

PERFORMANCE OF CENTRAL COIR RESEARCH INSTITUTE FOR THE PAST 50 YEARS

YEAR	EXPENDITURE (Rs.in lakhs)	ACTIVITIES	ACHIEVEMENTS
1971- 72	2.66427	<p>Modifications were effected in the feeding assembly forming part of the spinning machine for improving the machine performance. A suitable partition and covering were provided for the feeding channel and re-setted the position of combing nails to reduce the breakage of fibre. These modifications improved the yarn quality eliminating the possibility of flattening of the yarn in the course of spinning. Introduction of a spinning system and friction disc for contact with the driving wheel for controlling the bobbin speed did not work.</p> <p>Product Development and Diversification</p> <p>Light weight carpets of low pile heights of 3/8 inches were manufactured from single strand coir yarn using jute yarn as base fabric.</p> <p>Coated PVC based adhesives at the cut edges of coir door mats and hot pressed to yield a refined edging for the mat.</p>	<p>4.Light weight carpets were developed.</p> <p>5.PVC based adhesives for finishing the cut edges of mats were developed.</p>

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1972-73	3.72421	<p>Modernisation in Extraction and Processing of Coir</p> <p>Lab level studies in retting conducted in porcelain cisterns submerging the husks in ret liquor by weighting down the material with stones in collaboration with Indian Institute of Science, Bangalore. The result indicated that all the bacterial flora of the rets belonged to six genera. Isolated and identified the microflora present in the retting environment by drawing mud samples from five retting sites which confirmed that the bacteria belonged to the genera Pseudomonas, Acrobactor, Alcoligenes, Paracolobactrum and Bacillus. Except for the Bacillus species, this observation is in agreement with the bacterial isolates obtained from laboratory ret liquors.</p> <p>Studies were conducted in softening of coir fibre by the action of microflora associated with the retting of coconut husk and observed that fibres could be softened to varied extent but had reduction in the weight of the fibre softened by the action of mycelium growth.</p> <p>Development of Coir Machinery</p> <p>The research investigation on the ceylon type defibering machine revealed that 350 full dry husks after crushing and soaking in water for 6 to 8 days could be processed per 8 hours operation and the yield of fibre was 107 kg. per 1000 husks in which the bristle fibre content to 20%, Mattress fibre 1st grade of 50% and mattress fibre of 2nd grade of 30%.</p> <p>Use of suitably hardened tongues on the feeding nozzles of motorised coir spinning machine removed the limitations in controlling the thickness and shape of the yarn. Cracks were also developed in the driving shaft supporting the gears and forming part of the spinning frame during prolonged use of the machine.</p> <p>Fabricated and modified equipments for testing indentation hardness and flexing of rubberised coir.</p>	<p>1. Analysis of ret liquors collected from retting sites confirmed the findings of retting in Lab. level</p>

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1972-73	3.72421	<p>Product Development and Diversification</p> <p>Developed pile carpets woven with polypropylene filament yarn as the base fabric for development of light weight fabrics having coir pile structure in place of traditional carnatic carpets of high weight.</p> <p>Coir webbings were woven from single strand coir yarn for finishing the cut edges of coir mattings and have advantages of better wearing life with increased resistance against degradation under moist condition on comparison with hessian webbings.</p> <p>Woven fabric from single strand coir yarn spun out of softened coir fibre for use as window and door curtains.</p> <p>Utility of coir netting as a means of erosion control was established by field studies undertaken in collaboration with Central Road Research Institute by covering a total area of 23000 sq.ft at certain hillside slopes in Simla and Railway embankments in Pathankott in 1972. The monsoon rains of 1972 and the winter rains of 1972-73 and the weather effects of the period had little influence on coir netting at both the experimental sites and the coir netting was intact. Grass was uniformly covered itself on the slopes in Jammu whereas in Simla the grass cover is not so luxuriant. Coir nettings with ½” mesh seemed to offer too small openings to permit quick emergence of vegetation, though such small openings provide a greater weight on the soil, thereby reducing the impact of heavy rains. There was no damage or cuts on the nettings, covering the treated slopes.</p>	<p>2.Applied coir mattings for lining canals to prevent seepage of water.</p> <p>3.Field studies were carried out on coir netting for soil erosion control.</p> <p>4.Preformed joint filler boards were developed.</p> <p>5.Woven coir webbing from single strand coir yarn</p>

