Murgo Farms Inc.: HACCP, ISO 9000, and ISO 14000

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Abstract

Murgo Farms Inc., addresses the challenge of choosing between the Hazard Analysis Critical Control Point (HACCP), International Organization of Standardization (ISO) 9000, and ISO 14000 systems for a business with grain farming, elevator and spraying enterprises. Murgo has recently entered markets that are more quality oriented and wishes to expand its activities in those markets. The President wonders whether HACCP or ISO 9000 might help that expansion. However, the company is also faced with significant environmental risks due to its spraying and manure spreading activities and its proximity to a local municipal water source. There are good reasons for Murgo to consider each of the systems, but there is also the question of whether the benefits for implementing any system are sufficient to do so immediately.

1. Introduction

Murray Hammerton, President of Murgo Farms Inc., let out a long sigh as he looked at three thick folders on his desk. They were labeled Hazard Analysis Critical Control Point (HACCP), International Organization of Standardization (ISO) 9000, and ISO 14000. Three years ago the labels would have meant nothing to him, but now they represented the three alternative solutions to a major decision he felt he had to make. Murray thought that it was only a matter of time before he would have to have a quality program in the business in order to meet the needs of his customers. He was considering putting one of these quality programs in place in the next several months, before spring planting in 2000. The question was which one should it be, or was his best alternative to ignore them all and hope that the future of agriculture wasn't passing him by.

Choosing between the different systems was made more difficult because each program had a different orientation and application to his grain farming and elevator business. HACCP emphasized food safety and would be an advantage in his edible bean business. ISO 9000 had a broader focus, and would integrate quality management across all areas and business lines of his company. Finally, ISO 14000 would help control the company's environmental risks. Determining which program to install was made more difficult because Murgo faced different needs. Companies Murray's grain farming and elevator business supplied or competed with were adopting HACCP or ISO 9000 standards. But ISO 14000 was also important to Murgo because the company operated in the watershed supplying water to the city of Woodstock, Ontario.

2. Background

Murgo Farms Inc., a grain farm with elevator facilities, was started by Keith Hammerton in 1955. Keith's son, Murray, and his wife Jane purchased the grain elevator in 1981 and operated it as a profitable independent business. Murray and Jane began purchasing shares in the farm in the late 1980s and completed the transfer of shares and ownership in 1993.

Murgo had sales of $1.2 million and profits in the six-figure range in 1998, employing total assets worth $4 million. Its principal activity was grain farming, but it also did custom planting, spraying and harvesting for nearby farms. In 1999, the company planted approximately 2,100 acres (1,700 owned or leased and 400 custom planted). The harvested crop would be stored in the Murgo elevator and sold later in the year.

The farm began producing specialty crops in 1997, growing seed wheat and edible (food grade) soybeans. Murray said, ''We are trying to break out of the mold of being a cash crop farm. We are starting to position ourselves to take advantage of identity-preserved, value-added products.'' The 1999 crop plantings, shown in Table 1, displayed the beginning of the shift of acreage from commodity to more higher value crops like the seed wheat and edible soybeans.

The specialty crops grown by Murgo had slightly lower yields than regular crops but the premium prices they received on these crops produced net margins almost 10% higher than margins on commodity crops. The seed wheat was grown under contract for a regional seed company, C&M, who later sold it to wheat producers throughout Ontario. The edible

Table 1
Projected 1999 planting for Murgo Farms

Crop	1999 plantings on Murgo land (in acres)
Soft red wheat	100
Hard red wheat (including seed wheat)	330
Seed wheat includes in acres of wheat	85
Beans (including seed and food grade)	590
Round-up ready seed soybeans	120
Edible (food grade) soybeans	150
Corn	650

soybeans were destined primarily for the Japanese market, with production contracted through First Line Seeds of Guelph, Ontario.

Murgo's elevator business had a storage capacity of 6,500 mt. The company used only 50% of the capacity for its own crops and used the remaining capacity to store grain for a few local farmers. This represented a change from the 1980s when Murray had tried to move as much volume through the elevator as possible by using it as the center of a grain trucking business. By the 1990s, he realized that the Murgo was not able to compete with the large grain elevators in the region. With the new approach emphasizing specialty crops, he put much of his effort into marketing its crops.

