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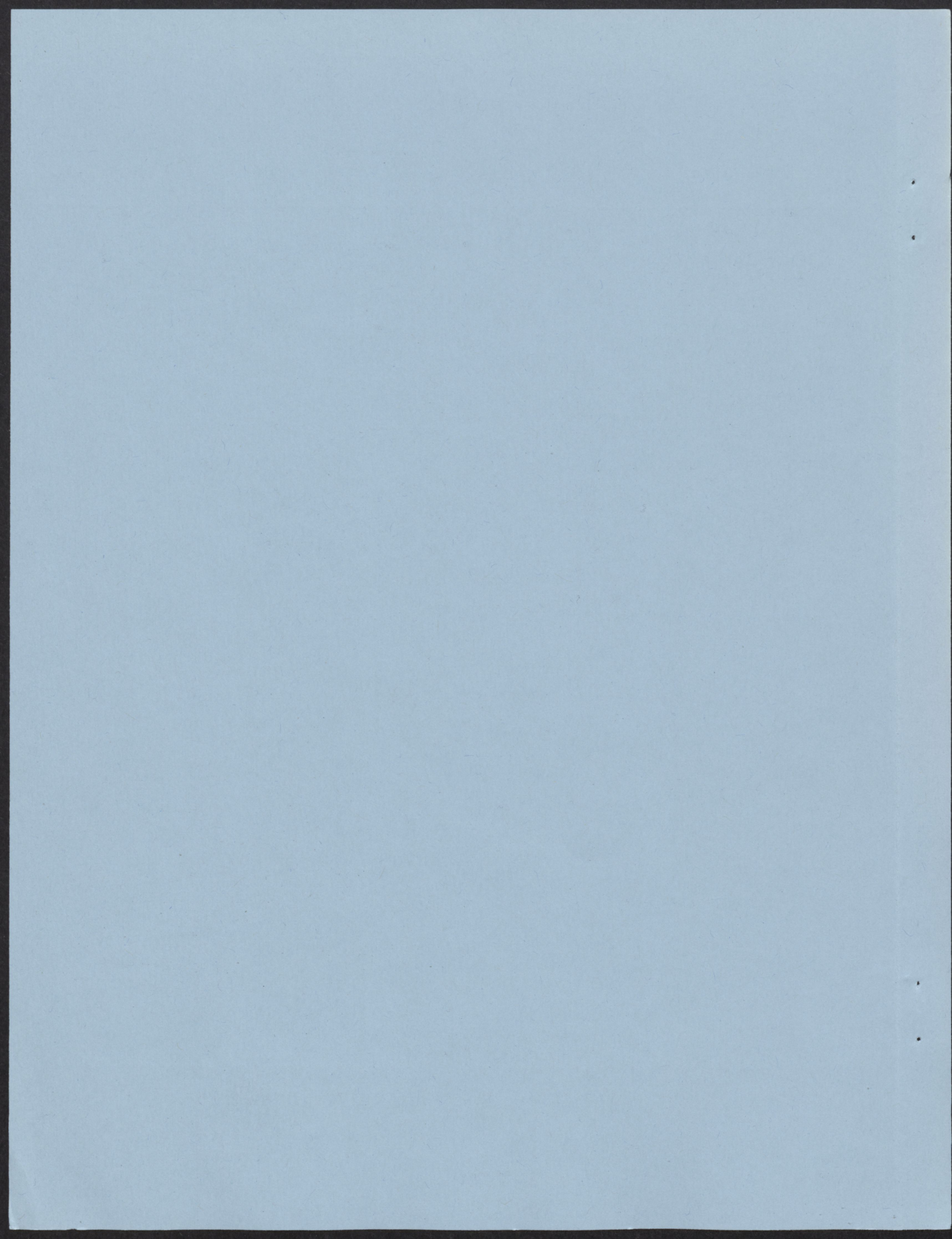
AGRICULTURE AND ISO 1400

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WORKING PAPER WP98/01

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March 1998
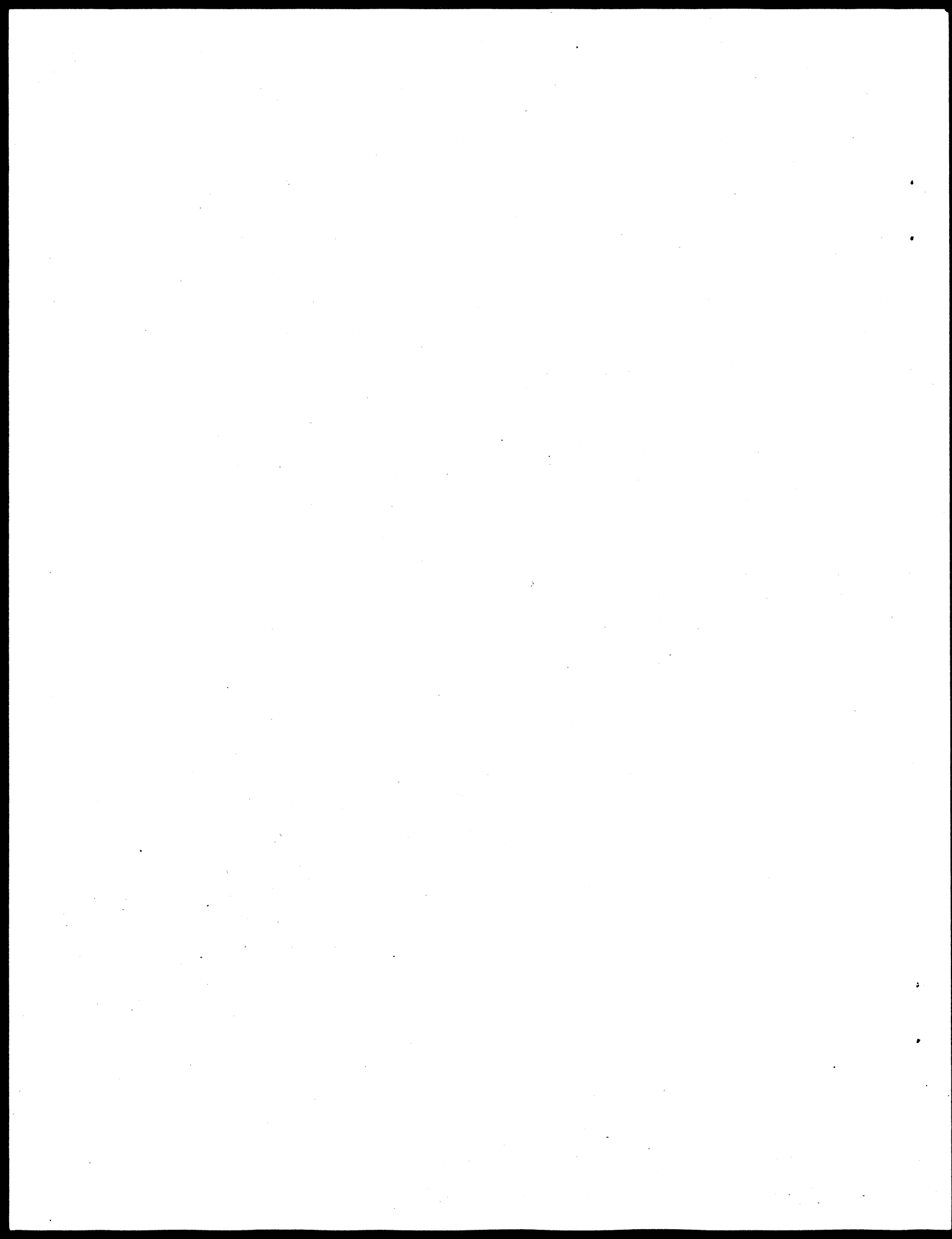
AGRICULTURE AND ISO 14000

