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## Going Organic

### Converting Patagonia's Cotton Product Line

Yvon Chouinard  
Michael S. Brown  
Patagonia, Inc.  
Ventura, California, USA

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#### Summary

The integration of industrial ecology principles into a business may mean significant changes in its customary activities. In this article, we present a case study of a decision by Patagonia, a manufacturer and distributor of clothing and gear for outdoor sports, to use only organically grown cotton for our cotton products as of spring 1996. We describe the history of our efforts to reduce our environmental impacts, the relationship between understanding the life-cycle impacts of garments in general and cotton in particular on our decision, and the changes required throughout the company to implement the decision. Although initial sales of the organic cotton products have met or exceeded expectations, most customers continue to buy our products for traditional reasons: quality, fit, styling, and brand. We struggle to change consumer perceptions about the environmental significance of their purchases and influence major apparel manufacturers to make a similar switch. Our experience suggests, first, that consumers and industry need to understand the principles of industrial ecology and, second, that environmental improvements must be integrated into all aspects of operations (e.g., marketing). An unexpected benefit of the decision was an increase in our knowledge about the garment life cycle, which in turn improves our ability to develop new fabrics when off-the-shelf products do not meet our needs. Much remains to be done, however, to reduce impacts associated with other aspects of our products and corporate activities.

Address correspondence to:  
Michael Brown  
Patagonia, Inc.  
259 West Santa Clara Street  
Ventura, CA 93001  
USA  
MIKE\_BROWN@mailgate.patagonia.com

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quality problems, particularly with shrinkage, could not be controlled. Additional products were designed and released in subsequent seasons; sales slowly increased as design problems were resolved.

### Deciding to Go Organic

A significant outcome of the fiber LCA was the 1992 decision to establish an assessment process that would consolidate Patagonia's efforts to reduce its environmental impacts. We committed ourselves to establishing a set of environmental operating principles, researching the life-cycle impacts of our products and corporate activities, and educating our staff about the process of integrating quality and environmental performance.

### Incorporating Industrial Ecology

We directed our initial efforts at identifying environmental principles that would guide staff in their daily work. We were interested not only in reducing our impacts—pollution prevention was a given—but also in keeping a focus on creating an economy that might someday allow us to restore the ecological health of the world. What seemed to make the most sense to us was the newly emerging philosophy of industrial ecology, especially as embodied in the work of Hardin Tibbs (Tibbs 1992). His background as an industrial designer and his efforts to marry industrial technology with ecological "laws" resonated with our own philosophy. Combining Tibbs's insights with Fritjof Capra's work on systems thinking (Spretnack and Capra 1988) and Ernest Callenbach's vision of what an ecologically sound world might look like (Callenbach 1990), we adopted a set of environmental prin-

- Maximize system efficiency
- Close the loop
- Protect worker and public health
- Use renewables judiciously
- Conserve nonrenewables
- Educate ourselves and our customers

Figure 1 Patagonia Environmental Principles

ciples in the summer of 1993 to serve as a guide in our daily worklife (see figure 1).

A key part of the assessment process was educating our staff on the principles, and how they might be integrated into people's jobs, and on what we knew about our environmental impacts. The assessment process encouraged further internal debate on what we should do to reduce Patagonia's impacts and how we might integrate the concepts of industrial ecology into our business decisions. Education on developing closed loops, efficient production, and design to minimize environmental impacts resulted in our introducing recycled fiber for polyester fleece in outdoor products, establishing a fleece scrap recycling program, paying greater attention to minimizing waste in markers (cutting patterns), and reducing the use of formaldehyde resins for wrinkle resistance. It also prompted more questions about our products and how they might affect the environment.

