



PRODUCT DEVELOPMENT AND DIVERSIFICATION

YEAR	ACTIVITIES	ACHIEVEMENTS
<p>1981-82</p>	<p>17 novel designs for coir mats in different colour combinations, 3 new patterns for frame mats, six new patterns for loop carpets, 9 patterns for 4 shaft carpets and six designs suitable for 2 shaft and 4 shaft matting and one design for three shaft matting were evolved.</p> <p>600 copies of selected designs for coir products and 53 copies of “Design catalogue” were made available to the industry.</p> <p>In the collaborative project with the Tamil Nadu Agricultural University, it was observed that as the dose of coir pith increases the organic carbon content of the soil is also found to increase.</p> <p>Assisted two units in putting up improved matting looms of varied capacities. Studies in containerisation in collaboration with Indian Institute of Packaging, Bombay revealed that 5.5 to 6 tonnes of coir mats and 5.8 tonnes of coir mattings could be stuffed in a 20 feet container</p>	<ol style="list-style-type: none"> 1. Evolved a Design Catalogue for coir products 2. Coir pith was found to increase the organic carbon content of soil increasing its fertility 3. The concept of containerisation was introduced in the coir industry.
<p>1982-83</p>	<p>20 new designs for fibre mats, 13 designs for carpets and 16 designs for matting including five patterns for weaving on jacquard machine were evolved. A few designs suitable for weaving mattings were evolved in consultation with the National Institute of Design.</p> <p>Samples of 62 fibre mats, 32 carpets and 8 rolls of matting in standard sizes were woven for exhibiting in Show Room & Sales Depot of Coir Board.</p> <p>Studies in improvements in packaging of coir products carried out in collaboration with the Indian Institute of Packaging, Bombay in areas of alternative wrapping materials for export cargo, development of unit packaging and protection of corners of mat bundles. On study with the different wrapping materials such as hessian/poly laminate, hessian/bitumen/polylaminate, hessian/kraft, HDPE/Hessian/Kraft, HDPE/Kraft, WovenPP/kraft and Woven JHDPE/Poly for coir indicated that Hessian/Polylaminate gave encouraging results.</p> <p>In the unit packaging of coir, different materials such as HDPE, LDPE, LDPE with handle, polypropylene with handle, PVC with handle, PVC with flap, button and handle and corrugated board carton were examined and observed that HDPE packs with suitable openings for escape of moisture and arrangement for heat sealing at the packing stage offered further scope for examination.</p>	


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	<p>The possibility of effecting improvement in packing to prevent damages of mats at the edges/corners by positioning of corner strips made out of solid fibre board and corrugated board were examined and found that corner strips made out of corrugated board withstood the pressure of wrapping strings at the edges with out damage to the mats.</p>	
<p>1983-84</p>	<p>A total of 88 novel designs were evolved including 38 for fibre mats, 19 for mourzouk carpets, 16 FF mats/ mourzouk carpets, 10 for stencilled mats,3 for mattings and 2 for Road-in-laid mats.</p> <p>14 carpets of size 6¹ x 3¹ were woven incorporating new designs.</p> <p>Sample products conforming to the designs of ITC expert were woven and displayed. 600 pieces of door mats/mourzouks /matting rugs in 20 designs were consigned to the Show Room for assessing the consumer receptivity to the new designs.</p> <p>Conducted studies to impart flame retardance to rubberised coir using chlorinated paraffin wax, chlorinated rubber, isodecyl diphenyl phosphate, hydrated alumina which did not improved the fire retardency.</p> <p>Adhesives based on polyvinyl acetate, synthetic rubber solution and concentrated natural rubber latex were coated on coir needled felt and bonded to substrates of film of PVC, LDPE, PP, HDPE and Polyamide netting and bonding was satisfactory.</p> <p>Coir needled felts in nominal densities of 500 g/m², 1000 gm/m² and 1500 g/m² made with varied punching densities and needle penetration.</p>	  <p>Coir needled felt machine</p>

