

The ISO 14001 EMS Implementation Process and Its Implications: A Case Study of Central Japan

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ABSTRACT / This study aims to investigate the ISO 14001 implementation process and its implications for regional environmental management. The region of Central Japan (known as Chubu in Japanese, which literally means center) was chosen for this case study. The study focuses on selected issues such as the: (1) trends and motives of private firms in the implementation of an ISO 14001-based environmental management system (EMS); (2) obstacles during system implementation; (3) role of the system in enhancing environmental performance within the certified organization; and (4) relation between the major stakeholders, local citizens, governments, and firms after adopting the system. To achieve these objectives, a questionnaire survey was mailed to all certified firms in the region. A 58% response was achieved overall. The results show that the main aims behind

the adoption of ISO 14001 by firms in the Chubu region are to improve the environmental aspects within the enterprises and to enhance the employees' environmental awareness and capacity. The results have also shown that the ISO 14001-based EMS has had a great effect on a firm's environmental status as certified firms have claimed that natural resources such as fuel, water, and paper consumption have been more efficiently managed after adopting the system. Implementation of the system causes the firms to consider the role of the local people and the government in more effectively involving the local people in the firm's daily environmental activities. It also helps to enhance the environmental awareness among the local people. Adopting the system also promotes a better relation within the enterprises affiliated to the same group, such as more attention given by the parent firms (head offices) towards other firms working for the same group, or branches—mainly small and medium sized enterprises (SMEs)—in the field of EMS. Finally, the results show that firms give serious consideration to their final products' impacts on the environment. In other words, attention is given to life cycle analysis (LCA) among certified firms.

In 1996, a comprehensive set of standards for environmental management was published by the International Organisation for Standardisation (ISO). This series of standards, generally known as the ISO 14000 series, is designed to cover the whole area of environmental issues for organizations throughout the world. The ISO 14000 series emerged from the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 (Lord 1997). This generated a commitment to protect the environment by advancing the cause of sustainable development across the world.

The ISO 14000 series consists of a set of standards and guidelines of environmental management systems (EMS), environmental auditing, environmental performance evaluation, environmental labeling, life cycle analysis (LCA), and environmental aspects in product standards (Zharen 1995, Cascio and others 1996, Lamprecht 1997). The set of standards and guidelines allows organisations to focus environmental efforts on interna-

tionally accepted criteria. The benefits that may accrue from the implementation of an effective EMS developed on the basis of the ISO 14000 standards and guidelines include productivity improvement and cost savings derived primarily from increased efficiency in resource/energy utilization; improved corporate image, which fosters better relations with the stakeholders; competitive advantages in international trade; and increased marketing opportunities (ITD and others 1997).

The ISO 14001-based EMS is now being adopted worldwide, and the number of certified organizations is increasing. Globally, Japan, United Kingdom, Germany, and the Netherlands are the leading countries with the highest number of certified organizations of ISO 14001. In this study, the focus will be on Japan, specifically the central part of Japan.

The central part of Japan, known as the Chubu region, has been chosen as the case study location. This region consists of eight prefectures, namely Aichi, Gifu, Ishikawa, Mie, Nagano, Shiga, Shizuoka, and Toyama. In this region, a variety of big projects such as the Expo 2005 and the Chubu International Airport are underway. This region has played a leading role in the

KEY WORDS: ISO 14001; Environmental management system; Sustainable development; Green market

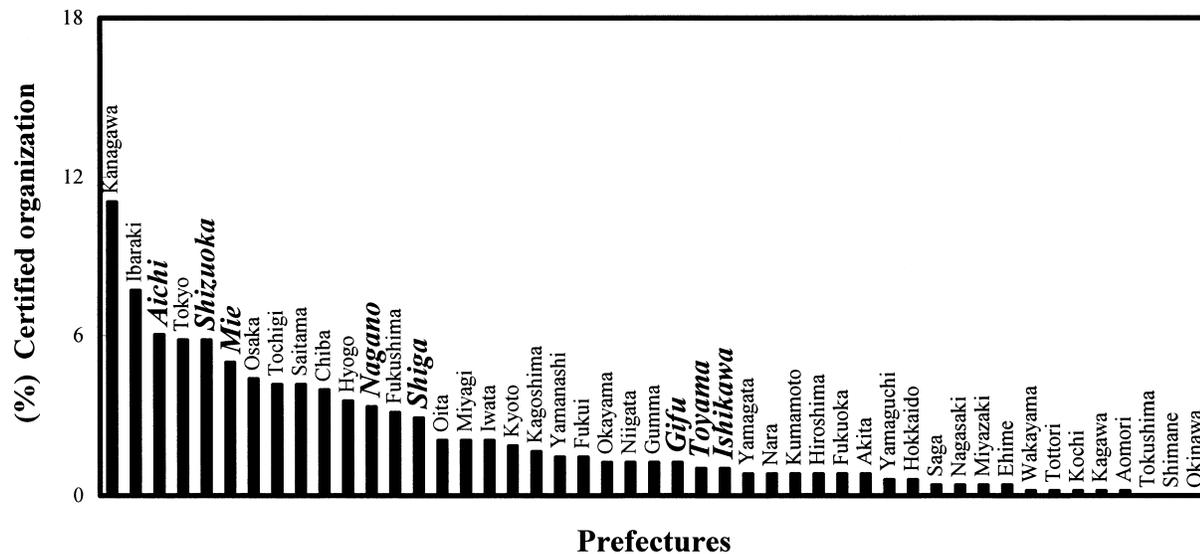


Figure 1. Percentage of ISO 14001-certified organizations in Japanese prefectures (total of 479 as of November 1997; source: MITI). Note that the Chubu region consists of eight prefectures, referred to in italic bold letters in this figure.

development of modern industry and technology in Japan (Chubu 1996) and has a wide experience in addressing environmental problems, such as the case of Yokkaichi City, at Mie Prefecture (Sawa 1997, ICETT 1994). Recently, a growing number of private firms in the region have begun to adopt the ISO 14001-based EMS in line with the policy for promoting environmentally sound and sustainable development.

In Japan, a large percentage of the certified firms fall within the field of electrical goods. Other industries, such as general machinery, transportation, chemicals, and precision industry, are beginning to actively implement the ISO 14001 standards (Global Environmental Forum 1998).