### Educating Ourselves about Cotton Growing

Cotton was an early focus of our concern about the environment. We knew little more than what our consultants had told us, however. Like many in the apparel industry, we had no interaction with the providers of the raw materials from which our suppliers built fabrics and ancillary items (zippers, buttons, snaps, etc.) to our specifications. In response to customer questions, we could not identify where the cotton that went into our products was grown. Our true education in cotton began in 1992 when Will Allen, a farmer and organic agriculture activist, took representatives from Patagonia and several other apparel companies on a tour of cotton farms in California's San Joaquin Valley, also known as the Central Valley. Running down the middle of the state, the valley is an enormous piece of rich soil that was formerly a series of deltas and low-lying lake beds interconnected by seasonal streams fed from snowmelt from the Sierra Nevada. Drained and channeled with irrigation water provided by the U.S. Bureau of Reclamation, the valley was transformed into the most productive agricultural land in California and became the leading source of high-quality cotton for the

United States and the world. Each of the valley's one million plus acres (404,700 hectares) that is planted in cotton regularly produces between two and two and a half bales (one bale is approximately 480 pounds or 220 kilograms) annually. Nearly all of it is farmed as a monocrop with synthetic pesticides and fertilizers.

On our tour, Allen showed us soil that had been robbed of its natural fertility and was useful only as a mechanical system for holding the plants in place while synthetic nutrients were delivered to the crop and pesticides were used to keep insects at bay. Aerial delivery of pesticides to large fields had resulted in overspray onto surrounding roads and communities. Runoff into irrigation ditches and leaching through soil had contaminated groundwater. Allen pointed out that because the Central Valley does not drain to the sea or another large water body, farm chemicals were collected in large evaporation ponds that drew wildlife such as migratory birds that no longer had natural lakes on their flyway for stopovers. Without a regular frost, defoliant, essentially specialized herbicides, were used to facilitate mechanical picking of cotton bolls without leaf contamination. Each year, 12 to 13 million pounds of pesticides (defoliant, fungicides, herbicides, and insecticides) are dumped on California's cotton crops (CalEPA 1995), along with many more pounds of fertilizer, which results in additional nitrate contamination of groundwater. United States' federal water subsidies allowed some farmers (primarily the largest with annual crops of up to 100,000 plus acres, or 40,400 hectares) to use flood irrigation; they would put about seven feet of water on each acre of cotton (Allen 1994). Farmers without subsidized water would use sprinklers to cover their crops to the depth of three to four feet per acre. Perhaps the most sobering sight on the tour was at the gin, where a mountain of cottonseed, separated from the lint that would be baled and sold for spinning into fabric yarns, awaited shipment for cottonseed oil production destined to end up in processed food products or as food for beef cattle in nearby feedlots. Allen argued strenuously that not only were conventional cotton-growing practices unsustainable, but that we were robbing our children of the land's productivity and poisoning ourselves in the process (Allen 1990a, 1990b).

Allen had set up the tour thinking that if he could show the contrast between the conventional cotton growers and the organic growers, the apparel companies might begin using certified organic cotton and more farmers would be enticed by the market opportunities to grow organically. The organic fields on the tours were markedly different. Irrigation ditch banks that were bare dirt on conventional farms were green on the organic ones. In contrast to farms with only cotton monocrops, the organic farms typically had trap crops of plants, designed to lure potential pests and the beneficial bugs that kept them in check away from the economically valuable cotton rows, and cover crops that kept weeds down during early growth periods. The tours were immensely successful because attendees could see firsthand the impact of synthetic pesticides and fertilizers on the land, ecosystems, and indirectly, the implications for people's health.

### ***The Internal Debate***

The information gained on the tour prompted greater efforts by us and by other companies on the tour to begin developing new products. Quickly, however, we realized that few of the cotton fabrics that we used were available in organic versions: maintaining our product line would require developing new fabrics using organic cotton fiber. We were locked in debate about how to proceed: should we slowly convert our cotton products as more organic cotton fabrics became available or should we set a date for dropping all conventionally grown cotton and embark on a crash development program? The first alternative seemed to offer the fewest business risks and the greatest likelihood of long-term success. Eliminating conventional products completely, however, might take five years or more while we waited for mills to undertake development projects, which suggested to us that converting everything at once would result in greater environmental improvement at a significantly high business risk. Given that prices for organic cotton ran 50% to 100% higher than commodity cotton, consumer prices would most likely go up. If our customers balked, we would have nothing to fall back on.