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1984-85	<p>53 novel designs were evolved -31 for FF mats, 14 for mourzouck carpets, 3 for stencilled mats, 4 for mattings and 1 for 4 shaft carpet. 5 loom sketches were drawn on graph paper for weaving FF mats.</p> <p>A set of 33 patterns for window curtain, partitions etc. were woven. Organised a special display for designs. 15 mourzouk carpets of standard size, 3 samples of 4 shaft carpets and 20 samples of mattings were woven in new designs.</p> <p>A treatment with Amgard TR was observed to give better flame retardent effect on coir needled felts.</p> <p>Rubberised coir needled felts used for packaging fragile items such as valves and T.V tubes withstanding the rigours on handling and transport of the items.</p>	<p>1. Rubberised coir needled felts used for packaging fragile items</p>
1985-86	<p>71 novel designs – 29 FF mats, 18 Carpets, 8 jacquard matting, 3 wall hanging and 13 stencilled mats were evolved.</p> <p>31 samples of mourzouk carpets and 8 patterns of mattings in Jacquard weave were evolved in novel design and displayed at Exhibition / Trade fairs within India and abroad.</p> <p>11 sample patterns were woven for screen/partition material.</p> <p>Treatment of coir needed felt with PVC latex improved the fire retardancy in which the charred surface area was 4 cm² as against the 12 cm² for untreated coir needled felt. Of the formulations attempted for imparting fire retardance to coir needled felt, best result was obtained with Amgard TR, followed by UF treatment,PVC latex and borax - boric acid. Application of UF and PVC latex composition resulted in bonding of the fibres to some extent besides imparting rigidity to the material and improving the flame retardance as well.</p> <p>Studies on use of sand filled rubber backed coir matting bag as armour for sea wall in coastal protection work was conducted in collaboration with the Central Water & Power Research Station. Sand filled coir matting bags each weghing 8 kg. were laid in single layer and double layer and the effect of wave action on placement of the bags horizontally (parallel to the waves)and vertically (normal to the waves) were studied and observed that the sand filled coir bags in single layer could withstand wave height of 0.8m to 0.95 m. without any damage and in double layer could withstand wave height up to 0.95 to 1.25 m.</p>	<p>1.A study in collaboration with Bharat Electronics Ltd, Bangalore revealed that coir needled felt in the tube form is a good packaging material for electronic items.</p> <p>2.Coir needled felt backed with rubber latex was used as a carpet underlay.</p> <p>3.Sand filled coir matting bags were used for coastal protection and were found to be effective.</p>

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	<p>Studies on the use of coir pith as a medium for conservation of soil moisture, as a mulch in the farms and the effect of adding coir pith in specific proportion to farm soil on the physico-chemical of the soil with particular reference to selective crops such as coconut, cashew and paddy were studied in the collaboration project with the University of Agricultural Sciences (UAS) Bangalore.</p> <p>UAS, Bangalore analysed the chemical composition of coir pith available in Karnataka and also analysed the mineral contents, cellulose, lignin and degradation of coir pith.</p> <p>Research on the scope for the utilisation of coir pith as additive to soil for increasing the yield in agricultural crop such as ground nut, sorghum, sugar cane etc were conducted in collaboration with the Tamil Nadu Agricultural University, Coimbatore and coir pith samples were analysed for micro nutrient content (Zn, Cu, Fe, Mn).</p> <p>Coir needled felt of compact structure was attained from coir fibre containing 25 % moisture. Evolved coir needled felt with HDPE scrim.</p>	<p>4. Amgard TR and Urea Formaldehyde are best Fire retardant additives to coir needled felts.</p>
<p>1986-87</p>	<p>Composting coir pith using the fungus Pleurotus Sajor Caju (mushroom) in combination with urea was confirmed in the field level study by Tamil Nadu Agricultural University, Coimbatore for crops like ground nut, paddy, sapota etc. The effect of continuous application of coir pith on the growth and yield of groundnut for a period of three seasons showed a steady increase in yield by groundnut pod.</p> <p>University of Agricultural Sciences, Bangalore conducted study on the efficacy of using coir pith in cashew and coconut crops, revealed that the yeiled of crops increased by the application of coir pith.</p> <p>66 designs – 36 FF mats,13 stencilled mats, 3 jacquard matting, 8 mourzouk carpet and 6 stencilled carpet & FF mats – were evolved for weaving different coir products.</p> <p>6 mourzouk carpets of size 6¹ x 3¹ were woven in new designs for display. Copies of 80 original designs were issued to coir product manufacturing units.</p> <p>Several chemical combinations were applied on coir needled felt / creel mat / mattings for improving the fire retardency and observed that the best result were achieved with sodium tungstate, boric acid, ammonium dihydrogen phosphate for coir needled felt and Fabretar – FR-891 gave improved fire retardency to matting/creel mat. Manufactured rubber backed coir tiles of size 50 X 50 cm.</p>	<ol style="list-style-type: none"> 1. Plurotus sajor caju, an edible mushroom in combination with urea was used for composting of coir pith. 2. Janatha mattresses were developed out of coir-needled felt. 3. Rubber backed tiles were developed.