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1972-73	3.72421	<p>Laboratory experiments in association with Central Road Research Institute (CRRRI) in preparation of pre fabricated bituminous surfacing using coir mesh matting as the base fabric indicated that coir mesh had to be pre-dried to whittle down the moisture content to facilitate proper impregnation of the bitumen into the coir mesh. About 6 to 7 kg. of bitumen was required to coat 1 sq. metre of coir netting. Bitumen of 20/30 grade pen or partially blown grades was found to be suitable for impregnating the material. Thickness of coir netting put limitations in rolling of treated material to convenient size without forming cracks on the binding medium.</p> <p>Preformed joint filler boards were made in collaboration with Central Road Research Institute (CRRRI) by dipping rubberised pads in bituminous composition of 10/20 pen. The board so prepared was pressed under a pressure of 100 lb per sq. inch to expel the excess binder and dried in chamber. The binder content was 3 kg per sq. meter of 2.5 cm thick pad.</p> <p>Investigations on the efficacy of coir nettings to prevent scour was conducted on a laboratory scale under the collaborative project with the Department of Civil Engineering of the Punjab University using 1 cm mesh nettings made of 11/12 score anjengo yarn and 13/14 score vycome yarn. The study revealed that coir is adequately tough and hard to withstand cutting on contact with sharp edges of the stones. Coir nets have extreme flexibility to allow the settlement of the coir-stone-bed to assume the profile of the protected bed with the advantage of causing the stones to act in unison, there by precluding the possibility of the stones being washed away even at high velocity flows.</p> <p>Testing and Service Facilities</p> <p>Dyeings taken with sulphonated fish oil revealed that sulphonaed oil is not compatible with basic dyes and does not produce any glossy effect on the dyed material.</p> <p>Sulfamic acid used as Dye bath assistant in place of sulphuric acid during application of acid dyes to coir showed that the dye uptake was satisfactory but not recommended, as sulphamic acid is easily hydrolysable.</p> <p>Revised the IS specification for coir rope.</p>	

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1973-74	5.81151	<p>Modernisation in Extraction and Processing of Coir</p> <p>Preconditioning of semi/dry husks by spraying with tap water twice in a day for 3 days prior to crushing and soaking yielded higher proportion of bristle fibre and mattress fibre of grade I.</p> <p>Development of Coir Machinery</p> <p>Soft twist vycome yarn having 17 twist per foot with a runnage of 200 m/kg was produced on motorised coir spinning machine after effecting the necessary modification for synchronization of the feeding, combing and drawing operations and adjusting tension on the feed 'finger tips' of the nozzles. The physical characteristics were compared with commercial grade Vycome yarn and the texture was uniform all along the length unlike the twist of yarn with a runnage of 200 m/kg.</p> <p>Conducted spinning trails for processing mattress fibre on motorised coir spinning machine produced coarser yarn of 7/8 score with a runnage of 100 meters per kg.</p> <p>Attempts to dispense with the use of the lead thread yielded an imperfectly twisted material of uneven thickness and twist on the motorised coir spinning machine.</p> <p>The preliminary experiments indicated that an operator could attend 3 spinning machines at a time.</p> <p>Fabricated a loom having fly shuttle for weaving lightweight fabrics of simple construction for use as window/door curtains woven out of single strand coir yarn.</p>	<p>1.Soft twisted yarn comparable to vycome yarn was produced on automatic spinning machine.</p> <p>2.Fabricated a handloom having fly shuttle for weaving lightweight fab-ric.</p>


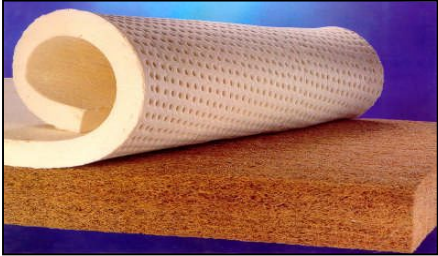
YEAR	EXPENDITURE (Rs.in lakhs)	ACTIVITIES	ACHIEVEMENTS
1973-74	5.81151	<p>Product Development and Diversification</p> <p>Non-skid backing and finishing of the cut edges of matting mats was developed using compounded reclaimed rubber by pressing in a hot press at a temperature of 120 to 140⁰c for 4 to 12 minutes. ¾ inch width strips of rubber sheet were used for finishing the cut edges of matting mats.</p> <p>Central Road Research Institute selected a hill slide slope in Simla and a rail embankment at Pathankot. The sites selected were the following:-</p> <p>Site 1 Hill side slopes Hindustan – Tibet National Highway – downhill near Idgah Grounds in Simla. Western Slide (Wooden pile) 167.2 sq.mtr. Opposite Western slide: 111.5 sq.mtr.</p> <p>Site 2 : Railway embankment slopes Near Bridge No 154- Pathankot to Jammu Railway Link 70 km from Pathankot – Both side slopes give a total area of 1200 sq.mtr.</p> <p>The slope angle, soil temperature, moisture content, soil type, pH of soil, total rainfall and the percentage survival of vegetation were also recorded during the investigation.</p> <p>It was reported that coir nettings are a very effective means of checking erosion and establishing vegetation on denuded slopes.</p> <p>Studies were conducted for using coir as a reinforcing material in the preparation of roofing/paneling boards in collaboration with the Central Building Research Institute and developed composite boards from coir fibre, rice straw and cement, from coir fibre, coconut pith and cement and corrugated sheets from coir fibre and cement. The panels were found to be suitable for partitions and walling in building constructions. The physical properties such as bulk density, texture, moisture absorption, bending strength, thermal insulation, thermal performance index, fire resistance, drying shrinkage, sound transmission loss and absorption coefficient were measured.</p>	<p>3.Evolved nonskid matting mats.</p> <p>4.Composite boards were developed out of coir fibre and cement.</p> <p>5. Conducted field demonstration on application of coir netting at Pathankot.</p>

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1973-74	5.81151	<p>Testing and Service Facilities</p> <p>Softened mattress fibre of grade I on treatment with 10 % (w/v) solution of caustic soda.</p> <p>320 kg coir yarn was bleached with a bath containing sulphuric acid [3 ml/litre for 45 minutes] in cold for eliminating the dull grey shade of coir yarn commonly marketed. A model shade card with a total number of 190 shades was prepared by depicting samples of the different shade and detailing the receipe of dye stuff combinations, dyeing methods etc.</p> <p>Samples of dyestuffs received from different parties were tested for tinctorial value and bulk dyed 173 MT of coir in different shades for Hindustan Coir.</p>	<p>6. A model shade card from 190 shades were developed.</p>

