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REPORT

DEVELOPMENT OF COCONUT-BY-PRODUCT INDUSTRIES[1/]

INDONESIA

by

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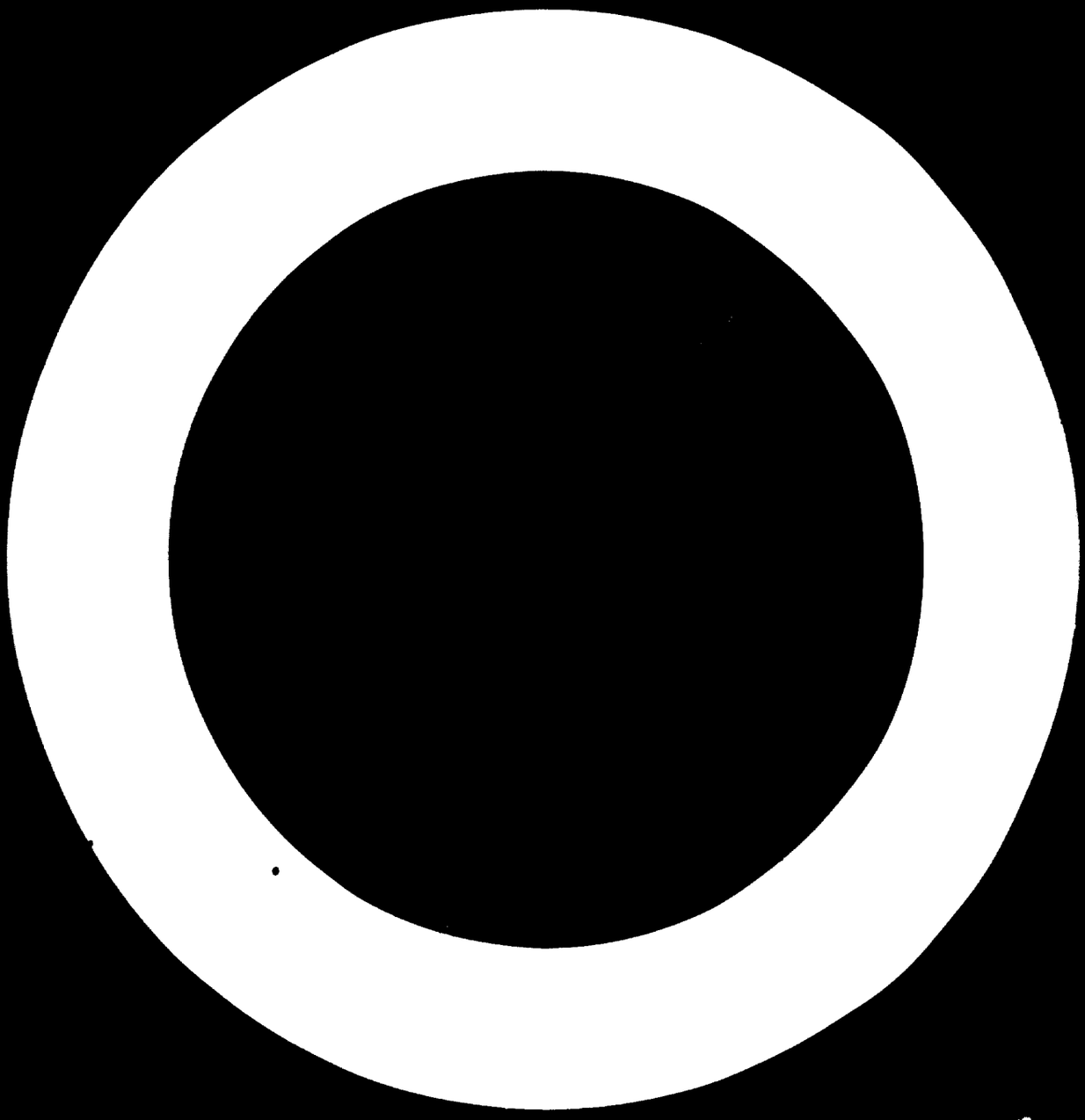

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PROPOSALS FOR CONSIDERATION BY GOVERNMENT OF INDONESIA

A. COIR FIBRE INDUSTRY

The survey visit to Sri Lanka and Japan indicates that undoubtedly there is a case for Indonesia to re-activate the existing coir fibre industry for making rubberized coir fibre for car seats, mattress and coir bags for domestic consumption.

As suggested in the body of the report, the Government of Indonesia to take immediate steps to conduct pre-investment feasibility studies in collaboration with the Sri Lanka Coir processing company - Messrs. Hayleys (Ceylon) Ltd.

B. SHELL CHARCOAL

Due to the unusually high freight rates from Indonesia sea ports, producers of coconut shell charcoal obtain low prices, which is invariably lower than their cost inputs. Therefore, it is most unlikely that Indonesia will be successful in developing this industry as an export oriented product. However, prospects exists for developing this industry for domestic use by setting up a joint venture for shell charcoal based activiated carbon plant with a developed country other than Japan.

= INTRODUCTION =

Even though Indonesia being the second largest coconut producing country in the world, yet there are no significant coconut-by-product industries at present in Indonesia. From time to time various projects have been initiated by the Government to develop the by-product industry. These projects have not been successful.

There are at present three mechanical coir fibre mills in Indonesia which have either made fibre in the past and have been shut down or have yet to be completed. The mills are located in Wane (Central Sulawesi), Pangasih (Jogyakarta) and Aceh (North Sumatra). Similarly there appears to be very little coconut shell charcoal produced in Indonesia. In early 1970, the Government of Indonesia through Department of Industries have set-up three pilot projects to manufacture shell charcoal using modern type kilns in Tulung Agung (East-Java), Kebumen (Central Java) and Pariaman (West Sumatra). Again, these pilot plants did not prove that such projects are economically viable due to a number of factors (Please refer APCC/ UNIDO report - Coconut Industry Development Visit to Indonesia dated April 7, 1975 and Pre-Feasibility Study for the Development of coconut-by-products Processing Industry Indonesia - IS/INS/74/040/11-01/06 dated February 16,1976.

In late 1974 the Government requested urgent UNIDO expert assistance to enable the Government to formulate a plan of action for development of the coconut-by-product industries. In compliance with this request, a UNIDO expert arrived in Jakarta on September, 1975 for a period of two months. The final project report, Pre-Feasibility study for the Development of Coconut-by-products Processing Industry-Indonesia IS/INS/74/040/11-01/06 was

submitted to Indonesian Government on March 10, 1976.

As a follow-up of the above project as well as from earlier studies, the National Agency for Export Development (BPEN) requested UNIDO through project VS/RAS/75/011 to have a Seminar on Coconut-by-product industry development in Manado, North Sulawesi. This Seminar was held in June, 1976 with the objective of keeping the potential coconut-by-product investors in Sulawesi on the need for Coconut-by-products industries development in Indonesia as an export oriented industries. One of the recommendations made by the Seminar was that a study team from Indonesia be sent to Sri Lanka and Japan to study the existing state of the coconut-by-product industries, especially coir fibre industry in Sri Lanka followed by a visit to Japan to study the prospects of the market as well as to explore the possibility of establishing a joint venture company in Sulawesi with assistance from interested Japanese partners. Through the assistance of the UNIDO Project Manager, VS/RAS/75/011, a team consisting of ten participants visited Sri Lanka and Japan from 24 October - 7 November 1976. The team included six government officials and three coconut industrialists. The latter were potential investors on coconut-by-product industries. The UNIDO Project Manager (VS/RAS/75/011) and the UNIDO Industrial Economist attached to the Asian and Pacific Coconut Community also accompanied the team as advisors.

This report has been prepared by the UNIDO Industrial Economist attached to the Asian and Pacific Coconut Community in order to help the Government of Indonesia officials as well as potential investors in coconut-by-product industries to gain an insight into the problems that inhibit the full exploitation of all parts of the coconut.

COIR FIBRE AND COCONUT SHELL CHARCOAL BASED ACTIVIATED CARBON INDUSTRIES IN JAPAN

SUMMARY OF MAJOR FINDINGS

(a) COIR FIBRE

(i) Current Situation

Japan is the largest consumer of bristle fibre. Consumption of yarn is negligible. The market for manufactured coir products is small, but growing steadily. Sri Lanka, Thailand and Malaysia are the main countries supplying coir fibre to Japan. Import statistics from 1972 to 1975 indicates that the Sri Lanka market share fell from 74 percent in 1972 to 66 per cent in 1975. Imports from Malaysia increased to match the decrease in imports from Sri Lanka, growing from 1.5 percent of the total imports in 1972 to 17 percent in 1975. Imports from Thailand remained fairly constant at about 15% of the total. Other countries were relatively minor suppliers.

