

# Coir Industry

Competitiveness  
Strategy

## A Competitiveness Strategy for Sri Lanka's Coir Industry

Developed by The Coir Industry Cluster



Supported and funded by The Competitiveness Initiative, a joint project of the United States Agency for International Development (USAID), Nathan Associates Inc., and J.E. Austin Associates.

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This report outlines a strategy for Sri Lanka's competitive success in coir product manufacturing and export. It distills assessments of Sri Lanka's opportunities for and constraints on achieving competitiveness. The recommendations herein chart a path for growth that can resolve near-term barriers and set the stage for medium-term and long-term progress in Sri Lanka's coir industry.



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# Executive Summary

**S**ri Lanka is the world's largest supplier of various grades of coir fiber and of coir pith used as substrate in horticultural applications. At the same time, its share of export revenues from value-added products—such as brooms, brushes, mats, geotextiles, and rubberized coir—is much less than that of its main competitor, India. Sri Lanka's coir industry stands to gain from its extensive experience with fiber production and marketing, domestic production and trading infrastructure, renewed interest in technical uses of natural fibers, and innovative technologies and product lines. But its profitability, competitiveness, and long-term viability are threatened by inconsistent fiber quality and low productivity at the mill level; insufficient understanding of the technical demands, structure, and dynamics of existing and emerging markets; and competition from foreign suppliers of coir, synthetic products, and other natural fibers.

The strategy described in this report proposes to counter these threats through initiatives that will improve fiber quality and productivity; encourage the industry to “get close to the customer” in existing markets; explore new technically and economically viable applications for coir fiber and pith; and create an organization dedicated to promoting the industry as a whole. The strategic initiatives are as follows:

- **Improving product quality and productivity.** This initiative aims to improve fiber quality through price incentives, understanding how equipment and processing conditions affect quality, and workforce training.
- **Expanding existing markets and exploring new applications.** This initiative aims to develop understanding of customer needs, structure, competition, and innovation in domestic and foreign markets and applications.
- **Creating a Sri Lanka Coir Center.** This initiative will establish a trade association or center to support the coir industry in becoming more competitive and achieving long-term viability through innovation, market intelligence, education, and effective representation.



The success of the strategy and these initiatives will depend in part on some changes in government policy. These changes include (1) government recognition of the need for an entity devoted to coir, (2) parliament permitting the industry to administer export duty revenues at its own discretion, (3) fiscal support for companies offering vocational training and social programs, (4) eliminating or refunding unfair and counterproductive duties and shipping charges, and (5) strengthening government agencies that prevent such duties and charges.

Outside technical and market expertise, conflict mediators, and coordination of the research and development program will also be helpful. That program will benefit from the development and deepening of relationships between research organizations and research-minded manufacturing operations in Sri Lanka and abroad.

Industry commitment will also drive the success of the strategic initiatives, which were developed in cooperation with the Coir Cluster. The cluster, which represents all sectors of the industry, is motivated to improve the industry's global competitiveness and some members have independently initiated research projects. To stimulate collaboration, motivation, and innovation among domestic and international members of the coir industry, the cluster is preparing for an international convention to be held in Colombo in 2002. In fact, preparing for this convention has already required extensive cooperation in the local industry and abroad, particularly with counterparts in India. The industry, with support from TCI, is coordinating support from other donors and is procuring funding from the Common Fund for Commodities to assist in preparations for a global convention on coir.

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# The Competitive Context for the Coir Industry

**M**easured by product volume, Sri Lanka's coir industry is the world's largest exporter of coir fiber and coir products.<sup>1</sup> The industry supplies various grades of coir fiber, baled or twisted, for value addition abroad; produces value-added goods such as brooms, brushes, and bootscrapers from long-bristle fiber; produces and distributes other value-added products such as twine, floor coverings, woven and stitched geotextiles, rubberized coir for mattresses, home and car upholstery; and treats and exports coir pith as horticultural growth substrate.

To a varying degree, all segments of Sri Lanka's coir industry are facing similar threats to competitiveness, profitability, and sustainability. These include inconsistent fiber quality and low productivity at the mill level, due in part to the lack of a quality-based pricing system for coir fiber, and declining markets for coir fiber, because of competition from synthetic materials and foreign suppliers. Many industry members do not understand the technical requirements and distribution structures of existing and emerging markets for natural fiber products, nor have they aggressively pursued opportunities for coir products in domestic markets. Until recently, the industry had not effectively used domestic research capabilities for coordinated applied research and development (R&D). Such R&D is needed to help the industry address technical aspects of quality control and evaluate opportunities in new products and markets.

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<sup>1</sup>In this report the fiber extracted from the coconut husk—generally named coir—will be referred to as “coir fiber,” as opposed to the residue of the fiber extraction process, or “coir pith” or “coir dust.”

In response to these threats, members of the coir industry formed the Sri Lanka Coir Industry Cluster. The cluster believes that the industry can be transformed into a globally recognized supplier of “excellence in coir” if the industry strives to expand existing markets and explore novel applications that match coir’s intrinsic characteristics to customer demands. The purpose of this report is to support the Coir Cluster’s commitment to transforming the industry. It examines the opportunities for and constraints on Sri Lanka’s competitiveness in the coir industry, recommends a strategy for overcoming constraints and exploiting opportunities, and presents specific initiatives for implementing the strategy.

## INDUSTRY CONSTRAINTS AND OPPORTUNITIES

### Global Market Context

Coir’s technical advantage over other natural fibers lies in its unusually high lignin content and its related stiffness. These properties result in slower degradation and greater resilience compared to other natural fibers—such as flax, hemp, jute, or sisal—and make coir the fiber of choice in erosion control products, upholstery, and rubberized coir applications. The fiber’s relative coarseness, low tensile strength, and inelasticity may limit its use in advanced composites, but special treatments and processing methods could modify some of these characteristics for specific purposes.

Historically, coir fiber has been used in floor coverings (mats and rugs), brooms and brushes, and in home and automotive upholstery. In recent decades, a significant share of the latter markets has been lost to competition from synthetic foams and fibers. This is reflected in the decline in total coir fiber trade from 160,000 metric tons per year in the mid-1970s to about 110,000 metric tons per year currently. Value-added fiber products—such as floor coverings from India, Tawashi brushes, and high-end twine from Sri Lanka—have maintained or even increased their global market volume. Sales of coir pith, traditionally a waste produced during fiber separation and promoted since the 1980s as a potential substitute for peat in horticulture, increased sharply in the early to mid-1990s. In recent years sales declined because of poor product quality and consistency and the high risk of crop failure in commercial horticulture. Today, significant amounts of coir are produced in only a few coconut-growing countries, including India, Sri Lanka, Thailand, Brazil, and the Philippines. Figure 1 shows the process and product flow for the industry in these countries.<sup>2</sup>

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<sup>2</sup>The milling process in Figure 1 indicates use of Ceylon drums and decorticators. Drums are used to produce long-bristle fiber. Decorticators, which do not separate by fiber length, produce only mixed fibers.

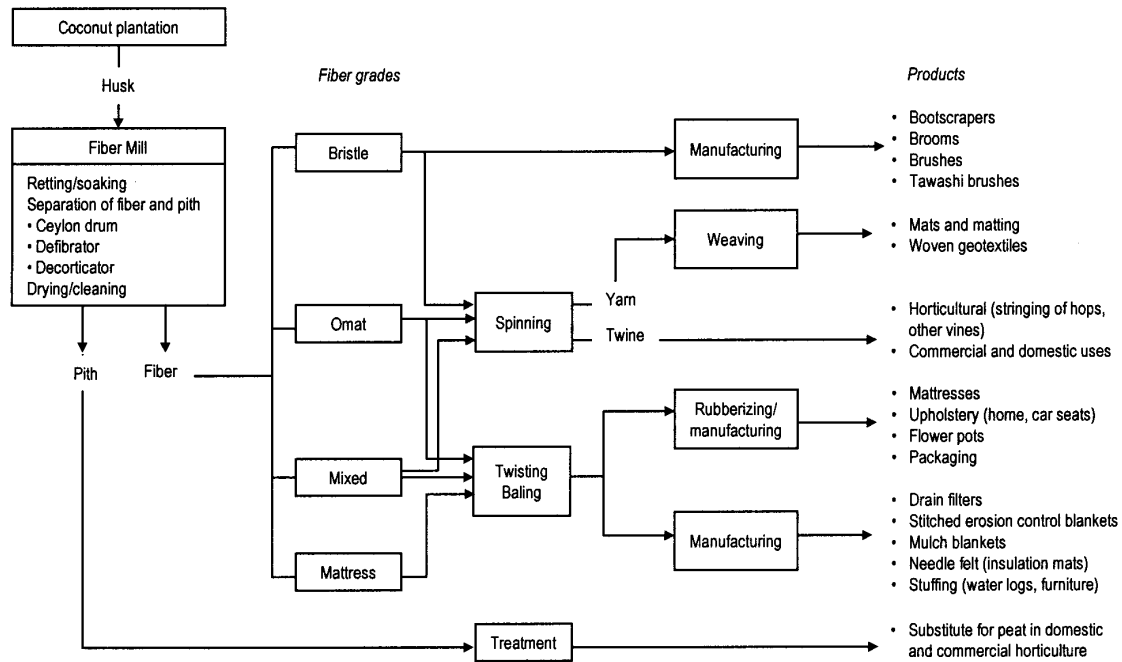


Figure 1. Coir Industry Process and Products

Interest in the use of natural fibers for technical purposes, such as advanced composites and building materials, has grown since the early 1990s. Natural fiber-based products offer technical and environmental benefits over competing products, but capture significant market share only where they can compete on price and performance with functionally equivalent products. Only in very small niche markets does the “greenness” of coir and other natural fibers reap higher margins.