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1974-75	8.05987	<p>Modernisation in Extraction and Processing of Coir</p> <p>Studies revealed that elimination of phenolics from the husk facilitates speedy retting.</p> <p>Analysed percentage distribution of different groups of long, medium, short and bit fibres in retted fibre and decorticated fibre from green husks and observed that there was a substantial fall in the percentage of long fibres and perceptible increase in the percentage of short and bit fibres in the decorticated fibre compared to the retted fibre.</p> <p>The studies on colour of the stored yarn indicated that the natural tint of the yarn deepens on continued exposure of the material to the air.</p> <p>Development of Coir Machinery</p> <p>Multiple spinning heads were introduced on the motorised coir spinning machine and put into intensive performance run. The introduction of a specially designed porcelain nose tip in place of the ordinary nose tip prone to wearing found to improve the machine performance.</p> <p>Yarn was spun from slivers made from blends of bristle and mattress fibre in the proportion of 60:40 on the motorised coir spinning machine and produced coarse yarns with a runnage of 120-150 m/kg having a scorage of 11/12 from the blend. An output of 54 kg was realised on 3 spinning heads in 8-hour work.</p>	<ol style="list-style-type: none"> 1. Designed and fabricated a device for lubricating warp sheet of power loom. 2. Multiple spinning heads were introduced for the motorised coir spinning machine. 3. Standardised components of slivering and motorized coir spinning machine.

YEAR	EXPENDITURE (Rs.in lakhs)	ACTIVITIES	ACHIEVEMENTS
1974-75	8.05987	<p>Designed and fabricated a device for steady application of the emulsion for lubricating the warp sheet of power loom of Hindustan Coir.</p> <p>Standardised the components of slivering and motorised coir spinning machine.</p> <p>An improved handloom with fly shuttle picking arrangements was developed for weaving light weight fabrics of simple construction from single strand coir yarn spun out of softened, bleached and dyed coir fibre. Studies on the productivity indicated that an expert weaver produced 12.5 meters of the matting in 1 meter width on this loom in the course of 8 hour work.</p> <p>The repositioning of the sley and modified shuttle and eyelet of the shuttle resulted in an increased production of 20 sq. meter of matting in 8 hours work.</p> <p>Product Development and Diversification</p> <p>A project for construction of an experimental road using coal tar carpets was evolved in consultation with the National Highway Division.</p> <p>The prospects of using tubular coir mattings as filter points in tube wells was investigated in collaboration with the Agricultural Department of Tamil Nadu Government.</p> <p>The technical aspects of using coir matting as a medium for sea erosion control were examined in consultation with the Kerala Engineering Research Institute. The prospects of using coir reinforced precast slabs in civil works for drains were explored.</p> <p>Kayarool druggets of 4 shaft weave in different design patterns were woven.</p> <p>Composition for non-skid backing and edge finishing of matting mats with improved flexibility was evolved.</p>	<p>4. Bristle and mattress fibres were converted in to yarn.</p> <p>5. Kayarool druggets were made from softened coir.</p>

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1974-75	8.05987	<p>110 druggets and 80 rolls of Kayarool webbings were made against the requirement of the trade.</p> <p>Testing and Service Facilities</p> <p>A total of 243.6 tonnes of coir yarn was dyed in different shades for meeting the dyed yarn requirements of Hindustan Coir and facilities for bulk dyeing was increased to meet the growing requirements of the power loom factory.</p> <p>Field level peroxide bleaching was conducted for popularisation and 4.55 tonnes of coir yarn was bleached for trade in batches in the Lab. as part of extending service facility.</p> <p>A treatment of commercial grade of Anjengo yarn in a solution containing 3 g/litre of sulphuric acid and 5g/litre of sodium sulphite for a period of one hour at room temperature was observed to give satisfactory levelling of shade variation in the natural tint of coir yarn.</p> <p>Formulated a draft Indian standard specification for rubberized coir products.</p>  	<p>6. Formulated draft Indian standards for rubberized coir.</p> <p>7. Popularised Peroxide bleaching of coir in the field level.</p>

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1975-76	13.57240	<p>Modernisation in Extraction and Processing of Coir</p> <p>Sample lot of husk received from Goa was evaluated for its suitability to extract the fibres in the combing type machine and assessed the yield of bristle and mattress fibre from 1000 husk.</p> <p>Development of Coir Machinery</p> <p>A number of modifications were effected on motorised coir spinning machine in feeding, improvements for reduced wear of nozzle controls, realignment of worm wheel assembly, balancing of the spinning frame, easier positioning of lead thread, reduced wear and tear of driving mechanism, modification for elimination of flattening of yarn, improvements in spindle tube for reduced strand breakage led to the improved performance of the machine in production of yarn.</p> <p>Roller type nozzle controls were used to accommodate thicker strands of yarn while spinning of soft twisted and coarse yarns.</p> <p>Jute spinning system with improved settings was used for spinning single strand coir yarn from softened coir fibre in association with the Jute Industries Research Association.</p> <p>Rectification/ Fabrication of loom components was attended. New tappets were fabricated for the defective looms.</p> <p>Product Development and Diversification</p> <p>Admixture of jute to the extent of 20% improved the uniformity of single strand yarn due to more efficient movements to the coir fibre in association with the jute strands.</p>	<p>1.Introduced roller type nozzle controls for spinning thick strands of coir.</p> <p>2. A number of modifications effected improved the performance of motorized coir spinning machine.</p> <p>3.Jute spinning system was modified to produce single strand of coir.</p>