The sharp increase in coir fibre exports from Malaysia from 1972 to 1975 is due to the re-activation of an idle coir fibre plant in Penang by a Japanese firm by the name Marubeni Trading Co., Tokyo who accounts for 50% of the total coir fibre imports into Japan. This plant was purchased by Marubeni in 1973.

Coir fibres have traditionally been used in Japan for brush-filling, making twines, nets and bags for special marine uses, for collection of sea-weeds and pearl fisheries. But, these end-uses are being gradually dominated by synthetic substitutes. Rubberized coir fibre find

its use in making car seats, mattresses, cushion for irrigation drain pipes, air-filters and pads for the reinforcement of river embankments. So far, coir fibre has withstood compitition from synthetics and other natural fibres. The main reason being the largest rubberized coir fibre manufacturer in Japan (IKEDA BUSSAN) has set up six plants in various parts of Japan many years ago as labour intensive processing units are carrying out constant research and development work to effect improvements in the manufacture of rubberized coir fibre.

ASSESSMENT OF COIR FIBRE INDUSTRY IN JAPAN

Due to the high wage rate in Japan as well as severe compitition from synthetics, use of coir fibre in traditional small-scale labour intensive industries such as brush making (Tawashi), twine making, nets and bags for special marine use will gradually come done. In anticipation of this, Sri Lanka is taking this opportunity to manufacture semi-finished and finished items for export to Japan. The success of this operation depends on the freight cost from Sri Lanka to Japan.

On the other hand, the use of rubberized coir fibre in making car seats, beds, cushion for irrigation drain pipe, air-filter, pads for the reinforcement of river embankments etc. may remain unchanged or increase depanding on the future state of the automobile industry.

CONCLUSION

Since twisted fibre is the starting raw material for rubberizing, this type of fibre offers the most favourable prospects on the Japanese market. In case, Indonesia would like to go into twisted coir fibre

manufacture, the first problem they will face will be to break into the existing market held by Sri Lanka, Malaysia and Thailand. Only way to gain access to the Japanese market is to invite Japanese coir fibre end-users and traders to invest in a joint venture to produce coir fibre in Indoneisa. From the discussions, the study team had with various Japanese companies in Tokyo, I am under the impression that it is extremely difficult to attract Japanese partners to invest in Indonesia for the following reasons:

(i) Shipping problems and high freight cost from ports such as Bitung and Donggala in the coconut producing region of Sulawesi to Japan.

(ii) High coconut husk collection cost compared to other countries such as Sri Lanka, Malaysia, and Thailand.

(iii) Non-availability of labour in the Sulawesi region. Successful development of coir industry in Sri Lanka, India, Thailand and Malaysia is due to the labour intensive nature rather than capital.

(iv) Japanese Trading Company by the name "Marubeni Trading Co.," Tokyo which accounts for 50% of the total imports of coir fibre into Japan owns and operates a coir fibre decortication plant in Penang, Malaysia. Therefore, for economical reasons Japanese traders would prefer to expand activities in Malaysia rather than investing in Indonesia, where shipping is the biggest problem. Port of Penang is well developed and less shipping problems with comparatively cheaper freight rates to Japan.

In view of the above mentioned problems, I am of the opinion that the coir fibre industry in Indonesia should not be developed as an export oriented industry. The potential for development of this industry for domestic market is greater for the following reasons:

(i) The estimated production of automobiles for 1977 is 88,000 - which requires 180 tons of twisted fibre for rubberizing and use in car seat manufacture.

(ii) The market for mattresses in Indonesia is also slowly increasing and with setting up of a unit to manufacture rubberized coir mattresses for bedding industry, the existing imports of cotton made mattresses from Australia will be replaced.

(iii) Present annual requirements of bags for copra is about 4.5 million, which could be easily made from coir fibre. Assuming at least 2 million bags could be made, the coir fibre requirements will be 2,000 tons/year (Refer to Report on Sri Lanka Coir Bag making)

RECOMMENDATIONS

(1) Government of Indonesia to take immediate steps to conduct pre-investment feasibility studies in collaboration with Hayleys (Ceylon) Ltd. to re-activate the coir fibre plant in Wani for making rubberized coir for use in car seats and mattresses for domestic consumption.

NOTE:

(1) Sri Lanka Government through Hayleys (Ceylon) Ltd. (largest processer and exporter in coir fibre from Sri Lanka) agreed in principle to help the Central Sulawesi Government to re-activate the Wani plant to produce twisted fibre for rubberizing and further processing into car seats and mattresses, initially for domestic market. The industry could be latter on expanded and exported to overseas markets.

(2) Other alternative will be to hire two experts from Sri Lanka to re-activate the plant. Two experts namely Messrs. Subasinghe and Wickremasinghe, presently in Tanzania setting up coir processing plant for Tanzanian Government indicated interest in offering similar assistance to Indonesia, if a request is made through Sri Lanka Government.

(b) COCONUT SHELL CHARCOAL AND ACTIVIATED CARBON

(i) Current Situation

The main countries supplying coconut shell charcoal to Japan are the Philippines, Sri Lanka, Thailand and Indonesia. Import statistics (Appendix-) from 1966 to 1975 indicates that the market for coconut shell charcoal grew rapidly from 1966 to 1974, but declined in 1975. The main reason for the decline was partly due to recession in Japan as well as new plants to manufacture activiated carbon from shell charcoal have been set up in the coconut producing countries. To-day, there are seven activiated carbon plants based on shell charcoal in four of the ten APCC member countries. Except for the plant in Sri Lanka, other plants in Thailand, Malaysia and the Philippines are joint ventures with Japan.

The Philippines market share for coconut shell charcoal in Japan is about 70 to 80% of total imports between 1973 and 1975.

(ii) Assessment of the coconut shell charcoal based activiated carbon plants in Japan

The comparative manufacturing cost in Japan and in coconut shell charccal producing countries indicates that it is more profitable to manufacture activiated carbon, in the producing region due to high freight and handling charges to Japan. With recent new factories coming up in producing region, as well as reduced demand for activiated carbon due to recession, manufacturers in Japan are not operating their plants to full capacity. For this reason, the Japanese manufacturers' are rather reluctant to consider further investment in the producing region.

Regarding market for shell charcoal in Japan the buyers prefer to buy from the Philippines due to less shipping charges, steady supply and proximity. The analysis of the freight charges from producing countries to Japan indicates that other than the Philippines, all other countries FOB prices are low as the Japanese buyers maintain CIF prices as fixed immaterial as to where it is shipped from. In other words, the Philippines shell charcoal producers obtain better price for shell charcoal compared other countries. This is the reason why this industry is developing rapidly in the Philippines.

CONCLUSION:

Due to the high freight rates existing in Indoneisa, and with gradual shifting of manufacturing plants for activiated carbon to coconut shell producing countries, it is most unlikely that Indonesia will be successful in developing this product as an export oriented industry. However, the only hope for developing the coconut shell charcoal industry is to look into the possibility of setting up an activiated carbon plant with foreign collaboration both for domestic consumption as well as exports. Since marketing of activiated carbon is a highly specialized job, it would be advisable to invest in joint venture with developed countries other than Japan.

RECOMMENDATIONS:

1. Indonesian Government to explore the possibility of setting up a joint venture with developed countries other than Japan to manufacture coconut shell charcoal based activiated carbon.

COIR FIBRE AND COCONUT SHELL CHARCOAL PROCESSING INDUSTRIES IN SRI LANKA

SUMMARY OF THE MAJOR FINDINGS

(a) COIR FIBRE

I. THE STRUCTURE OF THE COIR INDUSTRY

Sri Lanka produces both brown and white fibre. Brown fibre is extracted from dry husks, where as white fibre is made from green husks. Sri Lanka is the world largest producers of brown fibre with an estimated annual production of 110,000 tons, nearly all of which is expected. This consists of 57,000 tons of mattress fibre, 23,000 tons of bristle fibre and 25,000 tons of twisted fibre. White fibre production totals about 5,000 per year most of which are used for making yarn for mats, mattings, rugs and carpets mainly for domestic market.

BROWN FIBRE INDUSTRY

Brown fibre industry in Sri Lanka are well organised and there are 621 brown fibre mills producing mainly bristle and mattress fibre by wet milling process using Ceylon drums. A small amount of decorticated fibre is produced by the dry milling process. Most of the plants visited are old (more than 40 years) and need renovation.

Majority of the further processing of coir fibre is carried out by well established companies, one of which is Messrs. Hayleys (Ceylon) Ltd. They are involved in hackling drafting, dyeing, bleaching, cutting and

flagging of bristle fibre for use in brush making. The mattress, fibre is cleaned and baled for the production of pads. Mattress, bristle and mixed decorticated fibres are twisted and the bulk exported, although some is used locally in rubberized coir for making beds and upholstery. Some bristle fibre is machine spun to produce twine.