In 1999, the elevator facilities were updated so that the identity of crop stored at the elevator could be maintained. The large 25-year-old storage bins were upgraded and new smaller bins were added for specialty, identity-preserved grains. Murray installed 11 new, 600 mt bins that would allow dedicated storage for each of the different seed and edible bean products. This was becoming more important as importers in the United Kingdom were differentiating between genetically modified (GM) and non-GM crops. There were indications that the differentiation would spread into other export markets as well. A new, low temperature, high capacity batch drier was installed to maintain the product quality.

Murgo had four full time employees. Murray Hammerton directed all operations. He also handled spraying operations, since the sprayer was a complicated piece of equipment and spraying involved serious liability risk exposure. Jane Hammerton managed the inventory and accounting activities. Ted was the office manager. Murray anticipated that Ted's duties would eventually include handling the paperwork for any new management system that Murgo adopted. Finally, Russ was responsible for planting, harvesting and maintenance.

Murray would be classified as an early adopter of new technology, always employing the latest production techniques. He started zero-till farming in 1994, and by 1998, all of their wheat and soybean acreage, and 60% of their corn acreage was handled this way. Murgo Farms had utilized Global Positioning Satellite (GPS) and Geographic Information Systems (GIS) technology for 4 years. All fields were soil tested and grid-mapped to monitor nutrient variation and changes in soil conditions. Yields were also monitored by location. Murray used all the data produced to make crop variety and chemical application decisions for his fields and he viewed the GIS system as an invaluable management tool.

Murray realized that the farm's success could no longer be guaranteed by efficient production alone. Increasingly, the world's most lucrative agrifood markets required proof of quality and, quite likely in the future, proof of environmental sensitivity. These assurances could only be provided through new management systems, with external accreditation and auditing. After searching the Internet and consulting industry specialists, Murray decided that HACCP, ISO 9002, or ISO 14000 might potentially meet Murgo Farms' needs. All three programs were internationally recognized. Murray's felt that implementing and maintaining each system would require significant time and financial commitment. He was certain he only had enough resources to implement one of the three, but which one? There were many differences among the programs and their application to his business. Murray's decision was complicated by the fact that he had both quality and environmental reasons for introducing one of the new management systems.

Table 2
Production and use of Ontario soybeans

Crop year	Harvested area (×1000 ha)	Yield (t/ha)	Soybean production	Imports	Total supply	Exports	Food and industrial use	Average price ($/t) (thousands of mt)
1990–1991	484	2.61	1,262	164	1,617	213	936	224.5
1991–1992	598	2.44	1,460	72	1,743	252	975	228.2
1992–1993	622	2.33	1,453	226	1,871	211	1,000	264.5
1993–1994	748	2.70	1,945	57	2,116	492	1,060	308.8
1994–1995	821	2.60	2,254	67	2,415	542	1,122	272.4
1995–1996	824	2.78	2,298	70	2,536	599	1,220	356.7
1996–1997	862	2.51	2,170	232	2,565	478	1,424	382.3
1997–1998	1,060	2.58	2,738	149	2,966	769	1,583	333.4
1998–1999	980	2.79	2,737	254	3,179	868	1,576	266
1999–2000	999	2.76	2,766	450	3,458	900	1,800	250–270

The units 'ha' indicates hectare and 't' indicates metric tonnes. Source: Agriculture and Agrifood Canada, July 4, 2000, Grain and Oilseeds Report; http://aceis.agr.ca/policy/winn/biweekly/English/index2e.htm.

2.1. Quality assurance

Yield had been most important to Murray when growing standard corn, wheat and soybeans. It was also important for the crop to be disease free with the appropriate moisture level when harvested. The crops were graded at the elevator, but with a little effort in production, the crops almost always graded #1 or 2 and both grades received the same price.

Murray determined that he could be more profitable by producing specialty products. Edible beans received a premium of between $0.50 and $1.00/bu. for a uniform, high-quality product. This premium had stimulated both soybean production and exports (Table 2). Asia was the principle destination for edible beans (Table 3). Most were ultimately sold for export to the Japanese market, where quality was of vital importance.

