ripe.

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The Chief, Plantation Extension Service, West Sumatra Province supplied the following information on monkey harvesting the coconut in his province. Table 1 shows the area under coconut in West Sumatra, the number of nuts harvested and the percentage of nuts harvested by monkeys each year for the period of 1970 - 1976. Eventhough about 80% of the trees used to be harvested by monkeys, during recent years, man seems to compete successfully with this primate, as he is able to harvest about 30% of the trees.

Table 1. Data on monkey harvesting coconut in West Sumatra.
Tabel 1. Data pemetikan kelapa oleh beruk di Sumatera Barat.

Period Periode	Area under coconut <i>Luas perta- naman kelapa</i> (hectares)	No. of nuts harvested for the whole period <i>Jumlah buah yang dipetik selama se- luruh periode</i>	Percentage of nuts harvested <i>Persentase buah yang dipanen</i>	
			by trained monkeys <i>oleh beruk yang terlatih</i>	by human climbers <i>oleh tukang panjang</i>
1970	49,595	126,865,000	80	20
1971	50,176	123,169,650	75	25
1972	51,215	166,791,000	70	30
1973	52,373	170,883,150	70	30
1974	53,085	171,952,350	70	30
1975	53,655	167,518,500	70	30
1976	56,057	170,403,750	70	30

There are about 1200 trained monkeys working in this single province.
Ada kira-kira 1200 ekor beruk yang telah terlatih digunakan di propinsi ini.

There is no shortage of macaque monkeys in South-East Asia in the wild. According to estimates (WHITING, 1979), Indonesia exported several thousands of different species of primates such as the crab-eating macaque, pig-tailed macaque, langur, gibbon and even orang utan in the recent past. During 1978 (ANON., 1978) alone, 23,000 crab-eating macaques and 5,250 pigtailed macaques were exported to Sweden, West Germany, Switzerland and other countries for medical research, especially to test polio vaccines. As long as the forests are not destroyed by man, this group of animals is bound to maintain, and even better its population and some of them can relieve human labour at least for harvesting coconut palms.

While in West Sumatra, human labour seems to compete successfully with monkeys for harvesting coconut, in another province (Central Sulawesi),

plans are being finalised to introduce monkeys to harvest some of the coconut palms since human labour is becoming increasingly expensive. According to report (ANON., 1979), the Acting Governor, EDDY DJA-DJANG, was considering importing numerous monkeys to be trained into coconut pickers. Central Sulawesi, a leading copra producer with an estimated 10 million coconut palms, is facing serious shortage of coconut pickers as many of the professional pickers have left their traditional job for more remunerative jobs that are available in the development projects that multiply in many parts of the province.

PRICE OF COCONUT PICKING MONKEYS

The cost of a macaque varies from country to country and within a country, region to region. Also the price depends on its age and health, but more on its capacity to harvest coconuts. Bad-tempered monkeys do not fetch good price. A good, clever, strong and fearless monkey in Malaysia, according to CORNER (1937), is worth more than US \$ 25.00. However, this price is very low compared to rates prevailing in Indonesia. According to WHITING (1979), the price in Malaysia varies considerably from the time they are caught from jungles to the stage when the monkey has been trained into an expert fruit-picker. Trappers sell their animals to shops who in their turn sell these untrained animals at about 160 ringgit (US \$ 75.00). Top harvestors have been sold for as much as 300 ringgit (US \$ 138.00). SANTOSO, the owner of a sturdy, 8-year old male weighing 15 kg, informed one of us (TAD) in March 1979, that a well-trained and good-natured monkey like his Mundi would cost not less than Rupiah one hundred thousand (about US \$ 160.00). He also said that the price has no much meaning for owners who have developed intimate attachment with their bread-winners. The monkey forms part of his family, playing with the household youngsters, and attending to his duties on six day in the week. Friday is rest day as it is the day of prayers for the Moslems.