One question that was raised during this period was whether cotton farming was the right

place in the cotton life cycle to put company resources: would company resources that were spent to reduce impacts at other points in the life cycle result in greater environmental improvements? In taking another look at the original consultant's study, as well as additional secondary data about several aspects of the cotton garment life cycle (Van Winkle et al. 1978; Pimentel 1993), we found that the most significant stage was home laundry, followed by farming, then dyeing and finishing. Because we believed that we could generate only marginal reductions in laundering impacts, we concluded that, within our control, addressing farm-related cotton impacts would be our most efficacious course.

The other companies on the tour also began small programs in organic cotton. We were encouraged by their efforts until we heard that sales, much like our initial efforts, were not doing well, most likely because of their customers' price sensitivity and the lack of fashion currency in the designs. These results strengthened arguments that an evolutionary approach would likely result in greater long-term benefits. Still unable to make a decision, we invited Allen to give a talk on cotton at our spring 1994 sales meeting, where he used slides to show what the tour participants had seen.

Allens's presentation shocked the audience. His vivid descriptions, combined with stark pictures, conveyed a harsher reality than any of us (except for the two Patagonia staff that had participated in the tour) had imagined. A collective sense of "we really didn't know how bad it was" led to a desire for immediate action. A serious analysis of the implications of totally eliminating cotton grown with synthetic chemicals began shortly thereafter. The findings suggested that the business risks might not be as great as we had assumed. First, we found that the percentage of our sales that involved cotton was fairly small. Even if we lost every single sales dollar attributable to cotton-content products, our overall financial health would not be destroyed. Second, although a small number of our products could use available fabrics, there was some optimism that existing relationships with mills could lead to the development of new fabrics for a majority of our products. Third, total elimination created an opportunity to tell a single story to the con-

sumer and not confuse them by offering both conventional and organic products in our line. Finally, a commitment to providing customers with products of the same high quality and range of colors as was currently available would avoid conflicts with consumer perceptions that organic products did not provide sufficient value.

Patagonia's shareholders became convinced that knowledge of the destructiveness of conventional cotton farming practices brought with it the responsibility to act. In the summer of 1994, armed with information about how we could respond in a strategic fashion, they brought to the rest of the board of directors a proposal to eliminate the use of all conventionally grown cotton by spring 1996. The staff had 18 months to implement the board's recommendation, which had been adopted by unanimous decision.

In effect, the new direction reinforced for us the power of our environmental principles. Obviously, the decision increased our ability to use renewable resources more judiciously. To an extent, nonrenewable resources are conserved as synthetic pesticides and fertilizers are eliminated. Toxics that threaten farmworkers and farm communities are eliminated or reduced to small amounts.<sup>2</sup> With its heavy reliance on composting farm-generated wastes to provide nutrients and build soil fertility, organic farming contributes to building a "closed loop" material cycle. The decision also provided the opportunity to increase the efficiency of our production processes by consolidating the number of fabrics and suppliers that we would use. Overall the decision was our chance to "walk our talk."

### Implementing the Board's Decision

Staff reaction to the decision was a mixture of enthusiastic approval for taking a stand and skepticism that we could succeed in converting the entire line in just 18 months, particularly when the usual lead time for a season was 19 months (with most products as simple carryovers). Concerns were refined into two critical issues: how to develop quickly a series of new organic cotton fabrics that met existing quality standards and what the effects of higher production costs were likely to be.