The production of edible beans required different production practices in order to achieve the maximum price available. Quality control and identity preservation were also essential. Japanese buyers had been known to inspect farms before buying the product. To reduce contamination risks, Murray had moved the pesticide and liquid fertilizer facilities away from the bins where the beans were stored so that a leak or spill could not contaminate the beans.

Strict quality assurance procedures were also necessary for producing seed wheat, which was re-distributed throughout the province of Ontario, but this crop did not involve food safety concerns.

The controversy over GM crops had resulted in restrictions on exporting many of those crops to Asian and European markets. Ontario accounted for most Canadian exports of soybeans and was becoming a preferred supplier for edible soybeans. This was in part due to the fact that no GM edible varieties had been approved for production in Canada. Organizations with identity preservation capabilities had a distinct advantage in serving export markets, where identity preservation was becoming a market entry criterion. Unfortunately, the uncertainty surrounding GM crops made the potential benefits to Murgo difficult to quantify. However, Murray was certain that in the future identity preservation capabilities would be a requirement for operating

Table 3
Exports of soybeans to selected markets

Destination	1995/1996	1996/1997	1997/1998	1998/1999
China	2,974	4,639	5,248	34,076
Hong Kong	31,271	30,811	23,212	27,783
Indonesia	3,630	1,754	318	4,757
Japan	36,523	62,154	62,931	75,630
Malaysia	21,386	18,767	20,539	82,411
Philippines	2,074	3,596	4,848	6,417
Singapore	19,797	18,032	15,164	15,712
South Korea	2,555	3,234	3,131	4,863
Thailand	1,652	507	340	3,364
Asia total	121,862	143,494	135,731	255,013
Edible soybeans form approximately 85% of exports to Asia				
Austria	59	183	157	54
Belgium	44,010	43,435	20,687	9,171
Denmark	33	39	7,748	59,349
France	7,826	7,053	758	693
Germany	7,851	–	17,194	73,085
Italy	8,241	2,984	5,572	2,055
The Netherlands	88,217	29,565	28,513	96,642
Norway	28,285	144,127	159,000	–
Portugal	48,194	–	58,465	19,713
Spain	100,695	35,492	34,759	91,408
Western Europe total	333,411	262,878	332,853	352,170
Edible soybeans make up only approximately 15% of exports to Europe				
Africa: 0%	630	142	4	69
Central America: 2%	2,131	1,243	1,021	2,622
Eastern Europe: 2%	41	76	652	233
Middle East: 0%	39	580	9,140	151,582
Oceania: 4%	19	292	57	95
South America: 3%	64	4	51,749	84
United States: 4%	126,903	48,115	134,706	101,701
Total exports	585,100	456,824	665,913	863,569

Source of grain export numbers—October 1999 statistics, Canada. Source of percent edible bean exports: Ontario Soybean Marketing Board.

in many markets. Quality management systems, like HACCP and ISO 9000, would likely be needed to sell into these markets. If Murray continued in the edible bean business he would almost certainly have to eliminate GM varieties from at least some of his farms. Murray also believed that it would be easier to build the edible bean business than the seed wheat business.

2.2. Environmental issues

Murgo Farms was involved in spraying and manure application; two activities with potential negative environmental impacts. Spraying involved applying a variety of chemicals, including herbicides and pesticides, to his farm and to neighboring farms under contract. The company held the necessary licenses for both on- and off-farm spraying, but

there were few environmental standards and regulations related to storage on the farm of the chemicals sprayed. Murray had built a cement dyke around his farm chemical storage area to reduce the company's exposure to environmental liability should these chemicals be spilled.

Murgo Farms had contracted with a neighboring hog farm to spread manure on Murgo land. The hog farmer needed this service because the local township required 1.5 acres of land per animal unit for manure disposal and, when he wanted to expand his operation, his land base was insufficient. To secure township approval for the farmer's expansion, the farmer and Murray had completed a Nutrient Management Plan together. Murray estimated that 170,000 gallons of manure would be spread on Murgo land in 1999. The deal provided the company with an excellent, inexpensive source of nutrients for its land but increased its environmental liability exposure.