TRAINING THE MONKEYS FOR PICKING COCONUTS

According to CORNER (1937), year-old young male macaques are trapped in the forest. They are taught by word of command to twist the nuts from the inflorescences which they learn to do with one hand and the opposite foot. If the nut sticks, the twist is reversed by changing limbs as often as may be necessary. As it crashes to the ground, the monkey jumps

up and shakes a frond in excitement. So the man standing below shouts at the monkey which he holds with a thin cord attached to a copper collar round its neck. He must keep the cord from entangling and he must guard against the falling objects like dried up or ripened leaves and other appendages of the crown which the monkey delights in knocking down. CORNER goes on describing that the beast is also taught to jump from crown to crown where the palms are close enough, so also to avoid unnecessary ascend and descend. Thus, for this purpose, the monkey does not require to provide bamboo-ways or rope-ways between palms. The human areca palm climber leaping from crown to crown (DAVIS, 1963) resembles the macaques jumping from tree to tree. Macaques are not bred in captivity. Generally, only the males are caught and trained although occasionally the females also carry out the job as efficiently as the males, as the one we watched working near Solok in West Sumatra in April 1980. They lead a celibate life, which state, according to WHITING, keeps their minds constantly on coconuts.

Professional trappers of monkeys use cages baited with fruits and fitted with mirrors to attract curious youngsters. They are given formal training which in Malaysia lasts at least a month, an hour each morning and similar period in the evening. There are professional experts who charge about 50 ringgit (US \$ 23.00) for a complete course of training. According to WHITING, the first step in the training is to learn how to twist a coconut spike while sitting on the ground. Lesson two is sending them up an old tree at the end of a cord to dislodge two or three nuts fastened loosely so that a few gentle twists release the fruits. Guidance is provided by tugs on the cord and grunts of encouragement. Next they are taught the difference between ripe and immature nuts while on the ground before being tested with each kind up the training tree. As the apprenticeship proceeds, taller trees are used to perfect the picking act. Many prefer to twist the spikes with the right forepaw and left foot while holding on with the left forepaw and right foot. Graduation, according to WHITING comes only after mastering the jump from the top of one coconut palm to another to save time instead of returning to the ground and climbing the next tree. Elaborate training is not necessary according to Indonesian macaque owners. Monkeys know how to climb the palm, and plucking fruits is their natural instinct. They have their own judgement whether a nut is to be twisted, kicked down or the fruit stalk of another to be cut with the sharp teeth. However,

they need to understand the message conveyed through the cord tied to the neck strap. It need not even know how to distinguish a bunch of ripe nuts from another of immature ones. This part of the job is done by the trainer standing below the tree who directs (through the cord) the beast to harvest a particular bunch or move to the right or to the left for the appropriate bunch. The most important training, we are told, is how to make the monkey not to get entangled with the cord while moving between leaves and bunches. The botanical monkeys at the Singapore Botanical Garden are given verbal instructions in Malay. When one says 'gi ata', the monkey goes up to the tree. If it climbs along a branch not intended, one shouts 'bukan itu, gi ata lagi', and when it gets to the right shoot, 'bela itu' and along it the monkey goes. When it reaches the twigs to be collected, one shouts 'ambil itu' where up on the monkey bites off and drops clear the shoot or fruit or flowers.

BOTANICAL MONKEYS

While most monkeys have been trained for plucking coconut fruits, some are taught other jobs such as harvesting mangoes and durians or pulling down bunches of rambutans from orchard trees. Therefore, it seemed possible, that a monkey so trained would solve even the botanical problem of obtaining specimens from tall trees the height of which rendered them inaccessible. Otherwise the tree has to be cut down, and often cutting down a giant forest tree can be extremely expensive. It is destructive to eliminate such giant trees for a few flowers or fruits. Based on experience, authorities of the Singapore Botanical Garden consider that the monkey offers the ablest assistance which the student of trees can have in the high forest. The eminent Botanist, E.J.H. CORNER was once assisted by a monkey called Merah during one of his plant collection trips. In Johore it worked at the crown of a wild chempedak at a height of 170 feet; another day it collected specimens from 24 trees all of which were over 100 feet. At Fraser's Hill, it obtained specimens from five of the giant palms, *Caryota equatorialis* which was for the first time added to the Singapore Herbarium. It is further reported that Merah revelled in throwing down fruits of many plants of a climbing fig (*Ficus callicarpa*), that it was discovered for the first time that the gall-figs of this species were twice as big as the seed-figs and differently marked. For climbing sleder, tall and swaying palms in order to obtain seeds or flowers, the macaque can serve well where man fears to scale.