ABSTRACT

Many agricultural firms are now considering the environmental consequences of their activities as a means to obtain a competitive advantage. The shift is highlighted by the significant interest in standardized private codes such as those found in ISO 14000. These standardized codes are characterized by signatory firms voluntarily agreeing to abide to a given set of environmental management principles with monitoring conducted by an outside party. Government policy makers are also interested in the ability of such codes to address environmental concerns related to agriculture. This paper examines the feasibility of ISO 14000 for agricultural producers and the policy issues surrounding its application. The costs to an individual firm largely depend upon the availability of an environmental management system and the extent of the changes required under the system. The potential rewards are related to lower costs from reduced input use or lower premiums and increased revenue from new customers or market premiums. Net benefits to ISO 14001 certification will be greater for producers marketing food products than for firms selling a bulk commodity far removed from final consumption. Policy concerns related to ISO 14000 include providing institutional support for promotion and training, tying environmental regulations to the code, and the lack of public accountability in the setting of standards.

INTRODUCTION

Designing effective environmental policy for the agricultural sector is complicated by the non-point or diffuse source nature of the pollution emissions. Agricultural pollution primarily is associated with water runoff, seepage, and soil erosion, ruling out certain policy options such as those based on the level of emissions. Diffuse pollution sources could be traced with an increase in monitoring costs but the many farms often contributing to pollution levels make it difficult to separate damages across firms and subsequently assign liability. In addition, monitoring costs are high in agriculture because of the complexity of the production and environmental fate process rendering it arduous to infer emissions from observable inputs. Another complication in the development of environmental policies for agriculture is spatial, temporal, and technological heterogeneity causing the damages and the abatement costs mitigating those damages to vary with each farm. Not only is the relationship between agricultural production activities and environmental quality complex and multi-faceted, the relationship is not known with certainty. Given the inherent difficulty with first-best policy options such as tradable permits or emission taxes to most environmental problems in agriculture, solutions will most likely arise through technological developments or business-led initiatives (Weersink *et al.* 1998).

The appropriate environmental policy that will garner public support and lead to environmental improvements remains a challenge for all economic sectors, not only agriculture. In the past, environmental policy has focused on regulation of allowable technologies and inputs but there is a trend toward market-based, business-led initiatives (Batie 1997). Driven by factors such as competitive advantage, anticipated government regulations, customer demands and public expectations, many firms are now considering the previously ignored environmental consequences of their activities (Esty and Chertow 1997). The shift is highlighted by the significant interest in standardized private codes such as those found in ISO 14000. These standardized codes are characterized by the voluntary agreement by signatory firms to abide to a given set of environmental management principles with monitoring conducted by an outside party. Many business analysts believe that registration with codes verifying a firm's adoption of environmentally responsible actions will become a necessary condition to be successful, particularly when trading internationally. However, because the ISO environmental initiative is so recent, little is known about its applicability and potential for such voluntary standardized codes, especially in the agri-food sector.

The purpose of this paper is to examine the feasibility and issues surrounding the use of ISO 14000 for agricultural producers. The paper begins with a historical review of ISO efforts followed by a discussion of the specific components for ISO 14000. Special attention is paid to ISO 14001 which is the only prescriptive element of the series. The following sections are directed specifically at agriculture. It examines how an agricultural firm can become ISO 14001 certified and the alternative routes to certification. The relationship between ISO 14001 and HACCP are then discussed along with global experiences of ISO 14001 in agriculture. The potential costs and benefits of the process are then reviewed to determine whether producers would be able to obtain market premiums sufficient to offset compliance and auditing costs. The paper concludes with policy issues facing the agri-food sector confronted by voluntary standardized codes such as ISO 14000.

DEVELOPMENT OF ISO

Standardization is fundamental for smooth and effective exchanges between and among individuals and their related organizations. Language and social interaction, for instance, become standardized through custom and practice so that communication can take place with as little confusion as possible. In a similar vein, standards set for weights and measures were initiated at national and inter-national levels so that goods could be exchanged fairly and efficiently. A contemporary example of standardization is found in the use of bank, credit, or "smart" cards which have to be uniform in size, thickness, and electronic features to be used worldwide.

Industrialization and its attendant mass production have fostered standardization at an increasing rate. With the introduction of assembly line work there was pressure not only for parts and final products, but also for the management of workers, to be uniform and predictable. Among the groups promoting standardization of industrial components were the engineering organizations whose work relied on precision and exactness. After World War I, the necessity for establishing uniformity in industrial production was recognized with the creation of the International Federation of the National Standardizing Associations (ISA).

Standards associations now exist in most industrialized countries to oversee and promote the establishment of national standards. Many of them also contribute to international bodies focused on standardization such as ISO (International Organization for Standardization) which was established in 1946/47.[1] ISO is a non-profit, voluntary, business or industrial association much like an engineering society. (ISO originally began as an engineering based group.) Representatives from each country's standards-setting bodies, along with those from industry, academia, and government sit on the many committees that comprise the ISO organization which has a highly bureaucratic structure.[2] Officially, ISO's main purpose is to encourage and assist the international exchange and transfer of goods and services thereby enhancing technological, economic, and scientific activity throughout the world. Non-harmonized standards are viewed as technical barriers to trade. ISO's primary objective then is to benefit global economic exchanges and industrial development through the dynamics of freer trade.

Although ISO began with a primary focus on production features (for example the thickness of pipes), by the 1980s it also started to encompass "softer" issues such as the processes involved in different management systems (Gleckman and Krut, 1997). To date, the most widely known of the ISO efforts is ISO 9000, a series of guidelines and standards for quality management that is designed to focus on meeting customer requirements. The ISO 9000 series is made up of five different documents for standards; ISO 9000 explains the details, concepts, description, and terms of basic quality assurance systems; ISO 9001 outlines a model for a quality assurance system in design, development, and servicing; ISO 9002 is concerned with models for prevention, detection, and correction of problems during production; ISO 9003 covers requirements for detecting and controlling problems during final inspection and testing; and ISO 9004 provides guidance for the suppliers to use and contains in depth managing guidelines for ISO 9001-9003 (Croy, 1995). Response to ISO 9000 has been overwhelming in terms of the growing number of firms seeking registration as many businesses view it as a "ticket' to do business in a global as economic environment (Croy, 1995; Mehta and Wilcock, 1996).