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1975-76	13.57240	<p>Developed woven sample carpets in 20 different patterns in 4 shaft carpet weave resulted in projecting different patterns of the design on the two sides of the fabric by the relative disposition of yarns of different shades. Sample mourzouk carpets were made out of softened hard twist yarn.</p> <p>Developed woven carpet with carnatic yarn (natural as the warp and softened carnatic yarn as the weft).</p> <p>Evolved smooth loop mats/ carpets in novel designs out of softened carnatic yarn used for the formation of loop. Hand tufted coir in PVC base was evolved.</p> <p>Asphaltic coir mesh mattings was used in the road construction in the premises of CCRI. After making the surface of the road dust free, hot bitumen was sprayed on the cleaned surface before laying the chipping carpet, which was subsequently rolled for consolidation. Reinforcement of the road with coir mesh was attempted in following phases to arrive at the most satisfactory method of application of reinforcement.</p> <p>In the 1st phase ½ inch mesh matting soaked in bitumen at near about boil by dip treatment in the tank by open width passage of the matting from the roll, suitably positioned on the top of the tank, was laid on the chipping carpet. The seal coat with 6 mm metal was spread to 1-inch thickness over the coir tar carpet and the surface rolled for consolidation.</p> <p>In the second phase, ½ inch mesh matting was spread on the chipping carpet already sprayed with hot bitumen. On application of a coat of hot bitumen on the top of the mesh matting, the seal coat was spread and the surface rolled. Consolidation was better in this case.</p> <p>In the 3rd phase, ½ inch mesh matting spread on the chipping carpet sprayed with hot bitumen was stretched by passage of the roller before application of the hot bitumen for bonding with the seal coat. The seal coat was applied and the surface consolidated.</p>	<p>4.Asphaltic coir mesh mattings were used for construction of roads in the campus.</p>

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1975-76	13.57240	<p>In the 4th phase, 1 inch mesh matting was spread on the chipping carpet sprayed with hot bitumen, stretched by passage of the roller and finished with the seal coat and consolidated.</p> <p>In areas of curvature, the mesh was laid crosswise, with the warp running across the road.</p> <p>The performance of the coir-reinforced road was compared to the control with a broad stretch not containing coir mesh.</p> <p>Testing and Service Facilities</p> <p>Experiments were conducted in softening of different types of coir yarn such as Anjengo, Quilandy and Beypore.</p> <p>Conducted bleaching with a solution containing 10 g/litre of sodium per borate and 5g/l of sodium silicate in the hot (60-70⁰C) imparted a bright creamy yellow colour to the material and 4 shaft twill carpets were woven from it.</p> <p>Evolved techniques for bleaching of coir with peroxide in the cold for greater flexibility in adoption of the bleaching process to industrial application.</p> <p>The pH for bleaching was 10.5 – 11.0 which decreased to 8.5 with the progress of bleaching.</p> <p>A total quantity of 324 tonnes of coir yarn was dyed in different shades for Hindustan Coir.</p>	

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1976-77	18.31606	<p>Modernisation in Extraction and Processing of Coir</p> <p>A field study of the different types of machines for extraction of coir from dry/semi dry coconut husk was conducted with a view to assess the performance of the machines under field conditions. The field investigation covered Japanese (SATO) Austrian (Fehrer) and Indigenous (Alltex,Ennor Patvolt etc.) installed in the regions of Karnataka, Tanjore and Kozhikode. Evaluated fibre content of sample husk received from the Andhra Pradesh on the combing machine and obtained a yield of 35 kg. to 40 kg. bristle fibre and 25kg. to 30 kg mattress fibre per 1000 husks ie. for 8000 husk segments.</p> <p>Conducted a field experiment at South Paravoor in reducing the period of retting of crushed husk in comparison to uncrushed husks as control. 12000 each of crushed and uncrushed husks in batches of 500 crushed/uncrushed husks were steeped for retting in “Malis” by the usual technique. It was observed that the crushed husks sink quicker than the uncrushed husks. Sample husks of 100 each were taken from the lots of crushed/uncrushed husks after a period of two months and subjected to extraction of fibre by the usual techniques of beating by mallets. It was observed that a worker experienced in extraction of coir by the traditional method of beating with mallets could handle 50 husks in 8 hours compared to the 15 uncrushed husks (control) and the fibre extracted from crushed husk was brighter in colour compared to the fibre obtained from control.</p> <p>Development of Coir Machinery</p> <p>Carried out trials on spinning of coir ropes of 8 score with a runnage of 100 m/kg having a doubling twist of 14 to 16 per ft on the motorised coir spinning machine by suitably modifying the controls and roller type nozzles and set of change gear wheels and also adjusting the spindle speed. Both retted and brown fibres were processed to make ropes and the output was 35 to 40 kg. per spinning head per 8 hour work.</p>	<p>1.Precrushing of husks reduced the retting period.</p> <p>2. Produced coir ropes from retted and brown coir fibre on motorised coir spinning machine.</p>