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	<p>A field project was conducted in a section of the Western Ghats and Almora in UP on use of coir netting by laying it for arresting erosion of soil slopes of Highways in collaboration with Central Road Research Institute, New Delhi.</p> <p>Sample janatha beds evolved from coir needled felt/rubber latex were consigned to UPASI to ascertain their views on the suitability of the coir janatha mattresses for use of workers of Tea Estates.</p> <p>Laminated coir needled felt pads were made available to major industrial establishments to use as packaging material for transport of delicate electronic items.</p>	
<p>1987-88</p>	<p>70 elegant designs were evolved –FF mats(29), FF mat/ stencilled mat (18), corridor mat(1), matting(13) Jacquard matting(1) and carpet (8) for weaving different types of coir products.</p> <p>10 rolls of mattings of size 1m x 25m and 2 rolls of 2m x 25m were woven in new design patterns evolved under ITC SIDA Trade Promotion Programme.</p> <p>68 designs were issued to coir units for diversifying the range of patterns for exports and domestic markets.</p> <p>Rubber backed coir tiles with better dimensional stability were evolved using 4 types of compounding formulation. Rubber backed Coir Tiles</p> <p>Different composition of chemicals were used for imparting flame retardance to creel mats, Jacquard matting, coir needled felt, rubberised coir and it was observed that the flammability characteristics of rubberised coir improved substantially without adversely affecting the performance on application of flame retardant combinations</p> 	<ol style="list-style-type: none"> 1. Evolved recipe for rubber backed tiles of better dimensional stability. 2. Field experiments on application of coir pith revealed the weed suppression and moisture conservation properties of coir pith. 3. A recipe was developed to reduce the consumption of hydrogen peroxide in bleaching of coir.



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<p>1988-89</p>	<p>Evolved a hand tufted coir in PVC base under the collaborative project with Mechanical Engineering Research and Development Organisation.</p> <p>Matting of H2BM7 is best for giving cooling effect by roof-surface evaporative technique in association with Central Building Research Institute, Roorkee which was proved by experiments conducted using different types of mattings.</p> <p>New designs in novel themes in attractive colour combination involving the development of the design concept, translation of the design concept into the design card, manufacture of selected designs of consumer appeal and popularisation of the designs by display at Trade Fairs / Exhibition within India and abroad were carried out availing the services and support of International Trade Centre, UNDP, New Delhi / Geneva and the Swedish International Development Authority, Stockholm.</p> <p>51 new designs to different coir products were mats, 8 for jacquard mattings, 11 for mouzouk carpet .</p> <p>46 patterns of coir matting, 25 patterns of carpets, 11 patterns of FF mats and 3 patterns of corridor mat were evolved under ITC SIDA Trade Promotion Programme.</p> <p>11 selected patterns of coir matting rugs in jacquard pattern, rubber edged at the ends were sent to 14 Coir Board Show Room and Sales Depot for display.</p> <p>5 compositions based on Styrene Butadiene rubber were attempted for the manufacture of rubber backed coir tiles of a firm structure.</p> <p>Different fire retardant additives were used for imparting fire retardancy to coir products and it was observed that Fabretar-FR-891, Borax-Boric acid and sodium tungstate as the most effective FR additives which imparted perceptible improvement in flame retardancy on coir needed felt, jacquard coir matting and brush mat respectively as evidenced by "Ignition pellet" test.</p> <div data-bbox="952 459 1464 849" data-label="Image"> </div> <p style="text-align: center;">Pile Wire Loom</p>	<ol style="list-style-type: none"> 1. Evolved a hand tufted coir in PVC base. 2. Conducted two successful field demonstration on application of coir netting for erosion control of slopes of highways at Nilgiris, Tamilnadu and Dehardun.(U.P) 3. Experiments with H₂BM₇ matting established the use of this matting for effective roof surface cooling. 4. An international workshop was organised at Coimbatore on 21st September 1988 to disseminate the findings on use of coir geo fabrics in various areas of applications.