ISO 14001-Certified Enterprises in Japan

As of November 1997 the number of organizations certified by ISO 14001 in Japan was reported to be 479 (MITI, 1997). The percentage of certified organizations in each prefecture is shown in Figure 1. According to Figure 1, a high percentage of certified organizations are located in Kanagawa, Ibaraki, Aichi, Shizuoka, and Mie prefectures. It is here that a high percentage of chemicals, general machinery, electrical, and transportation equipment industries are located. A great majority of these enterprises are export/import-oriented, such as Toyota and Sony in Aichi; Honda in Shizuoka; and Toshiba, NEC, and Fujitsu in Kanagawa, which means giant industrial firms are located in these prefectures.

It is interesting to note that within these prefectures

not only are the firms themselves actively implementing ISO 14001, but the prefectural public service offices are also trying to adopt the standards. Moreover, the government administrative offices are trying to encourage the firms to implement the ISO 14001 by promising the firms to reduce several reporting requirements for auditing and monitoring.

In total the Chubu region contributes more than 20% of the total certified firms to ISO 14001-based EMS in all of Japan. The number of certified organizations according to prefecture by order of region is: Aichi, Shizuoka, Mie, Nagano, Shiga, Gifu, Toyama, and Ishikawa (see Figure 1).

The number of certified firms as of November 1997 was reported to be 122 organizations. Figure 2 shows the percentage of ISO 14001-based EMS applications among industrial sectors in the region. The largest percentage of certified firms is in the electrical field, while other industries such as general machinery, chemicals, transportation, and precision manufacturing are also becoming active in implementing the standards.

Questionnaire Survey on ISO 14001-Certified Firms

A survey was conducted by sending a questionnaire to 106 certified firms in the Chubu region. The names and addresses of the certified firms were obtained from Ministry of International Trade and Industry, (MITI) and Japan Audit and Certification Organisation for Environment (JACO) in August 1997. The questionnaire was mailed to the certified firms on 17 December

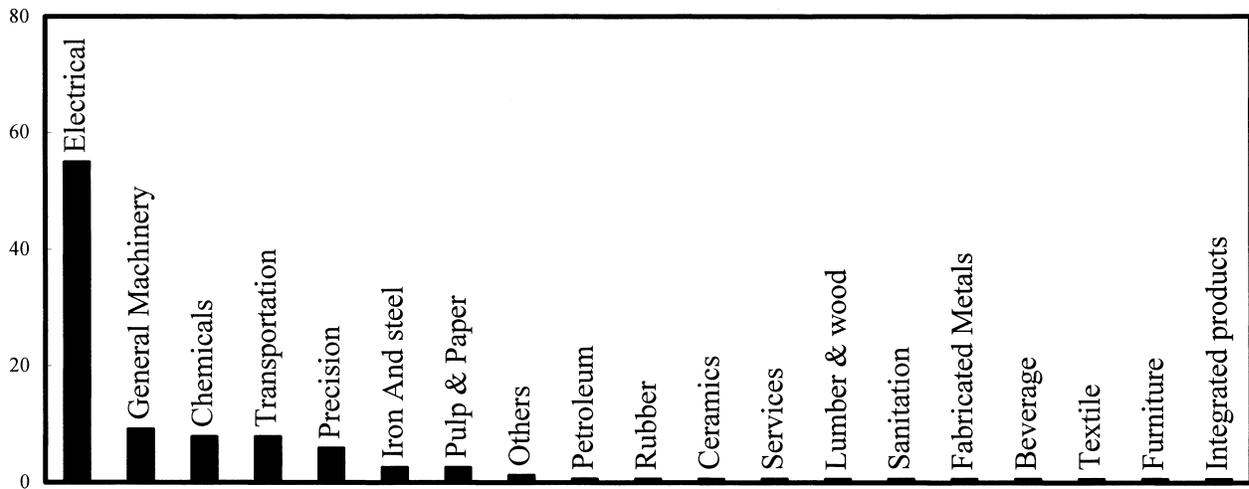


Figure 2. The percentage of ISO 14001 applications among industrial sectors in Central Japan. (Source of data: MITI, as of November 1997.)

Table 1. Responses to the questionnaire

Prefecture	Certified firms (N)	Firms response		Type of industry	Response (%)
		N	%		
Aichi	24	15	63	Elec. machinery	56
Gifu	6	5	83	Gen. machinery	10
Nagano	11	4	36	Precision mach.	7
Ishikawa	4	1	25	Transportation equip.	7
Mie	20	11	55	Chemical prod.	7
Shizuoka	26	16	62	Pulp and paper	3
Shiga	11	6	55	Other (iron and steel rubber products, services)	10
Toyama	4	3	75		
Total	106	61	58		

1997. Of the 106 firms, 61 responded to the questionnaire. The percentage of response by each prefecture is given in Table 1.

Table 1 shows that the response rate to the questionnaire was 58%. According to the responses, an analysis is made focusing on: (1) the source of information that the firm relied on during their preparation of the implementation process, (2) the basic aim for implementing the ISO 14001 and difficulties encountered during the implementation process, (3) the common pollutants released by the certified firms to the region, (4) the effect of ISO 14001 on released pollutants (environmental performance), (5) the relation between the firms and the local people in the participatory scheme, (6) the relation between the firms and the government, and (7) firms' consideration for their final products' life cycle. Finally, and based on the analysis of the respondents' answers, the regional environmental management will be discussed and introduced under

the ISO 14001-based EMS certification process and its role in building a better partnership with the main stakeholders.