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1976-77	18.31606	<p>Vycome type soft twist yarn was also spun on the motorised coir spinning machine by effecting suitable alterations in the settings, revising the ratio of speed of the spinning frame to that of spindle to 1:3.25, a 14 toothed change gear wheel in place of 9 toothed wheel for draw rollers and increasing the combing drum speed vycome coir yarn having a runnage of 230 m/kg, score of 11 to 12 with a doubling twist of 16 per ft. was realised on the machine.</p> <p>Trials were also conducted by replacing the 2/20^s cotton thread with 20^s single yarn of Z and S twist for effecting reduction in cost of production of yarn. Fabricated 8 spinning heads, one slivering machine and one willowing machine and put into performance run by an operator attending to 4 spinning heads at a time and achieved an output of 45 kg. yarn with a runnage of 230 m/kg for 8 hours. The breakage of strand was reduced by replacement of flat spring control with specially designed roller control on the machine but the yarn produced was found to be more hairy.</p> <p>Section wise assembly drawings and machine drawings of the components of willowing, slivering and spinning machines were drawn.</p> <p>Designed and fabricated a new device consisting of two roller with one emery roller and positioned in between the creel stand and the loom for eliminating the buckling in mattings resulting from unequal tension in the warp strands. The modification produced mattings of much better texture without any buckling and uniform selvages.</p> <p>Product Development and Diversification</p> <p>Single strand yarn spun from blends of softened coir fibre and jute was bleached and dyed in black shade for weaving wall carpets in novel designs.</p> <p>Uncut pile carpets from single strand coir spun from blends of 80% softened coir and 20% Jute fibre on jute spinning system was woven with an uncut loop fabric of ½ inch pile height. 3 ply jute yarn was used as the tight chain, single ply jute as slack chain and single strand softened coir for the loops.</p>	<p>3. Drawn section and assembly wise machine sketches of components of Willowing, Slivering and Spinning machines.</p> <p>4. Designed and fabricated a device in eliminating buckling in matting during manufacture.</p> <p>5. Innovative products were developed out of softened coir.</p>



Willowing Machine

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1976-77	18.31606	<p>Yarn was also spun from blends of 50% each softened coir fibre and ordinary jute fibre.</p> <p>A new woven pattern was developed for ribbed matting/mats on a two shaft treadling system with stationary tight warp and a slack chain weave. In weaving, two sheds are formed; insertion of weft in the top and bottom sheds, woven patterns with differential colour effects could be produced in the material. Fancy coir products in novel designs, ten carpets in different design patterns and wall carpets in fancy designs from blends of softened coir and jute were displayed at the ISOCARD exhibition at Kasargode.</p> <p>Testing and Service Facilities</p> <p>Study was conducted in softening of coir yarn in a solution containing 5% caustic soda (w/v) at 80-85⁰c for 2 hours resulted in 40% saving in chemicals compared to the cold treatment. Softened 530 kg coir fibre, 836 kg carnatic yarn and 225 kg medium spun yarn and woven fancy coir products and displayed at International Seminar on Coconut Research organized by the Central Plantation Crops Research Institute, Kasargode. Thin Anjengo yarn was dyed in four fancy shades for preparation of special badges for distribution at the seminar.</p> <p>Studies were conducted in a coir factory using a bleaching recipe containing 5 g/l of sodium perborate, 5ml/litre of Hydrogen peroxide and 5 g/litre of sodium silicate. A pretreatment with a solution containing 5g/l of soda ash in the cold for ½ hour led to improve the variation in tint of the yarn and in getting uniform bleach. Attempts to reduce the cost of bleaching with a solution containing 3.75 g/l sodium carbonate, 6.5 g/l of sodium silicate and 4.5 g/l of hydrogen peroxide gave duller shade. Two shades were matched on softened/ bleached coir fibre to produce special effects on use of dyed fibre in the manufacture of fibre mats.</p>	

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1976-77	18.31606	<p>Rubberised coir products were tested for conformity set forth in the Defence specifications. Details of test method for determination of Indentation Hardness index were finalised and write up with drawing of the testing instruments was forwarded to the ISI, New Delhi for publication of the standard specification for rubberised coir products. Spring reinforced rubberised coir cushions were tested in the laboratory for determination of loss in thickness on repeated flexing which was found to be within 3.5%.</p> <p>Technical assistance was extended to an industrial establishment for adopting softening treatment of coir on a commercial scale. A total quantity of 3 tonnes of coir yarn was peroxide bleached and 236 tonnes of coir yarn and 600 kg of sisal in different shades were dyed for Hindustan Coir.</p> <p>A paper on "Use of Coir in Building Construction" was presented at the National Seminar on Development and Utilisation of New Materials in Building Technology, held at Trivandrum during 21st to 25th September 1976.</p> <p>A paper on "Studies in Coir Extraction, Spinning, Softening, Bleaching and Dyeing" was presented at the seminar in Coir processing, forming part of the 12th Session of the FAO Inter Governmental Group on Hard Fibers held at New Delhi during 14-19, March 1977.</p>	