### **New Product Development**

The decision prompted new approaches to fabric and product development, but this was complicated by the fact that the supply chain is quite complex. Buyers of finished fabrics typically deal either with fabric manufacturers that are vertically integrated or with converters that coordinate the production of fabrics to specification. The supply chain for a dyed and finished cotton fabric would start with the grower who delivers picked cotton to the gin (where the cotton receives its initial cleaning and the seed is separated from the fiber). Ginned cotton is baled and may be stored before sale to a yarn spinner (sometimes through a broker). The spinner creates yarns for knitters or weavers. After the fabric is knitted or woven, it is called greige (pronounced "grey") goods. The greige goods are then dyed (or printed) and finished (which gives it special characteristics such as wrinkle resistance, water resistance, and shrinkage resistance). The fabric is then ready to be cut and sewn. After cutting and sewing, additional processes may occur such as garment washing.

Inquiries with existing fabric vendors resulted in a number of refusals to undertake development of organic cotton replacements. Typically, they resisted producing the small quantities we wanted and cited a lack of supplier alternatives: dyeing mills did not know producers of raw fabrics (the greige goods) made with organic cotton; knitters and weavers did not know where to get organic yarns; yarn spinners did not have sources for organic cotton. They also voiced skepticism about the market potential. Where previously we were able to buy finished fabrics built to our specifications, we found ourselves creating linkages among the entire supplier chain. Staff identified cotton brokers with access to grades of cotton appropriate to the quality needed for the finished goods and put them in touch with spinners willing to work with organic cotton to develop the yarns for knitting and weaving mills. In some cases, new relationships between spinners and greige fabric manufacturers needed to be established. All of this took time and resources. Even though we did not pay for development directly, fabric prices reflected the increased costs. From approximately 90

styles that had partial or complete cotton content, we expected to deliver fabrics for over 60 styles in 100% organically grown cotton.

We made several decisions that eased the product development task. Early on we decided to use "transitional" as well as certified organic cotton. Transitional cotton is grown using organic practices, but the fields have not been certified to be free of synthetic chemicals for the required period of time. Will Allen convinced us that it was important to support farmers who took the risk of converting their production but were waiting for certification. In addition, we decided that we would not sell organic clothing, but rather clothing made with organically grown cotton. Although organic cotton is separated from conventional cotton from the field through the spinning mill, we decided to continue using synthetic dyeing technologies and conventional cotton or poly/cotton thread (pockets and interfacing were all converted). Natural dyes did not meet our quality standards, and they had potentially significant environmental problems of their own<sup>3</sup>; thread is a mass-produced commodity that required significant minimum quantities to begin development of new products. Although we had been working to eliminate formaldehyde resins (a toxic compound used to minimize shrinkage and wrinkles in cotton garments), we decided that two styles using woven fabrics would use the resin to continue to minimize wrinkles. By mid-1995, the fabric and product development team gained a measure of confidence that they would be able to deliver Patagonia quality on time. Concurrently, the marketing staff began putting together its approach to selling the products.

### **Marketing Organic Cotton**

Our marketing team developed three goals: sell the organic spring 1996 cotton line successfully to the retail consumer, influence the apparel industry to increase their use of organic cotton over the next two to three years, and precipitate growth in organic cotton farming. Highest priority was given to the first goal, because without a track record, the others were not likely to be achieved. How we would accomplish this goal became a polarized debate.

In our initial thinking, we believed that the most effective marketing approach would parallel our efforts to raise awareness and action on other environmental issues. On a number of issues, such as threats to Yosemite National Park, salmon habitats, and old growth forests, we had sought to pique public interest in protecting these resources through stories and pictures in our catalog and strategically placed advertising designed to generate media coverage. Using the same techniques, we thought we should craft a campaign detailing all the negative impacts associated with conventional cotton farming. Our art department prepared mock-ups of advertisements showing farmers in gas masks while fields were being sprayed with captions connoting the dangers of pesticides. These were hard-hitting messages that had little to do with the virtues of Patagonia clothes.

On the other side of the debate was a group who suggested doing market research that would evaluate customer demographics and motivations before we chose a marketing strategy. Although we had a fairly good idea of who our customers were, we had little that would tell us how they might respond to organic cotton and whether customers differed by distribution channel (our dealers, our own retail stores, our mail-order sales, and our international distribution). We decided to pursue answers with the help of a consultant, Harvey Hartman, whose expertise was in marketing environmentally improved products and who had experience in market research on organic cotton garments (denims).