### Sri Lankan Context

Since its inception in the early 1900s, Sri Lanka’s coir industry has been the world’s primary supplier of various grades of coir fiber and has manufactured a limited range and volume of semi-finished and finished goods. The latter include coir twine and rope, doormats and rugs, brooms and brushes, and rubberized mattresses and pads. In contrast to India, which has a large domestic market for coir products, Sri Lanka’s production of raw fiber and manufactured goods has been driven almost exclusively by external demand. Sri Lanka’s domestic use of coir for twine, rope, woven and knotted bags, and brooms and brushes is comparatively small and routinely involves lower grade products and rejects.

Thus, the industry is export-oriented, with domestic sales of finished products approximately 17 percent of total production. Total revenues from the export of coir fiber and finished products were approximately 4 billion Rs (US \$52 million) in 2000, corresponding to about 5 percent of agricultural exports, 1 percent of all exports, and 0.3 percent of Sri Lanka's GDP. The industry employs an estimated 35,000 to 45,000 people or 0.6 percent of the entire domestic workforce, at the level of primary production (fiber mills) and manufacturing. Many of these workers are seasonal or part time. Productivity per worker in the coir industry is thus about half the national average.

Profitability varies greatly between industry sectors. Fiber production and export has low profitability and is under constant threat from other natural fibers and synthetic products. The manufacturing and export of brooms and brushes from long-bristle fiber, traditionally produced only on Sri Lanka's "Ceylon Drum" system, is profitable but often cannot get "close" to the customer. High-end brushes and bootscrapers with unique, sometimes protected designs are very profitable. Other value-added coir products, such as floor coverings and mattresses, are modestly profitable but subject to growing competition from coir fiber and product suppliers abroad and from synthetic products.

Sri Lanka exports predominantly fiber and pith with little or no value added. Compared to India, its main competitor, Sri Lanka exports almost twice the volume of coir but receives only about 76 percent of export revenues (see Figure 2). Fifty-one percent of Sri Lanka's coir revenues are from the commodity fiber and pith exports; 97 percent of India's export revenues are generated by value-added products, including yarns (see Figure 3). Consequently, Sri Lanka's export value per metric ton of coir material is only 38 percent of India's. Despite this concentration on commodity exports, some members of the coir industry are innovative and market-oriented, and Sri Lankan coir continues to be used in technically demanding applications, such as car seat tops in high-end Mercedes models.

So far, Sri Lanka's coir industry has not profited enough from its experience or from the renewed interest in natural fibers. Fiber exports, particularly of low-grade mattress fiber, have been dropping since the early 1990s while exports of value-added products have not increased significantly. For example, demand for erosion-control blankets from Sri Lanka has not met expectations. Sri Lankan blanket producers compete with more mechanized and thus more productive, large operations in North America and Europe, which use raw fiber supplied by Sri Lanka. In addition, the use of rubberized coir products in car seats has continued to shrink because of price competition and is now limited to several European high-end models. Rubberized coir, which exemplifies the technical benefits of natural fibers, cannot compete with synthetic foam products on price because its production sequence is not cost-effective. Recently, however, two German automotive suppliers developed a one-step injection-molding process for rubberized coir that may reduce production costs for car seat applications and other rubberized coir products in Sri Lanka.

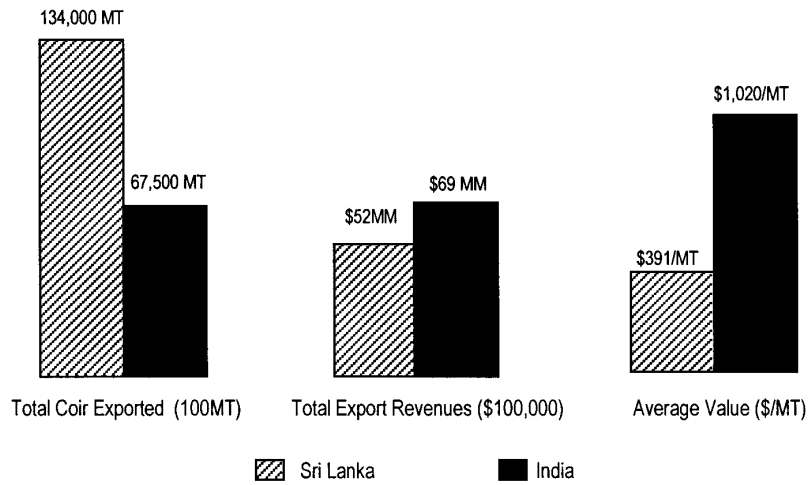


Figure 2. Volume and Value of Coir Exports, Sri Lanka vs. India (year ending March 2001)

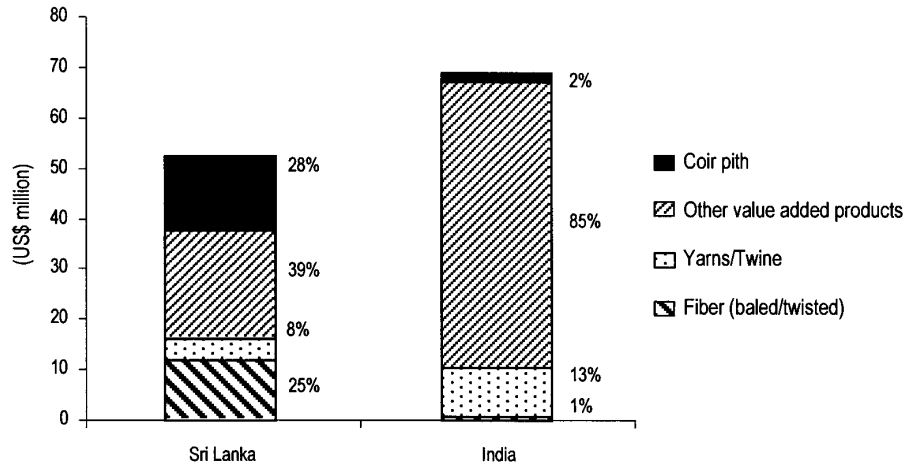


Figure 3. Composition of Coir Exports, Sri Lanka vs. India (year ending March 2001)

Sources: Sri Lanka Coconut Statistics, 2000, Coconut Development Authority; Coir News, July 2001

At the same time, competition from coir suppliers in other coconut-producing countries, particularly India, is increasing. For decades Sri Lanka was the largest exporter of coir materials, but the export value of Indian coir products now exceeds that of Sri Lanka. The Indian coir industry has a more developed infrastructure (including several experienced manufacturers of processing equipment), lower wages, and support for modernization and innovation by the India Coir Board. Other Asian countries with considerable coir potential and a growing production capacity include the Philippines, Thailand, and Vietnam. China, which now shows growing demand for mattress fiber from Sri Lanka, will eventually develop a domestic supply.

Foreign customers and domestic manufacturers believe that Sri Lanka's coir industry is being harmed by its failure to establish an effective quality control system, particularly between fiber mills and buyers. Mills use labor-intensive and unproductive fiber extraction and cleaning methods. Variability in husk quality, weather, and operating conditions, as well as poor plant layout contribute to poor quality—high dust content, short fibers, husk residues, and moisture in the fiber. Millers and manufacturers in the Coir Cluster agree that some customers' ignorance of quality and the lack of a quality-based pricing system in Sri Lanka hinder quality control. Simply, millers have little or no incentive to improve equipment and plant layout, or to improve operations to achieve consistent quality. And the failure of the average miller to impress upon his staff the importance of quality poses another obstacle.

Because of poor product definition, the demand for "mattress fiber" from Sri Lanka has declined since the mid-1990s from 30,000 metric tons to 25,000 metric tons. Prices have eroded and operations at fiber mills that depend on revenues from mattress fiber have become uneconomical, preventing investment in equipment and plant layout. Recent Chinese demand for high-quality mattress fiber may permit primary sectors of the industry to improve profitability and draw attention to the need for quality control.

### ***Industry Strengths and Opportunities***

Sri Lanka's coir industry faces considerable opportunities for and constraints on its competitiveness, internationally and locally. Strengths include

- Abundant raw material,
- Long industry experience,
- Relatively competitive freight rates,
- Access to subsidized loans, and
- Technical research support.

At the level of primary production, Sri Lanka has abundant raw material—coconut husks—which could permit a major expansion even assuming stagnant coconut production.

The infrastructure for collecting husks and separating and transporting fiber is diversified and simple, if unproductive. And, while motivation and enthusiasm for innovation at this level is not the norm, it is growing among some mills and small-scale further processors. In addition, the trained or trainable workforce is large enough to support small-scale mills and larger manufacturing operations.

The long experience of the industry provides for a rich network of business and personal contacts among domestic industry members from various segments and an extensive international network of professionals. Foreign customers recognize Sri Lanka as an experienced supplier of coir fiber, and the industry enjoys a near-monopoly on bristle fiber-based brooms and brushes, thanks to international recognition of their quality. In addition, a diversified global industry leader has provided innovation in Sri Lanka's coir industry since its inception.

The industry can also take advantage of subsidized, one-time government loans for mill modernization and can seek domestic and international public-sector funding to support applied R&D and technical support (the Common Fund for Commodities or the European Union's AsiaInvest program). Recently, there has been industry-wide collaboration on research for characterization of fibers and processes. More needs to be done, however, to ensure a focus on applied research and commercial applications. Several research organizations, experienced in coir, are capable of bench-scale, pilot, and full-scale research on products and processes.

Sri Lanka's coir industry is also well-positioned to benefit from (1) renewed interest in using natural fibers for technical purposes; (2) the emergence of novel applications in advanced composites, building materials, and horticulture; and (3) innovative processing technologies for natural fiber products, specifically the one-step injection molding process for rubberized coir developed in Western Europe and now used by two automotive suppliers.