Source of Information for ISO 14000 Series Among Firms

Figure 3 illustrates the common source of information that the firms obtained during or before implementing the ISO 14001. According to the respondents, the industrial association of the firms which they belonged to, and the firms' head offices play an important role in introducing the ISO 14000 series concept and encouraging their branches to adopt the system. Approximately 38% of the respondents consider their industrial association as their only source, 26% of the respondents stated that their source of information was entirely from their parent firms (head office); whereas 52% referred to ISO 14000 groups, i.e., JACO, as their only source of information and taking the role of disseminating infor-

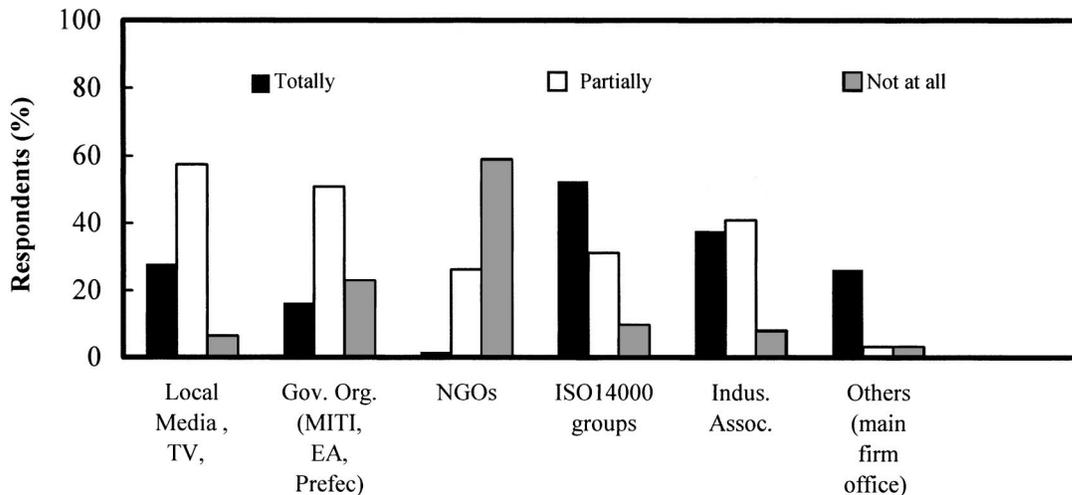


Figure 3. Source of ISO 14000 series information according to the respondents.

mation and making significant efforts to introduce the knowledge of the ISO 14000 series among the firms.

The questionnaire results showed that nongovernmental organizations (NGOs) make less effort to introduce the ISO 14000 series and cannot be considered a major source of information for the firms, while 59% of the respondents said that NGOs were not their source at all. However, 26% received partial information from NGOs and only 2% replied that their only source of information was from NGOs. This might reflect the weakness of the relation of interaction between the firms and the NGOs.

The local mass media, such as newspapers, TV, and magazine, amount to only 28% of the source of information according to the respondents. On the other hand, government offices, such as the prefectural environmental bureau and municipality environmental offices at the local level and the national governmental offices of MITI and Environment Agency at the national level, are relatively inactive in disseminating the information, as 51% of the respondents reported that the governmental offices partially share the firms source of information. It is interesting to note that some firms mentioned visits to certified sites of ISO 14001 that were open for demonstration purposes as their other source of information.

Main Reasons for Implementing the ISO 14001-EMS

Figure 4 shows the main aims behind the ISO 14001 adoption by firms in the Chubu region. According to the respondents, the common aims for adopting the ISO 14001 are: (1) improving the environmental aspects inside the firms, (2) enhancing the employees'

environmental awareness and environmental capacity-building, (3) enhancing the firms' image among the public, and (4) improving the management system of the environment inside the firms. These aims reflect the firms' ideology towards focusing on their internal capacity for environmental protection by giving more efforts towards enhancing the environmental education of their employees and building a better EMS. According to the questionnaire results, 80% of the respondents have referred to these aims as their chief targets in implementing the system. Meanwhile, matters at the external level, such as the firms' image, will be improved when an adequate internal management system is established. Therefore, the respondents believe ISO 14001-based EMS implementation will be one of the tools for improving their internal management system. The respondents showed that the benefit of having more access to either local or international markets was not their main goal for implementing the ISO 14001; less than 10% of the respondents think the ISO 14001 will give them new market opportunities. More than 55% of the respondent firms believe that ISO 14001 adoption will enhance the relation between the firms and governmental offices. According to the economic merits of ISO 14001 adoption, the firms believe that their productivity will improve, with cost reduction benefits (30% of respondents) upon adopting the system. Others (10%) responded that ISO 14001 certification will enhance the image of social responsibility of the firms, such as reducing the risk of environmental incidents, and produce improved relations with top management and more collaboration within corporate groups to which the firm belongs.

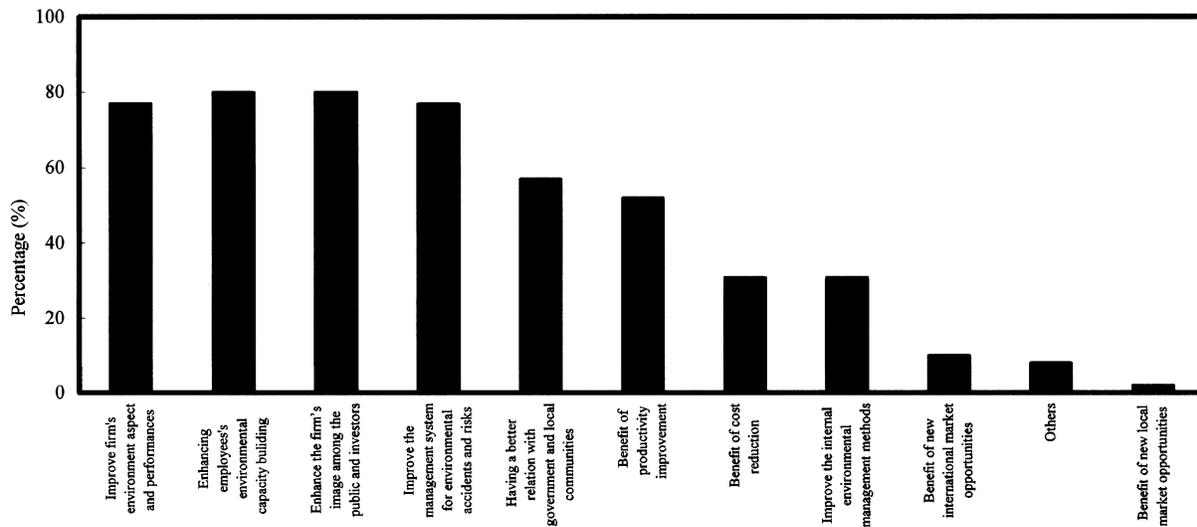


Figure 4. Firms' aim in implementing ISO 14001.