Like ISO 9000, ISO 14000 is directed at the management systems within organizations. Both are not sector specific standards and their structures can be applied to any kind of organization, institution, factory, or commercial enterprise. However, the key concern with ISO 9000 is on product or service quality whereas with ISO 14000 it is on the environmental impacts an organization has in the course of doing business. This distinction leads to other key differences between 9000 and 14000 namely the move from the "private" domain of business efficiency to the "public" realm of environmental performance. Whereas the consequences of quality management are viewed primarily within the business of competitive markets, the consequences from environmental performance have implications beyond industrial relations and move ISO into public policy (Gleckman and Krut, 1997).

Interest from the Business Council for Sustainable Development and ISO to explore the creation of international environment standards arose during the preparations for the Uruguay Round of GATT negotiations and the 1992 United Nations conference on Environment and

Development in Rio de Janeiro, Brazil (Hortensius and Barthel, 1997). ISO 14000 was conceived of as an industry response to a host of potentially inconsistent environmental standards and to the perception that government and existing industry initiatives for environmental standards were too bureaucratic and burdensome (BEC, 1996). Governments in turn are recognizing the initiatives and shifting environmental policy from the "command and control" system of regulation to one that is more market-driven and business-centered (Begley, 1996).

THE BASICS OF ISO 14000

ISO 14000 is a series of standards and guidelines that can be grouped into three broad categories and smaller sub-topics (Table 1). Details on some of the standards have been published but many are still in the development stage.[3] Guidelines for evaluation and auditing tools were among the first ISO 14000 documents released because it was necessary to have the basis for evaluation in place before organization could be assessed. Product-oriented support tools regarding life-cycle assessment are still in draft for with anticipated publication in 1998. The first and "cornerstone" standard is ISO 14001. Formally published in the fall of 1996, it is the only specification standard in the 14000 series and as such is a prescriptive document against which an organization will be measured for registration. ISO 14001 is the only international standard for environmental management systems that includes performance standards which must be met for an organization to gain registration. There are five separate elements or principles for ISO 14001 (Figure 1) with the ultimate goal of the ISO environmental management system being a commitment for continuous improvement. Each of the five elements, environmental policy, planning, implementation and operation, checking and corrective action and management review, are discussed below.[4]

Components of ISO 14001

Policy/Commitment

First, each facility must have an environmental policy statement "appropriate to itself" that contains a commitment to comply with applicable laws and regulations, with "other requirements to which the organization subscribes", and to "continual improvement and the prevention of pollution" (CSA, 1996, p.18, p.22). The policy statement is used to design and implement the environmental management system and forms the basis for its monitoring and continual improvement. The standardization implied by ISO refers to the management system of the firm rather than its outputs.

Objectives/Planning

Organizations must have a planning dimension so that environmental aspects and legal and voluntary obligations can be assessed, objectives and targets can be set, and a program (or programs) to achieve the targets and objectives can be developed. An organization needs to review their operations, activities, products and services to identify which may have an interaction with the environment. This identification of the environmental aspects include those which occur during normal business operations, abnormal conditions, incidents and future activities. When the aspects are identified, the organization needs to determine which aspects have, or can have, a significant impact on the environment. The organization must identify and have access to legal and other requirements which apply to the organization's environmental aspects.

Environmental objectives and targets need to be developed, documented and communicated throughout the organization. Objectives are long term goals, such as "We will reduce solid waste to landfill", and targets are short term goals, such as "We will reduce non-hazardous waste by 50% and reduce hazardous waste by 80% this year". Targets will generally vary throughout the various functions in an organization depending on the activities, products or services. One or more management programs are needed by the organization for achieving objectives and targets. These programs assign responsibility throughout the organization for achieving objectives and targets, and specify the means and time frame by which they will be achieved.

Implementation/Management System

There must also be a management system for implementation in place that includes defining and documenting the roles, responsibilities, and authorities of personnel whose activities have, or may have, an impact (directly or indirectly) on the environment. The organization must provide adequate resources for the implementation and maintenance of the Environmental Management System (EMS).

One or more individuals need to be appointed as the "Management Representative(s)". Irrespective of other responsibilities, the Management Representatives are given the responsibility and authority for ensuring that the EMS complies with ISO 14001 and for reporting the performance of the EMS to top management. The organization needs to identify training requirements of personnel whose work may create a significant impact upon the environment and ensure that these personnel have received appropriate training. Awareness is required for all personnel throughout the organization of the environmental policy, the EMS program and procedures, and the actual or potential impact of their activities on the environment. The competence of personnel performing activities which might have significant environmental impacts needs to be determined by the organization through education, appropriate training and/or experience, as required. Communication of relevant information on the basics of the EMS and its interaction with the environment is required throughout the organization including communication between different functions and levels of the organization, and externally to interested parties. Documentation needs to be controlled to ensure that the current versions of the documents are available where the work activities or tasks are performed.

Evaluation/Corrective Action

The organization's EMS for ISO 14001 involves measurement and evaluation. Characteristics of operations and activities which can have a significant impact on the environment need to be monitored and measured regularly. Records of monitoring and measurement information are required to track performance, to prove that operating controls were effective and to demonstrate conformance with objectives and targets. Monitoring and measurements results

need to be compared to the legal and other requirements to determine compliance. Although ISO 14001 focuses on practices rather than on performance measures such as water quality, the EMS must ensure regional environmental regulations are met.

Responsibility and authority need to be defined for dealing with non-conformance found in the EMS including the actions to be taken to mitigate any impact caused and for initiating corrective and preventive action. Corrective and preventive action taken must be proportional to the magnitude of the actual or potential non-conformance. Records relating to the EMS must be identified, collected, stored and maintained to provide objective evidence of conformance to the ISO 14001 standard, and to legal and other requirements. These records include training records, EMS audit results, management review records and the results of monitoring and measurement.

Review/Continuos Improvement

Audits of the Environmental Management System (EMS) are required on a periodic basis to provide assurance to the organization of its implementation, to determine if the EMS is operating as planned, to provide information for management review and to determine the capability of the EMS in achieving the organizations environmental objectives and targets. Besides reviewing the audits, management must be aware of the continuing suitability of the EMS in relation to changing conditions and information. For instance, they must address changes in legislation, alterations in the expectations and requirements of stakeholders, advances in science and technology, any lessons learned from environmental incidents and the concerns of relevant interested parties. Continuous improvement is achieved through addressing potential problems that arise during these reviews and through a commitment to search for and implement practices that will enhance the environmental aspects of the organization.

Some Misconceptions about ISO 14000

Although ISO 14000 is heralded by some as the great solution to environmental problems world-wide and as an effective way to ensure environmentally responsible production, there are many misconceptions about just what it is and how it works. For instance, ISO is not the

organization that issues a certificate acknowledging compliance with ISO standards. This service is provided by organizations independent of ISO and there are presently few firms qualified to do so.