Based on phone interviews with mail-order customers and customer focus groups from dealers and our own stores, Hartman concluded that the most significant reason for purchasing Patagonia products is quality. To the customer, quality meant durability, functionality and performance, and fit. While brand name (beyond its connotation of quality) and price were also significant influences on purchases, environmental concerns, either in terms of the company's performance or characteristics of the product, were less important to customers. Most customers knew that we supported environmental causes, and they assumed that we made an effort to reduce our environmental impact. They knew little about agricultural issues and found it difficult

linking them to the clothes they buy. Customers, especially those who shopped at our dealers, expressed a desire to see marketing materials that emphasized the positive aspects of organic cotton; to some extent they were turned off by negative messages that made them feel guilty.

As a result of Hartman's work and additional staff research, we developed a marketing strategy structured with two themes: (1) we expanded our definition of quality to include the environment, and (2) we decided to put the negative issues associated with pesticides in the context of positive messages about available alternatives. We would emphasize that consumers would be getting the same Patagonia quality to which they were accustomed with the added value of improved environmental performance. We would show the crop dusters in contrast to the release of beneficial bugs in organic fields. This seemed to satisfy both the concerns of our dealers, who sold conventional cotton clothing lines next to Patagonia's organic styles, and our own desire that media interest contribute to the success of the decision.

Price was a difficult issue. Increases in production costs varied by product but ranged from 15% to 40%. Hartman's research had suggested that consumer demand was moderately inelastic: small price increases would not matter to customers although larger ones would be resisted. In the end, we decided to ask customers to share in the cost—we would reduce our margins on most products to moderate retail price increases to a maximum of 20%. Where we could not meet that goal, we decided to limit distribution of a product to direct channels (our own stores and mail order), thereby allowing us to keep the retail price within bounds.

#### ***Development of a Full Cost Methodology for Cotton Impacts***

One way we thought we might address the concept of value inherent in the environmental improvements made by the conversion was to attempt to price the environmental harms associated with conventional cotton. If substantiated, we could argue that it made sense to pay a little more now for organic cotton garments, rather than "paying" for the impacts in the form

of adverse health effects, loss of soil productivity, and ecosystem disruptions. Working with James Walsh, a graduate student researcher from the University of Washington, we developed a method for assigning dollar costs to environmental and public health impacts. The research validated our intuitive assertion that the environmental costs of conventional cotton outweighs the price differential (for raw cotton) between conventional and organic. The research gave quantitative support to our earlier findings that home laundry caused the greatest level of impacts across the life cycle (outweighing all other impacts combined) and that growing, dyeing and finishing, and transportation were the next most significant contributors to environmental degradation (Walsh and Brown 1996).

#### ***Integration of Organic Concepts Throughout the Business***

The decision to change the cotton products had ripple effects through the rest of the company. Our tithing program (grants to environmental nonprofits), which had been active on agriculture issues for a number of years, increased its funding of groups working to promote organic agriculture. Staff also established a working relationship with Pesticide Action Network (PAN) that would check our facts on the issues and provide a referral resource for people seeking additional information about pesticides and alternatives to them. Our cafeteria increased its use of organic food products to between 60% and 70% of purchases. Buyers for our retail stores, which had always carried a small selection of sportswear produced by outside vendors to complement our own line, began to source all organic cotton products. New hang tags and point of purchase (POP) materials were developed in conjunction with the marketing strategy. The spring 1996 catalog required the development of cotton-related stories with appropriate graphics and photos. Press kits for print media needed to be developed and distributed. We coordinated an event for the outdoor industry's trade show to introduce the issue and the products to our dealers and our industry. Marketing and design staff cooperated in producing a brochure to accompany retail and mail-

order sales that reinforced the environmental message for purchasers of organic cotton products. Finally, the cotton team also realized that an intensive education and training program for customer service staff (wholesale, retail, and mail order) would have to be created, if the sales goals were to be met. Significant resources were redirected toward this task.