Environmental concerns had become an important issue for Ontario farmers in the late 1990s. The public was increasingly concerned over levels of herbicide and pesticide spraying and some communities in Southwestern Ontario were discussing complete bans on spraying within municipal boundaries. New environmental regulations related to agriculture had been introduced, mostly dealing with livestock production and manure management, but it seemed only a matter of time before the regulations were applied more broadly across the agriculture sector. In Murray's opinion, farmers needed to anticipate the laws to protect themselves. ''If you are prepared, the laws should have no bearing on your operations.''

Murray had begun reducing his exposure to environmental liability in 1994, completing the Ontario Environmental Farm Plan (OEFP) that identified key areas of environmental risk on his farm. The OEFP was a voluntary program. Farmers attended a workshop and filled a booklet that described their operations and plans to ensure environmentally sustainable production. A committee of trained peers appraised the plan and, if approved, a $1,500 grant was made to the farmer to assist in implementation. The changes to his chemical storage had partially due to this program.

Murray wondered if the OEFP was enough to protect his business from potential lawsuits. Both Murray's banker and insurance company expressed the same concern. In fact, the bank required an environmental statement as a condition for its mortgages and operating loans.

Murray had other reasons for worrying about Murgo's environmental risk. Sub-divisions of the City of Woodstock bordered Murgo land and one of the company's farms was adjacent to Woodstock's water wells. The gravel base underlying its farmland allowed water from nearby livestock operations to flow relatively unimpeded into the water supply. To further complicate matters, a river ran through several of the farms before going through Woodstock and most of the land of Murgo Farm was located along the Highway 401 corridor, the most heavily traveled highway in Canada.

In 1998, the well water of a nearby service center had tested above the allowable nitrate level of 10 ppm, indicating a high degree of agricultural runoff. This had provoked the Ministry of the Environment officials to visit Murgo Farms. Murray showed them his accurate records of chemical and fertilizer application, and his grid and soil maps. The Ministry found no fault in his practices, but the situation made him aware of the extent of his liability. Murray realized that a serious problem in his operations could cost him his farm. Already, some of the Woodstock town council had talked about appropriating his farm near the water supply.

3. The management systems

Murray was considering three very different management systems, outlined below.

HACCP focused on the elimination of food-related health hazards. Companies involved in HACCP attempted to identify all Critical Points at which health hazards could be introduced into food products and control those points to eliminate the associated risk. Companies who established HACCP programs and met minimum criteria were said to be *HACCP recognized*. Use of HACCP in the food industry was increasing rapidly, in part due to new regulations. This was especially true in meat processing facilities, where HACCP recognition was becoming a requirement for exporting meat to the United States. The Canadian Food Inspection Agency (CFIA) was moving toward mandatory HACCP programs for all federally inspected meat and poultry processing plants. However, few farms were implementing HACCP systems. One of Murray's neighbors who produced maple syrup and related products had recently become HACCP recognized. The process had been long, complex and expensive, since there were approximately 200 critical control points (CCPs) in the production processes for maple syrup.

ISO 9000 consisted of a series of quality systems that focused on documenting all quality assurance and improvement processes in a company. The series ranged from the comprehensive ISO 9001, which included all activities from product design to customer service, to ISO 9003, which dealt with final product testing systems. Although the ISO series was originally developed for the manufacturing sector, it had been applied to many service organizations and was gaining some acceptance in the food industry. The ISO 9002 system, which included all management, production, distribution and service activities, but not product design, suited Murgo Farms' needs most closely. Although not widely adopted in North American agriculture, ISO 9000 systems were well accepted in Europe and Japan.

The relatively new ISO 14000 series dealt with environmental management. The system focused on awareness and prevention of environmental problems, actions to be taken in the event of a potential problem and on documenting an organization's environmental management system (EMS) and procedures. ISO 14000 was site specific, with different sites receiving individual registration.