The quality and legitimacy of the audits is questioned by those who point out the inevitable variability there will be among different nations' auditors (Day, 1997). As well, state environmental legislation varies widely throughout the world yet forms the basis for objectives and targets connected to ISO 14001 environmental policies. Thus, ISO 14001 certified organizations in the United States (where environmental regulations can be very strict) could be perceived as being on par with ISO 14001 certified organizations in a less developed nation (where there may be no environmental regulations in place). Given these possible inconsistencies, some claim that it is a false impression that ISO 14000 is a "standard" and "international" (BEC, 1996).

Another important misunderstanding is that ISO 14000 is not a label that signifies a "green" or "environmentally friendly" product or service. ISO certification is attached to the organization (or a division within a firm) and means only that the organization has followed the prescribed steps for implementing an environmental management system. The objective is to give the customers/consumers some confidence that the organization they are dealing has considered the environmental impacts in its production of goods and services.

IMPLEMENTING ISO 14001 IN AGRICULTURE

Detailed descriptions about the five elements of ISO 14001 discussed in the previous section and what actions need to be undertaken for each one for certification are readily available (e.g. Char, 1995; CSA, 1996). The stumbling block for most individual producers or organizations within agriculture would be identifying the environmental impacts arising from its activities and the subsequent development of an environmental management system. The informational and time requirements necessary to assemble such a system would be onerous for most farmers. However, public agencies in many jurisdictions have documented variations of an EMS (e.g. Ontario's Environmental Farm Plan, Farm-A-Syst in the United States) in an effort to

increase producer awareness of the environmental consequences of their actions. Assuming that a producer would use a publicly available environmental management system as the basis for their ISO registration, there are three remaining steps required; the inclusion of an environmental policy, third party auditing, and a commitment to continuous improvement. The following discusses the how these steps may be pursued and the alternative routes to certification.

Environmental Policy

Based on a study of small and medium enterprises (SMEs) in Europe that were in the process of adopting ISO 14001 or EMAS environmental management systems, Hillary (1997) found there were significant problems in writing up environmental policies. Included in their complaints were difficulties in finding the right kind of language to use and a lack of knowledge about all the environmental aspects of the organization. As well, the SMEs were criticized for ignoring non-regulated environmental issues, focusing instead on just what they were required to meet by law. These points suggest that small and medium size farm operations will fare much better if there is institutional support for them when undertaking the development of their own environmental policies.

There are at least 6 elements to consider in an environmental policy. The first three are: a mission statement which gives "the reason an organization exists, the societal needs it fulfills, and its fundamental business focus"; a vision which expresses the organization's aspirations and, along with the mission statement, provides long-term guidance; and the core values and beliefs or code of ethics underlying decision-making in the organization (CSA, 1996, p.23). These elements are pictured as working together to "connect business strategy to values, purpose, and behaviour" (CSA, 1996, p.23). Although each individual farm operation might vary in terms of its mission and vision statements and code of ethics, it will likely be very similar to the other farms in this respect. Consequently, these aspects of the environmental policy might be developed by appropriate farm and/or commodity organizations for interested members. A template with

suggested phrasing could be made available to farm operators so that they could tailor their statements to their specific situation.

The fourth factor in an environmental policy is the need to ensure consistency with existing policies found in the organization (CSA, 1996, p.24). Examples include any formal obligations for meeting standards associated with occupational health and safety, quality, and human resources. It is important that there are no potential conflicts between these and the environmental policies being developed. Also of concern in this regard are the environmental policies of related organizations, whether parent companies, partners, competitors, or buyers. Awareness of their positions regarding environmental policies reduces the chance for potential conflicts.

A fifth consideration, namely contractual obligations, may constrain what an organization can or cannot do with respect to its environmental policy (CSA, 1996, p.24). Both existing policies and contractual obligations could be significant for farming operations developing environmental policies for ISO certification. Other interests in the agri-food industry have implemented quality assurance programs and policies that may require agricultural producers to farm in a prescribed way. With the rise of niche marketing in agriculture, producers need to be aware of the distinctive characteristics of potential buyers. Appreciating the details of buyers' various environmental policies could be a strategic advantage to farm operators.

The final component noted for an environmental policy is a code or set of environmental guiding principles that constitute a public commitment to environmentally responsible behaviour (CSA, 1996, p.25). Because of the generic nature of these principles, agricultural organizations could assist individual farmers in a similar manner to the one suggested for the vision and mission statements.

Third Party Auditing

Quality assurance schemes must have some kind of independent review and verification to be credible. ISO 14001 has established an extensive third party auditing process that is often cited as one of the drawbacks to adopting the EMS due to its expense.

Suggestions about how to proceed with the auditing dimension for ISO 14001 in the agricultural industry include a proposal to have registration at the level of farm organizations rather than individual farm enterprises. For example, if several pork producers in a region wanted to pursue ISO 14001 registration to give them an advantage in foreign markets, they could request their representative producer organization seek ISO 14001 registration. To qualify, all farm operators wanting the certification would have to adopt an ISO 14001 environmental management system but only a random sample of them would be audited. If those audits were successful, then the producer group would become an ISO 14001 organization. Any producers with membership would be able to claim ISO 14001 registration.

Farm and commodity organizations might play other roles in the auditing process if there is strong interest in the farming sector for adopting ISO 14001. For instance, sponsoring the training of staff in ISO certification and providing their services at reduced or minimal costs would be of great assistance. Likewise, providing comprehensive environmental consulting through appropriately trained staff could streamline ISO auditing. Information seminars directed specifically at ISO 14001 adoption would also be beneficial to those producers interested in pursuing individual certification.

Continual Improvement

The idea of continual improvement entered organizational and management theory with the growing awareness of Japanese management style in the 1970-80s. Working to find more efficient and effective ways of completing tasks has become one of the principles that modern industrial firms expect of their employees. Several questions have been raised about the interpretation of continual improvement in ISO 14001, especially with respect to SMEs. For instance, Hillary (1997) points out that because the notion is somewhat vague, organizations are concerned about; how quickly improvement needs to occur; whether improvement has to occur in all areas; what rate of improvement needs to be demonstrated; and what standards of improvement are being worked towards.

The general response to such questions is that the interpretation of continual improvement will vary among different organizations, depending on the environmental impacts they begin with and on the technologies for improved environmental performance available to them. ISO 14001 does acknowledge and accept that continual improvement will not occur in all areas of activity simultaneously, reinforcing the idea of gradual incremental change for the better (CSA, 1996). However, the environmental management system must be designed to incorporate continual improvement. For example, Ontario's Environmental Farm Plan designates categories ranging from poor through fair, good, and best with respect to the 23 environmental criteria selected provides a structure suitable for continual improvement. Each farm operator can use the goal of moving to the next classification through implementing the management practices suggested for that improvement as the guide for continually bettering the environmental practices in the farm operation.