WHITE FIBRE INDUSTRY

The processing of green husks into white fibre in Sri Lanka is mainly done by traditional methods involving retting in water for varing periods of time-usually 9-12 months. The retting usually takes place in lagoons or backwaters. The retted husk is then subjected to crushing and beating or tearing out the fibre by hand. The fibres are then shaken and spread out by hand to dry in shade and separated from dusty pith. The cleaned white fibre is now ready for spinning.

The spinning is either done by hand or by spindle. The manufacturing sector purchases the spun yarn for making mats, mattings, rugs and carpets. Weaving of these coir products are done on traditional hand-looms.

LABOUR EMPLOYED AND WAGES PAID IN THE SRI LANKA COIR INDUSTRY

The white coir fibre industry in Sri Lanka is essentially a cottage industry dispersed mainly over the South Western Coast of Sri Lanka. The work involved in of an ardous nature, but it is readily available in areas where no other vocation is generally open. The availability of a large work force mainly depending on this industry on one hand

and the inelastic nature of the price pattern on the other have brought about a low wage level particularly in the retting and spinning sector of the industry. The labour in the manufacturing sector is more organised with comparatively higher rates of wages.

II. ASSESSMENT OF COIR FIBRE INDUSTRY

With the workers' efforts through co-operatives to obtain improved wage level as well as governments' concern on minimum wage and labour welfare measure for labour employed in coir industry, most of the coir processers are not sure of the future of this industry. The following summary of the estimated profit return on coir fibre production at various stages and their finished products indicate the serious problem this industry has to face when a minimum wage rate is enforced (Please refer to attached individual cost analysis reports)

	Operation or Product	Number of Men employed on piece rate	Net Profit	Net Profit per day (8 hrs work)
1.	Retting operation (after retting for 9-12 months-3,000 husks)	Unlimited	Rs 70.00	not applicable
2.	Defibering retted husk-manually 3,000 husks	Unlimited, wage Rs 1/= per 20 husk	Rs 145.00	not applicable
3.	Defibring retted fibre using drum decorticator 6,000 husks/8 hrs	24 men and 9 women	Rs 481.00	Rs 481.00

4.	Salt bag making using coir fibre	4 men and 3 children	4 cts to 14 cts per bag (Sri Lanka cents)	Rs 2.80 to Rs 9.80
5.	Door mat making size: 12.5" x 18"	3 men	Rs 2.90?mat	Rs 43.50
6.	Door mat making Size: 12.5" x 21"	3 men	Rs 1.75/mat	Rs 29.50
7.	Carpet Making Size: 75' x 6'	5 men	Rs 204.75 in 16 hours	Rs 104.40

Because of the general unemployment problem, the work which could perhaps be done by fewer persons on a continuous basis gets done by a large number with wider dispersion and breaks in between on a piece rate basis.

The study on the economics of setting up a small-scale decorticating plant in Sulawesi for coir fibre production using new machines purchased at the current price indicates that such a project is commercially not viable. (assuming that market for coir fibre exists in Indonesia - for further details see attached report page --57--)

CONCLUSION

The problems of the coir fibre industry in Sri Lanka are mainly related to processing and marketing. The processing technology used is largely traditional and requires high in - puts of labour. Due to increasing labour costs and out-dated technology which results in low out-put, the cost of production is high in spite of the fact the plant/building depreciation and investments are zero (as the plants & building are old more than 40 years old). The solution would be to increase mechanization

of the processing sector and go into further processing of coir fibre into rubberized coir fibre for car seats, mattresses, upholstery, coir filterations pads for use with drainage pipes etc. (where these products fetches high sale value & profitability). Due to severe compitition from synthetics, any increase in price for raw coir fibre may up-set the present export market. Therefore, steps should be taken to reduce cost of production via mechanisation, further processing of coir fibre, and continuing product research and product development.

(b) SHELL CHARCOAL

The shell charcoal in Sri Lanka is made by a very simple process and on an average farmers' obtain a net profit of Rs 49/= per ton of shell charcoal. The demand for shell charcoal is better both for domestic as well as export market. Domestically shell charcoal is used in the activiated carbon manufacture. A Sri Lanka national company - Messrs. Hayleys (Ceylon) Ltd. is involved in activiated carbon manufacture since 1972.

From Janauary - October, 1976, Sri Lanka has exported 21,184 tons of coconut shell charcoal of which 8,050 tons went to France, 4,525 tons to Japan, 4,104 tons to America, 3,599 tons to U.K. and the rest went to Holland, Canada and Dubai.

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VISIT TO MARUBENI TRADING CO., TOKYO, JAPAN

INFORMATIONS GATHERED IN THE PROCESS OF DISCUSSION

Japan imports on are average 10,000 tons of coir fibre annually of which 50% is imported by Marubeni Trading Co. About 90% of the imports of coir fibre comes from Sri Lanka, the balance 10% comes from Thailand, Malaysia and the Philippines.

In 1973, Marubeni Trading Co. purchased a non-operating coir fibre decorticating machine in Penang, Malaysia. This plant is now in operation and presently producing 160 tons of mixed coir fibre per month. Bulk of the production is exported to Japan.

The imported coir find its use in the following and products.

(a) Bristle fibres are traditionally been used for brush-filling, making twines, nets and bags for special marine uses for collection of sea-weeds and pearl fisheries.

(b) Bristle fibre mixed with mattress fibre are processed into rubberised coir pads for use in the automobile industry.

(c) Use of coir fibre as cushion for irrigation drain pipe is also on the increase in Japan.

(d) Air-filters and pads for the reinforcement of river embarkments.

Use of coir fibre for making rugs or carpets are not known in Japan. Japan has very little experience in making coir fibre decorticating machine. According to informations received, Japanese made twisting machines are far more superior to the machines made by European manufacturers. The Japanese firm that manufactures twisting machine is OKINI & Co.

Japan produces 7-8 million cars per year of which about 1.5 million cars use rubberised coir fibre for seats. The annual imports of twisted coir fibre for car seat manufacture is 4,000 tons.

MARKET PROSPECTS

(a) Rubberised Coir Fibre

Use of rubberised coir fibre in car seats is now on the decrease due to the following reasons.

(i) Recession in the Japanese automobile industry.

(ii) Due to the need to install pollution control equipments in cars, the car industry is going into reducing the weight of cars, car with rubberised coir seat is heavier than that of foam rubber car seats.

(iii) Synthetic substitutes are cheaper than coir fibre.

(b) Brush Making Industry

Brush making industry in Japan are done on a small scale and operated by elderly workers. With high wage rate in Japan the brush making industry is becoming costlier and the industry

is finding difficulty in recruiting young workers when the old hands retire.

It is anticipated that with retirement of old hands, the brush making factories will be closed down.

(c) Nori - Netting and Pearl Fisheries

Synthetics are replacing the coir, unless, the coir fibre is made cheaper, synthetics will completely replace coir.

(d) Rubberised Coir Fibre in Civil Engineering Works

Use of rubberised coir fibre in civil engineering works such as reinforcement for river embarkments is on the increase in Japan.

JAPAN STATISTICS ON COIR FIBRE AND ITS PRODUCTS

A) IMPORT RECORD (Unit 1000 Kg)

	1972	1973	1974	1975
CHINA	114	111	92	68
THAILAND	1,885	1,972	1,804	1,518
SINGAPORE	430	100	180	15
MALAYSIA	163	246	1,117	1,662
PHILIPPINES	166	224	410	2
INDIA	62	81	175	40
SRI LANKA	8,229	10,322	11,757	6,305
PAPUA NEW GUINEA	10	0	0	0
INDONESIA	0	10	0	0
TOTAL	11,059	13,066	15,535	9,610

B) USAGE

BRUSH, KITCHEN BRUSH		150 TON/MONTH	(Tawashi)
TWINE ROPE		150 TON/MONTH	(General use)
PADDING (CAR SEAT BED)	)	600 TON/MONTH	
DRAIN PIPE OTHERS	)		

C) SORT OF THE FIBER IMPORTED

BRISTLE FIBER	300 TON/MONTH
TWISTED FIBER	500 TON/MONTH
MATTRESS FIBER	100 TON/MONTH

D) FUTURE DEMAND

BRUSH SCRUB BRUSH	UNCHANGED
TWINE ROPE	-"-
PADDING FOR CAR SEAT	DECREASED
PADDING FOR BED	UNCHANGED
DRAIN PIPE	UNKNOWN
TOTAL	DECREASED

SOURCE: MARUBENI TRADING CO., TOKYO, JAPAN.

VISIT TO MESSRS. IKEDA BUSSAN CO; LTD

YOKOHAMA, JAPAN

Messrs. Ikeda Bussan Co. Ltd. is a subsidiary firm of NISSAN Group (manufacturers of Datsun Cars). 80% of the car seats from rubberized coir fibre for Datsun are supplied by Ikeda Bussan which is about 150,000 cars per year.