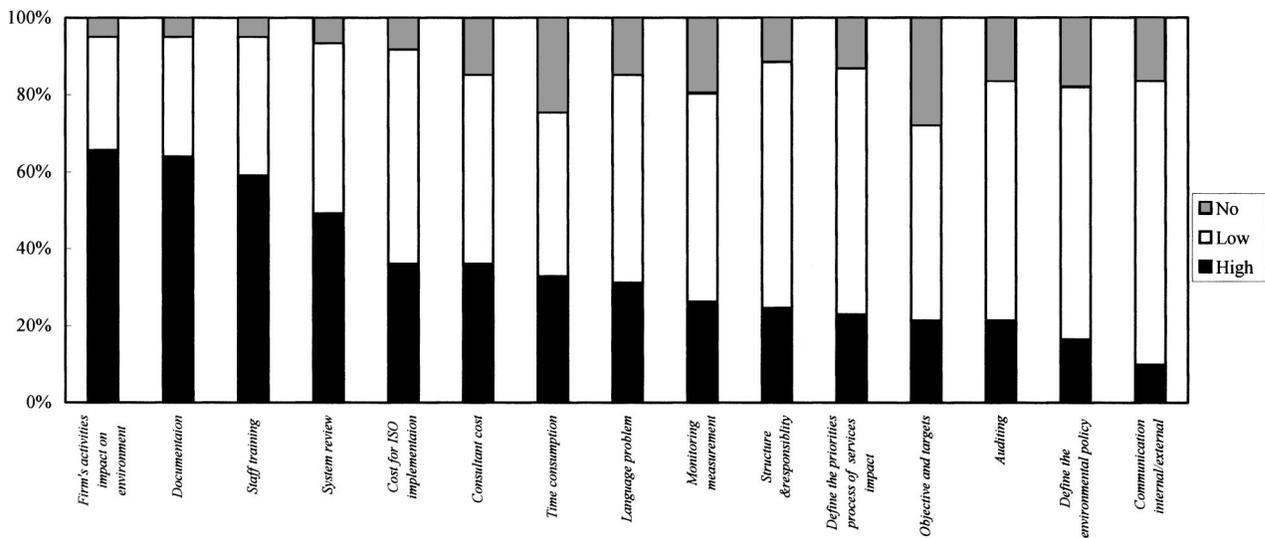


Figure 5. Difficulties with the ISO 14001 adoption process among the respondents.

Difficulties Faced in Adopting ISO 14001 by Firms

As has been recognized, there are some difficulties encountered before, during, and after the ISO 14001 adaptation process. These difficulties may occur in the initial stage (preparation) and before the certification; during the certification process, which is mainly when the organization begins to implement the ISO 14001 standard basic elements; and after the certification process, mainly involving monitoring and auditing schemes as well as follow up to maintain the certification.

These difficulties were pointed out in the question-

naire. The respondents' results are given in Figure 5. According to the respondents, these major difficulties are as follows: (1) defining the firm's activities, services, and products that interact with the environment and their impact on the environment was referred (66%) to as one of the major difficulties during the initial stage, (2) documentation (64%) and the firm's employee training (59%) were considered the most difficult steps during the implementation process, (3) system review (49%) and monitoring and measurement (26%) were considered among the greatest difficulties after the certification process, and (4) other indirect difficulties

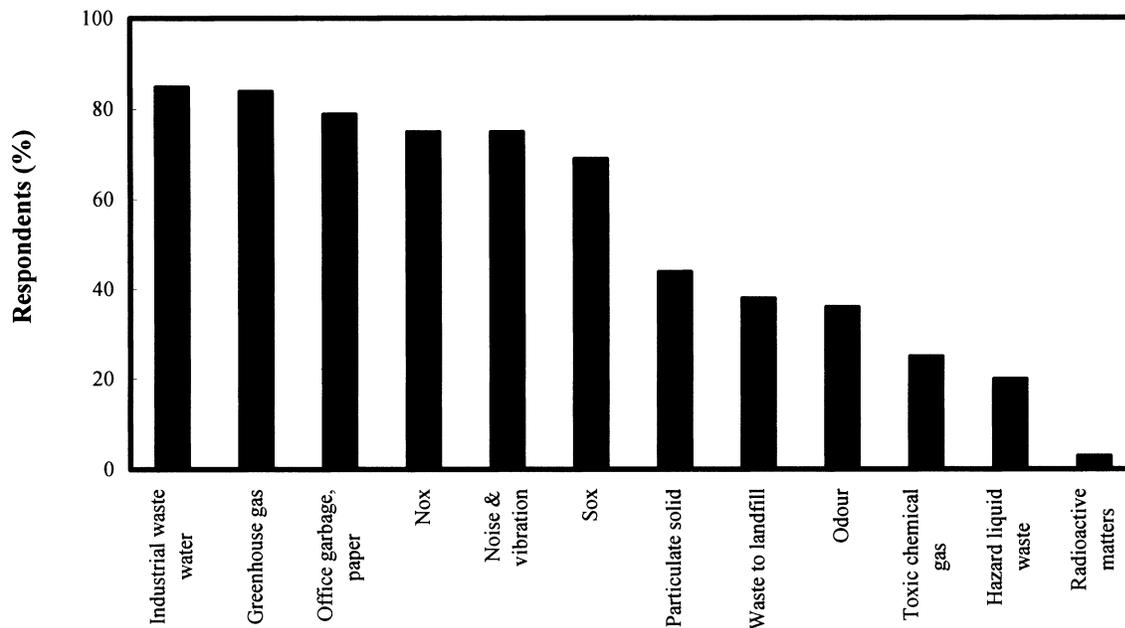


Figure 6. Percentage of respondents according to type of environmental risk involved in the firms' production process in the Chubu region.

that related to the cost of implementation (36%) and consultancy (36%) were also reported.

In 1996, the English version for ISO 14001 standards was translated into Japanese, and 31% of respondents considered language as a problem during their certification process. It is interesting to know that the respondents do not consider the auditing scheme (62%) as a major difficulty after certification.

Types of Environmental Risk Involved in Firms' Production Processes

In the responses of the firms, the questionnaire highlighted the most common environmental pollutants released during the daily activities of the firms in the region. According to the results given in Figure 6, industrial waste water, office refuse, noise, vibration, nitrous oxides (NO_x), and sulfur oxides (SO_x), respectively, are the common environmental risks. Meanwhile, a high percentage said that the greenhouse gases were being phased out. Particulate solids, landfill waste, odor, toxic chemical gas, hazardous liquid waste, and radioactive matter, respectively, showed the lowest common risk among the firms in the region.