Routes to ISO 14001

Based on possibilities suggested by Hilary (1997), there are three potential approaches to obtain ISO 14001 for agricultural producers; (i) direct ISO 14001 certification of the farm enterprise; (ii) indirect through an existing certification programs such as HACCP or ISO 9000; and (iii) indirect through the creation of a national standard.

The first approach to ISO 14001 certification has been successfully carried out by an Australian cotton producer. This individual found the exercise "horrendously expensive" but is satisfied that the marketing opportunities it brings will eventually compensate. If individual producers wish to follow his example they would have to be prepared to incur high costs for auditing and perhaps modifications in their farm enterprises, depending on their initial conditions. In addition, it may be difficult for farmers to create a market demand for the agricultural products coming from their individual farm.

The essence of the second approach to ISO 14001 certification has been favoured by many non-farm industry organizations. In this case, establishments have gone through extensive

management changes to incorporate their own (or their own industry recommended) EMS that require minor modifications for ISO 14001 certification. Similarly, some food processors have adopted HACCP and are starting on ISO 9000. When these systems are up and running, the structure for ISO 14001 is in place making its adoption much less costly.[5] Existing producer environmental management systems such as the Ontario EFP would provide a similarly strong base for ISO 14001 and put producers in a good position for seeking registration. Because some commodity groups (e.g.. pork and poultry) are implementing HACCP-like programs as well as EMS suitable to their industries, they would also be in a good position to rely on that experience for implementing ISO 14001.

The final suggestion is to move into ISO 14001 through the creation of a national standard. This route is favoured by current national standard associations with the explanation that it will cut down significantly on the certification process because the elements of an environmental management system will have been thoroughly worked out and made available to interested producers. As well, it is thought that having a nationally respected institution involved in the process will give more credibility to the industry. The Canadian forestry industry developed a national standard for sustainable forest management in 1996 (CAN/SCA-Z808-96) that some consider to more stringent and demanding than ISO 14001. However, no certifications have been presently granted. Some of the factors facing the forestry industry are similar to agriculture and make creating a national standard very difficult; both have a great diversity in regional conditions and practices, a mix of organizations approaches and size, and range in public pressure for responsible environmental planning.[6]

In addition, there is a perception that major difficulties exist with establishing a national standard in environmental farm management due to the substantial costs and the great diversity in agricultural practices, conditions, and business approaches across a heterogeneous country.

STATUS OF ISO 14000 WITHIN THE AGRI-FOOD SECTOR

Experiences of ISO in Agriculture

The agricultural sector in North America has generally not considered ISO 14000. For example, personnel in many Canadian provincial ministries of agriculture had not heard of ISO 14000 and, when approached for information, often requested it rather than offering their views. The U.S. has a "cautious interest" in ISO 14000 and is adopting a "wait and see" approach since the program is too new with too many uncertainties associated with it. The U.S. Department of Agriculture does not appear to have any ISO 14000 initiatives under way although the Environmental Protection Agency in different states has taken some interest in it for non-farm industry under their *Environmental Leadership Programmes* (1994) and their *Common Sense Initiative* (1993). In Mexico, nothing has developed between ISO and agriculture but there are a reported 4 or 5 non-agricultural companies with ISO 14001 certification who relied on auditors from another jurisdiction. As in many developing nations, Mexican officials are concerned about the high costs of ISO 14000 and the inability of many small to medium sized firms to become involved. Consequently, there are attempts in that country to develop and institute their own national system that will be as good as ISO 14000 but less expensive to adopt (*National Environment Reporter*, June 25, 1997).

Countries in the European Union are considered by many to be the most environmentally aware and demanding in the world. Forerunners to ISO 14000 include EMAS (Eco-Management Auditing Scheme) launched in 1995 and BS 7750 (the British Standard for Environmental management). EMAS has been implemented by hundreds of firms in Europe, particularly Germany where demand for environmentally responsible production is very high (Gelber et al., 1997). EMAS is site- specific and composed of 9 elements that are similar to the components of ISO 14001. In preparation for the EMAS review (due in 1998) a European organization called European Partners for the Environment (EPE) conducted an assessment of EMAS noting its strengths, weaknesses, and applicability for non-manufacturing industries (Spencer-Cooke, 1997). Cited as examples of strengths for both EMAS and ISO 14001 are its systematic approach,

transparency, improvement in company profiles, and inclusion of stakeholders. By contrast, weaknesses include the high costs, the stress on administrative documentation, and a lack of environmental performance requirements (Spencer-Cooke, 1997).

EMAS is often compared to ISO 14001 and found to be similar in essence but with a few differences worth noting. For instance, EMAS is considered to be more stringent regarding past practices, insisting that the current system takes these into account and ensures problems arising from them are addressed. ISO 14001 emphasizes present processes and continual improvement rather than past environmental problems. EMAS expects annual environmental reports while ISO does not. There are also differences in the auditing and verification of audits that separate the two systems. One of the first food processing companies (Hipp) in Germany to gain EMAS certification has documented how its supply chain has been affected by its move to certification for environmental management. Hipp has always had direct interest in the environmental conditions on the farms supplying product to their corporation, increasing the percentage of "organic" raw material from 18% in 1994 to 69% in 1995 (Gelber et al., 1997). As a further assurance for Hipp customers, the company is intending to have contracts only with farms that can be certified to EMAS.

It may be that Pacific Rim countries have taken ISO 14000 and agriculture more seriously than most. In fact, one of the only farmers in the world known to have ISO 14001 certification is a cotton producer from Western Australia where environmental management has been a key issue in the agriculture industry. This individual was an ISO pioneer of sorts and has taken the training to be an ISO auditor himself. China has also pursued the ISO 14001 initiatives with respect to environmental management systems for their country during its intensive growth. Recent reports indicate that 14 cities have pilot certification projects with ISO 14001. In this case as in various local jurisdictions in the UK, the public sector is adopting certifiable environmental management systems as a way to ensure consistency and some degree of legitimacy.

For non-farm industry, ISO 14000 is viewed positively by a number of Pacific Rim countries including South Korea (where the government requires leading Korean companies to

achieve ISO 14001 certification by the end of 1997), Singapore, Philippines, Malaysia, and Indonesia (Day, 1997). Similarly, Japan, has supported ISO 14001 certification and has established certification bodies under JACO (Japanese Audit and Certification Organization) which has certified several electronic industry organizations (Kurasaka, 1997). Given that the Japanese are major food importers and have very high standards for domestic food production, there is some expectation that ISO 14001 or some equivalent environmental management systems could become a pre-requisite for securing future Japanese markets.