Both ISO 9000 and ISO 14000 systems were designed and regulated by the International Organization for Standardization based in Switzerland. A consultant would prepare a company for registration by helping it analyze, improve and document current processes focusing on the quality assurance/environmental management methods employed. When the company was ready, external auditors would perform an original registration audit and award ISO registration if the company passed. At predetermined time intervals, typically annually or bi-annually, the external auditors would return to ensure that the company was still meeting ISO standards. The ISO 14000 system was quite new and offered one unusual twist; companies could actually self-declare their ISO registration, without third party auditors. It was anticipated that this option would eventually disappear as registrations increased.

Murray estimated that installing each of the three systems would cost at least $20,000 in consulting and registration fees to implement and the entire process would take approximately

a year to complete. The nature of HACCP made it likely that additional expenditures could be as high as $50,000. Table 3 contains more detailed descriptions of the systems.

Murray had only found few instances where elevator or farming companies had adopted these systems. The two southern Ontario grain companies who had adopted quality systems had chosen different directions. The Hensall District Co-op., the largest farmer owned co-operative in Ontario, had implemented ISO 9002 at one of its grain handling facilities. Hensall management decided that ISO 9002 was the best quality management system to serve the international markets where they sold their commodities. W.G. Thompson Inc., one of the largest commercial elevator operators in Ontario, had implemented HACCP at four of its grain elevators. The company took this route primarily to avoid food safety problems and because some of their processing customers were HACCP certified. At the time, no agriculture companies or farms in the area were ISO 14000 certified.

4. The future for Murgo Farms

The company's goal was to move away from commodity markets and into the more profitable specialty products. Murray realized that both C&M and First Line Seeds were closely monitoring Murgo's performance in specialty crop production and handling. If Murgo could prove itself capable, Murray thought that this business would expand. However, he had no immediate plans to move totally out of commodity crop production. He liked having different marketing options and products, so that if difficulties arose in one area of his business he had other lines to maintain the company.

Each of the three management systems had positive arguments in its favor. The problem was that Murray only had the resources to implement one—but which one? Murray looked at the pile of folders and shrugged. He couldn't afford to make a mistake in such an important decision, but he wasn't sure how he was going to choose between the three. Maybe he shouldn't implement any system at all. Did he really need one of these systems to take full advantage of the market opportunities or to cut his risk? In this situation, he might actually be a bit too far ahead of the crowd to gain an advantage.

Supporting website: Case-related readings on the systems and photos of Murgo Farms can be found at the Murgo case web page at www.uoguelph.ca/[approximate]dsparlin/cases/cases.htm.

Teaching Note: Instructors may obtain the Murgo Farms Teaching Note by contacting David Sparling at dsparlin@uoguelph.ca.

Appendix

A.1. Management system descriptions

A.1.1. Introduction

HACCP is a process control system that identifies prioritizes and controls potential hazards in the food production process. Emphasis is on identifying CCPs in the process

where microbiological, chemical or physical contaminants may be introduced into the product. These CCPs are strictly monitored and controlled to reduce the chance of a hazard occurrence. Because HACCP is process-based, its plans are unique for every company, and for every specific food product a company produces.

A.1.2. Background

HACCP was first used in the early 1960s by the Pillsbury Company to produce the safest and highest quality food possible for astronauts in the space program. The challenge was to perfect a ''zero defect'' program to guarantee the safety of foods while in space. The concepts forming the foundation for HACCP were based on the Total Quality Management (TQM) philosophy and work by W. Edwards Demming. The TQM approach involves the integrated effort of everyone in an organization to improve the quality and performance of the company at every level.

A.1.3. Regulatory requirements

In the United States and Canada it will soon be mandatory that all meat processors be HACCP certified to sell their products for human consumption. Currently, Canadian meat processing companies wishing to export to the United States must be HACCP recognized.

A.1.4. The structure of HACCP

There are seven principles which serve as the foundation for a HACCP system.

1. Conduct a hazard analysis.
2. Determine the CCPs.
3. Establish critical limits.
4. Establish CCPs monitoring procedures.
5. Establish corrective actions.
6. Establish effective record keeping procedures.
7. Establish verification procedures.