Effect of ISO 14001 Implementation on Environmental Performance

When the questionnaire was distributed among the ISO 14001 certified firms in the region, a high percentage of the firms had been newly certified. According to

the respondents' responses, the certified firms were registered for ISO 14001 between 1996 and 1997 and only a few firms were registered in 1995; therefore, it is difficult to see the tangible effects of implementing the system on environmental performance (EP). Therefore, in this questionnaire EP was related to the firms' objectives and targets as a reference scale for the firms to elaborate on the effects of ISO 14001 implementation on EP. According to the results obtained from the respondents (Figure 7), the effect of adopting the system on EP is readily evident in the reduction of paper purchases (69%), electrical consumption (56%), chemicals and toxic materials use (52%), fuel consumption (52%), and packing volume for products (48%).

A high percentage of the respondents replied that there was no tangible change on the NO_x (62%) and SO_x (56%) emissions, industrial waste water (59%), volume of regulated water (54%), particulate solids (44%), environmental accidents (62%), and reported injuries or illnesses (66%) from the prespecified objectives and targets. One explanation for the reason why no significant reduction in conventional pollutants released in the region, such as NO_x , SO_x , noise, vibration, and particulate solids, could be seen among the respondents is the strict compliance with local regulations before system adaptation as well as the short-term operation of the auditing system after implementation. Very few of the respondents claimed an increase beyond

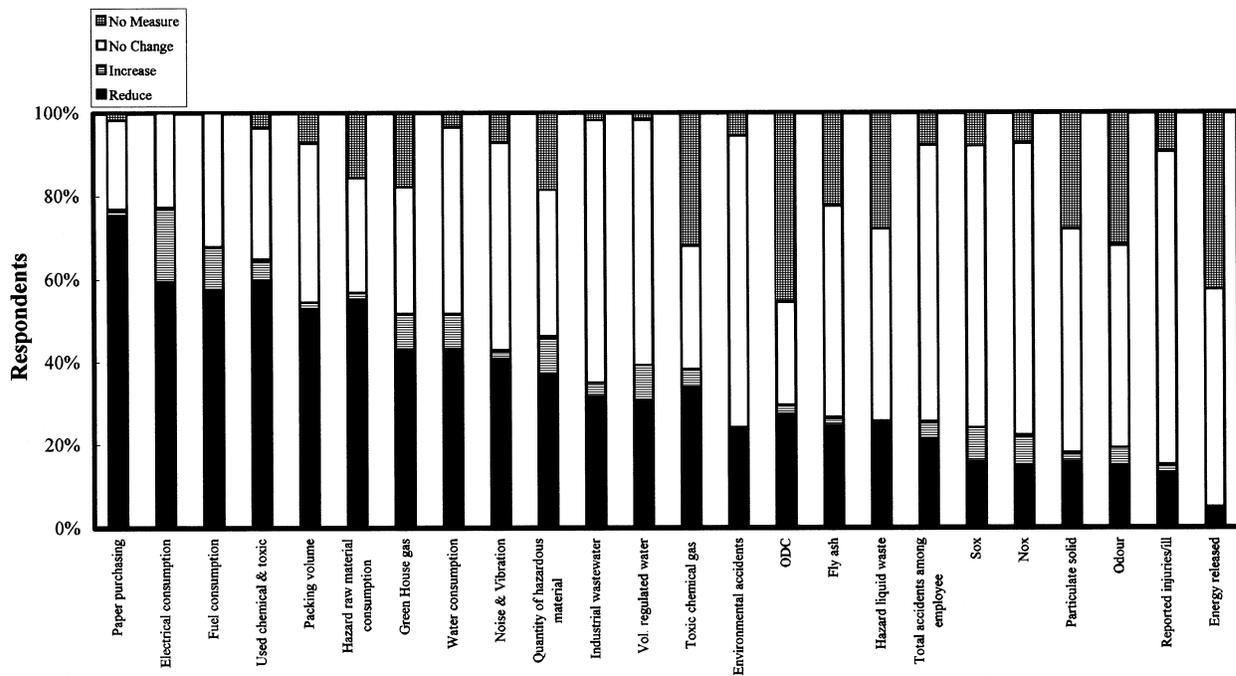


Figure 7. Effect of adopting the system on environmental performance (EP) for firms certified to ISO 14001. EP: the reduction or increase in pollutants released based on the prespecified targets and objectives.

the specified objectives and targets for the environmental aspects of the firms during their daily activities.

Relation Between the Firms and Local Communities

Building a better partnership with the local people is one of the main reasons why the ISO 14000 series has been adopted. Therefore the most important requirement for a successful certification process is making the firms' environmental policy open to the public. Through this approach, the firms will begin to practice and seek how to interact with the local people and try to build a partnership with them. According to the questionnaire results shown in Figure 8 and as a result of implementing the ISO 14001, 89% of the respondents said they have developed a plan to involve the local people in the event of unexpected accidents. Moreover, 84% have responded that they have a special section or person in charge to follow up on comments or complaints from local people regarding environmental issues related to where the firms are being operated. Some firms (56%) have responded that they keep in touch with the local people and their environmental efforts through an open seminar for the public. About 44% of the respondents said they have schemes and programs to encourage the effectiveness of the green market among local

people. On the other hand, only 23% of the respondents said that they will consider keeping in touch with the local people regarding their environmental performance (EP) report data.

To examine the role of firms in enhancing environmental awareness among the local people, the questionnaire pointed out some activities and requested the firms to elaborate on them. Figure 9 shows the percentage of firms that have regular activities to enhance environmental awareness among the local people. For example, 31% responded that they have special environment events such as tree planting. Some firms (20%) said that they have their own way of advertising for the environment. One interesting behavior that appeared among the respondents' answers is that 26% said they have a training program for small and medium-sized enterprises (SMEs) aimed at encouraging and implementing ISO 14001 in their organizations. More than 80% showed that they would consider having a collaboration with other SMEs to discuss the pollution released in the region. A high percentage of the respondents (more than 90%) agreed to implement a scheme for environmental activities initiated by local people. More than 60% of the respondents said they will consider having an educational environmental program to enhance and initiate a recycling system for the local people.