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	<p data-bbox="344 245 1496 432">Out of 9 Fire Retardant additive combinations so far applied for imparting fire retardant property to rubberised coir mattresses without adversely affecting the physical characteristics, the silicone composition gave improvement in fire retardancy with retention of the physical characteristics within the specified limits.</p> <p data-bbox="689 432 1496 647">A project on developmetnt of coir polymer composite using coir needled felt and phenol formaldeyde resin in collaboration with Regional Research Laboratory, CSIR, Trivandrum was in progress and the impregnation unit of special design was fabricated at RRL, Trivandrum and trial runs were taken.</p>  <p data-bbox="248 715 1496 868">Poly Coir use of coir nettings for erosion control of soil slope of highways was conducted on the Nagapattanam – Guddalore-Mysore Road and Connoor-Kundra Road of the High ranges of Nilgiris District of Tamil Nadu, covering an area of 3300 sq.m. in association and supervision of the Highways Research Station, Govt of Tamilnadu , Madras.</p> <p data-bbox="248 868 1496 979">Another field experiment was conducted in U.P. covering an area of 2550 m² on Mirapur – Davel Road (Muzzaffar Nagar Dist.), Lambidher Mines (Deharadun Dist.) and Dolman Nainital Almora Road.</p> <p data-bbox="248 979 1496 1091">The experiment conducted in the Nilgiris region revealed that coir nettings could effectively contain the hazards of erosion, by proper application of the netting, over the surfaces, which are erosion prone.</p> <p data-bbox="248 1091 1496 1166">An International Workshop on Coir Geogrids / Geofabrics in Civil Engineering Practice was organised at</p> <p data-bbox="248 1166 1496 1241">Coimbatore on 21st Septembner 1988 to disseminate the findings of the research effort to Technical experts, Consultancy</p> <p data-bbox="248 1241 1496 1316">Architects/ Engineers, Govt.officials, Research Scientists involved in tackling problems of eroson control, soil stabilisation and soil conservation.</p> <p data-bbox="344 1316 1205 1353">The use of Coir geofabrics in the following areas was highlighted:-</p> <p data-bbox="248 1353 1496 1428">Highway construction- establishment of vegetation on shoulder, embankments and central reservations.</p>	

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	<p>Lake, cannal and river banks. Farm and forestry applications. Drainage ditches, culvert and table drain outlets. Parks, Airports, Housing estate, etc. Ski-slope and high altitude revegetation. Sand dune stabilization. Subbase layer in road pavements. Filter for underground drains. A brochure on use of coir netting for erosion control was published.</p> <p>Use of coir pith along with nutrient materials contributed in augmenting the output of selected crops such as sorghum, groundnut, paddy, ragi, sugar cane, tapioca, etc. was revealed in the studies in collaboration with the Tamil Nadu Agricultural University, Coimbatore. The methodology and training in composting coir pith was demonstrated to farmers, students, unemployed graduates and visitors during exhibition conducted by TNAU. A pamphlet on composting of coir pith was prepared and released to farmers. The methods of composting coir pith were demonstrated to farmers of the Oil Seed Training programme organised by KVK and SPIC.</p> <p>Continuous application of coir pith with groundnut as test crop for five seasons produced positive effect on yield and nutrient uptake.</p> <p>The field experiment with paddy as the test crop conducted in alkali soil shown that coir pith application helped to improve the nutrient uptake by the crop.</p> <p>Iron enriched composted coir pith along with zinc salt recorded high yield of maize over the control with NPK to the extent of 28.5%.</p> <p>Studies in rainfed and irrigated farms with tapioca as the test crop showed that the yield increased significantly on application of coir pith with a saving of potash fertiliser to the extent of 50%.</p> <p>Pot experiments with coir pith based poultry litter along with NPK indicated significantly higher yield for sodium cowpea cropping system.</p> <p>Experiments conducted with the application of coir pith in collaboration with University of Agricultural Sciences, Bangalore to the farm soil with ragi, groundnut and maize as the test crop indicated maximum yield of ragi when coir pith was applied at the rate of 20 tonnes per hectare with the recommended level of fertiliser (100% NPK).</p>	