### ***Industry Weaknesses and Threats***

The coir industry also has many weaknesses and is facing real threats. In general, coir is little recognized as a constituent in consumer products, and where it is recognized its image is not always positive. Coir is also under constant threat from other natural fibers and synthetics. In addition to these general threats, Sri Lanka's coir industry has the following weaknesses:

- Inadequate understanding of the importance of quality at all levels;
- No influence on government policy;
- Declining performance of the Colombo port;
- Eroding advantages in freight rates and port facilities;
- Little knowledge of markets, ultimate customers, or domestic market potential;



- Little experience with technical, applied product, and market research;
- Costly and unreliable electricity; and
- Little motivation to undertake dangerous work tasks in mills.

Disregard for product quality affects the behavior of both mills and exporters. Without a sound product grading system and a quality-based pricing system, mills are not motivated to improve their products by modernizing equipment or by making plant layout and operations more efficient. And destructive price-based competition among Sri Lankan exporters has helped erode price and quality, particularly for mattress fiber and coir pith, as well as the profitability of brooms and brushes.

The industry as a whole has not influenced government policies to improve its chances for competitiveness. Government policy assumes coir is a byproduct of the coconut industry, rather than an industry in its own right. As a result, little thought, much less funding, has gone into improving the competitiveness of the coir industry. The government, for instance, has no long-term plans for modernization loans and no minimum standards for exporters of coir products.

Colombo's freight rate advantages over India—for destinations in Europe, the Far East, and North America—and over the Philippines, Thailand, and Vietnam—for destinations in Europe and the U.S. East Coast—appear to be eroding rapidly. The recent imposition of insurance premiums and surcharges for stopping in Sri Lanka, combined with substantial new infrastructure investments in the Indian ports, threatens the competitiveness of the Port of Colombo.

In addition, excessive terminal handling charges imposed by freight lines, and the failure of the Fair Trading Commission to enforce its ruling against the Ceylon Association of Ship's Agents for such charges, has slowed productivity and turnaround at the port, making it vulnerable to competition. The shippers avoided enforcement via a technicality in the language of the ruling that identified only the association and not specific members. This has allowed the shippers to continue their pricing practices individually.

Little knowledge of markets, ultimate customers, or domestic market potential is also threatening the competitiveness of Sri Lanka's coir industry. Even experienced exporters have difficulty understanding, following, and acting on new market opportunities and technologies. Consequently, they often fail to persuade existing and potential customers of the benefits of coir for a specific application. Many exporters, depending on agents and middlemen, have only limited access to their product's customers and applications in foreign countries and consequently know little about the needs of ultimate customers. In addition, development of the domestic market for value-added and new coir products has not been pursued.

Research in the coir industry suffers from a dearth of younger, dynamic researchers experienced with technical, applied product, and market research on coir. At the other end of the production chain, few workers are motivated to undertake undesirable and dangerous tasks in fiber mills; and smaller mills, particularly, are harmed by costly and unreliable electricity supply. Supply problems are exacerbated by generally inefficient use of power at the mills.

Two general constraints also impede industry growth. First, the legal system is not effectively protecting intellectual property rights. A panel of lawyers has recommended changes to intellectual property laws, but those recommendations do not yet have parliamentary approval. Second, local investment capital is scarce and interest rates on traditional loans are prohibitively high. In 2001, for instance, a customer known to a bank could obtain a collateralized loan at an interest rate of 18 to 22 percent annually. Loans denominated in foreign currency are available at an interest rate of 4 to 6 percent, close to international corporate rates, but to be eligible the business must have foreign currency earnings. A business with an overseas presence and seeking debt financing on international markets can find cheaper capital, but must bear the risk of exchange rate fluctuations. Such fluctuations may add 8 to 10 percent annually to the cost of capital for companies relying on local revenues—or substantially more if the rupee is severely devalued.

Promoting an association to represent the common interests of the entire industry and to initiate and coordinate research could help significantly in overcoming these weaknesses and threats. It is hoped that all associations representing different segments of the industry would come together to form such an association.

### ***The Coir Industry Cluster***

The Sri Lanka Coir Industry Cluster believes that the industry can be transformed into an internationally recognized supplier of “excellence” in coir. Product exporters in the cluster are responsible for most raw fiber exports, as well as a significant share of manufactured exports. In recent months, cluster participation has expanded to represent key segments of the Sri Lanka coir industry, including

- Fiber millers, the primary producers of raw fiber and pith;
- Manufacturers and exporters of fiber and value-added goods, such as floor coverings, brooms and brushes;
- Research organizations, academic and semi-governmental; and
- The Coconut Development Authority (CDA), the government body overseeing coconut industry policy.

The Coconut Growers Association has been invited to join the cluster.

The core of the cluster, formed in response to The Competitiveness Initiative (a USAID-funded project), includes representatives from all these groups and is chaired by Indrajith Piyasena, Managing Director, Volanka Exports. From October 12 through December 5, 2001, cluster members went on a study tour to India; held regular meetings and work group sessions, including a strategy workshop in Colombo on November 23; and worked closely with this report's business strategy specialist, who met with individual cluster members and their trade organizations and visited more than 15 production operations—fiber mills, cottage spinning, weaving and matting operations, and large commercial plants for value-added fiber, twine, erosion control products, and rubberized mattresses. In addition, controversies, including those between millers and exporters over product quality and incentive systems, have been addressed openly and constructively.

Some cluster members are motivated to improve the competitiveness of their own firms; they realize that this will require collaboration with competitors and other industry sectors. Others are critical of prevailing noncompetitive behavior, such as the lack of market intelligence and reliance on state patronage, and are addressing these issues at the company level. And closer collaboration between coir exporters and fiber millers may generate a model for making small-scale primary processors of agricultural products aware of end-user demands and thus able to improve competitiveness through innovation and productivity.

Domestic retailers of coir products and suppliers of testing and certification services also contributed to development of the industry strategy, and they have been asked to join the cluster.

## THE COMPETITIVENESS STRATEGY AND THE STRATEGIC INITIATIVES

Developed by the Coir Cluster, the strategy and strategic initiatives take into account the constraints, opportunities, strengths, and weaknesses of the coir industry, global and local. By working together, industry members can overcome quality and productivity problems at the mill level, bridge the communication gap between millers and manufacturers and exporters, curb destructive internal competition for foreign customers, better serve existing and new international markets, be more innovative, and regularly assess and develop emerging applications. The industry strategy is to

- Promote innovation and quality;
- Improve the quality and consistency of fiber grades produced in Sri Lankan fiber mills;
- Better understand, serve, and expand existing markets for raw fiber and manufactured goods;
- Evaluate the technical and economic viability of and potential for emerging and novel uses for coir in composites, building, horticultural, and other technical products;

- Develop promising new markets in Sri Lanka and abroad;
- Improve workplace safety and workforce productivity measured as value per worker hour; and
- Create an institution with a mandate to speak for the entire industry and guide industry initiatives.

This strategy will improve the competitiveness and profitability of using coir husks, a domestic resource, for the benefit of the coir industry and Sri Lanka as a whole. In implementing this strategy through the following strategic initiatives, the industry will be able to move beyond the fiber trade and traditional market for brooms and brushes.

- **Improving Product Quality and Productivity.** Improving the quality of exported fiber will be the foundation for maintaining and expanding markets for value-added coir products and developing new applications and techniques. This initiative aims to improve fiber quality through price incentives, understanding how equipment and processing conditions affect quality, and workforce training. This will require selecting parameters for measuring fiber and product quality; selecting and developing methods for spot and lab measurement of quality parameters; negotiating and implementing a quality-based pricing system for coir fiber; establishing a “test and demonstration mill” for production-scale research to identify better equipment configurations and operational practices; and promoting workforce development through training in mills and manufacturing and trading operations.
- **Expanding Existing Markets and Exploring New Applications.** This initiative aims to develop a “value-added” approach through understanding of customer needs, structure, competition, and innovation in domestic and foreign markets and applications. This will require tracking and communication of market intelligence through seminars and workshops with market experts, foreign customers, and industry members. Domestic institutions will conduct technical and market research in collaboration with or with guidance from foreign research organizations and expert consultants. Findings will provide guidance on opportunities and methods for improving competitiveness in various markets. Existing and emerging applications will be evaluated relative to the technical and economic competitiveness of coir in domestic and foreign markets. Customers in existing and emerging markets will perceive the sophistication and attention of suppliers as “providing value” rather than a mere commodity. This approach may purge elements in the value chain that prevent effective communication between customer and supplier and that reduce supplier profitability.
- **Creating a Sri Lanka Coir Center.** Pursuing the first two initiatives will require a committed and dynamic staff with business experience, political understanding, and an appreciation of scientific methods, technical research, and the intricacies of translating research into reality. This initiative will establish a center to support the coir industry in becoming more competitive and achieving long-term viability through innovation,

market intelligence, education, and effective representation. The center will collect, evaluate, and disseminate market intelligence; coordinate strategic initiatives; support research and development (R&D); lobby for policy changes; and coordinate workforce development, training, and social development. An executive staff will operate the center as a private sector entity; a board of representatives from industry, government, and research will govern it. A consortium of domestic and international researchers will guide R&D projects. The industry expects to fund the center through voluntary duties on coir exports, industry contributions, and project-specific grants from government and non-governmental organizations.

### Other Effects of the Initiatives

The strategic initiatives may also stimulate other changes in infrastructure, technology, and policy essential to moving the industry to more sophisticated and profitable products.