Relationship of ISO 14000 to HACCP

ISO standardization fits into the company of well-established international bodies that set policy concerning with food safety and quality assurance. For instance, Codex Alimentarius Commission, which is run jointly by the United Nations Food and Agriculture Organization (FAO) and World Health Organization, was established in 1963 to develop and institute food safety and quality standards that would result in increased security for agricultural and food trade between supplier and consuming nations. Both NAFTA and GATT (or WTO) use Codex Alimentarius standards as part of their trade regulations although there is some dispute over the use of codex standards as technical barriers to trade. One of the key programs Codex has supported is called the HACCP (Hazard Analysis Critical Control Point) system which was developed to ensure food safety for the space program in United States in 1960s (Mehta and Wilcock, 1995). Currently, national governments have been guiding food processors and producers through HACCP implementation.[7]

One of the reasons interest in HACCP has been sharpened is related to developments in the import/export markets for food. For instance, by December 18, 1997, all seafood related entities that are in the Food and Drug Administration's establishment inventory and foreign processors that export to the U.S. must implement HACCP in their organizations (Smith, 1997). Accompanying the interest in HACCP for food safety is the adoption of ISO 9000 for food quality. Both of these are becoming important aspects of quality assurance programs that are appearing throughout the

world. Australia, for instance has instituted a program called SQF (Safe Quality Food) 2000. Quality Code that is designed to assure consumers that high standards (which have been audited by a third party) are employed in the production of food with that label. The SQF 2000 uses a HACCP based system that incorporates features of ISO 9000.

A certifiable environmental management system such as ISO 14001 could become part of a total quality assurance package which also includes a certifiable management system for food safety such as HACCP. The issues dealt with in ISO 14001 overlap with many of those important for HACCP. For instance, a firm that has waste water on site has the potential for contaminating not only the food products being created (therefore relates to HACCP) but also the environment within which the production process is taking place (therefore relates to ISO 14001). Developments in food production and quality assurance will inevitably have some influence on agricultural production given the close linkages between the two sectors.

COSTS AND BENEFITS TO ISO 14001 FOR AGRICULTURE

Acceptance of ISO 14001 by agricultural producers will occur if the benefits from compliance are greater than the associated certification and marketing costs. Whether the net returns are positive is unknown but will undoubtedly vary significantly depending on factors such as the stringency of the environmental management system, the type of output produced, and consumer awareness. The following section examines the components of costs and benefits for ISO 14001 compliance.

Costs

Certification Costs

There are costs associated with each of the five components of ISO 14001 discussed earlier. Developing an environmental policy statement, setting environmental objectives and defining an environmental management system can be done through private or public consultants. An individual firm could also complete these first three components of certification depending on

the producer's knowledge base. The necessity for completing these components by an individual firm would be negated if the firm moved into ISO 14001 as part of a group with others in an industry sector. The major cost with the initial development of an ISO plan is designing an environmental management system. This cost will increase with the comprehensiveness of the EMS but be lowered significantly with the existence of publicly available systems such as Ontario's EFP. The cost of acquiring information necessary to complete all steps of ISO 14001 certification will decrease as the acceptability of the program increases and its appeal broadens.

The two major costs of certification are those associated with the change in practices required to meet the established EMS and the auditing costs to verify the EMS is being followed. The stringency of the ISO 14001 plan developed for the agricultural firm determines the cost of its implementation. Little change implies little cost. The firm could decide to make rather mundane changes in the way pesticides are stored and handled as an example. The average cost to Ontario farmers of meeting relatively tough standards in this area is $1,800. In contrast, if the EMS outlines changes in the way manure is stored or crops are cultivated, compliance costs associated with manure tanks or no-till equipment would be at least ten times greater.

The final step necessary for registering an organization to ISO 14001 is an audit to confirm the firm is following its EMS. Auditing costs for the non-farm sector are approximately $7,500. The high cost incurred by the only farmer that is presently ISO 14001 certified ($12,000 (AUS) for certification plus $2,800 (AUS) for annual audits) led this cotton producer from Western Australia to become an ISO auditor himself. Auditing expenses will likely decrease with an increase in the number of auditors that would result from wider adoption of ISO 14000. The costs to an individual producer would be much lower if certification were pursued as part of group such as a producer organization. Auditing would occur only on a randomly selected group of farms thereby spreading the costs among all members of the group.

Marketing Costs

Before a firm can reap any benefits from ISO 14001 registration, it will have to enhance customer awareness in the environmental implications of registration and develop trust in the

claims made. A study by the Food Marketing Institute indicates consumers are largely unaware of the relationships between agricultural practices and environmental quality (FMI 1997). The implication for a standardized code such as ISO 14001 based on process rather than actual environmental performance is that it may be difficult to create consumer awareness about the benefits from ISO 14001 produced goods. The costs of developing the knowledge among potential purchasers may thus be significant. Marketing costs, however, will likely be assumed by processors of the raw agricultural products who use ISO 14001 grown commodities as part of a life cycle assessment on the environmental friendliness of the final consumer product.

Benefits

Despite the concern that improving environmental quality through ISO 14000 will lead to more restrictions, more paper work, and increased costs, there may be a number of positive aspects associated with the adoption of ISO standards besides the obvious improvements to environmental conditions on the farm and the surrounding area. The four areas of potential benefits include enhanced competitive advantage found through innovation offsets, increased demand, alleviating the potential of more stringent government regulation, and a lowering of insurance and financial premiums associated with reduced liability risk. Each of these four potential benefits are discussed below.

Competitive Advantage

Rather than forsaking profits by improving their environmental performance through ISO 14001, firms may be able to enhance their competitive position. According to Porter (1991), green competitiveness and its "win-win" opportunities for individual firms arise from innovations induced by environmental regulations. Porter and van der Linde (1995) describe several means of enhancing competitive advantage. First, costs can be reduced by lowering input use through a reduction in initial application rates or by re-capturing and re-using the excess. Cost savings will increase with the cost of the inputs and waste disposal. Second, many examples exist of companies developing new products from wastes (Porter and van der Linde 1995). Finally, a

policy instrument such as ISO 14001 can force a firm to evaluate its production process that may create value to its product and reduce input costs. An example provided by Porter and van der Linde (1995) within the agricultural sector are Dutch flower producers. Forced to reduce fertilizer and pesticide contamination of groundwater, these producers developed a closed loop system for growing flowers in water and rock wool which reduced input levels, lowered the risk of disease and narrowed the variation in growing conditions. Both environmental health and the competitive position of the firm improved.

Reduced Liability Risks

ISO 14001 may allow firms to reduce insurance and financing costs in addition to lowering productive input expenditures. With the rise in law suits over environmental infractions, registration to ISO 14001 is being presented as evidence supporting an argument of "due diligence". Due diligence is demonstrated when proactive measures have been taken to avoid the commission of an offense and is often the only defense acceptable under environmental legislation. Organizations that are sued for damages stemming from environmental "accidents" have been viewed more favourably by the courts if they have a recognized environmental management system in place. Related to liability issues are concerns the farm community has over potential difficulties regarding their eligibility for insurance plans and bank loans. The net result is that the existence of a recognized environmental management system such as ISO 14001 will likely reduce premium costs for loans and insurance.