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1977-78	32.67385	<p>Modernisation in Extraction and Processing of Coir</p> <p>The field study on different sets of crushers having 2 rollers, 3 rollers ,4 rollers and 5 rollers in defibering process revealed that an equipment of 5 rollers with a combination of punching rollers and fluted rollers with adjustments for release of the clearance between the rollers to allow passage of husks of different thickness , running at slow speed are more suited to give optimum crushing effect without damaging the fibre, facilitating efficient extraction of the fibre in the subsequent defibering process. A soaking period of 7 days is adequate for optimum yield of fibre.</p> <p>Studies indicated that on crushing green husk prior to steeping, the period of retting is reduced to three months as against 10 months required for uncrushed husks. Retting crushed husks beyond six months is observed to adversely affect the colour of the fibre.</p> <p>The analytical results on percent proportion of different length of fibre and pith content of fibre extracted from crushed husk retted for 3 months and uncrushed husk retted for 10 months did not show any appreciable difference.</p> <p>Ret liquors from 5 retting places viz. Chavara, South Paravoor, Muthukulam, Pachalloor and Muthakunnam were analysed for microflora (bacteria, fungi and yeasts) under the research project in collaboration with the Indian Institute of Science, Bangalore.</p> <p>Development of Coir Machinery</p> <p>Designed and fabricated new tappets for power loom which increased the design capacity of the loom for weaving dot patterns in coir mattings.</p> <p>Springs made out of spring steel wire of different gauges were designed and fabricated for maintaining appropriate tension on the roller controls for spinning satisfactory quality of coir yarn from white fibre on motorised coir spinning machine.</p>	<ol style="list-style-type: none"> 1. Precrushing reduced retting period to 3 months only. 2. Soaking period of 7 days was found to be adequate for fibre extraction by defibering process. 3. Analysed ret liquor from various retting sites for microflora. 4. Fabricated and tested refined spinning machines.

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1977-78	32.67385	<p>It was observed that springs made out of steel wire of 20, 21 and 22 gauges is suitable for producing hard twist yarn and springs made out of 23 and 24 gauge for soft twist yarn on operation of the machine with a speed ratio of spinning frame to the nozzles at 1:3.</p> <p>The spinning units for the field centers at Narasapur and Arsikere were fabricated and tested with refinements. Exploratory studies were undertaken on spinning of coir by feeding the fibres from slivers to the spindles on the ratt.</p> <p>Product Development and Diversification</p> <p>Evolved a black shade on coir based on KCA Direct black along with 2% soda ash and 10% common salt at 90-95⁰C. Wall hangings and table mats in mourzouk weave were evolved using single strand coir yarn spun out of softened coir fibre and carnatic yarn.</p> <p>Attempts were made to reduce the harshness of coir by blending coir with sisal and bhendi fibre in the proportion of 3:1 and 1:1 that had substantially improved the feel of the product.</p> <p>18" x 18" sample panels were made by spreading coir shearing dust uniformly on the polyvinyl acetate coated cardboard, plywood and cotton fabric was dressed with a spring of the adhesive and hot pressed for effective bonding of the coir fibre bits with the base material.</p>	<p>5. Springs made out from varied gauges of spring steel wire yielded soft and hard twisted coir yarn on motorised coir spinning machine.</p> <p>6. Coir was blended with sisal and bhindi fibres to provide supple feel.</p>

YEAR	EXPENDITURE (Rs.in lakhs)	ACTIVITIES	ACHIEVEMENTS
1977-78	32.67385	<p>Testing and Service Facilities</p> <p>Use of 0.5% formic acid in place of acetic acid yielded dyeings of improved penetration and better levelling during dyeing with basic dyes.</p> <p>Hypochlorite bleaching observed to level off the variation in tint of the commercial grades of vycome coir yarn.</p> <p>42 designs were evolved for coir products and 178 copies of design cards were distributed to the coir industry.</p> <p>A receipe was evolved for bleaching vycome coir yarn and field tested by treatment of the material in a sodium hypochlorite solution with a strength of 10 g available chlorine per litre at a pH of 9 to 10 for half an hour in the cold followed by antichlor treatment of 3g/l litre of hydrochloric acid solution for 15 minutes, washing and drying. The studies on break load indicated that there was limited variation in the break load of hyprochlorite treated coir yarn from that of the unbleached (control).</p> <p>250 samples of rubberised coir were tested. A shade matching was taken on aloe yarn. 120 tonnes of coir yarn was dyed in different shades for Hindustan Coir.</p>	<p>7. Hypochlorite bleaching was studied and demonstrated.</p>