THE TECHNIQUE OF PLUCKING COCONUT FRUITS

As soon as the simian harvester reaches the palm crown, its first impulse will be to pluck the fruit that is on his way. Normally, only the more mature bunches occupy the lowest position in the crown. However, if the bunch is not mature in the estimate of the trainer, he conveys the primate an instruction through the cord to move on to a ripe bunch, which the monkey obeys without any resentment or confusion. Within a short time, the monkey plucks all the nuts of the 'approved' bunch. Some people are of the opinion that the animal plucks any nut standing on his way to demonstrate his vengeance and wrath against the trainer's shouts from below. But the truth is far from it. Even in parts of West Sumatra, although many trainers give oral instructions, there are other experts who work with intelligent macaques and who do not utter any word to the monkey from below. All the needed instructions are conveyed only through the cord which are followed without any confusion.

As among human beings, no doubt among monkeys too, there are differences in their intelligence, capabilities and temperament. This is reflected in their capacity for harvesting, and the methods they adopt for dislodging the fruits. The more intelligent ones will adopt easier and appropriate methods. Thus, depending on the manner in which the nuts are placed on the palm crown, resourceful monkeys will resort to different methods. Where the fruit-stalk is longer and accessible for biting, the monkey is able to demonstrate the sharpness of the teeth by letting down many fruits in a very short time. One of us (DVL) planned to study the time required for plucking each nut. By the time he looked at the watch and fixed his eyes back on the primate-harvester, alas! the fruit dropped. A 3-second time is adequate for nipping down a fruit with the teeth. The bunch hanging with the weight of the nuts is dislodged by a different technique of kicking with feet and pushing them down. By far, the most common method of plucking fruits is by twisting them. If the animal gets a place to sit, he uses one of his fore-paws and pulls the nut towards him, simultaneously pushing the nut backwards with a foot. The fruit gets twisted, and the act is continued for a few more seconds when the fruit drops down. Even where a convenient sitting place is not available, he can still twist a fruit with just his two hands (Fig. 1).



Figure 1. The most common method of picking coconut is by twisting the nut with a hand and a foot. Here the monkey is about to twist a fruit merely with the hands.

Gambar 1. Cara memetik buah kelapa yang paling lazim dilakukan ialah dengan memutar buah dengan tangan dan kaki. Disini nampak beruk memutar buah dengan kedua tangannya saja.

At times the monkey hangs down, supporting himself by two or even a single leg, and twists down an inconveniently-placed fruit (Fig. 2). The trigonous nature of the fruits enables the beast to twist them more easily. Thus, the monkey can harvest fruits much faster than one can imagine possible. When it comes to harvesting arecanuts, the more intelligent monkeys are sure to peel off and drop the entire bunch rather than plucking the fruits one by one, though there may be some who do it that way partly out of laziness and partly due to ignorance.



Figure 2. The simian harvester in the act of plucking a coconut by using his powerful teeth.

Gambar 2. Beruk sedang beraksi memetik buah kelapa dengan menggunakan giginya yang sangat kuat.

CLIMBING CAPACITY OF MACAQUES

As with man, the working capacity of simian also differs between individuals. Age, maintenance and the intrinsic nature of the animal as well as the false reporting by the monkey's master contribute to the variation in the climbing capacity of individuals. An efficient monkey can harvest about one thousand coconuts in a morning, earning for the owner as much as 15 ringgit (US \$ 7.00). They work throughout the year, excepting Fridays, and the continuous production of coconut keeps the monkeys and their masters busy week after week endlessly. According to LIBAI MATT (1977),

an officer of the Department of Agriculture, Govt. of Malaysia, a monkey climbs only 20 palms on an average. In Malaysia, the monkeys gets two nuts for each tree harvested, as its wages. But as per information provided by the Plantation Extension Service, West Sumatra, a monkey can harvest 500- 750 nuts in one day depending on the garden situation. For each nut harvested, the master gets Rp. 2.50 as the charges which works out to be US \$ 2.00 to 3.00 which is a poor income. In Riau Province, where usually the home-stead gardens are harvested by monkeys for which they receive 20% of the fruits harvested. On successful days, a monkey can earn as much as US \$ 9.00 per day. Reports received from Riau reveal that a monkey can climb on an average 40 palms of medium height which is about twice the capacity of a man. In West Sumatra, because of the competition between monkey owners, only 10 percent of the fruits harvested goes for harvesting charges which is less than the rates prevalent in other areas. However, we had difficulty to accept the appealingly low figure (about Rp. 400 per day or US \$ 0.60) reported by a monkey owner whom we interviewed near Solok, West Sumatra.