Ikeda Bussan have six factories in Japan involved in car seats manufacture starting from rubberized coir fibre, of which Ikeda Bussan, Yokohama is the oldest and the largest. Nisan Group owns 35% of the shares of Ikeda Bussan. Ikeda Bussan also manufactures car seats for Mitsubishi as well as Honda cars. Toyotas, as I understand uses foam rubber for their car seats. This company is also involved in making mattresses for bed and have 10% of the market share for mattresses in Japan.

RAW MATERIALS SUPPLY FOR CAR SEATS

Coir fibre for rubberizing is mostly imported from two well known companies in Sri Lanka, namely Hayleys (Ceylon) Ltd and VOLANKA (Ceylon) Ltd.

IKEDA BUSSAN CO. RUBBERIZED COIR FIBRE FACTORIES IN COCONUT PRODUCING COUNTRIES

(a) Thailand: - Ikeda Bussan have already started making car seats starting from coir fibre in Thailand. The bulk of the production is for local consumption and the

production figures are not available.

(b) MALAYSIA: - Ikeda Bussan have entered into agreement with a Malaysian partner to manufacture car seats locally.

MARKET FOR COIR FIBRE IN AUTOMOBILE INDUSTRY IN JAPAN AND EUROPE

AUTOMOBILE INDUSTRY

(i) JAPAN

Ikeda Bussan is the largest company in Japan involved in car seat manufacturing with six factories and uses about 3,000 tons of coir fibre annually. The techniques used by Ikeda Bussan for producing rubberized coir fibre are considered advanced compared with manufacturers in Europe. Over the years, this firm in order to meet the sophisticated cushioning requirements of the automobile manufacturers have effected several improvements in the manufacture of rubberized coir fibre. This firm pioneered and developed a process to impregnate coir fibre in polyurethane foam for cushioning automobile seats. Another new product developed by this firm is the synthetic moulded car mats with rubberized coir backing.

According to Ikeda Bussan, recession in the Japanese economy has decreased the demand for coir fibre, as this is dependent on the state of the automobile industry. The future prospects of using more rubberized coir in the automobile industry, when the production levels of cars returns to normal, will depend on the competitive price of rubberized coir vis-a-vis substitutes.

(ii) EUROPE

Since rubberized coir fibre industry is labour intensive and due to very high cost of rubberizing coir fibre for the manufacture of moulds for car seats, the European car manufacturers are using synthetic foam for car seats. In the case of USA, the car manufacturers who are used to cotton as main material for car seats are also changing slowly to synthetic foam for economic reason.

ECONOMICS OF RUBBERIZED COIR FIBRE PRODUCTION BY IKEDA BUSSAN

According to the Ikeda Bussan management, they are running their plants at profitable level due to the fact that they have started these plants in a small way and over the period of years expanded their production capacity. Their existing plants are labour intensive. A new plants of these types to be put up at this time may not be able to run at a profitable level due to high investment cost.

VISIT TO NIHON BED MANUFACTURING CO. LTD

OTA-KU, TOKYO

In Japan there are about 230 bed making companies of which Nihon Bed MFG. Co Ltd. is one of those.

Generally the Japanese population is not used to Western type beds. The younger generations are now going to more and more to the Western style beds. The sales of beds in Japan has been increasing steadily from 1966 to 1974 and in 1975 there was a drop in sales.

With the Japanese government directive for use of anti-fire beds (particularly people used to smoking in bedrooms) and with high cost of imported mattress fibre, chances are that the use of coir fibre in bed making will diminish.

Presently, in Japan coir fibre, sisal, foam rubber and steel wire are used in bed manufacture. Foam rubber beds are the most expensive, followed by coir and sisal fibre. Steel wire insulated beds are the cheapest. The imported cost of coir fibre from Sri Lanka is almost the same price as sisal imported from Mexico, but people prefer sisal fibre made beds to coir fibre one. Durability of coir fibre beds are good (last for 15 years) compared to steel wire beds.

For cost comparison purpose, I give below the raw material cost per bed for the three different types of fibre/wire.

Wire	-	¥ 420 per bed
Coir Fibre	-	¥ 1,056 per bed
Sisal Fibre	-	¥ 1,056 per bed

MARKET

Nihon company expects that the domestic market in Japan will increase, where as the export market will be limited due to high cost of shipping. In the past Japanese Bed Manufacturers have exported beds to Hotels in South Pacific and Jakarta.

PROSPECTS OF NIHON INVESTING IN INDONESIA TO MAKE BEDS

Nihon have explored this possibility and decided against investment as it is extremely difficult to complete with imported Australian made beds from cotton, which are more economical.

In case, Indonesians are willing to start a bed making industry on their own, NIHON is willing to pass on technical known-how.

DOMESTIC PRICES OF VARIOUS TYPES OF BEDS IN JAPAN

Standard Type Single bed made of wire insulator ..... US$ 25/bed

Standard Type Single bed made of Coir Fibre as insulator ..... US$ 40/bed

Expensive European Type Single bed made with cotton pads and metal springs ..... US$ 170/bed

▪ STATISTICS OF BED MANUFACTURING IN JAPAN ▪

		1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	TOTAL	Presumption as of end 1965	G. Total	
													970.000		
A	B e d	336.747	473.059	520.722	699.278	810.342	1053.878	1092.598	1222.350	1153.258	1107.191	8.469.423		9.439.423	A
													1.073.263		
B	Soft Bed	372.661	326.417	291.461	207.384	164.012	133.543	124.047	103.331	74.067	55.954	1,852.877		2.926.140	B
C	Hospital-												262.782		
	Bed	93.881	98.283	107.317	99.214	106.489	101.677	106.318	109.582	92.595	66.769	982.295		1.245.077	C
													452.347		
D	Wood -														
	Bank Bed	157.065	179.652	193.399	337.010	402.683	413.158	363.340	352.406	323.036	255.598	2.977.347		3.429.694	D
													108.783		
E	Steel Bed	37.772	29.992	30.381	25.088	15.684	10.279	15.478	6.702	7.074	4.574	183.024		291.807	E
	A----E =	998.096	1107.403	1143.280	1367.974	1499.210	1712.535	1701.781	1794.371	1650.030	1490.286	14.464.966	2.867.175	17.332.141	
	A+B+C+D+E=	904.245	1009.120	1035.963	1268.760	1392.721	1610.858	1595.463	1684.789	1557.435	1423.317	13.482.671	2.604.393	16.087.064	

VISIT TO SUMITOMO SHOJI KAISHA LTD.

TOKYO OFFICE

Visit was made to the Carbon Dept. of the Sumitomo Shoji Kaisha Ltd. Tokyo Office. Since the technology for making activiated carbon from coconut shell charcoal was developed in Japan, most of the manufacturers were very cautious about showing their plants to visitors. Therefore, our informations on activiated carbon from coconut shell charcoal were gathered in the process of discussions with the officials of the carbon Dept. and Inorganic Chemicals Section of the Sumitomo Shoji Kaisha Ltd.

Price of coconut shell charcoal imported delivered to the factory (which includes tax etc) ..... ¥ 42,000/ton

or US$ 141/ton

Selling price of activiated carbon from coconut shell charcoal ..... ¥ 450,000/ton

or US$ 1,510/ton

Activiated carbon from coconut shell charcoal is specially well suited for gas adsorption, where as activiated carbon derived from coal is preferable for water treatment, because it is cheaper and can be re-cycled and used.

Price of activiated carbon derived from coal ..... ¥ 400,000/ton

or US$ 1,342/ton

DEMAND FOR ACTIVIATED CARBON IN VARIOUS INDUSTRIES IN JAPAN

UNIT: - ton

USE OF GRANULAR ACTIVIATED CARBON	1973	1974	1975	1976	1977	1978
Gas Adsorption	5,923	6,200	7,500	9,760	11,200	12,880
Water treatment	4,648	4,600	5,400	7,300	8,800	10,600
Industrial Chemicals	1,409	2,160	2,580	2,840	3,120	3,430
Solvent Recovery	637	900	1,000	1,100	1,200	1,300
Catalyst	984	900	860	770	690	620
Others	447	355	400	550	600	700
Exports	179	425	500	600	700	900
T O T A L	14,227	15,540	18,520	22,840	26,310	30,390

USE OF POWDERED ACTIVIATED CARBON	1973	1974	1975	1976	1977	1978
Sugar industry	2,411	2,400	2,400	2,520	2,650	2,780
Lactose	1,744	1,760	1,800	1,800	1,800	1,800
Industrial	5,468	6,240	6,860	7,550	8,150	8,800
Gulutamic Acid	2,600	2,290	3,330	3,400	3,500	3,610
Wine Making	3,067	3,940	4,330	4,780	5,070	5,270
Fats Oils Industry	746	670	700	700	700	700
Water treatment	6,902	2,540	3,050	3,960	4,360	4,800
Others	692	600	650	700	750	800
Exports	1,365	1,080	1,200	1,300	1,400	1,500
T O T A L	21,784	24,500	26,330	28,810	30,580	32,370