A.1.5. From farm to table

HACCP is most successful when applied to all companies and process involved in the food supply chain from farm inputs right through to the consumer. On the farm, this includes monitoring inputs, maintaining sanitation procedures, and practicing good animal health management. At the processing level, the focus is on contamination prevention during processing, transportation, storage, and distribution. In retail, restaurant and food service organizations emphasis is on proper sanitation, refrigeration, storage, handling and preparation procedures. Although HACCP is operating primarily at the processing level, now there are numerous initiatives designed to prepare farmers for eventual HACCP implementation.

A.1.6. The certification process

Companies employing HACCP in their organizations are said to be HACCP recognized. The CFIA is the government agency responsible for inspecting HACCP recognized companies to ensure compliance with the guidelines. There are a number of private

consultants who specialize in developing HACCP plans for companies, and aiding with their implementation.

A.1.7. Cost and time required

Cost for HACCP implementation depends on the product and processes involved. For a single process in a small company the cost would be approximately $15,000. To develop a HACCP plan and become HACCP recognized typically takes 6–9 months.

A.1.8. Benefits

Companies implementing HACCP will benefit in several ways. The following outline the most significant benefits that proponents claim can be obtained from HACCP recognition:

- meeting regulatory requirements for domestic and export markets;
- meet customers' food safety specifications;
- lower risk of product recall/potential liability;
- lower current operating costs;
- provide management with better information for decision-making.

A.1.9. Summary

HACCP is one response to the demands of international markets and consumers for a safe supply of food products. HACCP should be thought of as a preventative plan, designed to eliminate the risk of food safety problems.

A.2. ISO 9000—quality

A.2.1. Introduction

Although ISO 9000 was designed primarily for manufacturing organizations, it has been applied to all types and sizes of organizations. The ISO 9000 series is a set of five individual, but related, international standards on quality management and quality assurance. The ISO 9000 series focuses on documenting the quality system elements, improvement plans and procedures to maintain and improve an organization's process, with particular emphasis on quality.

A.2.2. Background

The ISO 9000 series of standards for quality management and quality assurance in manufacturing was developed in 1987 by ISO and later updated in 1994. The ISO 9000 series was developed in response to increasing pressure from the European Community for minimum quality standards for products produced or imported. Located in Switzerland, ISO includes 91 participating countries.

A.2.3. Structure of ISO 9000

The ISO 9000 series comprises the following components:

- ISO 9000 Quality Management and Quality Assurance Standards—Guidelines for Selection and Use.

- ISO 9001 Quality Systems—Quality Assurance for Design/Development, Production, Installation, and Servicing. This is the most comprehensive series.
- ISO 9002 Quality Systems—Quality Assurance in Production and Installation. It is similar to ISO 9001 without standards for Design/Development.
- ISO 9003 Quality Systems—Quality Assurance in Final Inspection and Testing.
- ISO 9004 Quality Management and Quality System Elements—Guidelines for development of ISO programs.

ISO 9002 is the most common standard for food and beverage firms. Firms who complete the requirements for this standard can apply for ISO registration.

A.2.4. Regulatory requirements

There are no regulatory requirements for firms to be ISO certified.

A.2.5. ISO 9000 through the supply chain

There are numerous industry incentives and requirements for ISO certification. ISO 9000 provides a measure of a company's commitment to quality. Organizations that are involved in ISO 9000 frequently require their suppliers to be ISO 9000 certified or that they work toward certification in the near future.

A.2.6. The certification process

Preparation for certification is usually completed with the assistance of a consultant who helps with analysis and documentation of quality procedures. The certification process requires an on-site audit by an accredited independent third party to ensure that the company's operations comply with the appropriate standards. If the audit is successful, the company receives an ISO 9000 registration certificate. The company will be listed in a register that is maintained by the accredited third party registration organization. Continued compliance with ISO 9000 standards is assured through periodic third party audits. Companies can implement the standard themselves and have internal audits. However, there is less credibility with this method and so it is much less common.

A.2.7. Cost and time required

The ISO accreditation process typically takes about 1 year to complete, although it may vary from 9 months to 2 years. The cost of consultants and auditors for the process will be approximately $20,000 for a small company. The accreditation process and maintenance requirements for ISO 9000 are significant in terms of management time needed and add significant costs above the cost of consultants.