#### ***The Cotton Road Show***

A cotton education team consisting of staff from environmental assessment, environmental affairs (tithing), fabric development, marketing, merchandising (responsible for POP), and public affairs developed cotton-specific materials to take on the road to retail stores, mail-order customer service staff, and sales representatives servicing dealer accounts. The team developed a video explaining why we chose to convert our cotton products and showing the impacts of conventional growing practices along with the methods farmers use to grow organically. The video embodied the marketing strategy of connecting the negative and the positive into a call to action, and it has become the introduction to the training.

The team developed and distributed a booklet that gave technical information about cotton farming—both conventional and organic. Lifecycle information, presented in poster format, detailed the impacts of a cotton T-shirt and provided the context for Patagonia's decision to focus on growing practices. Training sessions concluded with a demonstration of the most popular tool, a board game (printed on organic cotton fabric) where players answered questions about cotton farming, fabric production, and Patagonia products, as their game pieces (different colored ladybugs) moved around the board. A multiplicity of materials using video, games, text, and lectures accommodated different learning styles to ensure that the core messages got to the people who had the primary interaction with the customer.

#### ***Outcomes***

Wholesale sales to dealers, completed by mid-fall 1995, exceeded expectations; in fact, several products were oversold. An enthusiastic response from dealers buoyed our hopes that the

line would do well with consumers. By spring 1996, all the pieces were in place: the product was in stores, training was complete, advertising was in place, and customers were buying the product. Our initial expectations of moderate retail sales actually fell short of reality. The line appeared to be selling well. Customer response was positive, viewing the products as providing enhanced value. Anecdotal evidence suggested that customers perceived the softer feel of organic cotton (an unexpected and unexplained characteristic of most of the fabrics) as evidence of higher quality. The organic cotton itself seems to be viewed as a bonus for an already high-quality product. Initial sales did not seem to indicate that we were pulling into stores new customers searching for organic cotton, although that may be related to the advertising program, which was directed at our existing customer base. Preliminary research during the season suggested that there might be a differentiated market with a small group of consumers who respond strongly to the environmental messages of the company and the environmental value in the products. Interestingly, the impact of the price increases—our biggest concern during the initial marketing phases—seems not to have been a significant factor for most of our customers.

Our commitment to organic cotton remained solid. Developments in the fall of 1996 included the introduction of a complete line of flannels in organic cotton—the only ones available in the world. The number of styles with organic cotton is expected to increase in spring 1997 compared with the initial offerings in spring 1996. Development work for fall 1997 is concluded and initial work on spring 1998 has begun. Overall, we expect sales to grow. But a few clouds remain on the horizon.

It has been a struggle to maintain product quality. Working with new vendors interested in organic cotton products has meant that we have revisited quality issues in fabrics that had been resolved with previous suppliers. Surface qualities of some fabrics appeared to be degraded in long-term testing, although it may be related to the withdrawal of formaldehyde resins rather than organic cotton. The perceived softer feel of organic cotton created the illusion of reduced du-

rability in products known for their toughness. Different characteristics have led to sewing problems that have had to be addressed in production runs.

We have been disappointed by the apparel industry's lack of interest. Few manufacturers seem to have joined us at this early stage. Mass marketers appear discouraged by price increases and the limited availability of organic cotton fabrics. Specialty fashion marketers, wary of environmentally related products, perceived it as a niche they did not occupy. A few companies in the outdoor industry expressed interest and thought they might pursue development for a future season. Without additional apparel manufacturers in the organic market, supplier interest will remain weak, prices high, and fabric development slow.

Initial press response was relatively mild, especially compared to the interest in our Synchilla® fleece made from recycled PET (polyester) soda pop bottles. Debate continued as to whether we should move away from balancing the negative with the positive to an increased confrontational stance.

The cotton industry and mainstream agriculture were generally irritated by our decision and public presentation, believing that we were denigrating their products and maligning their character.<sup>4</sup> We steadfastly argued that we hoped to increase cotton sales and that they, too, could benefit by growing organically.