PRODUCTION TREND OF ACTIVIATED CARBON

Type of Activiated carbon	1971	1972	1973
Powdered	21,607	20,274	21,367
Granular	9,238	12,318	14,118
T o t a l	30,845	32,592	35,485
Number of factories producing;			
(a) Powdered activiated carbon	18	18	19
(b) Granular activiated carbon	7	8	11

Example to Indicate LAND, CAPITAL, Plant and Labour Required to Set up a Plant Producing 4,200 tons of Activiated Carbon/Year

(1)	Land	40,000	sq.m
(2)	Housing	2,005	sq.m
(3)	Personnel	54	persons
	Direct workers	40	persons
	Indirect workers	14	persons
(4)	Investment		
	Machinery	¥ 384,670	million
	Maintenance & Electricity	¥ 133,250	million
	Auxillary equipment	¥ 56,180	million
	Fundamental Building Cost	¥ 12,350	million
	Installation	¥ 75,200	million
Total Investment Excluding land & Housing cost:		¥ 661,650	million

It is assumed that (a) all plants and equipments are new

(b) plants & equipments are mechanical and automatic

(c) minimum number of personnel required is 54

ESTIMATED PRODUCTION COST FOR SHELL CHARCOAL BASED ACTIVIATED CARBON

	Percentage
1. Material cost	37.7
2. Operational cost including labour, fuel and power	22.7
3. Investment includes depreciation, interest, insurance, tax etc.....	29.7
4. Management	6.7
5. Marketing cost	3.2
	100.0

ASSESSMENT OF THE COCONUT SHELL CHARCOAL BASED ACTIVATED CARBON INDUSTRY IN JAPAN BASED ON THE INFORMATIONS GIVEN BY MESSRS. SUMITOMO SHOJI KAISHA LTD., TOKYO

(1) JAPAN

On the basis of the information given, let us work out the estimated cost of production and assess the profit margin in Japan. Experience in Sri Lanka indicates that to produce 1 ton of activiated carbon, you require approximately 4 tons of coconut shell charcoal.

		US $
1.	Raw material cost at US$141/ton for 4 tons	564
2.	Operational cost including labour, fuel and power on the basis of given parameters	340
3.	Investment including depreciation, interest, Insurance, tax, etc. based on the given percentage	445
4.	Management	100
5.	Marketing cost	48
		US$1,497
	Selling price	US$1,510
	∴ Nett profit	US$ 13/ton

(2) IN THE COCONUT SHELL PRODUCING COUNTRIES

Let us assume the average price of shell charcoal delivered to the processing plant in either Philippines, Thailand, Malaysia or

Sri Lanka as US$80/ton leaving the other cost structure same as that in Japan. (Japan operational cost, management and marketing cost extremely high compared to the producing countries)

	US $
1. Raw material cost at US$80/ton for 4 tons.....	320
2. Operational cost including labour, fuel & power on the basis of given percentage.....	193
3. Investment including depreciation, interest, insurance, tax etc based on the given percentage	253
4. Management	57
5. Marketing cost	27
Total .....US$	850

Assuming a maximum average freight including insurance to Japan .....US$ 50/ton

∴ CIF price of activiated charcoal, Tokyo ...US$900/ton

∴ Nett profit .....US$600/ton

COMMENTS:

The above analysis indicate the need for establishing activiated carbon derived from shell charcoal in the coconut producing countries. Due to the high-freight and handling charges on coconut shell charcoal shipped from the producing country to Japan, profit margins in Japan is very little. During the past few years number of joint ventures have been

established to manufacture activiated carbon in coconut producing countries, especially in Thailand (Mitsubishi), Malaysia (TAKETA) and the Philippines (four plants). The plant in Sri Lanka is set up with 100% national capital and run by Hayleys (Ceylon) Ltd.

VISIT TO JAPAN SHIPPERS' COUNCIL

MINATO-KU, TOKYO

The main objective the Japan Shipper's Council is to solve problems for their members on transportation. To fulfill these objectives, they are now engaged in the following activities.

(1) To conduct survey and research on matters related to transportation of export and import cargoes

(2) To promote rationalization in the transport costs by a study of freight rates, storage charges and others related to the export and import cargoes.

(3) To promote improvement and elevation of levels of transportation method, facilities and others related to the export and import cargoes.

(4) To promote rationalization in the procedural mattress dealing with the export and import cargoes.

(5) Liaison and collaboration with agencies and organizations concerned with the transportation of the export and import cargoes.

SHIPPING PROBLEMS OF INDONESIA

It was mentioned that the Tokyo-Sempakku Lines Ltd Ships goes to Bitung port in North Sulawesi at least once a month to discharge goods. In case Indonesia wants to ship Coir Fibre, they are willing to pick up either from Bitung or Donggala (Central Sulawesi) provided the tonnage of coir fibre is minimum 600 tons/month.

FREIGHT RATES FOR COIR FIBRE AND ITS PRODUCTS TO JAPAN

FROM	ITEM	BASE CHARGE	OTHER CHARGES
CEYLON	Coir Fibre Mattress	US$90.75K/T	
	Coir Fibre Yarn	Bundle US$72.70K/T	CAF = 8% DAT = 18% 26%
		Bale US$25.95 M3	US$32.70
PHILIPPINES	Coir Fibre	US$18.25M3 (all inclusive)	
INDONESIA	Fibre N.C.S.	US$24.25K/T or M3	US$29.30 (all inclusive)
	Coir Fibre	US$26.25K/T or M3	US$31.70 (all incl.) BAF = 17.3% CAF = 3.5% 20.8%
MALAYSIA	Coir Fibre	US$22.50 M3	US$30.75 (all inclusive)
(Container)	Twisted Fibre	Open	BAF = $ 5.00 CAF = 14.25%

BAF = Bank adjustment factor

CAF = Currency adjustment factor.

VISIT TO THE SOUTHEAST ASIAN PROMOTION CENTRE FOR TRADE, INVESTMENT AND TOURISM, MINATO-KU, TOKYO

The Southeast Asian Promotion Centre for Trade Investment and Tourism (SEAPCENTRE) is an International and multi-national organization established to promote exports from Southeast Asian Countries, to accelerate the inflow of investments into the Southeast Asian region, and to increase tourist traffic to and through the region.

The Centre is one of the joint undertakings of the governments of countries participating in the ministerial conference for the Economic Development of Southeast Asia. Its establishment was first suggested at the Third Ministerial Conference held in 1968, and it was finally brought into existence after a three year period by the intensive and co-operative efforts of the countries concerned.

The present members of the SEAPCENTRE are the governments of Indonesia, Japan, Khmer, Laos, Malaysia, the Philippines, Singapore, Thailand and Vietnam. The centre has its council and secretariat. The council is composed of directors nominated by each member country, while the secretariat is composed of the Secretary-General, who represents the centre, and staff members.

The secretariat Headquarters is located at 9th Floor, Kyodotsushin-Kaikan.2, Aoicho Akasaka, Minato-Ku, Tokyo-Japan-107.

DISCUSSION WITH SEAPCENTRE

In course of the discussion with the Secretary-General, SEAPCENTRE on the possibility of finding a Japanese partner to invest in a joint

venture to produce coir products and coconut shell charcoal based activiated carbon, he mentioned that they are prepared to make enquiries as well as conduct pre-investment studies provided an official request is made by the Government of Indonesia.

IMPORTS OF COIR FIBRE, YARN AND MANUFACTURED PRODUCTS (tons)

YEAR	COIR FIBRE	COIR YARN	MANUFACTURED PRODUCTS	T O T A L
1955 - 57 ±	6,467	2,937		9,404
1960	9,503	1,682		11,185
1961	10,104	1,578		11,682
1962	7,050	1,858		8,908
1963	10,563	1,550		12,820
1964	11,458	1,328		12,786
1965	9,443	1,377		10,820
1966	8,587	807		9,394
1967	12,494	779		13,273
1968	11,900	600		12,500
1969	9,100	300		9,400
1970	9,700	200	400	10,300
1971	11,800	200	400	12,100
1972	11,100	300	400	11,800
1973	13,100	100	500	13,700
1974	15,536	61		
1975	9,609	32		
1973 - 75 ±	12,748	64		

± average

Source: Japan Exports and Imports
International Trade Centre UNCTAD/GATT

I. VISIT TO COCONUT HUSK RETTING PITS

KOSGODA, SRI LANKA

DESCRIPTION OF THE PROCESS EMPLOYED:

The husks purchased from small coconut farmers are transported by means of a cart to the retting pits. Retting pits are constructed on Crown stagnant brackish water land. The retting pits are usually barricaded by wooden poles or bamboo. The dimensions of the barricaded pits seen at Kosgoda varied from 5m x 8m to 7m x 10m and is capable of holding to 2,000 to 3,000 husk for retting.