The monkeys are taken good care by their masters who consider them as members of the family, since the owners live practically on the income earned by the animal. At different places these simian workers may get different kinds and quantities of food. According to trainer SANTOSO of Pekanbaru (Riau Province), his male macaque receive thrice a day adequate quantities of boiled rice mixed with coconut sauce, a chicken egg daily, a few bananas and three glasses of sugared water. During the training period, they receive special incentive food such as peanut and sugar candy. When they get sick, the veterinary hospitals are unable to treat them either in Indonesia or in Malaysia. But the trainers act as physicians who treat the animals mostly with herbals.

CERTAIN MONKEY - HABITS

To watch the amazing speed of a macaque climbing a coconut (Fig. 3) and the deftness with which it plucks coconuts, no occasion can be better than witnessing a competition organized by the Department of Agriculture, Malaysia from time to time. Such competitions are arranged primarily to encourage the monkeys and their owners, which incidentally offer unique entertainment to the numerous tourists who pour in throughout the year.



Figure 3. The monkey resting on the trunk of a coconut palm. The animal is controlled by the owner through the long cord/chain.

Gambar 3. Beruk sedang istirahat pada batang kelapa. Binatang ini dikendalikan oleh pemiliknya melalui tali panjang/rantai.

The government of Malaysia is also helping, in a special way, coconut pickers on Trengganu area who have been working on this job for ten years or more by presenting them with a monkey each to help them in their work. More than that, those who have already got monkeys will receive a bicycle each to make their rounds easier. A \$ 10,000 has been set aside by the



Figure 4. A male macaque monkey being led by his master to a coconut garden at Pekan Baru (Riau Province). Note the long cord held by the man at one end and of which is connected a short chain attached to the neck strap of the monkey.

Gambar 4. Seekor beruk sedang dibawa oleh tuannya ke kebun kelapa di Pekan Baru. Tali panjang yang dipegang oleh seorang lelaki pada pangkalnya, pada ujungnya disambung dengan rantai pendek yang terikat pada kalung di leher beruk tersebut.



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government for this purpose. The government is at present undertaking a census to determine the actual number of people engaged in this trade. A rough estimate gives the number of coconut picking monkeys in Malaysia as just over one thousand. But once the correct number is known, a study will be made to determine the type of monkeys to be purchased (ANON., 1980). It may be mentioned that only in Malaysia, from Pahang Estate to the South, some growers use baboons which are less efficient compared to the macaques which are used universally. The monkey has a special flare to ride on a bicycle along with his master. It occupies the prominent position of the handle bar of the bicycle. The monkey can also walk along the road like a dog on a leash (Fig. 4). When there is a need to cross a stream to reach a coconut garden, the primate perches on the bow of the boat as if to pilot the boat. Monkeys also enjoy riding on open trucks (Fig. 5). Mundi and the six-year old HARTONO, son of trainer SANTOSO of Pekan Baru, majestically arrived riding on a tempo to give a demonstration to one of us (TAD). In large estates where several monkeys simultaneously do the harvesting in different blocks, they have to move from place to place, and confrontations between their charges is a common difficulty for the trainers. As two such elements approach each other, they strain at the cords held by their masters, growl and shriek at each other as well as glaring and grimacing, revealing all their teeth.

Though the monkeys are always chained, and sometimes they look forbidding, they are said to be friendly and tame. But often they assume threatening postures at strangers who attempt to take their photographs. However, some of these beasts are evil-tempered, and curious tourists are warned to stay clear. It is reported that Malay farmers have been hospitalized due to wounds from bites from their own monkeys. Baboons can be nastier. Those monkeys that rebel against their masters and those which do not learn the art of picking coconuts are said to be sold in Malaysia to neighbours who enjoy curried monkeys. However, people eating monkeys in Indonesia are not known.

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PENDAHULUAN

Dewan ini sebagian besar miyok dan cangkah (2) (Merr & Perry) Indonesia masih dikumpul di samping sedikit untuk memenuhi kebutuhan dalam negeri. Ekspor miyok dan cangkah Indonesia dalam beberapa tahun terakhir dapat dilihat pada tabel 1.

Tabel 1. Ekspor miyok dan cangkah dari Indonesia *

Tahun	Jumlah (ton)
1970	209
1971	331
1972	303
1973	344
1974	347
1975	188
1976	280

* Sumber (Source): TAN (1977)