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	<p>Use of coir pith at the rate of 15 t /ha with recommended level of fertilisers showed maximum yield fo groundnut and maize. Use of microbial inoculums to enhance the degradation of coir pith resulted in a higher yield of grain/pods at a lower level of application of coir pith.</p> <p>Produced coir needled felt with HDPE Web. The techniques for preparation of coir needled felt reinforced gypsum / cement boards were evolved in collaboration with RRL, CSIR, Jammu.</p> <p>Sample coir needed felt was made available to Executive Engineer, WALI, Baroda for conducting performance of the felt for a period of about one year on service of the material under field conditions as filter for underground drains for lagging perforated underground drain pipes.</p>	
<p>1989-90</p>	<p>64 designs were evolved – 40 for FF mats, 17 for carpets, 4 for matting and 3 for stencilled mat – for manufacture of coir products.</p> <p>149 copies of designs were issued to coir units and 27 copies of designs to NCT & DC for manufacture of coir products for display in exhibitions. 6 designs were developed for publication in Coir Journal.</p> <p>18 pieces of carpets and 13 samples of coir mattings in new designs were woven and displayed at Trade Fairs/ Exhibition with in India and abroad for popularisation of the designs.</p> <p>The pilot equipment for application of PF to coir needled felt, drying of the resin coated fabric and curing of the resin in situ was installed and commissioned for test run. The composite boards warped on release from the hydraulic press and exposure to ambient conditions.</p> <p>Examined the techniques by which coir-gypsum composites can be prepared by preliminary exploratory investigation.</p> <p>Experiments conducted at Water and Land Management Institute, Anand, Gujarat, indicated that coir needled felt functions as an efficient filter material in underground drains.</p>	<p>1.Evolved coir needled felts of three grades with nominal densities of 5000 g/m², 1000 g/m² and 1200 g/m²</p> <p>2. Field studies conducted at 4 places revealed that coir matting is effective for cooling buildings with RCC roof by roof surface evaporation technique developed in collaboration with Central Building Resea-rch Institute, Roorkee.</p>

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	<p>Field experiments conducted in CBRI Roorkee, Modi Tyres, Modipuram, Mughal Sheraton Hotel, Agra and Navodaya Vidyalaya Complex, Sultanpur demonstrated that the coir matting can be used with cost advantage for cooling buildings with RCC roof by roof surface evaporation technique developed by CBRI, CSIR, Roorkee.</p> <p>The long-term effect of using coir pith in raising farm output for cultivation of selected cash crops was investigated in collaboration with TNAU. Experiments were conducted with different crops using composted coir pith and coir pith based poultry litter.</p> <p>A total of 25 candidates in 4 batches were trained in the technique of composting of coir pith.</p> <p>In cultivation of ground nut, repeated application of raw as well as composted coir pith in red sandy loam soil for raising five crops of ground nut in succession resulted significant increase of the available phosphorous and potassium content.</p> <p>Application of composted coir pith at 12.50 tones per hectare alongwith NPK with Ragi as the test crop is effective as NPK + farm yard manure.</p>	<p>3. Installed a pilot plant for manufacture of coir polymer composite with Regional Research Laboratory, Thiruvananthapuram.</p> <p>4. In collaboration with Water and Land Management Institute, Anand, Gujarat, it was revealed that coir needled felt can be successfully used as a filter for land drainage in reclamation of agricultural lands.</p>

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<p>1990-91</p>	<p>57 novel designs were evolved for FF mats, mattings and jacquard mattings. An album containing new designs was prepared. 75 design photographs for weaving products of novel designs were supplied to the trade. 375 samples of rubberised coir were tested. A Rubberised Coir Testing Laboratory was set up at Central Institute of Coir Technology, Bangalore.</p> <p>Rectified the initial warping defect observed in the composite board from coir-needled felt coated with PF resin.</p>	<p>3.Woven carpets from yarns spun from blends of softened coir / wool / goat hair.</p> <p>4.Evolved coir needled felt with jute and High Density Poly Ethylene scrim/web.</p> <p>5.Developed coir gypsum composites in collaboration with Regional Research Laboratory, Jammu Tawi and successfully used as panelling/ ceiling material.</p>
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Coir Ply Board</p> </div> <div style="text-align: center;">  <p>Coir Matting Board</p> </div> </div> <p>The project for development of gypsum coir composite panels in collaboration with Regional Research Laboratory, Jammu Tawi was implemented. The collaborative project on utilisation of coir pith for agricultural farms for retention of moisture content with TNAU was continued.</p>	