The pits are filled with husk, over which logs are keep to prevent the husk floating. The husks are allowed for retting for a period of 9-12 months. The retted husks are squeezed by hand in order to remove water and sold to small scale processers on the spot.

ECONOMIC EVALUATION OF THE PROCESS

DATA COLLECTED

1. Retting area: no rent paid
2. Purchase price of whole husk: Rs 20/1,000
3. Transportation cost: RS 5/= per 1,000 husk which, includes cost of loading and unloading.
4. Filling of pits with husk: Rs 15/= pit on contract basis which includes the labour for the whole operation filling, placing logs etc.

5. Cost of labour for taking the logs, squeezing water from retted husk and pilling up: Rs 15/= per pit.

6. Selling price: 1,000 segments or 200 husk at Rs 12/=

(5 segments make one whole husk)

COST ANALYSIS

per pit of 3,000 husk

1.	Raw Materials cost 3,000 at Rs 20/1,000	Rs 60.00
2.	Transport cost for 3,000 husks at Rs 5/= per 1,000 ...	Rs 15.00
3.	Filling pits	Rs 15.00
4.	Processing after retting	Rs 15.00
		Rs 105.00
5.	Other costs like fencing or barricading.....	Rs 5.00
	Selling price at Rs 12/= per 200 whole husks or 1,000 segments	Rs 180.00
	Estimated Nett profit	Rs 70.00

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II. VISIT TO MANUAL DEFIBRING UNIT

DESCRIPTION OF THE PROCESS EMPLOYED

The retted husks are purchased by cottage industrialists and transported to areas where decortication are done. The decortication is done manually.

ECONOMIC EVALUATION OF THE PROCESS

DATA COLLECTED

1. Purchase price of retted husk
   200 whole husk or 1,000 segments ..... Rs 12.00
2. Cost of transportation from retting pit area
   to decortication centre per 1,000 husk ..... Rs 5.00
3. Manual decortication done on contract basis at
   100 segments or 20 whole husk ..... Rs 1.00
4. Drying of decorticated fibre and bundling at
   100 segments or 20 whole husk ..... Rs 1.00

COST ANALYSIS PER PIT OF 3,000 HUSK

1. Raw Materials cost 3,000 retted husk at Rs 12/=
   per 200 husk ..... Rs 180.00
2. Cost of transportation..... Rs 15.00
3. Cost of manual decortication drying and bundling..... Rs 150.00

Rs. 345.00

Yield of Coir Fibre = 3 cwt/1,000 husks

∴ 3,000 husk will yield 9 cwt of Fibre

Selling price/cwt = Rs 55/=

∴ Total sale value = Rs 490/=

∴ Profit = Rs (490 - 345) = Rs 145/=

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III. VISIT TO HIKKADUWA ROPE AND SALT BAG MAKING UNITS

ROPE MAKING

Normally children are involved in rope making . 3 children are involved

1 - Wheel boy at Rs 1/60/200 yarn/day

2 - Children for making yarn at Rs 1/60/200 yarn/day

∴ Total cost of making 200 yarn = Rs 4.80

1 yarn = 16 metres approx.

SALT BAG MAKING

Labour Required

	Number of men	Cents paid per bag (Rs 1 = 100 cts)
Operator	1	16 cts
Side Operators	2	8 cts
Yarn winder	1	4 cts

Number of bags that can be made in 8 hrs = 70

1 bag weights = 1.75 lbs

Length of yarn required per bag = 160 metres. (160 metres equipment to 20 bundles and one bundle measures 8 metres and costs 10 cts)

Size of salt bag = 42" x 27"

Selling price of salt bags (Rs 2/50 - for sales in Colombo
(Rs 2/40 - Local

Salts bags are usually recycled and used.

COST ANALYSIS

for

Making salt bags (70 Bags)

	Rs	Cts
Labour cost	25	20
Cost of Raw Materials Yarn	140	00
Total cost	165 -	20

∴ Cost of producing 1 bag = Rs 2.36

∴ Profit varies from 14 cts/bag to 4 cts.

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IV. VISIT TO BALAPITIYA MAT MAKING CENTRE

This centre is run by the Department of Small-Scale Industry.

Purchase price of yarn used for mat making

Grades	Price/cwt	
I	Rs 120	(difference between I & I-B
I-B	Rs 120	(on thickness of the yarn
II	Rs 110	
III	Rs 110	
Special	Rs 200	

DYING SECTION

The vat used for dying is made of copper with a capacity of 0.5 cwt. Approximate cost of a vat is Rs 2,000/=. Water is taken in the vat and heated to 70^{o}C and 8 oz dye is added (8oz dye in sufficient to dye 1 cwt). The yarn to be dyed is put into the vat and boiled for 45 min., after which it is allowed in the vat for 1 'hr - Taken out and dried.

Price of dye: - Astra Red: Rs 16/= oz.

Other colour dyes

dyes: Rs 4.50/oz.

DOOR MATS MAKING

Size Made 36" x 18"

Machinery used is wooden weaver locally fabricated and costs about Rs 2,000 to Rs 2,500 to make one unit.

Labour is employed on a contract basis and consists of the following:

		Wage rate
(a)	Operator -	50 cts/sq. ft
(b)	Spool -	10 cts/sq.ft
(c)	Stitchingman -	1.25 cts/ inch

Quantity of yarn required for making 36" x 18" size mat = 8 lbs

Number of mats that can be made in 8 hrs - = 15

Selling price / mat = Rs 3/50 per sq. ft. (Ex-factory)

COST ANALYSIS

(For 36" x 18" size mat)

		Rs	Cts
1.	Raw Materials cost	8	60
2.	Dying cost	1	15
3.	Labour	3	00
4.	Depreciation		06
5.	Administration & Management		04
	Total Cost ..	12	85

Selling Price per mat at Rs 3/50 ex-factory ..... Rs 15.75

∴ Nett Profit/mat ..... Rs 2.90

CORRIDOR MATS:

Labour is utilized on piece rate system, about 15-20 mats are made/8 hrs and wage paid per mat is 45 cts.

Machines used are (1) Wooden stand with vertical iron rods and (2) Press.

Estimated cost of these two equipment is Rs 2,000

Labour for stitiching the corridor mat is 10 cts/mat

Size of the mat = 12.5" x 21" and the quantity of yarn required = 1.5 lbs

Selling price of the mat = Rs 4/50 per mat

COST ANALYSIS

(For 12.5" x 21" size corridor mat)

		Rs	Cts
1.	Raw materials cost - yarn	1	80
2.	Dying cost	0	30
3.	Labour	0	55
4.	Depreciation	0	05
5.	Administration & Management	0	05
	Total cost	Rs	2.75
	Selling price of mat/unit	Rs	4.50
	∴ Profit/mat	Rs	1.75

****

V. VISIT TO DODANDUWA COIR WORKSHOP

In this workshop, coir yarns are purchased, dyed and woven into carp mats and cricket mattings.

1. Raw Material

Coir Yarn	Price/Cwt
No. 2	Rs 180/=
No. 3	Rs 160/=
No. 4	Rs 120/=
No. 5	Rs 115/=

Numbers 3 and 4 are usually used for carpet making. Number 5 for cricket matting.

2. DYING

Capacity of the dying vat = 0.5 cwt of yarn amount of dye required for 0.5 cwt yarn is 4 oz. of any colour dye.

Purchase price of dye

(a) Basic dyes: at Rs 14/25 per lb

(b) Special dyes: at Rs 72 per lb

Dying is done by one man and one man in 8 hrs can dye 5 cwt. coir fibre. Wage paid to the labourer is Rs 300/= per month inclusive of all allowances.

3. WEAVING MACHINES

Total number of weaving machine = 9

Estimated cost of making the weaving machine locally = Rs3,000/=

Dimension of the carpet = 75' x 6' and 150' x 3'

To make one carpet of 75' x 6', it takes about 1.5 days (or 16 hours) and you need two men.

The wage is paid on contract basis at 70 cts/sq. yd.

Weight of a carpet (75' x 6') = 1.5 cwt.

Selling price of the carpet per sq. yd.= Rs 11.85 (for local sales)

Rs 14.85 (for out-station sales)

ECONOMICS OF CARPET PRODUCTION (75' x 6')

		Rs	Cts
1.	Raw Materials - yarn required 1.75 cwt at Rs 150/= cwt	262	50
2.	Cost of dying		
	(a) Dye cost	65	25
	(b) Labour	6	00
	(c) Other costs	5	00
3.	Cost of labour for weaving	35	00
4.	Depreciation	1	50
5.	Other costs	12	50
	Total cost	Rs387	75

Sales value of the carpet at Rs 11.85/sq.yd ..... Rs 592.50

∴ Nett profit ..... Rs 204.75

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VI. VISIT TO BROWN FIBRE DECORTICATION PLANT, MARAWILA, RUN BY THE SRI LANKA LIVESTOCK BOARD

This plant is an integrated industry, where the whole nuts are brought in and dehusked deshelled and pared for desiccated coconut manufacture. The husk is utilized for brown fibre production and the shells are use for charcoal production.