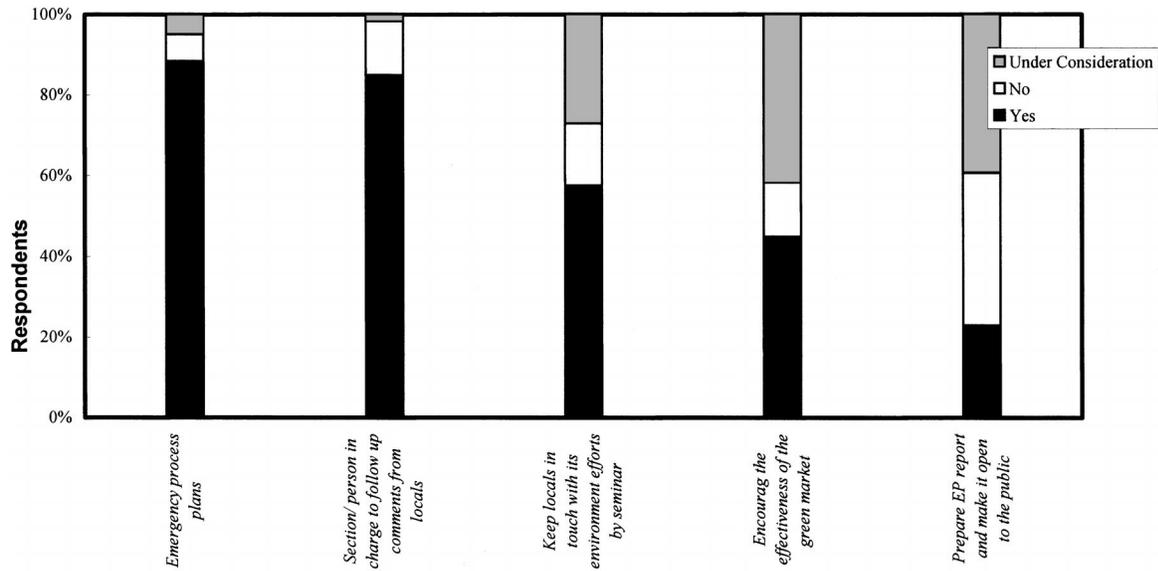


Figure 8. Relation between the firms and local citizens.

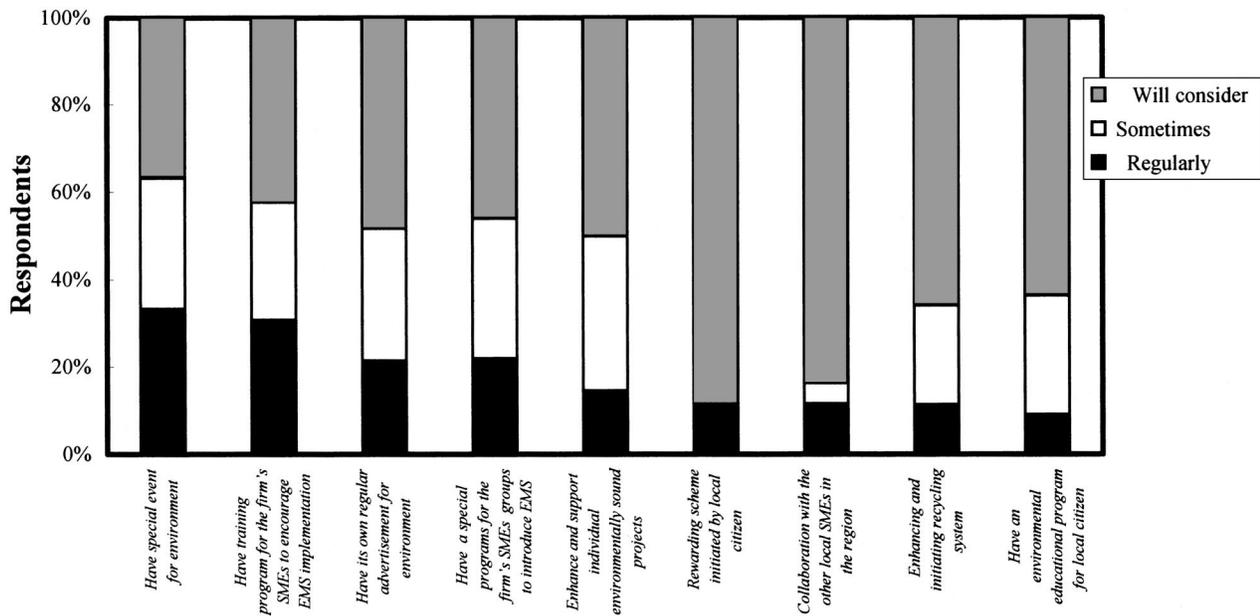


Figure 9. Role of the firms to enhance environmental awareness among the local citizens.

Relation Between the Firms and the Government

Even though ISO 14001 implementation is a voluntary scheme, and there is no role for the government to be significantly considered, a relationship between the firm and governmental offices still exists. For example, government offices will still have the role of examining the firms' compliance with local regulations as auditors, whether the firm is certified or not certified for ISO 14001. Also, the effectiveness of the existing regulations

is the government's responsibility as is the issuance of new ones. Therefore, the relationship between the firms and the government (local or national) was pointed out in this questionnaire to investigate what was required by the firms in order to collaborate more efficiently with the administrative offices and how this relation should be approached.