- **Infrastructure.** Millers will invest in facility and operation upgrades as a result of quality-based pricing incentives and cooperation with exporters. They may restructure plant layout and process sequences and use more conveyors—leading to greater mill productivity and profitability.
- **Technology and innovation.** Many changes will require and stimulate innovation and motivation. Such changes include introducing quality management systems at mills and manufacturing plants; investing in productive technologies and practices for fiber processing, including optimized soaking/retting<sup>3</sup> and pre-crushing steps; adapting defibering equipment to the production of bristle fiber; installing power saving motor controls; and transferring innovative technologies for manufacture of value-added products.
- **Regulatory framework.** Lobbying and cooperation with government staff will improve the regulatory and policy framework and benefit the entire industry. Desirable changes include government recognition of the need for an entity devoted to coir, parliamentary approval for the industry to administer part of the export duty-based cess fund at its own discretion, support for companies conducting vocational training, elimination or refund of unfair and counterproductive duties and shipping charges, and strengthening agencies charged with preventing such occurrences.<sup>4</sup>

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<sup>3</sup>Soaking/retting consists of soaking the husk in water, normally for 3 to 4 weeks. During that time, microorganisms break down pectic substances connecting coir fiber in the husk.

<sup>4</sup>The word “cess” is a Sri Lankan term for an assessment, voluntary or otherwise, on the exports or imports of an industry. The Treasury collects the funds, which are earmarked for projects that contribute to the improvement of the entire industry.

- **Public–private dialogue.** Creating public–private dialogue will help dispel the notion that coir is simply a coconut byproduct and establish working relationships between industry and the public sector through the proposed Sri Lanka Coir Center.

The core cluster, its working groups, and other interested parties will initially execute action items for the first two initiatives. After an industry-wide association or the Sri Lanka Coir Center is established through the third initiative, the working groups should accept responsibility for these and later initiatives.



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# Improving Product Quality and Productivity

**I**mproving the quality of Sri Lanka's exported fiber will be the foundation for maintaining and expanding markets for value-added coir products and developing new applications and techniques. Experience with other natural fibers, such as cotton, flax, and hemp, has shown that fiber quality is crucial to success in technical applications. Coir used in high-end European car seats must consistently meet the stringent requirements of sophisticated customers, such as Mercedes, or governmental performance and safety standards. To meet such requirements, the coir industry must know what it produces and ensure its quality.

The purpose of this initiative is to improve the coir industry's productivity and the quality and consistency of its products by (1) developing a quality characterization and monitoring system; (2) establishing a quality-based pricing system for assessing and improving mill technology and operations; and (3) instilling quality as a virtue in the workforce through technical and motivational training for mill, manufacturer, and export staff. Establishing the quality-based pricing system will require cooperation and consensus among millers, manufacturers, and exporters. This cooperation may also improve collaboration in other areas, such as price transparency. Training in quality could be extended to managers through training in leadership and staff motivation, process improvement, and customer management.

This initiative will also involve collaborative R&D between domestic and international researchers and foreign equipment manufacturers and the development of a test and demonstration mill to allow systematic improvements to fiber processing equipment.



## ACTIONS

### Select Quality Parameters

To characterize coir fiber quality, millers, exporters, and customers must agree on measurable attributes—parameters—based on coir products and their intended use. In the 1970s and 1980s, the Sri Lanka Standards Institute (SLSI) adopted standards for bristle and white fiber—fiber length distribution, color, and moisture, impurity, and salt content. In transactions between millers and exporters, these standards are rarely used, and no formal or informal standards or monitoring methods have been adopted for baled mattress.

Cluster members and foreign customers have helped identify three parameters for primary characterization of various fiber grades—dust and short fiber content, impurity content (e.g., husk and pith levels), and moisture content. These parameters are important in judging the quality of many coir products and may serve as the basis for a pricing system for mattress fiber. Simply put, a fiber buyer should not have to pay for “water and dirt.” These parameters are most effectively controlled at the mill level, so closer coordination in the upstream portion of the supply chain will be essential to improving quality and consistency.

Secondary parameters may include fiber length and fineness distribution, tensile strength, resilience, color, and brightness. These parameters characterize fibers for more demanding applications. In addition, twisted fiber runnage and number of twists should be monitored, and fiber length distribution for bristle fiber should be specified.

Determining parameters will require reviewing existing specifications for natural fibers and agreeing, within the Coir Cluster, on which parameters are relevant for internal trade and which for foreign customers. This process may require 3 to 6 months. The cluster could then decide to articulate parameters for value-added products and coir.

### Select Methods for Spot and Laboratory Measurement

Acceptance and use of quality parameters will require that interested parties agree on methods and test protocols for reliable, reproducible measurement. A quality-based pricing system will rely in part on spot test methods during transactions between millers and manufacturers. Such methods have been used sporadically in Sri Lanka and elsewhere to measure moisture and dust content. And at least one manufacturer in Sri Lanka uses simple spot measurements of fiber length for bristle fiber.

In selecting spot methods, their shortcomings must be taken into account. For example, fiber density and salt content distort conductivity-based spot moisture measurements in fiber bales and coils. How sensitive should the price paid to the miller be to such

distortions? Or consider that the properties of natural fiber vary considerably, even within bales. What sampling method can be used to obtain a representative measurement acceptable to both parties in a transaction? To address these issues, alternative spot methods will be reviewed and modifications proposed, and sampling methods and guidelines will be reviewed and possibly adapted to the characteristics of coir.

Laboratory methods for characterizing fibers and products also need to be more efficient. For example, manual methods used at the Industrial Technology Institute (ITI) to measure fiber length and fineness are labor-intensive and not suitable for characterizing commercial samples. To address this problem, advanced methods for characterizing natural fibers, developed recently in Europe and North America, are being reviewed; research institutes in the United States and Europe have been contacted; and collaboration with foreign institutes for the transfer of proprietary technology or operational know-how, or both, is being explored. Methods for monitoring coir pith are also being considered. During this activity, the industry will collaborate with SLSI, the government body that develops and codifies technical standards. Standards and methods will eventually be added to SLSI's system.

Reviewing and selecting methods for monitoring parameters may require up to 6 months. After discussions with ITI and Société Générale de Surveillance (SGS), an international testing and certification organization with operations in Colombo, it is expected that implementing this action item will help establish international recognition and certification for locally tested coir fiber and pith quality standards.

## **Implement a Quality-based Pricing System**

Transactions between millers and manufacturers are not governed by a widely accepted price differentiation system for baled and twisted fiber grades. Thus, millers have no incentive to improve the quality of their mattress, *omat* (oversized mattress), and mixed fiber grades.<sup>5</sup> To be practical and effective, a quality-based pricing system must be acceptable and transparent to both parties, based on spot measurements. It must also provide sellers with sound financial and psychological incentives. Such a system could be penalty or reward-based, with payment based on weight versus quality.

Quality-based pricing will drive quality management at the mill level. Thus, the Coir Cluster will form a working group to design a pricing system within 6 months. The system should be designed by the time spot test methods are selected.

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<sup>5</sup>*Omat* is oversized mattress fiber or the medium-sized fiber arbitrarily termed so. It is too long to be mattress fiber and is not bristle. In the standard specification for bristle fiber, *omat* is the fiber having not less than 15 percent and 35 percent, respectively, of long (more than 220 mm) and medium fiber (between 180-220 mm) by mass and not more than 60 percent of short fiber (between 80-180 mm).

## **Build and Operate a Test and Demonstration Mill**

Equipment configurations and mill operating practices affect fiber quality. Retting—soaking of husks in water before fiber separation—and the three defibering processes affect fineness, strength, and color. And the sequence of cleaning and drying steps determines the residual dust content in shipped fiber. Studying, in a controlled environment, how fiber separation and other mill processes, as well as operational practices, affect quality will result in sound suggestions for mill improvement.

Most mill processes, except for drying and storage, demand little capital or space—so conditions can be simulated easily in a full-scale test and demonstration mill. Industry members have already developed the concept for such a mill. Funding a joint project to upgrade technology in the coir sector with the India Coir Board is being investigated with the Intergovernmental Group on Hard Fibres of the Food and Agriculture Organization (FAO) of the United Nations. The CDA has expressed interest in supporting the project. If the test mill is to be used to demonstrate the economic viability of modifications it will have to be run, in part, as a commercial operation. In that case, ownership and management issues will have to be resolved ahead of time.

The scope of the mill's test and research program must be developed and its beneficiaries identified. In addition to input from industry, the project will rely on domestic research institutions to guide experiment design and perform lab evaluations of samples collected at the mill.

The test mill project was further supported by the Coir Cluster's study tour of the Indian coir industry in October 2001. The tour included visits to processing equipment manufacturers, fiber mills and research facilities, and plants that manufacture floor coverings, mattresses, rubberized coir products, and coir-based construction boards. These visits clarified developments in coir technology, particularly at the mill level. These developments include test-scale modifications to defibering machines; mechanization of the process with proper layout and conveyor systems and variations in husk preparation techniques (e.g., soaking and retting); an improved fiber cleaning process; a fiber feeding mechanism for more uniform twisted fiber; and "coirret," a microbial inoculum used to accelerate the retting of white fiber. The cluster's preliminary evaluation of techniques will be used in developing the test mill.

Finalizing the mill concept, identifying domestic and international funding, and selecting a suitable location will take approximately 6 months. Depending on industry commitment and support from research organizations and advisers, project start-up may require another 6 to 12 months.

## Promote Quality Training and Workforce Development

Workers and managers must begin to recognize the importance of quality management. This means changing attitudes as well as actions. Staff must be trained and motivated, while plant owners and managers improve their own skills. The coir industry needs a workforce development program at all levels—research, operations, and management.