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1978-79	24.85000	<p>Modernisation in Extraction and Processing of Coir</p> <p>The study of the project on microbiological aspects in association with the Indian Institute of Science, Bangalore revealed that retting of coconut husk is of aerobic nature. The pH, colour, distribution of bacterial genera and fungal flora, its counts/ml in the ret liquor collected from the five important retting centres viz Chavara, South Paravoor, Moothakkunnam, Pachaloor, Muthukulam were analysed during the study. The anaerobic species and yeast flora associated with the five natural rets were also analysed.</p> <p>The study revealed that many aerobic species of bacteria belonging to the genera Pseudomonas, E. coli, Micrococcus, Bacillus, Paraclostridium, Alcaligenes, Achromobacter and Aerobacter and yeast species such as Saccharomyces fructeum, Debaryomyces hansenii, D.nicotinae and Rhodotrula flavor, are intimately involved in the retting process. Most of the organisms play a vital part in the decomposition of pectic substances and polyphenols. Micrococcus and Pseudomonas have the ability to attack phenol and/or catechol. Micrococcus cryptococcus and other species are capable of liberating pectinolytic enzymes as poly galacturonase, pectin trans-eliminase and pectin-methyl esterase. The study also revealed that retting of coconut husks is of aerobic nature.</p> <p>Development of Coir Machinery</p> <p>On revision of combing device and use of 13 X 27 gear teeth combination for the draw roller, an output of 60 kg yarn of 7/8 score with a runnage of 113 m/kg. was attained on one spinning head per 8 hour work for thicker variety yarn on the motorised coir spinning machine.</p> <p>Modifications were effected by the use of nozzle controls made out of hardened high carbon steel. Realised an output of 13.5 kg. of coir yarn with a runnage of 230-240 m/kg while processing the FFF quality.</p>	<p>1. The study on microbiological aspects revealed that retting of coconut husk is of aerobic nature.</p> <p>2. Designed and fabricated a machine for making bottle cleaning brush.</p>

YEAR	EXPENDITURE (Rs.in lakhs)	ACTIVITIES	ACHIEVEMENTS
1978-79	24.85000	<p>Studies conducted by replacing cotton lead thread with jute twine were not successful due to the untwisting of the jute twine on operation of the motorised coir spinning machine.</p> <p>Introduction of revised pulley system with wire ropes for positioning of the heddle frames in place of coir rope facilitated easy movement of the heddle frames with reduced physical strain on part of the weaver. Use of the wire rope dispenses with the need for frequent retieing of the heddle frames by coir ropes to adjust for the elongation in coir ropes on continued use of the system in the weaving process.</p> <p>A counter weight was positioned at suitable distance on the top of the sley beyond the fulcrum for reducing the strain in the beating on the handloom for weaving mats/mattings.</p> <p>Evolved a revised design for the shuttle to facilitate easy movement of the shuttle through the shed with easy release of the weft from the cops positioned in the shuttle, which increased the productivity by about 10%.</p> <p>Designed and fabricated a machine for the manufacture of bottle cleaning brushes.</p> <p>Hard twist aloe yarn of uniform twist was spun on motorised coir spinning machine.</p> <p>Attempts were made to use picking sticks from local wood in place of processed wood did not succeed.</p> <p>Product Development and Diversification</p> <p>Experiments were done for spinning 2 ply yarns from blends of softened coir yarn and goat hair in the proportion of 1:1 and observed that it is not successful.</p> <p>Evolved reversible pile carpet with pile structure on both sides of fabrics. Carpets were made from single ply and two ply yarn spun from composite blends of softened coir and goat hair mixed in the ratio 1:1</p> <p>Coir quilts were woven out of yarn spun from blends of softened coir and goat hair using rubberized coir and mattress fibre as the stuffing material.</p>	<p>3. Introduction of revised pulley system with wire rope led to easy movement of the heddle frame and reduced physical strain to the weaver.</p> <p>4. Coir quilts were developed from blends of coir and goat hair.</p>

YEAR	EXPENDITURE (Rs.in lakhs)	ACTIVITIES	ACHIEVEMENTS
1978-79	24.85000	<p>Ribbed matting and loop carpets were woven from yarn spun from composite blends of softened coir and goat hair mixed in the ratio of 1:1.</p> <p>Testing and Service Facilities</p> <p>A recipe for bleaching yarn from brown fibre to a natural tint equivalent to that of Quilandy / Beypore yarn were evolved and recommended for field use.</p> <p>Fifty one samples of dyes were tested to examine their suitability for application on coir.</p> <p>69 novel designs were evolved for different types of coir mats, mattings, carpets and wall hangings. Copies of 299 selected designs were prepared and distributed to the industry.</p> <p>Copies of sixty selected designs were evolved in duplicate for preparation of a design folder.</p> <p>On the spot technical advice in bleaching, bulk dyeing and shade matching was extended by 144 visits covering 34 coir processing units</p> <p>49 samples of rubberised coir were tested. 154 tonnes of coir yarn was dyed in different shades for Hindustan Coir.</p> <p>The National Institute of Occupational Health was assisted in organising a study on the occupational health of coir workers.</p>	<p>5. Bleaching method was developed for yarn from brown fibre.</p>