According to the results shown in Figure 10, 43% said a tax exemption for those firms implementing the

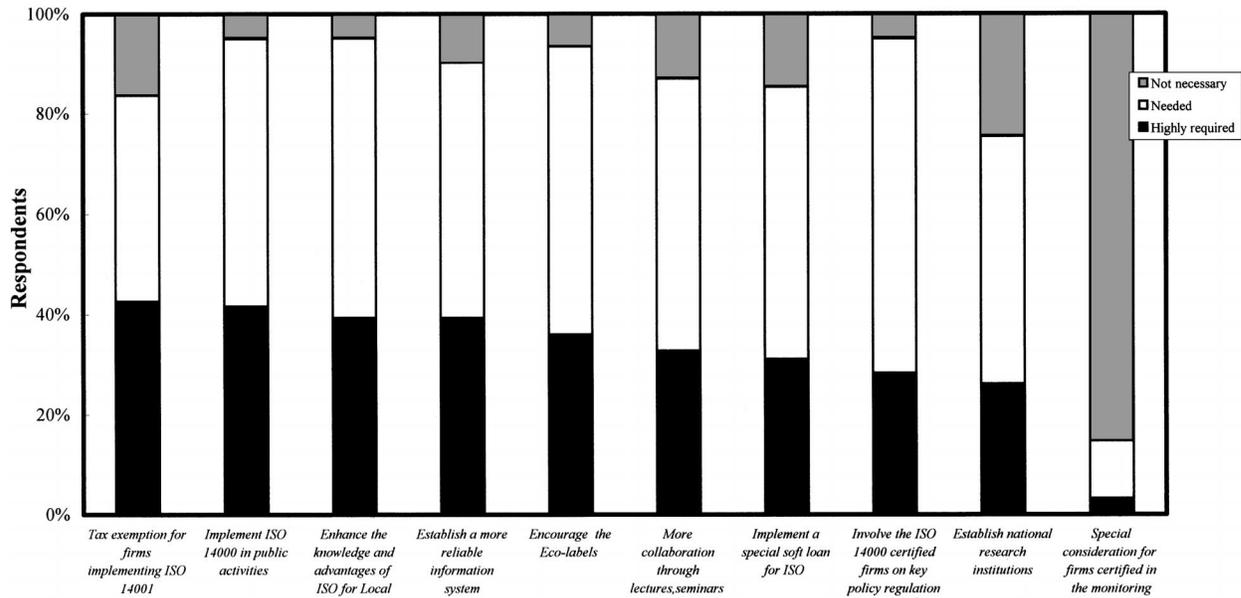


Figure 10. Relation between the firms and the government.

ISO 14001 is very important. It is also highly necessary (39%) for the administrative office to implement ISO 14001 in their public activities. The results have shown that 39% said a more reliable information system is highly required by the firms, while 51% said it is needed. Thirty-nine percent (39%) of the respondents believe it is highly required that the governments shall bear the responsibility to enhance the knowledge of ISO 4000 series as it brings advantages to local people, while 56% said it is needed but not highly required. Firms are looking for more collaboration with the governmental offices through seminars, lectures, and so on as 33% said it is highly required while 54% believe it is needed. It is interesting to note that more than 80% of the respondents believe that governmental consideration for firms certified for ISO 14001 in the monitoring and auditing scheme is not necessary, while (11%) said they are needed.

The Firms and Final Product Considerations

For a firm to be certified for ISO 14001, the product’s LCA consideration is necessary, especially if the firm seeks to be certified for other specified ISO standards. The ISO 14000 series itself considers LCA, namely, ISO 14040 and ISO 14042. According to the questionnaire results, more than 60% of the respondents have reported that they have given high consideration to their final product’s impact on the environment. Figure 11 indicates some considerations and approaches adopted by the firm for their final product’s impact. As is shown, more than 60% of the respondents said that they have given special consideration to the volume or

weight of packing and the reduction/reuse as well as recycling per volume or weight of their final products. Some firms (54%) indicated that they have an evaluation scheme for their final products before sending them to the market, while other firms (46%) paid great attention to the production process inside the firm by reviewing the emission of each substance used in the product line. A high percentage (41%) said they used recycled materials inside their firms. Some firms (20%) said that they provide label information on pollution prevention for their products. In responding to the availability of a take-back of used products systems, 15% said they had such a system.

ISO 14001 and Regional Environmental Management

It is believed that the ISO 14000 series, upon its emergence, will help build a better partnership with stakeholders, local people, government, and enterprises. Hence, its significant role in improving the level of regional environmental management is yet to be examined in detail. However, based on the results of the questionnaire, the analysis proposes that the role and interaction between these stakeholders be in the form demonstrated in Table 2 for each stakeholder.

The linkage and role of each of the actors towards achieving better regional environmental management and better partnership will require each stakeholder to understand what to do and how to interact with other stakeholders. The following sections will demonstrate how these linkages should proceed with under the ISO 14001-based EMS umbrella.

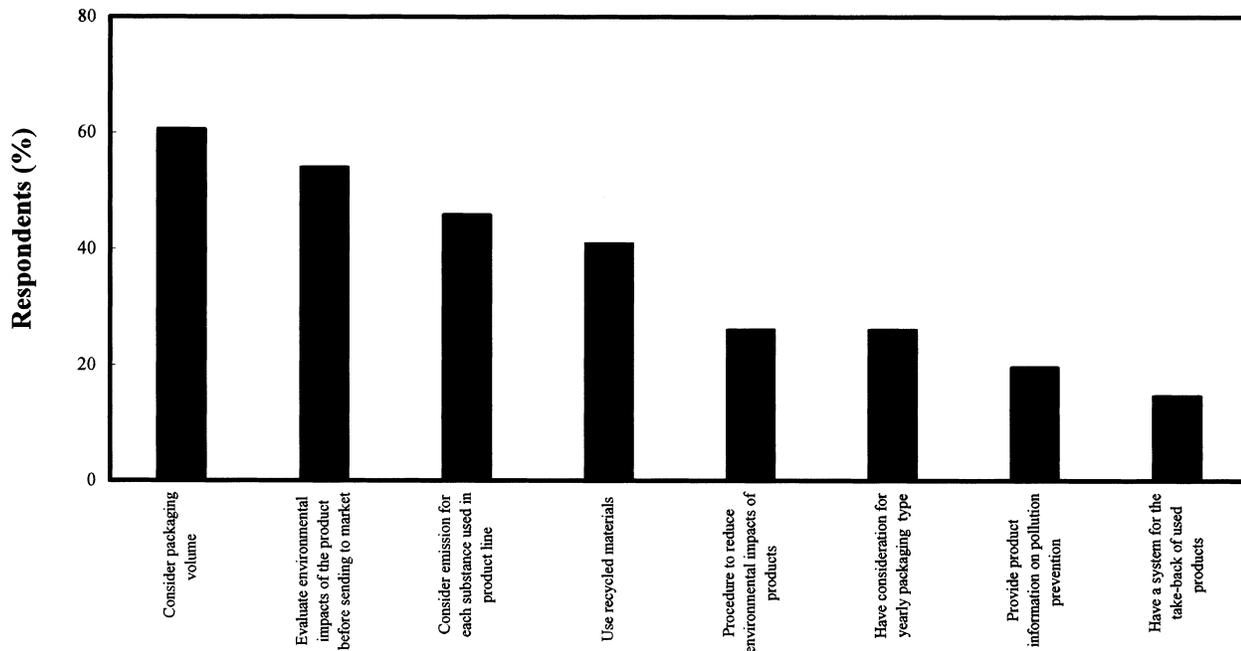


Figure 11. Firms' consideration for their final products.