The program should include hands-on technical and management training for mill foremen; technical consultancies to mill management on equipment handling, facility layout, and work organization; operation-specific quality management seminars; onsite training to provide manufacturing workers with technical and motivational skills; and leadership seminars and excursions for management. Institutionalizing vocational training for industry workers, possibly with diplomas as in India, should also be considered.

Backward integration—the shifting of value-added processes to smaller mills and cottage operations—also requires that the training program cover this part of the workforce. Such training should be coordinated between the Sri Lanka Coir Center and organizations experienced in smaller industrial operations, such as the Industrial Service Bureau's (ISB) Kurunegala office. It may also involve other groups experienced in workforce development, such as the German GTZ, the Konrad Adenauer Foundation and, for cottage operations, the Siyath Foundation.

Domestic policy changes to support this training may include tax incentives for larger companies providing in-house training and creating or financially supporting regional centers that provide training in small-scale operations.

The proposed training program affects all sectors of the industry. Training professionals should be involved in program design, status reviews, and guidance. To give trainees practical goals, the program should begin after the quality-based pricing system is adopted.

## ADDING VALUE IN THE BUSINESS PROCESS

As shown in Figure 4, this strategic initiative will directly affect Sri Lanka's competitiveness by adding substantial value in the early stages of the business process for companies in the coir industry.

- **Research & development.** The test mill will help develop productivity and quality improvements at the mill level.
- **Procurement.** This initiative focuses not only on the technical aspects of quality, but also on how to source the right products in the right form early in the supply chain—from the coconut husks to the processed fiber and pith.
- **Production.** Improved workplace skills, management, pricing systems, and mill productivity all contribute directly to this part of the value chain.



Figure 4. Value of Improving Product Quality in the Business Process

- Administrative and management functions.** Much of this initiative aims to change how progress is conceived, encouraged, and measured. Understanding the importance of training and workforce development, installing quality-based pricing systems, encouraging proper attitudes toward quality, and identifying non-capital-equipment productivity measures will all affect this part of the value chain.

TARGETS AND EXPECTED RESULTS

This first initiative will create a solid foundation for improving competitiveness and will produce measurable results. These include (1) primary and secondary quality standards for various grades of coir products, and protocols for their spot and lab measurement; (2) best practices for process sequencing and plant layout, and better processing equipment as a result of understanding how process conditions affect fiber quality; (3) consistent attainment of significantly reduced levels of dust, impurities, and moisture in baled and twisted fiber; (4) mills and exporters receiving a 15 to 20 percent price premium for high-quality baled and twisted fiber; and (5) a broad-based workforce development program. The timeline for this initiative is shown in Figure 5.

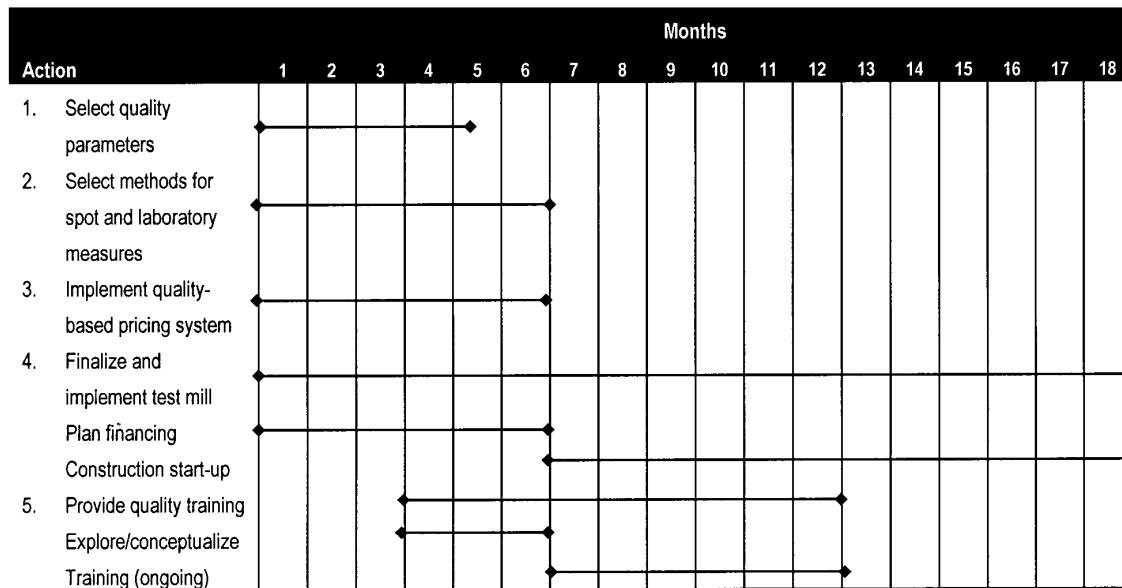


Figure 5. Timeline for Improving Product Quality and Productivity Strategic Initiative

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# Expanding Existing Markets and Exploring New Applications

**T**he range of coir applications suggests that the expectations of coir's foreign buyers and ultimate users cannot be generalized (see Figure 1). But innovation and competitiveness are based on a thorough understanding of (1) customer expectations and trends in specific markets; (2) the ability of a product to meet those expectations vis-à-vis competing products; (3) local, foreign, and international market mechanisms and distribution structures; and (4) emerging technologies. This initiative will explore existing and potential future markets for coir through two activities. The first will help members of each industry sector better understand its specific market and develop strategies for using that knowledge to become more competitive. The second will assess prospects and needs in selected markets, closely analyzing their conditions and potential.

## ACTIONS

### **Get Close to the Customer and Promote Innovation**

Sri Lanka's coir suppliers are not "close" to their customers. For instance, they do not understand the U.S. market's specification process for coir-based geotextiles, or how fiber buyers set up barriers to the sale of finished product. They do not have a comprehensive overview of markets for specialty brushes in body care applications, nor do they have a distribution structure for brooms and brushes in the European Union (EU) that meets the needs of domestic retailers and eliminates intermediaries. The lack of advanced technologies is preventing cost-effective production of rubberized coir products—such as "cocopots," horticultural growing containers—for export to the EU and North America. And without tracking systems they cannot respond to price fluctuations of various grades of peat, the main competitor for coir pith in the potting soil market.

Such obstacles to understanding are harmful across the industry, causing loss of contracts, price-only competition among industry members, losses in commissions paid to unproductive intermediaries, and loss of motive for innovation.

Coir suppliers need to develop a complete understanding of their customers' expectations, the mechanics of distribution in regional markets, and opportunities for eliminating unproductive or counterproductive intermediaries. Doing so will require sector-specific remedies. Leaders in some sectors have overcome these obstacles but are reluctant to share their experience with competitors.

Just as the first strategic initiative seeks to move suppliers closer to manufacturers and exporters, this initiative seeks to move the entire industry closer to importers and retailers. This initiative will help suppliers get close to their customers by

- Obtaining, evaluating, and communicating information on status and trends in specific markets;
- Conducting seminars and workshops for specific sectors to identify obstacles to competitiveness and profitability, quantify their tangible and intangible effects, and offer suggestions and motivation for joint or individual action; and
- Encouraging closer relationships with downstream importers and retailers so customer needs, preferences, and complaints are fully understood.
- Specific activities could include
- Expert consultancies for existing or emerging markets (e.g., erosion control products);
- Seminars and workshops on several industry sectors and on applications or regional markets for a wider range of products; and
- Hiring a representative or firm in key markets to track trends and preferences.

Industry sector workshops could cover how to avoid destructive competition and the benefits of continual innovation in product design and operational practices. Seminars focusing on innovation could encourage audiences to jointly identify opportunities for innovation in their sector and in operations and provide tools for implementation. Such seminars would involve reviewing a sector's trends and product innovations, and presenting strategies for encouraging innovation among workers and managers. Workshops on applications or regional markets could be moderated by market experts and feature presentations by foreign customers and industry members. Tracking trends and preferences may also require developing contacts and relationships with importers and retailers to acquire better customer information.

Some of these activities will require coordination with the quality training program. Most will require recruiting experts in specific markets, general trade issues, company

management, and leadership. It is suggested that the Sri Lanka Coir Center coordinate these activities. Once the center is operational, it will be best equipped to access instructional resources, obtain funding from domestic and international sources, and avoid duplication of training.

## **Assess Prospects and Needs in Selected Markets**

The coir industry identified seven applications to explore more in depth, according to current needs for intelligence or perceived potential, or both. These applications include erosion control (EC) products, rubberized coir composites, other advanced composites, insulation materials, fiber-reinforced cement tiles, binderless medium density fiber (MDF) board, and coir pith. The status of and prospects for these applications will be assessed; other applications may be explored in the future.

### ***Erosion Control Products***

Coir's properties make it highly suitable for use in woven, stitched-blanket, and stuffed EC products. But Sri Lanka supplies mostly raw fiber—not finished products—to the U.S. market. The United States is the largest market for EC products, so learning about its structures and issues in more detail is a good first step to understanding and approaching global markets. At present, the industry has only limited understanding of U.S. business structures and product certification and specification for public or private sector projects. The major buyers of raw fiber also manufacture final products and use their leverage to limit sales of products manufactured in Sri Lanka. To move up the value chain in the domestic and international EC market, the coir industry must

- Understand the business structure of the U.S. EC industry—its products, services, companies, and company relationships—as well markets and market trends for EC products from synthetic and natural fibers;
- Understand trends in regulations, government standards and certification systems, and engineering practices and criteria used to specify and select EC products;
- Identify market entry mechanisms, policy, and other barriers to entry, and their impact on the expansion of Sri Lanka coir in the U.S. market;
- Assess the performance of Sri Lanka coir-based EC products in the U.S. market and identify potential measures for improving product quality and service;
- Identify and evaluate opportunities for novel EC products that are technically competitive with synthetic-based materials but that cannot be manufactured competitively in the United States (i.e., woven materials);
- Assess the use of coir-based EC products in Sri Lanka; and
- Identify and assess prospects for developing domestic technical expertise in EC and providing this expertise to manufacturers and users of EC products abroad.