1. RATE OF DEHUSKING: 1 man can dehusk 1,800 - 2,000 nuts/8 hrs. Wage rate is Rs 6/= per 1,000 nuts plus 36% i.e. total wage of Rs 8.16 per 1,000

2. RATE OF DESHELLING: 1 man can deshell11,800 - 2,500 nuts/8 hrs. Wage rate is Rs 3.25 per 1,000 plus 36%. i.e. total wage of Rs 4.42 per 1,000

TRANSPORTATION OF HUSK

Husks are transported to the processing units by means of bullock carts. A cart load of 1,000 husk is paid at Rs 1.50

Number of trips a cart can do per 8 hrs = 6

Loading, counting and unloading of the husk is done by two men or women on a daily wage basis.

Wage rate: Men: Rs 5.25/8 hrs plys 36%

Women: Rs 4.85/8 hrs plus 36%

(Inclusive all benefits on an average Rs 11/= per 8 hrs. work)

PROCESSING

Husks transported to the processing plant are sent through rolling mill to crush the husk in order to facilitate soaking and thrown into an empty soaking tank. Wooden logs are placed above the husk in order to prevent floating of the husk and then water is filled in. After the water is filled in, the husk is allowed to soak for a period of 3 - 5 days. The water is pumped out from tank and the soaked husk is sent through rolling mill to remove water and then decorticated.

The decortication is done on a drum type decorticator; which separates the fibre into mattress and bristle fibre. The mattress fibre is sent through a shifter to separate the fine dust, dried and baled. The bristle fibre is hackled to remove short strands and baled.

WAGE RATE FOR VARIOUS OPERATIONS

(a) Soaking of the Husk

Husk are crushed, transported to soaking tanks. Complete operation at Rs 3/= per 1,000 husk plus 36%

A group of 5 men could handle 15,000 husks in 8 hrs. Soaking tank capacity is 35,000 husk with dimension of 40' x 15' x 10'
One man is employed for placing logs above the husk and filling the tank with water - wage rate: Rs 6.25 plus 36% per 8 hrs work.
Pumping water out from the tank, sending the husk through roller mill to squeeze out water, three men are employed on a piece rate basis: - 60 cts/100 lbs of bristle fibre.

(b) DECORTICATION

The decortication machine consists of 5 pairs and the total number of workers employed = 10. In one day, (8 hrs work) 5 pairs of drums are capable of producing 3,200 lbs of bristle and payment is paid at the rate of Rs 2.50/100 lbs of bristle fibre.

(c) TRANSPORTATION OF MATTRESS FIBRE TO SHIFTER

4 men involved in transporting mattress fibre to shifter and taking out the shifted mattress fibre.

Wage rate at 50 cts/100 lbs bristle fibre.

(d) COIR DUST COLLECTORS

5 men involved in collection of dust at 90 cts/100 lbs of bristle fibre.

(e) TRANSPORTATION OF WET MATTRESS FIBRE TO YARD FOR DRYING

Rs 8/= plus 36% for days production of mattress fibre.

(f) DRYING AND BALING OF MATTRESS FIBRE

75 cts/ plus 36% per cwt of dry mattress fibre.

(g) Bristle Fibre

Drying and primary processing of bristle fibre at Rs 2.50/cwt of dry bristle fibre.

(h) HACKLING OF BRISTLE FIBRE

Bristle fibre is further processed to clean as well as to remove

short stands. The wage rate is Rs 9/70 plus 36% per cwt of bristle fibre.

(i) TWISTING OF MATTRESS FIBRE

Wage rate: - Rs 18/= all inclusive per cwt.

(j) SELLING PRICE

(a) Mattress Fibre (twisted form) - Rs 31/50 per cwt less 5%
(b) Mattress Fibre (twisted form) - Rs 55/= per cwt less 5%
(c) Bristle Fibre (Hackled) - Rs 105/= per cwt less 5%
(d) Short Fibre (by product of hackled bristle fibre known as Omatt) - Rs 59 - Rs 65 per cwt less 5%

All these prices are delivered to shippers' warehourse - a distance of 36 miles.

(k) TRANSPORT COST

Rs 135/= per lorry load of 3 tons coir fibre.

(l) DECORTICATING MACHINE

Decorticating Machines are locally made and is of the drum type. Each machine have a pair of drums. The drum consist of a metal barrel diameter 28", over which is covered with wooden planks 3" thick to which steel spikes are attached.

The estimated cost of making a pair of drum decorticator is Rs 6,000/= including the motor and main shaft.

The average electricity consumped by 5 pairs of drum decorticators per month working on one shift of 8 hrs is 35-40 Kwh or Rs 1,700/= in terms of money.

ESTIMATED COST OF PRODUCTION OF COIR FIBRE

(Using 1 pair drum and processing 6,000 husk/day)

Let us assume that husks are purchased from the desiccated coconut manufacturers' at Rs 20/1,000 husk.

		Rs	Cts
1.	Raw Material (husk) cost 6,000 husk at Rs 20/1,000 ..	120	00
2.	Transport cost as well loading & unloading cost	39	00
3.	Labour cost for crushing the husk and preparation for soaking	36	50
4.	Cost of decortication	15	60
5.	Cost of transportation of mattress fibre to shifter..	3	36
6.	Cost of removing coir dust	6	05
7.	Transportation of Wet Mattress fibre to yard for drying	11	00
8.	Drying & baling of mattress fibre	13	44
9.	Drying & primary processing of bristle fibre	16	80
10.	Hackling of bristle fibre	88	70
	Total cost ....Rs	350	.45
11.	Depreciation on machinery	8	05
12.	Other costs such as Administration power, interest on working capital etc.	33	50
	Total .....Rs	392	.00

Yield of Fibre from 6,000 husk = (1) Matress fibre = 12 cwt

(2) Bristle fibre = 6 cwt

∴ Sales Value

(a) Mattress fibre at Rs 28.50 per cwt for 12 cwt = Rs 342.00

(b) Bristle fibre at Rs 88.50 per cwt for 6 cwt = Rs 531.00

Net Sale Value ..... = Rs 873.00

∴ Net Profit = Rs 481

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COCONUT SHELL CHARCOAL PRODUCTION AT MARAWILLA

PROCESS OF MAKING SHELL CHARCOAL IN SRI LANKA

A circular pit of 10 ft diameter and depth 7 ft is dug on the ground and filled with coconut shells (holds 30,000 whole shells and produces 1.5 tons of shell charcoal). Bamboo poles or wooden sticks are placed over the pit and covered with thatched coconut leaves (known as cadjans) over which earth is filled. Except for a small hole for firing the shell, the whole pit is air tight. After the firing, the hole is covered and the shells are allowed to burn in the absence of air for about 12-15 hrs. On the following day the covering of the pit is removed and the shell charcoal is packed in 50 kg coir bags lined with Polythene bag.

DATA

(1) Purchase price of shells Rs 12 to Rs 18 per 1,000 shells delivered to the factory.

(2) Transportation from factory to pit as Rs 1,50/1,000 shells.

(3) Processing of shell charcoal is done on a contract basis Rs 15/= per ton of shell charcoal plus 36% which consists of the following operations filling the pit with coconut shells, covering the pit, firing removing the cover of the pit, taking the charcoal out, sorting, weighing, packing etc. Usually 5 men are employed on this operation.

(4) Packing Materials

(a) Coir bags purchased at Rs 2/25 - Rs 2/75 a bag

(b) Polythene bag liner for coir bags purchased at Rs 2/= per bag.

(5) Selling price of shell charcoal is Rs 495/= per ton delivered to Port.

Loading and unloading charge is 10 cts plus 36% per bag and a lorry will hold 5 tons of shell charcoal or 100 bags.

Cost of transportation is Rs 135/= per lorry load.

ESTIMATED COST OF SHELL CHARCOAL PRODUCTION

(Based on one pit capacity 30,000 shells)

		Rs	Cts
(1)	Raw Material cost shell at Rs 15/= per 1,000 for 30,000	450	00
(2)	Shells transportation cost	45	00
(3)	Processing cost	33	00
(4)	Packaging Materials cost	90	00
(5)	Other cost cadjans digging pit etc	6	00
	Total cost	Rs624.	00

Selling price F.O.B. = Rs 495/ton

Less transport and loading charge = 30

Ex-farm cost = Rs 465/ton

Sales Value/1.5 ton shell charcoal ..... Rs 698

Net profit per one batch ..... Rs 74

Net profit/ton shell charcoal ..... Rs 49

ECONOMICS OF SETTING UP A SMALL SCALE INDUSTRY FOR DE-FIBERING DRY COCONUT HUSKS AND PRODUCING HIGH QUALITY BRISTLE AND MATTRESS FIBRE FOR USE IN IDNONESIA AND EXPORT (Using New machines purchased at the current price and to be installed in Sulawesi)

REQUIREMENT: For production of 12-13 tons of coir fibre per month in a single shift of 8 hours per day.