Linkage and Roles of the Major Actors to Ensure Effectiveness of EMS

As mentioned before, the three major actors involved in the region are the private enterprises, the government, and the local citizens. Each actor should take responsibility in order to achieve an increasingly effective implementation process so as to integrate these achievements into regional environmental management.

Roles and Linkages of Enterprise Stakeholders

As is well known, the decision by top management to implement the ISO 14001 standards is the key for successful implementation of ISO 14001 standards. This system will not achieve any continuity or improvement without top management support. Therefore, inside the enterprises, top management involvement plays the most important role.

The enterprise or organization certified for ISO 14001 shall adopt recent techniques and high quality instruments for measurement so as to ensure the continuity of high environmental performance achievement and a proper auditing compliance. When the enterprises understand their role, linkages with the government and local people can be illustrated as follows:

Enterprises and government. The self-declared commitment to comply with local regulations and even beyond will build a cordial linkage with government, in other

words, a better partnership. Therefore, the relation resulting from the command and control of the government will be minimized.

Enterprises' implementation of ISO 14001 will be within the government policy guidelines on enhancing the green market and eco-label approaches. Therefore, the ISO 14001 will be the bridge to building this linkage.

Enterprises and local citizens. The enterprises will need to build a better partnership with the local citizens as the numbers of green organizations are growing worldwide and are insisting on environmental report data disclosure. If this pressure continues, the enterprises will not be able to sustain themselves without disclosing their data and improving their environmental performance. Thus, adopting ISO 14001 will be one of the tools for reducing the green group pressures and become a mechanism to disclose these data.

Roles and Linkage for Government Stakeholder

The government's role will be significant in formulating a commitment to build and enhance the green markets policy (see for details Panayotou, 1993). The linkage with other stakeholders will be as follows:

The government and local citizens. It is the government's role to facilitate the information flow from and to the local people regarding the new EMS and its role in building sustainable development. It is the local

Table 2. Role of ISO 14001 in building a partnership with stakeholders

Government	Enterprises	Local citizens
Will benefit from a reduction in the momentum that will have to be produced so as to enforce the local environmental regulations that enterprises have to comply with. This is due to the fact that ISO 14001 adaptation is an organization's voluntary self-declaration to comply with the local regulations.	The standards will enable the organization to meet the concept of regional sustainable development by: (1) identifying the agreement between the environment and development, (2) enhancing competitiveness in the marketplace by adopting policies and practices that advance sustainability, (3) using full cost accounting (real cost pricing), (4) choosing environmentally responsible suppliers and contractors, and (5) adequately investing in non-renewable resources to maintain the capacity to meet the needs for future generations.	ISO 14001 will be able to enhance: (1) awareness of their impacts on the environment, (2) acceptance of the responsibility for these impacts, (3) the expectation that harmful impacts will be reduced or eliminated, and (4) sharing the responsibility for environmental impacts upon all members of the community.

citizen's role to monitor the government implementation policy programs to promote green markets.

Government and enterprises. The government must play a role in enabling policy measures such as implementing more reliable information systems, offering technical advice, and providing more research and development for proper EMS implementation, in addition to financial assistance and advocacy programs for the enterprises.

Roles and Linkages of Local Citizen Stakeholders

Local groups, including NGOs and institutional organizations, will have significant roles in synthesizing a commitment to promote environmentally sound and sustainable regional development among themselves.

EMS will be one of the alternative routes to achieve the local people's ambition. Moreover, the citizens alone will not be able to build their goals without linking with the government and the enterprises. EMS will be the chain that connects all parties together in a cordial relationship. Meanwhile, institutional organizations will have a role in focusing their research towards how the implementation of the EMS will contribute to the realization of environmentally sound regions.

Local people and government. The government's efforts directed to the local people will be required to reevaluate the efficiency of the education for enhancing environmental awareness among the local people and at the national level.

Locals and enterprises. It is the important role of the local citizens to attempt to obtain the enterprises' environmental data, and with such an EMS, the procedure will be easier for the two parties. The implementation of the EMS will help the local people to understand how much effort is made by the enterprises to improve their environmental performance and how progress is being made. This will provide give the enterprises with a better linkage with the local citizens through a mutual relationship.

Conclusion

The ISO 14001 implementation process among the certified firms in the Chubu region was examined using a questionnaire distributed to 106 firms. The results have shown that the ISO 14001-based EMS has a great effect on the firms' environmental status. Certified firms have shown that the consumption of natural resources such as fuel, water, and paper are more efficiently managed upon adopting the system, which leads in many cases to a reduction in consumption rate. However, the environmental risks involved in the firms' production processes are yet to be fully addressed and need to be investigated more in detail. This procedure needs a long period of observation to explore the tangible effects of the system on the environment performance after adoption of the standard by the organization. Implementing the system will enable the firms to consider the role of the local people and the government in a more effective manner. For example, this can be achieved by involving local people in the firm's daily environmental activities, enhancing environmental awareness among local people, and giving more consideration to other firms working for the same group (branches), mainly SMEs. The firms showed the intention of seeking more collaboration with governmental offices, such as by organizing seminars and lectures for the two groups. The firms also gave high

priority for their final products (LCA), which will help in controlling the environmental impacts of their products and reduce pollution.

In central Japan, the ISO 14001-based EMS case study has shown that the firms' main targets in adopting the system are as: (1) a tool to help in enhancing the internal management system, (2) an effective way of consuming natural resources using a sustainable method, and (3) an enhancement of EP of the firm. Meanwhile, the target of opening a new international or local market is a low priority in firms' desire for system implementation. Finally, implementing the ISO 14001-based EMS is a promising tool to build a better partnership with the main stakeholders—government, local citizens, and enterprises. When the roles and linkages between these stakeholders are correctly understood, the ISO 14001-based EMS will be tool for building an environmentally well-managed region.

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