To address these issues, the industry would benefit from further study by an EC specialist. The specialist should be able to guide product improvement and marketing strategies, provide understanding of markets in the Far East and Europe, and address prospects for developing domestic engineering and implementation services and offering them to customers abroad. Developing such capabilities would require creating a framework for training engineers and technical support staff. Also important would be government willingness to give preference to coir-based EC products in public projects and incorporating training into the making of these products. The consultancy and subsequent activities will motivate Sri Lankan participants in the EC market to form a working group, possibly under the auspices of the Sri Lanka Coir Center, to address issues of common interest.

### ***Rubberized Coir Composites***

Some rubberized coir composites are superior to competing products—high-end car seat tops, mattresses, specialty packaging, and horticultural applications, such as biodegradable flowerpots (cocopots). But production technologies for these items require multiple steps, significant manual labor, high capital investment, and considerable amounts of space for equipment. (The exception is mattresses, which require relatively little processing.) Often these composites cannot compete with synthetic-based materials on the basis of price or other desirable characteristics. For example, cocopots are considerably more expensive and less convenient than plastic pots, restricting them to a small niche market driven by environmental concerns. And, despite their superior comfort, car seat covers from rubberized coir have lost most of their market to cheaper foam products.

To improve the competitiveness of rubberized coir-based seats, two European automotive suppliers are using a new one-step injection molding process. This process may be useful in other rubberized coir applications and may stimulate new applications. This technology and know-how could be transferred to Sri Lanka and used in production of other value-added products.

- Expanding the use of rubberized coir products and improving their profitability for Sri Lankan firms would involve
- Comparing rubberized coir products—existing, new, and conceivable—to competing polymer products;
- Evaluating the technical characteristics and cost structures of existing and new production technologies;
- Assessing the transfer of technology and know-how for the one-step injection process;
- Identifying technical issues to be researched; and
- Exploring cooperation with the Rubber Industry Cluster.

The cluster should obtain support from a composites expert to address technical issues related to the use of rubberized coir in existing and novel applications. The expert, if qualified, could also address issues related to coir-based composites other than rubberized coir.

### ***Other Advanced Composites***

Natural fibers are used in advanced composites with polymeric matrices for such products as automotive interior panels, made from bast fibers (flax, hemp, kenaf, jute) and polypropylene or epoxy, and wood flour-reinforced building materials. As with rubberized coir, inflexible and time-consuming production neutralizes any technical and cost advantages. But experts project considerable growth in advanced composites in Europe and North America.

Coir fiber differs markedly from bast fibers—in strength, elasticity, stiffness, and surface characteristics. These properties affect how coir fiber is handled in production techniques and the characteristics of the final composite product. Information on coir’s potential for use in advanced composites with polymeric, possibly bio-based, polymers is minimal. Assessing the technical suitability of coir as reinforcement fiber in various polymeric matrices would require

- Compiling the characteristics of coir fiber grades, relevant to their performance in composites with polymeric matrices;
- Reviewing the literature on coir composites research;
- Producing composite samples with polymer matrices and testing the tensile, bending, and impact strength and modulus of the samples according to protocols of the International Standards Organization (ISO) or the American Society for Testing and Materials (ASTM);
- Assessing the strengths and weaknesses of coir composites in relevant applications; and
- Evaluating surface treatments for improvement of these characteristics.
- Once technically competent combinations of coir fiber and polymeric matrices have been identified, their market potential in selected regions (Western Europe, North America) should be assessed. It is recommended that an expert in natural fiber-based composites evaluate the compiled information and provide perspective on global trends. This consultancy may be coordinated with the consultancy for rubberized coir composites.

### ***Insulation Materials***

Coir products have a small presence in the slowly growing market for “ecological” building products in Europe; and rubberized or needle-punched coir fiber is used to make non-woven material used in thermal and acoustic insulation. Coir’s resilience promises superior

mechanical performance and durability in case of unintentional exposure to moisture, and it competes favorably on price with other natural fibers. The coarseness of coir may reduce thermal insulation performance and require a much higher packing density, resulting in higher material cost. Most important, the viability of producing such products domestically depends on the economics of producing and transporting such bulky material to Europe and North America.

In assessing coir's opportunities in the market for insulation material, this activity will

- Manufacture sample insulation material from rubberized coir of various fiber grades and test insulation performance according to Deutsches Institut für Normung (DIN) and ASTM methods as a function of packing density and fiber fineness;
- Test flame retardant's ability to achieve target fire protection ratings on coir and compare the economics of applying retardant at various stages of production;
- Estimate costs of domestic production under various scenarios, evaluate compactibility of products, and estimate transportation cost to international ports, comparing to production costs abroad;
- Evaluate experience of European distributors of coir insulation materials and identify obstacles to their success; and
- Evaluate market potential in selected regional markets relative to dominant fiberglass and foam products.

Some research organizations and manufacturers have suggested that several of these technical research tasks have already been done and results may be made available to the cluster. It is recommended that these tasks be completed to establish a baseline before engaging a consultant knowledgeable of the insulation and building materials markets in Europe and North America. Coir-based insulation can be produced on existing equipment for rubberized coir. Doing so will simulate productivity and related costs under representative operational conditions. Should test production be satisfactory, demonstration of coir-based insulation in public construction projects should be supported, for example, through government specification.

### ***Fiber-reinforced Cement Tiles***

Asbestos-reinforced corrugated cement roof tiles are manufactured and used in Sri Lanka in significant quantities. Research at the University of Peradeniya has shown that coir fiber-reinforced tiles can be as strong as asbestos tiles. Natural fibers have also been tested and used as reinforcement in mineral building materials elsewhere. If technically and economically feasible, using thoroughly cleaned, short mattress fiber to reinforce cement products may be a profitable domestic application. But cellulose fibers may weaken prematurely, depending on fiber and cement characteristics and environmental conditions. Evaluating this application's potential would involve

- Reviewing the literature on natural fiber-reinforced cement products and their technical limitations;
- Producing test tiles under varying conditions relative to fiber dimensions, surface treatment, and cement characteristics, with a focus on the variability of its free lime content;
- Testing performance parameters under short-term and simulated long-term stress;
- Evaluating the cost differential between asbestos and coir; and
- Researching the size, production, and distribution structure of the domestic market for fiber-reinforced cement tiles.

If this preliminary research is encouraging, the interest of major domestic manufacturers in further investigating and pursuing the application should be explored. Small-scale production trials with an interested domestic manufacturer should be conducted. Government support during this phase may involve specifying coir-reinforced tiles for some public construction projects and financial support of the manufacturer to compensate for the cost of small production runs.

### ***Binderless Medium Density Fiber Board***

Domestic users of medium density fiber (MDF) board for indoor construction rely on imports. Foreign investors have proposed a large-scale domestic MDF plant, but the plant could consume a great deal of rubber wood, which lower income Sri Lankans use for cooking and fuel. Or coconut husks could be used in MDF board production. The Dutch Agrotechnical Research Institute (ATO) and groups in the Philippines conducted an R&D project and developed a binderless MDF board from whole husks. The fiber and pith do not require separation and the husk's high lignin content allows for board pressing without polymeric binders. The quality of the board may match or exceed that of conventional wood-based MDF. Evaluating this technology's potential for use in Sri Lanka will require

- Attending a mid-term seminar on technology status at ATO at the end of February, or inviting a principal researcher to the coir convention in Colombo in 2002;
- Evaluating the economic competitiveness of a full-scale plant with a wood-supplied MDF plant, as a function of plant throughput and press cycle times, and evaluating the availability of husks near potential plants;
- Assessing the MDF market in Sri Lanka and its potential for growth.

If this preliminary evaluation indicates that the technology could be competitive in Sri Lanka, the construction of a pilot plant, possibly with government purchase of part of its production for use in public construction, should be considered.

### **Coir Pith**

Nearly 30 percent of Sri Lanka's coir export revenues are generated by coir pith exported as a growing substrate for commercial and domestic horticulture (see Figure 3). Exporters sometimes blend pith with cut mattress fiber to improve substrate porosity. Coir pith and these pith-fiber blends appear competitive technically with the commonly used grades of peat moss. Unlike peat, pith is a renewable rather than a limited resource. In Europe especially, this is a competitive advantage over peat, at least in the home gardening sector. In recent years, however, significant markets for coir pith have been lost in Europe because of the inconsistent quality of products supplied by Sri Lankan firms, the financial risk posed by crop failure, and the low cost of peat from Russia, the Baltic republics, and Canada.

The competitiveness and profitability of coir pith will improve considerably if pith achieves consistent quality, offers technical and handling benefits over peat (i.e., when offered as a complete, fertilized substrate), or exploits peat's cyclical pricing, which can be relatively high.

Several domestic and European firms have developed new pith handling and treatment processes. Their performance is not yet known, but a planned approach to product quality and global marketing is the only viable long-term option for sustaining sales. One European firm has suggested that pith's reputation would improve if an internationally recognized entity were established in Sri Lanka to test quality parameters. Also, using pith for domestic high-end horticulture would open opportunities for close-distance research, domestic expertise in the use of pith, and revenues from the sale of material not suitable for export. Achieving these goals will require developing testing capabilities for quality parameters and facilitating field-scale research and demonstration through preferential purchase of coir pith substrate for large public landscaping projects.

### **ADDING VALUE IN THE BUSINESS PROCESS**

As shown in Figure 6, this strategic initiative will directly affect Sri Lanka's competitiveness by adding value in the later stages of the business process for companies in the coir industry.