Internally, we benefited from new relationships with suppliers, but remained concerned about the difficulties of identifying new sources of organic cotton fabrics. We maintained a mix of sewing contractors around the world, while using U.S. cotton almost exclusively. New sources of organic cotton closer to spinning mills became a priority. We also benefited from involving the entire company in the project, which improved communication and established new working patterns.

### What We Have Learned

We are proud of our efforts, and we have certainly learned a number of lessons from our experience. It is possible to apply our environmental



principles and be successful. But we also learned that although the ideas that form the core of industrial ecology may generate the impetus to change, they do not necessarily lead to products supported by consumer acceptance. The initial market response underscored that our customers wanted the value in our products that they had always sought from us—durability, performance, fit, styling. The principles of industrial ecology need to be well integrated into a strong design philosophy and marketing strategy.

This suggests that on some environmental issues—organic cotton may be one of them—corporations are out in front of consumers. Our challenge is to change customers' perceptions of their purchases. Although they buy for quality, fit, and style, we want them to recognize their contribution to reducing the negative impacts of agriculture. We have made a few efforts in that direction (hang tags and a brochure distributed with their purchase), but we need a long-term commitment to education for the value of this change to take hold in the public's consciousness.

Our experience reinforced for us that successful implementation of environmental improvements requires an integrated approach across the entire organization. While a number of technical issues were involved in the decision and its implementation, much of what needed to be resolved were questions of organizational change and structural integration. An example was the development of a marketing strategy that accommodated multiple concerns: the production staff who were interested in protecting its relationships with the cotton industry, the quality staff who had to start anew with vendors unfamiliar with our working methods, and the environmental staff who wanted to avoid hyperbole while providing support to farm activists. Care in the integration of environmental improvements into an organization will produce long-lasting dividends. Done poorly, the innovation is not likely to reach its full potential and may be the precursor of skepticism about future efforts.

One of the greatest benefits has been the development of new skills in our research and development group. Because of the lack of readily available organic cotton fabrics, we had to learn a great deal about fabric "converting," that is,

the process of organizing production of a finished fabric from raw cotton through spinning, fabric manufacture, dyeing, and finishing. We are now capable of buying off-the-shelf goods when they meet our needs and developing new fabrics when necessary. Our products are better because our designers, rather than making do with commodity fabrics, are involved in the fabric creation process itself. In effect, we became a learning organization with the ability to assimilate new information rapidly and to be innovative in our approach to production.

Much remains to be done with cotton products. Further reductions in impacts associated with other parts of the life cycle are yet to be achieved. We continue to research alternative fibers such as hemp that might have even less impact than organic cotton in growing and may be appropriate for some sportswear uses. We are paying greater attention to reducing the impacts associated with our technical products. We currently use recycled content fibers for some of these products and are looking to increase their use and develop other ways to reduce the environmental impacts associated with fiber production. Greater potential may be available in reducing impacts at other stages, particularly in technologies that provide protection from inclement weather while maintaining comfort.

It may have been that we expected too much from our industry to think that others would join us in switching to organic cotton. Perhaps increasing our efforts to educate the industry both on the issues associated with cotton agriculture and on the larger threats to the ecosystem are necessary. Without greater participation by the apparel industry we do not expect organic cotton prices to moderate to any significant degree.

We remain committed to the principles with which we operate our business—create the highest quality products, while continually reducing their impacts. Switching to organic cotton is but one of a series of small steps that we have taken to change the destructive path on which we have been traveling. It is a valuable step, but other tough decisions still must be made. Alone we cannot do much to reverse the trends toward ecosystem destruction. Only mutual efforts will set us on a course toward restoration.

## Appendix: Summary of 1991 Fiber Assessment

In 1989, our growing realization that the products we made had an impact on the environment led us to seek some assistance in identifying impacts associated with the major fibers that we use. We engaged the services of a team from Werner International, a management consulting firm that specialized in the textile industry, and RCG/Hagler, Bailly, an environmental consulting firm. The two companies were subsidiaries of the same parent corporation. The project began in early 1990 and the final report was delivered in March 1991.