Meeting Market Demands

Regardless of the impact of ISO 14001 on a firm's cost structure, many firms will not consider certification unless revenues are improved through premiums for their products or increased sales. There is potential for increases in demands from the domestic market for food products that come from farm operations that can guarantee sound environmental management. Recent surveys indicate that North American consumers are very concerned about environmental issues and are willing to pay more for goods that are certified as "environmentally friendly". Food manufacturers may adopt ISO 14001 registration as one way to assure consumers that they are

purchasing goods that have been produced under environmentally responsible conditions. Processors with ISO 14001 would therefore be obliged to establish "procedures related to the identifiable significant environmental aspects of goods and services used by the organization and communicate relevant procedures to suppliers and contractors" (Day. 1997:175). Although the phrasing is somewhat ambiguous, this clause is understood to mean that suppliers could be required to adopt ISO 14001 as well (Day, 1997). In that case, farm products from operations with ISO 14001 certification would be in demand.

It is possible that new export markets for agricultural goods produced by farms with an ISO 14001 registration will develop. Companies that adopt the ISO 14000 series first are viewed as having a critical strategic advantage by being prepared when the demand arises (Birchard, 1997). Food processors and government agencies that import and distribute agricultural products could make ISO 14001 a stipulation to "do business" as has already happened with ISO 9000 and HACCP.[8] In these cases there is a need for an international as opposed to a national standard to overcome the uncertainty associated with the regional quality standards of foreign states. By adopting one global set of criteria, the importers and exporters (both of whom could have had input into developing the standards) have a degree of assurance about the environmental management systems employed for production.

<u>Anticipating and Reducing Government Regulation</u>

In general, the more farm operations that adopt environmental management systems, the better the public relations agriculture will have with customers and consumers. One consequence from improved relations could be a lessening of pressure for government rules and regulations regarding farming practices. This possibility has been an important selling feature of ISO 14001 in the United States where the Environmental Protection Agency looks favourably on firms that have ISO 14001 registration. The need to be pro-active through activities such as ISO certification is increasing as government enforcement of environmental policy is now being directed more at problem firms within an industry rather than the whole sector (Esty and Gentry 1997). In addition to potentially reducing the stringency of government regulations, firms adopting ISO 14001 may

enhance their strategic position relative to other firms. Business that incorporates environmental policy within their strategy are best positioned to adapt to changing regulatory conditions (Esty 1997).

CONCLUSIONS

It remains unclear whether ISO 14001 is necessary for an individual agricultural producer to be successful. Certification costs will decrease with the availability of environmental policy statements and management systems that can be adapted easily by an individual firm. That firm can directly determine the costs of meeting the ISO 14001 plan through its choice of practices prescribed for change. Thus, annual auditing costs may represent the major compliance expense for producers but this item maybe spread amongst other producers or purchasers depending upon the route chosen for ISO certification. The potential benefits from ISO 14001 are in the form of an enhanced competitive position from the lowering of input costs including reduced liability risks, increased market demand, and a reduction in regulatory pressures. These benefits will likely be less than the associated costs for traditional farms selling a homogeneous commodity on a spot market. However, new technology, both information and biotechnology, are allowing producers to engineer food products that meet the increasing demands of consumers rather than simply producing food commodities. The sale of these products tend to be negotiated through contracts rather than auctions. The negotiated coordination may allow producers to obtain added value for goods produced under ISO 14001 or it may become a necessary condition demanded by purchasers in order for sale to occur. The resulting food product would then likely have ISO 14001 as part of a total quality assurance package which may also include a certifiable management system for food safety such as HACCP.

The focus of ISO 14000 on environmental impacts implies that its feasibility is not only an issue for individual businesses but also for public policy makers. Even if it is not beneficial for firms to become certified, government involvement in promoting ISO 14001 can be justified if the total benefits, including environmental improvements, are greater than the costs. Adoption can be

promoted through the provision of environmental management system templates or through training and education into the certification procedures. The monitoring requirements under ISO 14001 could also serve as a reporting device under existing or potential regulatory programs. Governments could also stimulate firms to consider the environmental implications of their actions by reducing the threat of more stringent environmental policy tools for those firms that are ISO 14001 certified. However, potential environmental impacts are uncertain as the focus of ISO 14001 is on environmental practices and not on performance measures.

Another public policy concern with ISO 14000 is the power an industry has to institute international trade standards without involvement from the public or government institutions, thereby avoiding constraints from the democratic process and/or public accountability. In addition, some feel that ISO 14000 might have a potentially weakening effect on more regional and industry specific initiatives for sustainable development (BEC, 1996). The concerns are particularly relevant for developing nations who do not have a standards-setting body in place necessary for representation on ISO. These countries are automatically excluded from participating thereby losing the opportunity to contribute to initiatives that might be very important to their economic development (UNCTAD, 1996). As well, there is some apprehension that export markets for goods from developing countries could be lost if ISO 14001 becomes a requirement since many indigenous businesses in developing countries might not be able to afford ISO certifications or have reasonable access to auditors (UNCTAD, 1996). Whether these policy issues surrounding ISO 14000 such as environmental impacts and public accountability become a major concern will ultimately be determined by its feasibility at the individual firm level.

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Table 1. The Structure of ISO 14000 Series

Evaluating and Auditing Tools	Management System Standards	Product-Oriented Support Tools
Auditing Guidelines ISO 14010 ISO 14011 ISO 14012	EMS Specification ISO 14001	Lifecycle Assessment ISO 14040 ISO 14041 ISO 14042
Environmental Performance Evaluation Guidelines ISO 14031	EMS Guide ISO 14004	Environment Labeling ISO 14020 ISO 14021 ISO 14024

Terms and Definitions
ISO 14050

Source: Hortensius and Barthel, 1997.