1. Raw Materials: Coconut husk - Dry or green
2. Land and Buildings:
   (a) One work shed or size 50' x 40'
   (b) Open yard for storage of husks and drying the fibre 4000 sq. yards
   (c) Soaking tanks of size 90' x 15' x 5' divided into 6 compartments.
   (d) Office room 15' x 15'
3. Machinery required: Ennor New Standard Coir Fibre Production Machines

	Power	Operators required	Capacity
1. One Ennor Crusher for BC-73 pretreatment of coconut husks before soaking	5 H.P	1	6,000 husks/ 8 hrs

2.	ONE DC - 73	Ennor de-fibring Machine for extracting the fibre from soaked husks	12 H.P	1	5,000 husks/ 8 hrs.
3.	ONE RS- 73	Ennor Revolving Screener	1 H.P	1	400/500 kg fibre/8 hrs
4.	ONE TC- 73	Ennor Turbo Cleaner	7.5 H.P	1	400/500 kg fibre/8 hrs
5.	ONE HP- 73	Ennor Hydraulic Press	2 H.P	2	to press 20/30 bundles or 1 ton fibre per day

4. **Power required:** 27,5 H.P excluding pump set
For the soaking tank to be renewed in 4 days.

5. **Workers required:**

Skilled Mechanics	- 2
Electrician	- 1
Semi-skilled	- 5
Unskilled	- 10
Supervisor	- 1
Watchman	- 1

6. **Raw Material required:** 120,000 husks per 25 working days (month)

7. **Out-put:** 12 tons of fibre consisting of 4 to 5 tons bristle fibre and 8 tons mattress fibre.

COST ESTIMATE IN SULAWESI

1. Land, Building and soaking pits ..... US$ 18,000
2. Machinery (actual price) ..... US$ 22,000

Total investment ..... US$ 40,000

3. Working Capital:

(i) Raw materials per month - 25 working days - single-shift 120,000 husks at US$5 per 1,000 husks ..... US$ 300

(ii) Production expenses per month

Power and lighting 2,500 units	US$	120
Rates/Taxes	US$	20
Wages/Bonus	US$	1,375
Machinery Maintenance	US$	100
Other factory expenses	US$	200
Office establishment	US$	150
Depreciation on plant and building US$40,000 at 10% annum	US$	334
Interest on investment and working capital (40,000 + 7,680) at 12% per annum	US$	423
	US$	3,022

4. Out-put and recovery 10,000 husks yield approximately one ton of fibre, 1/3 of the yield consists of bristle fibre and the balance mattress fibre.

On the average 4 tons of bristle and 8 tons of mattress fibre can be produced and realized as follows:

4 tons bristle fibre at US$250/ton	US$	1,000
8 tons mattress fibre at US$115/ton	US$	920
	US$	1,920

∴ The loss/month = US$ (3,022 - 1,920) = US$ 1,102

∴ Even with a low cost machine of this type, it is not profitable to set up a coir fibre industry.

N.B.

Ennor New Standard Machine are the cheapest available coir fibre production units manufactured by Messrs. Bharat Motors, 35, Mount Road, Madras, 600.002, INDIA.-

COIR FIBRE

CURRENT EXPORT PRICES FROM SRI LANKA

OCTOBER 1976

US $ per metric ton F.O.B. Colombo

			F.O.B. COLOMBO	FREIGHT RATE TO EUROPE
1.	Mattress Fibre in bales	- US$	110 - 116	US$ 80.00
2.	Bristle Fibre One Tie	-	190 - 225	
3.	Bristle Fibre Two Tie	-	250 - 280	85.00
4.	Bristle Fibre Three Tie	-	300 - 350	
5.	Machine Twisted Bristle Fibre	-	245 - 280	
6.	Machine Twisted Mattress Fibre	-	200 - 225	78.00
7.	Hand Twisted Mattress Fibre	-	140 - 155	
8.	Dyed Bristle Fibre	- US$	155 premium is added	
9.	Coir Yarn: Higher grades	- US$	270 - 300	85.00
	Low grades	-	200 - 250	134.00

Source; Coconut Marketing Board

Colombo - October 27, 1976

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COCONUT SHELL CHARCOAL

OCTOBER, 1976

US $ PER METRIC TON F.O.B., COLOMBO

		F.O.B. COLOMBO PER TON	FREIGHT PER TON
J A P A N	-	US $ 65	US $ 35
U.K.	-	US $ 70	US $ 83

Source: Coconut Marketing Board

Colombo, October 27, 1976

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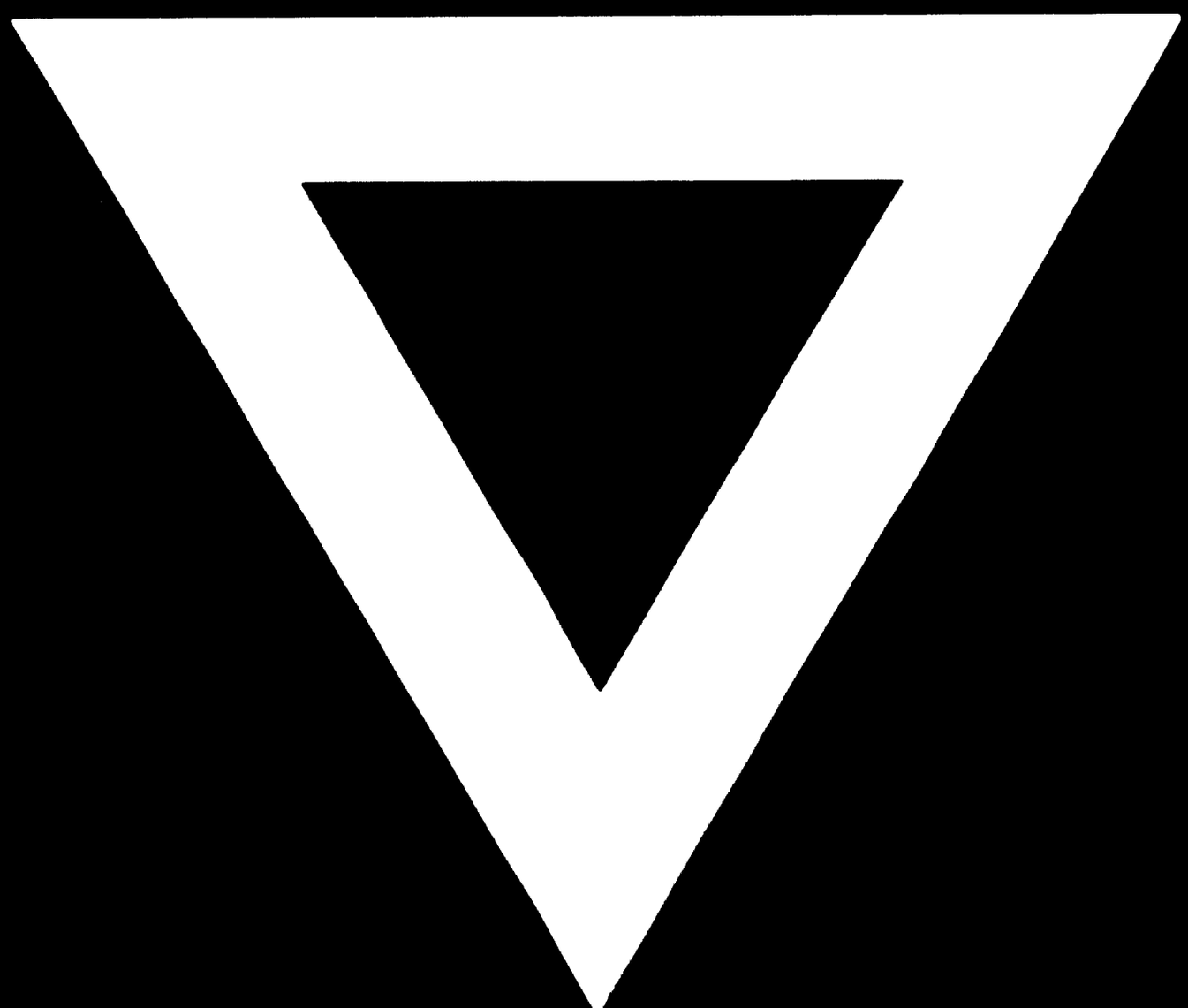

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