The scope for the assessment listed three goals: to identify environmental impacts associated with the manufacture and use of cotton, wool, polyester, and nylon; to develop a system for examining the environmental risks associated with each fiber category; and to identify opportunities for Patagonia to reduce risks to the environment. We specifically asked for analysis that could be used to rank the four fibers in terms of their impact on the environment. At the time, little guidance was available for doing life-cycle analysis. Decisions about methods, validation, and data were made jointly by the Patagonia staff managing the project and the consultant team.

In the initial tasks, the consultant developed categories so that all the activities from creation to final disposal associated with each fiber could be compared. They then identified the major environmental releases associated with each fiber by category and evaluated the severity of the risks associated with the releases. Finally, they identified issues that were serious risks and likely to be within Patagonia's ability to do something about them.

The data for the study consisted of a combination of qualitative descriptions, quantitative analysis (relatively little), and expert judgment. Although some of the data were collected from Patagonia suppliers, the bulk came from generic industry sources as well as the consultants' experience.

The results of the study were summarized for us in the following categories. For cotton, the major concerns were with growing, dyeing and

finishing, and distribution. For wool, it was pasture management, sheep husbandry, dyeing and finishing, and distribution. Significant risks for nylon and polyester were associated with oil and gas extraction, petroleum refining, fiber manufacturing, dyeing and finishing, and distribution.

The consultants stated explicitly that they could not conclude that any of the fibers reviewed in the study were significantly better for the environment, because each had drawbacks. According to their findings, during production of the raw materials for the fiber, the synthetics had a greater potential for environmental risk than natural fibers. In creating fabric, wool had the largest potential risk, followed by cotton and the synthetics.<sup>5</sup> For cutting, sewing, and distribution, the risks were equivalent. In consumer use and maintenance, the consultants found that wool was a greater risk. At the point of disposal, wool was less of a risk than the other fibers.

In their recommendations, the consultants combined their risk review with their evaluation of where Patagonia had a measure of management control to suggest areas for action. These included dyeing and finishing, cutting and sewing, and packaging. In addition, they suggested that Patagonia could focus on distribution, even though we did not necessarily have much control over those impacts.

## Notes

1. Certified organic cotton refers to cotton grown in fields that has been certified by an independent organization to be free from synthetic chemicals for a minimum time period (usually three years). Certifiers typically require the use of farming practices that regenerate soil and protect worker and community health. Documentation of farming practices is required as well.
2. Some certifying organizations allow limited use of natural pesticides such as rotenone and pyrethrum.
3. Natural dyes are made from plants and insects. When collected from the wild, significant demand could harm ecosystems and endanger species; cultivation, even with organic farm practices, may result in monocropping and disruption of indigenous cultures. Cotton (a cellulosic material) does not easily bond to dye molecules. Without the use of toxic metals to

improve the chemical bond, natural dyes are not particularly colorfast to light, chlorine, laundering, and mechanical abrading.

4. For example, in an editorial for *Cotton Grower*, a trade publication for cotton farmers, Donna Sandusky (1996) wrote that "Another perception—that organic cotton is morally better than conventionally grown cotton—could become an even more painful, income threatening reality. This could happen sooner than later if niche 'organic' marketers continue to propagate emotional messages without rebuttal. In an obviously well thought out marketing plan, Patagonia® Inc., a manufacturer and retailer of outdoor clothing, uses its beautiful, well-written catalogs as a 'bully pulpit' for environmental causes." (Sandusky, 1996).
5. The impacts associated with wool during fabric manufacture are primarily related to dyeing. It is relatively difficult to achieve colorfast dye in wool. Acid dyes, usually with heavy metals either in the dyestuff or the dye bath, are used. Residual dye requires treatment creating a hazardous waste sludge. If untreated, the metals may have a significant impact on biota in receiving waters.

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