A.2.8. Benefits

The following points outline the most significant benefits that proponents claim and can be obtained from ISO 9000 certification:

- international acceptance and recognition makes ISO a useful marketing tool and helps maintain and facilitate trade in international markets;

- promotes uniformity of product, greater customer satisfaction and fewer recalls;
- process documentation and monitoring prevents problems;
- reduces the number of audits performed by customers;
- focus on continuous improvement;
- self-regulation (proactive) may obviate the need for government involvement;
- customers expect it, competitors use it, so it is becoming a competitive necessity.

A.2.9. Summary

The ISO 9000 family of standards represents an international consensus on good quality management practices. Its primary aim is to give organizations guidelines on what constitutes an effective quality management system, which in turn can serve as a framework for continuous improvement. Agrifood sector implementations of ISO 9000 are increasing and will continue to do so in the future.

A.3. ISO 14000—environmental management

A.3.1. Introduction

ISO 14000 is a global environmental management initiative of the ISO and operates similarly to ISO 9000. Its objective is the creation of a voluntary agreement on EMS and practices, on a world-wide basis. Certification is an instrument for increasing corporate accountability, without government interference. Businesses must develop and meet environmental goals, as well as consider the impact the business has on the environment.

A.3.2. Background

Many countries have been developing environmental regulations for corporations, and these may have a profound impact on international trade. These regulations were creating some turmoil in the market place, as there was a great deal of inconsistency between each country's legislation. In September 1996, the international committee finalized the ISO 14000 series of standards for EMS. The goal of ISO 14000 is to provide an international guideline for developing an EMS and to aid organizations in developing a monitoring and documentation process. Taking a proactive and globally consistent approach to environmental management would reduce the need for government intervention while at the same time reducing an organization's environmental risk exposure. ISO 14000 may eventually be required for selected industries or products.

A.3.3. Structure of ISO 14000

As with ISO 9000, the key to successfully implementing ISO 14000 is having documented procedures that are implemented and maintained to satisfy ISO 14001. There are several different standards in the ISO 14000 family, but ISO 14001 is the cornerstone. It is what develops the firm's environmental policy, and their EMS. The standards included in ISO 14000 are:

- ISO 14001—EMS specification;
- ISO 14004—EMS guidelines;

- ISO 14010, 14011, 14012—auditing guidelines;
- ISO 14020, 14021, 14024—environmental labeling;
- ISO 14031—environmental performance evaluation guidelines;
- ISO 14040, 14041, 14042—life cycle assessment;
- ISO 14050—terms and definitions.

ISO certification applies to individual sites rather than to entire organizations.

A.3.4. Regulatory requirements

ISO 14000 sets no numerical limits for environmental management. Instead it works within the existing environmental policy framework to ensure that a site meets or exceeds all existing government regulations. It also identifies environmental issues and risks that are not regulated and develops policies and management procedures to deal with them.

A.3.5. Cost and time required

The ISO 14000 accreditation process and time required are similar to those for ISO 9000. It is estimated that the cost would be somewhat lower, possibly $15,000, or less.

A.3.6. Benefits

The following points outline the most significant benefits that proponents claim that can be obtained from ISO 14000 certification:

- better understanding of environmental costs;
- motivate organizations to be aware of environmental legislation and problems;
- not too costly, as many organizations can adjust current environmental practices to satisfy the ISO 14000 requirements;
- international acceptance and recognition trade marketing tool;
- quicker response to environmental problems or occurrences;
- process documentation and monitoring prevents problems;
- fewer number of inspections by government;
- self-regulation (proactive) to prevent government from interfering;
- meeting customer expectations for environment stewardship.

A.3.7. The certification process

The certification and auditing process for ISO 14000 is identical to that for ISO 9000.

A.3.8. Summary

With ISO 14000, the key concern is with the environmental impacts an organization has in the course of doing its business. ISO 14000 standards are meant to be a complement to existing laws and legislation, not a replacement. ISO 14001 is the core standard, which specifies the requirements of an EMS. ISO 14000 was only adopted in 1996, but it is gaining popularity rapidly. It is a voluntary standard, but many organizations will require certification in the future, if they wish to do business in the international market place.