- **Distribution.** Sri Lanka's coir suppliers and end consumers do not communicate. This initiative will help bridge the gap in knowledge that develops between the time that the product leaves the manufacturer/exporter and the time that the end user takes possession.
- **Sales & marketing.** This initiative will improve Sri Lankan sales and marketing and the acquisition of market intelligence.
- **Customer service.** This initiative will help industry better understand what customers want, how to deliver it, how to develop better information on end customers, and how to start better serving customers after the sale.



**Figure 6. Value of Expanding Existing Markets and Exploring New Applications in the Business Process**

- **Administrative and management functions.** This initiative should refocus top management in producer companies and academic institutes on markets and trends rather than day-to-day operations.

## TARGETS AND EXPECTED RESULTS

This initiative to expand markets and explore applications will be crucial to sustaining and developing markets for coir products. It is expected to result in

- A determination of coir's suitability to target markets where other natural fibers have already made headway, particularly properties of coir that may provide a competitive advantage over these fibers and synthetics;
- Applied research that identifies suitable products and markets for competitive higher value-added applications;
- More domestic use of coir-based products leading to more total fiber consumption, and thus higher revenues;
- An applied research culture and knowledge base in coir leading to local university curricula in fiber;
- Cooperative research with at least two institutes outside Sri Lanka; and
- Effective distribution channels identified and used to increase sales and capture end-user information.

The industry should strive to identify at least seven new products and test them for commercial viability and launch at least one new product commercially in the next three years.

The timeline for this initiative is shown in Figure 7.

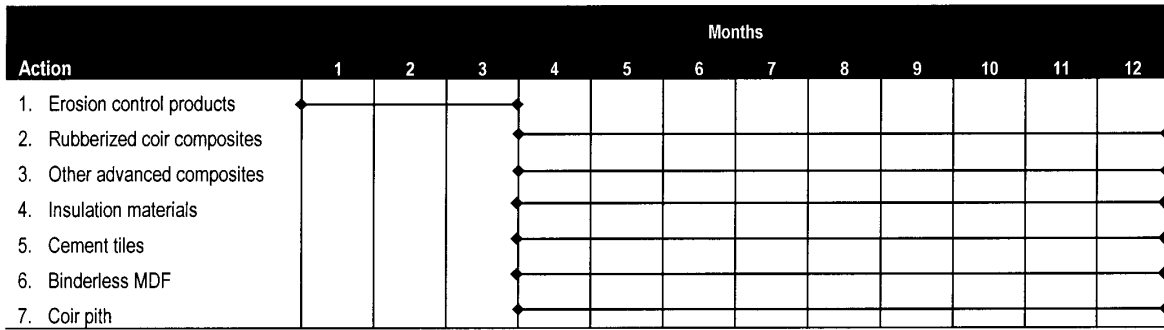


Figure 7. Timeline for Expanding Existing Markets and Exploring New Applications

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# Creating the Sri Lanka Coir Center

**T**he activities of the first two strategic initiatives must be administered and executed by a permanent, staffed organization. Voluntary organizations, such as the Coir Cluster, cannot be expected to undertake such extensive and complex work; government organizations, such as the Coconut Development Authority (CDA), does not primarily focus on coir; and industry trade organizations, such as the Sri Lanka Coir and Allied Products Manufacturers Association (SLCMA), do not have a mandate to represent the entire industry. The cluster's experience with the successful India Coir Board supported the impetus for an industry-wide organization dedicated to advancement of the industry. Such an organization—a Sri Lanka Coir Center—will be the voice, eyes, and ears of the entire industry. Its mission will be to support the Sri Lankan coir industry and its members in improving competitiveness and achieving long-term viability through research-supported innovation, continual workforce education, better market intelligence, and effective political representation.

## COIR CENTER RESPONSIBILITIES, STRUCTURE, AND FUNDING

Discussions with industry representatives and discussions at the November 23, 2001, strategy workshop clarified responsibilities proposed for the center. The center will

- Provide the industry with intelligence on markets and opportunities in product and technology development;
- Lobby for a better domestic and global policy environment;
- Identify funding sources for selected industry projects in R&D, market intelligence, and market development;



- Monitor the progress of strategic initiatives;
- Coordinate R&D with a “coir research consortium” and ensure dissemination of results;
- Publicize activities, findings, calls for action, and educational events, considering the accessibility of print and electronic media;
- Organize public events, such as conferences, trade shows, hearings, and delegations;
- Coordinate and collaborate on quality training and other training for industry staff and management;
- Support small entrepreneurs’ business planning and management;
- Coordinate social responsibility programs that serve the industry workforce, particularly in small commercial and cottage-type operations;
- Be a point of contact for foreign visitors from business and academia;
- Create and maintain contacts in international business and research; and
- Create visibility for Sri Lankan coir and its applications, at home and abroad.

The center’s structure was discussed during cluster meetings and the November 23 workshop. It was agreed that the center must primarily understand and respond to industry needs. It must be able to act quickly and collaborate with businesses and research entities abroad. Consequently, cluster members agreed that the center should be a private sector nonprofit entity that could eventually develop for-profit subsidiaries and offer some services and products. It should have an executive staff of between three and six committed dynamic individuals, compensated at private-sector rates. The center’s governing board should represent industry, government, and research, with size and make-up details to be decided. In the interim, industry committees, which may emerge from current cluster activities, can provide guidance on short-term activities. Guidance on research projects should be provided by a “coir research consortium,” which would include representatives from industry, government, and domestic and possibly foreign research organizations.

Initial, partial funding for the center should be sought from the cess fund, which collects duties from Sri Lankan exporters, including approximately \$200,000 from coir exports. Several of the larger exporters have suggested that an additional duty of \$2 per metric ton of exported fiber be collected and used to fund the center. This may require approval by parliament, making scheduling unpredictable. Major industry members have agreed on the imposition of this duty and some have offered to provide additional funding to bridge gaps. For specific projects, center staff will solicit funds from domestic and international governmental and non-governmental organizations.

## CENTER MODEL AND RISKS

The structure proposed for the center is modeled on Cotton, Inc.—a U.S. cotton industry association which has, since the 1970s, been largely responsible for cotton’s resurgence in textile and technical applications. Initially, it established a grading and quality control system for domestic cotton. Other activities include marketing and image creation. Much of the necessary research on cotton applications was conducted, at industry’s request, by the U.S. Department of Agriculture’s (USDA) research institutions. A private organization, with representatives from industry, government, and research on its board, the association is funded by the entire industry through a duty collected from the sale of each bale of cotton.

The experience of this association has shown that joint industry action and private–public cooperation on R&D can be very successful. At the same time, the experience of other natural fiber trade associations has shown that a private sector structure alone does not guarantee performance. Such organizations can fail through lack of direction, mismanagement, or unresolved internal conflicts between industry sectors. But these risks can be minimized through an effective structure of governance and performance review by industry.

Center formation and operation hinges on some policy issues. These are (1) government recognition of independent representation of the coir industry, (2) permission to administer government-collected funds autonomously, and (3) financial support for the center’s vocational training and socially responsible activities for the industry’s workforce.

## ADDING VALUE IN THE BUSINESS PROCESS

This strategic initiative should affect every aspect of the business process value chain (see Figure 8). The Coir Center will guide execution of other industry initiatives, maintain a comprehensive view of the industry and its global and local context, and influence attitudes about coir in the industry and the government.



**Figure 8. Value of the Sri Lanka Coir Center in the Business Process**

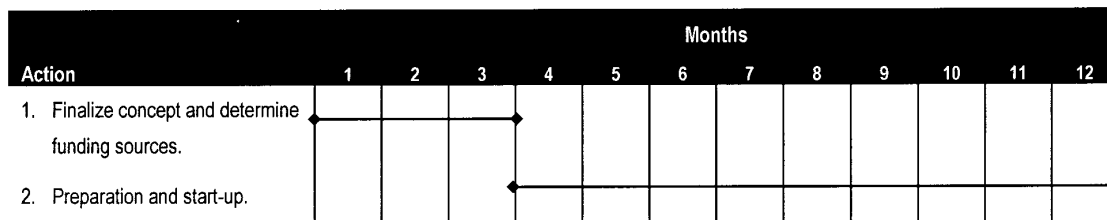
## TARGETS AND EXPECTED RESULTS

This initiative is expected to focus and give visibility to the coir industry by providing

- A single entity with a mandate from the entire industry (including lobbying capabilities);
- A vehicle for coordinating research and capturing market intelligence on industry-related matters;
- A forum for public–private dialogue on coir issues driven by the private sector; and
- A self-sustaining organization to continue the mandate of the Coir Cluster.

The resulting organization will assume responsibility for strategic actions, increasing cooperation among industry players, and focusing on long-term strategic issues and continuous upgrading for higher value.

The timeline for this initiative is shown in Figure 9.



**Figure 9. Timeline for Creating the Sri Lanka Coir Center**

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# Other Issues and Activities

**T**he effectiveness of the strategic initiatives in general, and many of their specific activities, will be influenced by industry motivation; effective research and development; industry's responsibility for social aspects of the workforce; and government policies. In addition, the Coir Convention scheduled for 2002 and cooperation and collaboration across industry clusters will help build momentum.

## INDUSTRY MOTIVATION

A successful strategy requires industry recognition of needs, motivation to collaborate in addressing those needs, and willingness to commit resources. Industry members who contributed to the development of this strategy meet these requirements. For example, they commissioned three domestic research organizations (ITI, Coconut Research Institute, University of Peradeniya) to conduct research establishing the characteristics of coir fiber and its variations, then shared research results with the entire industry in presentations and on the Internet. Industry members also used their own resources to innovate and develop new markets—the coir industry does not receive the public funding that the coconut industry does. Unsurprisingly, not all members of the industry are willing to risk innovation or explore new markets, but collaboration through cluster activities has stimulated interest in innovation and competitiveness among fiber mills and smaller exporters of coir goods. Cluster collaboration has also created a forum for resolving the fundamental conflict between fiber millers and manufacturers and exporters on the price and quality of raw material.