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1979-80	26.67125	<p>Development of Coir Machinery</p> <p>A revised arrangement of nozzle tips with improved design which controlled the thickness of the single strand yarn yielded an output of 8 kg of 2 ply yarn with a runnage of 155 m/kg per 8 hour on the treadle spinning machine.</p> <p>Designed and introduced an improved beaming arrangement with direct feed of warp from spools positioned on the creel to coir handloom increased weaving output by 15%.</p> <p>Improved shedding was achieved on use of freely rotating wheels in pulley system and wire ropes for the link up of the heald frames and treadles.</p> <p>Designed and introduced a compounded lever treadle mechanism on coir handlooms, which increased the output of the loom with lesser physical effort.</p> <p>Designed a new type of sley for the coir handloom.</p> <p>Designed a semi-mechanised coir handloom and fabricated components like take up roller, main bearings, crankshaft etc.</p> <p>Coir extraction spinning and brush making machine were installed at the Central Institute of Coir Technology, Bangalore.</p> <p>Extended technical assistance and supervised fabrication and installation of improved 4-metre loom at Foam Mattings (India) Ltd, Alleppey.</p> <p>Product Development and Diversification</p> <p>Designed and woven striped matting. Eleven designs suitable for fibre mats were translated into loom sketches on pointed paper and sample fibre mats incorporating the new designs got woven.</p> <p>Seventy five Fibre mats in No. 2 size were woven and displayed as exhibits.</p> <p>Analysed two photographic designs of mats and translated to loom sketch for guidance in weaving against request from the industry.</p>	<ol style="list-style-type: none"> 1.Introduced a compounded lever, treadle mechanism which increased output of handloom and reduced physical strain to the weaver. 2. Fabricated components of semi-mechanised loom. 3.Introduced and improved weaving of Carnatic mats on loom with two treadles resulting in higher productivity with reduced physical strain in weaving process. 4.Introduced an improved beaming mechanism working on emery fillets for the preparation of warp beam. Improved the above mechanism by fitting motor thereby increasing the productivity and quality of the beaming.



YEAR	EXPENDITURE (Rs.in lakhs)	ACTIVITIES	ACHIEVEMENTS
1979-80	26.67125	<p>Testing and Service Facilities</p> <p>54 novel designs for fibre mats/ stencilled mats and other coir products in different colour shades were evolved.</p> <p>201 design cards in selected design were prepared and issued to the industry.</p> <p>On the spot technical advice extended to 55 coir processing units. Evolved the details of dyestuff formulation for 25 selected shades of better fastness.</p> <p>Extended assistance in bulk bleaching of 125 MT coir yarn.</p> <p>368 nos of rubberised coir samples were tested. Formulated a draft standard specification for moulded rubberised coir cushion.</p> <p>A coir rope specimen was tested for break load and issued the test report.</p> <p>A total of 179 tonnes of coir yarn was dyed in different shades for Hindustan Coir.</p> <p>3 Shade matchings were taken for coir.</p>	

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1980-81	10.83276	<div data-bbox="837 225 1223 496" data-label="Image"> </div> <p data-bbox="443 496 1518 564">The Central Institute of Coir Technology, Bangalore became functional.</p> <p data-bbox="443 608 887 643">Development of Coir Machinery</p> <p data-bbox="443 683 1458 788">The designs of the various drives for synchronizing the beat-up, let-off, take up and shedding of the improved coir handloom with coordinated loom motions for weaving coir matting was finalized</p> <p data-bbox="443 794 1518 938">The settings on the spindle assembly of the treadle-spinning machine were revised with introduction of new type of mouth pieces and providing a feed tray of two sections to spin 5 kg Anjengo rope yarn having a runnage of 330 m/kg in 8 hrs by hand feeding of fibre by two persons.</p> <p data-bbox="443 944 1518 1050">Completed fabrication of loom components like heald frames, pulleys, spiked take up rollers, back rest, clutches, weavers pedal, brake system and sprocket drives for the improved coir handloom.</p> <p data-bbox="443 1056 1518 1193">Assistance was extended to Hindustan coir in developing indigenous fabrication of spindle tubes for cops winding machine and developed warp lubricating system for 2 metre power loom using wax moulded in wooden plank floating on the warpsheet</p> <p data-bbox="443 1238 1010 1273">Product Development and Diversification</p> <p data-bbox="443 1313 1518 1417">12 patterns were evolved for 4 shaft carpet/ mattings and a new type of loop carpet with rib formation on the face side was evolved and used for wall-to-wall carpeting.</p>	<p data-bbox="1541 600 1877 667">1.Improved weaving techniques for creel mats.</p> <p data-bbox="1541 715 1877 852">2. Fabrication of a few components of improved coir handloom were completed.</p> <p data-bbox="1541 1118 1877 1224">3.Designed and evolved 4 shaft carpets and tubular mattings.</p> <p data-bbox="1541 1272 1877 1370">4.A new type of loop carpet was developed with ribbed formation.</p>

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1980-81	10.83276	<p>22 pieces of wall hangings of size 75 cm X 50cm in different design and colour schemes were produced. Seven samples of carpets of size 75cm x 50 cm in different colour schemes were evolved from Beach yarn dyed by the tie and dye method.</p> <p>Investigations in utilisation of coir pith as manure in agricultural farms were conducted in collaboration with the Tamil Nadu Agricultural University for different crops in the field level. The result revealed that coir pith can be successfully utilised in agricultural farms for higher yield with lesser application of fertilizer, improving the yield in alkaline soils as well and coir pith application increase the hydraulic conductivity of the soil.</p> <p>Testing and Service Facilities</p> <p>Discoloured yarn and sun burnt yarn were treated for improving the brightness and lightening the tint.</p> <p>Developed a two bath process for bleaching of Beach Yarn.</p> <p>Thirty one dyestuff samples were assessed for suitability in dyeing of coir shades with improved fastness to water and rubbing were developed on coir using acrylic dyes with 2% acetic acid as dye bath assistant.</p> <p>40 dyestuff samples of different classes were tested for evaluating its suitability for dyeing of coir.</p> <p>A total quantity of 172 tonnes of coir yarn was dyed in different shades for Hindustan Coir.</p>	5. Coir pith manure identified for partially replacing the fertilizer.