Figure 2. Environmental Management System Model for ISO 14001
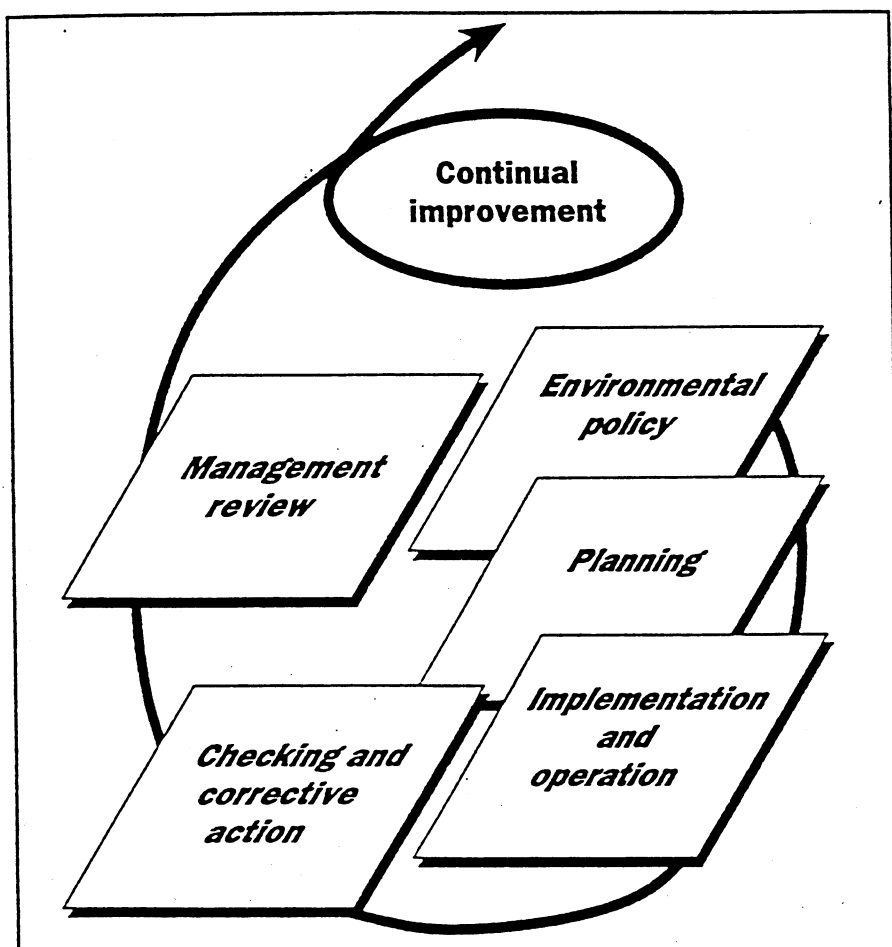
ENDNOTES

[1] Although the term International Organization for Standardization begins with the same letters as ISO, it is not an acronym. ISO is related to a Greek word *isos* meaning equal.

[2] ISO's structure is composed of the following divisions; General Assembly, Principal Officers, Member Bodies, Correspondent Members, Subscriber Members, Policy Development Committees, Council, ISO Central Secretariat, Ad Hoc Advisory Groups, Technical Management Board, Committee of Reference Materials, Technical Advisory Groups, and Technical Committees. To indicate how complex the ISO organizational structure is, the technical committee on environmental management contains six sub-committees (systems, auditing, labeling, performance evaluation, life cycle analysis, and terms and definitions) along with a number of working groups.

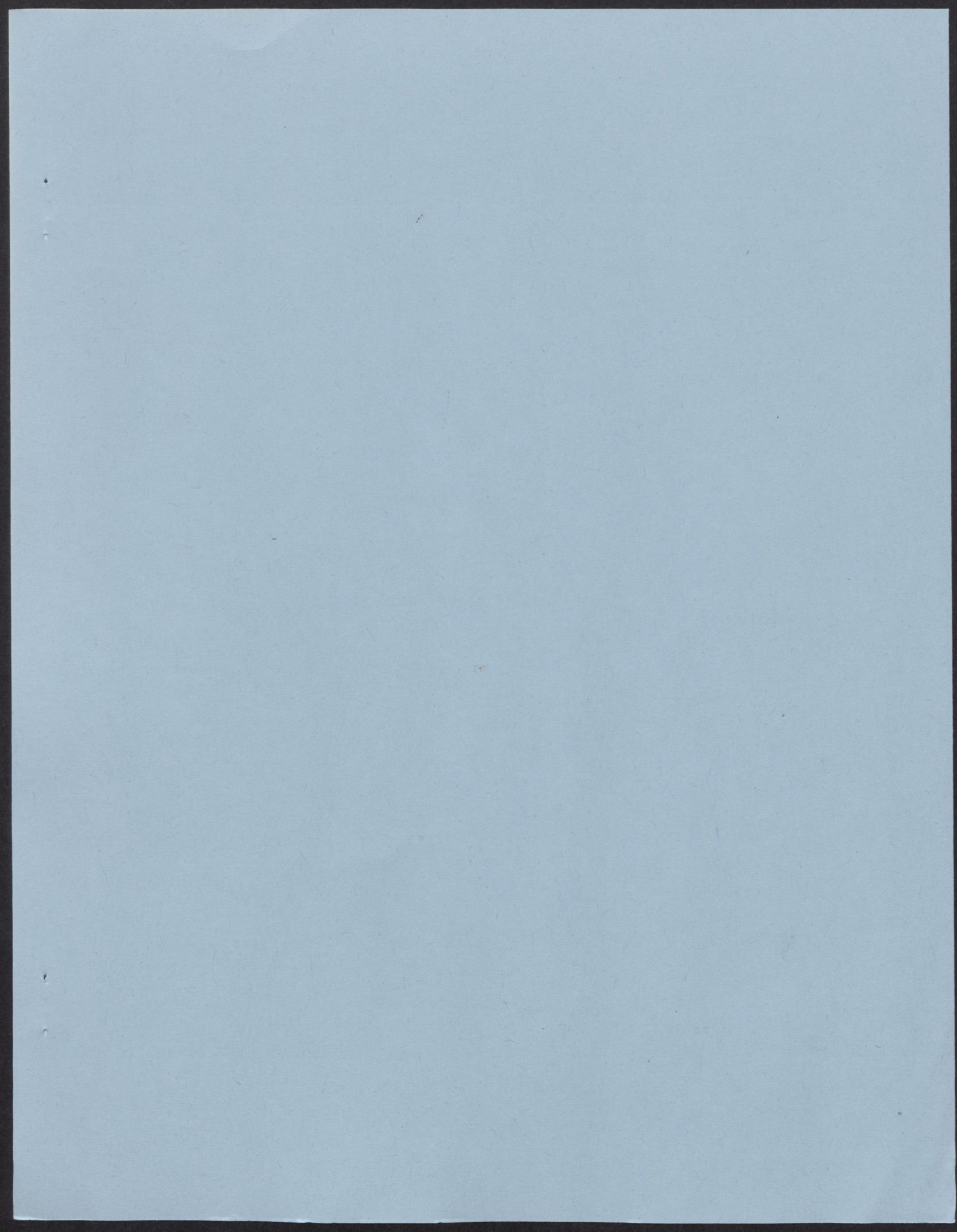[3] The most comprehensive and up to date information on ISO 14000 can be found at the website: http://www.iso.ch/welcome.html

[4] The following is based on information from MGMT Alliances Inc. at their web site: http//www.mgmt14k.com

[5] According to Hillary (1997) having gone through the ISO 9000 process can also be a deterrent for adopting ISO 14001 due to the costs incurred and the lack of tangible benefits.

[6] Non-government organizations in Canada have expressed concerns about corporate entities such as ISO entering into public policy and setting significant national and international standards.

[7] Agriculture Canada, for instance, has the Food Safety Enhancement Program in place which is based on HACCP (Graham, 1997).

[8] Besides noting the HACCP examples given above, there have been similar development for ISO 9000. For instance, CIDA (Canadian International Development Agency) now requires that the flour it purchases for distribution come from organizations that have an ISO 9000 registration. The same requirement is being considered for the distributors of grains and seeds and has spurred Pioneer Hi-Bred to register to ISO 9002 in all of its sites world-wide.