Through cluster activities the coir industry has demonstrated its motivation to pursue jointly developed strategic initiatives. But some tasks will require outside expertise and

support. These include mediation during negotiations between millers and exporters on a quality-based pricing system and consultancies for some technical and market research. TCI, wherever possible, will help the cluster in providing technical assistance for these consultancies.

## RESEARCH AND DEVELOPMENT

To be effective, R&D must be guided by clearly defined industry needs and markets, and the work of multiple research organizations must be coordinated. Lack of focus and poor coordination have made some applied research on natural fibers in Europe and North America meaningless, wasting opportunities and resources, including public funding. Consequently, skeptics question the value of institutional research conducted outside of industry.

### Roadmap

The strategic initiatives rely heavily on R&D, so pitfalls must be and can be addressed from the start. The industry strategist, therefore, is developing a comprehensive R&D roadmap that

- Identifies and prioritizes industry-wide R&D needs;
- Addresses formation of a “coir research consortium,” establishment of domestic capabilities in technical and market research, and creation of links with research groups abroad; and
- Identifies funding sources for proposed and potential future research.

### Linkages

The physical isolation of Sri Lanka's coir industry and the dearth of domestic coir research outside of industry make linkages between domestic groups and foreign research organizations with expertise in the technical uses of natural fibers all the more important.

During 2001, the cluster laid the foundation for such linkages by contacting foreign organizations and going on a study tour of India. The cluster contacted and discussed collaboration with the Department of Aerospace Engineering, University of Michigan; the United States Department of Agriculture (USDA) Forest Products Lab in Madison, Wisconsin; several applied research operations affiliated with the India Coir Board; the Dutch agricultural research conglomerate ATO-DLO; and the FIBRE fiber research institute in Bremen, Germany. Discussions about R&D collaboration on the product level with fiber manufacturers and distributors in consumer countries were also encouraging. Some of these contacts will likely develop into working relationships.

The study tour to India in October 2001 provided insight into coir research programs and helped lay the foundation for collaboration between Indian and Sri Lankan institutes. The tour showed that while India has done extensive research on coir, little of it was done for or from the perspective of commercially viable ventures. Consequently, few projects have been commercialized. Nonetheless, several of the technologies and research projects could be transferred to Sri Lanka and developed into new applications. Cluster members also attended the coir fair and conference in Cochin organized by the India Coir Board. The conference covered marketing, soil bioengineering applications, horticultural applications, and research projects. The tour demonstrated the value of networking and collaborating with foreign R&D institutions for a realistic assessment of the progress and relevance of research.

### **Operations, Workforce, and Product Life Cycles**

Applied R&D can solve operational problems and provide a rational basis for changes and strategies that will improve the performance of the entire workforce. And disseminating R&D results—at the proper levels and in lay language—may empower and motivate the workforce. Applied R&D on coir will also influence workplace health and safety conditions. For example, R&D is required to eliminate acute health hazards and reduce dust levels at coir mills and factories. Finally, more research will be needed to evaluate quantitatively the potential environmental “life cycle benefits” of coir products versus conventional products. Such life cycle assessments quantify the environmental impact of all processes in the value chain. Many manufacturers and distributors of commercial products in Western countries use such assessments to improve a product’s environmental efficiency and to demonstrate environmental commitment to their customers.

### **SOCIAL RESPONSIBILITY**

The growing shift of value-added processes to small commercial, often home-based operations presents opportunities and challenges to the coir industry, which is committed to meeting the basic social needs of its workforce. Such operations employ villagers, particularly women with children, and often contribute significantly to household income. But these operations are not able to meet the educational and social needs of their workforce—such as childcare, meals, and sometimes shelter. Foreign non-governmental organizations and domestic groups, such as the Siyath Foundation, have provided some support to Sri Lanka’s cottage industries. If properly managed, for instance, spinning, weaving, and matting operations in Galle could offer an attractive working environment and other social benefits to employees in cottage industries.

The Sri Lanka Coir Center should work with domestic and foreign organizations when developing and implementing a social responsibility program, thus benefiting from their

experience and relationships with entrepreneurs and the workforce. Initial activities could include establishing social support projects in the Kurunegala area to accompany the planned shift of production to cottage operations. Responsibility for the program should rest with a center staff member who would coordinate projects, solicit project funding, and coordinate with the existing international network that supports small-scale industries and advocates the use of appropriate technology.

## POLICY ISSUES AND RECOMMENDATIONS

Pursuing the coir industry strategy will provide economic and social benefits to the entire country and should be encouraged by changes in government policies. The recent change in central government provides an opportunity for industry to advocate for changes. Coir industry members are recommending policy changes to improve fund transfers; alleviate freight charge difficulties; refund import duties on some raw material; improve port management; give regulated preference to purchase of coir products for public projects; and provide incentive for industry assuming R&D risk and cost.

- **Fund transfer.** Industry believes that funding the Sri Lanka Coir Center through the existing export duty or an additional duty is equitable and efficient. Most strategic initiatives will rely on these funds, so industry must give the highest priority to ensuring that the government transfer collected funds to the center quickly and smoothly. The center will account for the proper use of funds.
- **Freight charges.** Freight lines impose a terminal handling charge of US \$184 per 40-foot container. Exporters claim that these charges are about \$60 too high and are sustained by pricing agreements between the freight lines. Apparently, the Sri Lanka Fair Trading Commission has supported this view but has not enforced its ruling. It is desirable that government agencies in charge of ensuring free trade have the independence and means to enforce their decisions. Also, exporters have requested that exchange control authorities permit freight charges to be paid in U.S. dollars instead of rupees. This would eliminate the negative effects of fluctuations in the rupee-dollar parity. Authorities have received this proposal favorably but have not acted on it.
- **Port management.** The low productivity and slow turnover of the Port of Colombo threaten to eliminate an important cost advantage of the Sri Lankan coir industry. Industry members blame this and other inefficiencies of the domestic infrastructure on a lack of technocratic management. Appointing competent and respected members of the trade as chairs of relevant agencies—as recently occurred at the port authority—will vastly improve efficiency in the respective sectors.
- **Purchasing preference.** Governments in Western countries routinely support introduction or expansion of novel environmentally desirable or locally manufactured items into domestic markets. For example, through the second strategic initiative, the Sri Lankan government may help introduce some coir products—coir-based composites,

insulation, building materials, coir pith—into domestic markets through a preferential purchasing policy. To avoid misappropriation of public funds, coir products will have to meet specified economic and technical criteria.

- **Fiscal incentives and grants.** To pursue its strategy, the coir industry will need to take on greater responsibility for R&D, vocational training, and social support of its workforce. These activities will contribute to development of the domestic workforce in general, so the government should encourage them through fiscal incentives or grants.

In addition to these industry-specific concerns, industry members have commented that protection of intellectual property rights in Sri Lanka is weak or not enforced. This discourages technical innovation.

## COIR CONVENTION

The success of any strategic initiative relies on cooperation in an industry and with domestic and foreign experts. To stimulate exchange and cooperation, the coir industry, led by the Coir Cluster, will sponsor an international convention in Colombo in 2002. Partial funding has already been approved by the CFC with support from the Food and Agriculture Organization (FAO). International experts on technology and natural fiber markets will make presentations and participate on panel discussions at the convention. The convention will encourage relationships among various sectors of the industry, build consensus on issues affecting the industry globally, encourage and inspire innovation in operations and products through discussion of technical and market developments, give Sri Lankans a forum for meeting otherwise inaccessible individuals, and identify opportunities for joint business or R&D projects between Sri Lankans and foreign industry members.

## CLUSTER COOPERATION

Cooperation across industry clusters in The Competitiveness Initiative (TCI) will help resolve general problems and create opportunities. For example, all industry clusters are harmed by expensive and unreliable electricity. The range of industries represented in TCI can give much weight to joint lobbying for creation of a framework more conducive to independent power projects. In addition, the coir industry is considering new markets that will involve rubberized coir. Discussions with the Cluster Coordinator and strategic consultant for TCI's Rubber Cluster about mutually beneficial collaboration have been encouraging. When the strategies for the coir and rubber industry are complete, the potential for a joint agenda will be discussed.





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# Glossary

<b>ASTM</b>	American Society for Testing and Materials
<b>ATO</b>	Agrotechnical Research Institute (Dutch)
<b>CDA</b>	Coconut Development Authority
<b>CFC</b>	Common Fund for Commodities
<b>DIN</b>	Deutsches Institut für Normung
<b>EC</b>	erosion control
<b>EU</b>	European Union
<b>FAO</b>	Food and Agriculture Organization (United Nations)
<b>GDP</b>	gross domestic product
<b>GTZ</b>	Deutsche Gesellschaft für Technische Zusammenarbeit
<b>ISB</b>	Industrial Service Bureau
<b>ISO</b>	International Standards Organization
<b>ITI</b>	Industrial Technology Institute
<b>MDF</b>	medium density fiber
<b>MT</b>	metric ton
<b>omat</b>	oversized mattress
<b>R&amp;D</b>	research and development
<b>Rs</b>	Rupees
<b>SGS</b>	Société Générale de Surveillance
<b>SLCMA</b>	Sri Lanka Coir and Allied Products Manufacturers Association
<b>SLSI</b>	Sri Lanka Standards Institute
<b>TCI</b>	The Competitiveness Initiative
<b>USAID</b>	U. S. Agency for International Development
<b>USDA</b>	U.S. Department of Agriculture

