

Japanese Corporate Environmentalism and New Industrial Standard for Excellence

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KEY WORDS Total Quality Management (TQM). International Standard Organization (ISO). Corporate Environmentalism. Japan.

INTRODUCTION

This paper analyzes corporate environmentalism expressed by Japanese multinational firms in relation to the new set of industrial standards for environmental excellence presented by the International Organization for Standardization in Geneva. It also examines Japanese rationale for corporate environmentalism, and identifies concerns from an anthropological perspective.

The emerging set of ISO 14000 standards is the most comprehensive environmental quality management initiative ever undertaken. This standard is expected to become the international environmental quality benchmark for conducting business in the global market place of the 21st century. The first edition of the standard, implemented in 1996, prescribes requirements for environmental quality management. Although there have been other standardization and auditing mechanisms, such as BS7750 in England, and EMS in the European Union, this paper focuses primarily on ISO 14000 because that is the most talked-about standard in Japan. We will analyze the current debate in terms of how to transform Japanese multinational companies from energy-efficient, cost-effective organizations to environmentally efficient, cost-effective organizations. Japanese firms spearheaded total quality management efforts in the past in their relentless pursuit of customer satisfaction and productivity improvement. Nissan, Toyota, NEC, Canon, Mitsubishi, to name a few that have accomplished quality standards, have now created new concepts of quality using such cultural metaphors as "symbiosis." They are incorporating

environmental quality as a new standard for quality and cost calculation, and using many innovative strategies in enhancing their international competitiveness. In this new mindset, environment is regarded in terms of both resources and cost factors. The paper will discuss the local and the global context of Japanese firms' reaction to this new corporate environmentalism, and will analyze what caveats must be taken in to account when one examines the new quality movement aiming at environmentally sound manufacturing process, customer service, methods of consumption, and waste management.

HISTORICAL BACKGROUND

The ideas for the ISO 14000 series of standards emerged primarily as a result of two international events: The Uruguay round of the GATT negotiations, begun in 1986; and the Rio Conference on the Environment in 1992. The GATT talks addressed the need to avoid or remove non-tariff barriers to trade, while the Rio Conference established the world's commitment to protection of the environment. The ISO 14000 series standards represent a new consensus position for business and the environmental community. They are a blueprint for promoting world trade while encouraging and assisting organizations to be environmentally responsible. Thus, advocates stress that it is no longer a question of jobs or the environment. The standard will now allow jobs and trade growth while promoting a clean environment.

The ISO 14000 standard will support the corporate goals of achieving compliance with legal requirements establishing internal environmental quality policies and managing marketplace expectations. These goals will be accomplished by implementing environmental quality management systems, environmental audits,

environmental performance evaluations, product life-cycle assessments, and new product labeling. All of these activities comprise a strategic environmental quality program that can be a distinct competitive advantage as well as the gateway to an organization's future success.

The ISO 14000 series is intended to enable businesses world-wide to establish and assess the effectiveness of their environmental management systems, and multinational corporations are currently at the forefront of implementing an objectively "audible" standard for environmental management. Businesses that meet the requirements of ISO 14000 may seek registration or "self-declare" their compliance to the standard. The steps to achieve these international standard are three fold, self assessment, implantation and auditing by external auditors.

The company that seeks ISO 14000 will:

- (1) define corporate excellence in terms of environmental issues
- (2) create international standard of excellence
- (3) develop third-party auditing in addition to governmental inspections
- (4) advance product life-cycle analysis
- (5) consolidate and simplify reporting
- (6) create new technology and production methods that are environmentally sound.

It is important to note that ISO 14000, like its cousin ISO 9000, is a management system benchmark. The standard describes a process; it does not and will not claim to set norms. However, it does require that a company's environmental policy include a commitment to comply with relevant environmental laws and regulations. Since there are many places in the world where local laws and even international treaty obligations are ahead of local industrial practice, compliance with the law is the minimum performance standard. But for ISO 14000 certification compliance is just a starting point. The international drafting committee has tried to create a standard which can be objectively verified. While ISO product standards are checked in a laboratory, the management standards are verified by audit. In either case the result is an official certificate on which others can rely. Both provide a ready reference for buyers and sellers of goods and services. This is especially useful in international trade, where

customary local standards may vary widely.

JAPAN'S ENVIRONMENTAL POLICY AND T.Q.M.

Like those in many advanced nations, Japan's environmental movement is based on lessons learned from past mistakes (Iijima, 1993). Japan experienced a series of environmental disasters, particularly in the 1960s and the 1970s. In reaction, *Kogaitaisaku-kihon-ho*, or the first anti-pollution law was passed in 1967, the first White Paper on Ko-gai or Public Hazards, was published in 1970, and *Kankyo-cho* or Environment Agency was established in 1971. Immediately after that, a series of environmental standards were set by fourteen environmental laws and regulations in 1970, that established the world's most strict anti-pollution standards in air-quality, water, noise, and CO₂ emission rates for automobiles (1970).

In 1993 the Environmental law was enacted, and in 1995 the Japanese government that contributes to about ten percent of Japan's GDP (gross domestic production) began so-called green procurement programs, that encouraged governmental purchase of recycled paper, energy saving automobiles and office equipment, and special favors for public work, firms with a good record of energy saving, water preservation, and CO₂ emission reduction. When the ISO 14000 plan was announced, the Japanese government's reaction was swift. It quickly established ISO/TC207 Committee and created environmental standards as integral parts of JIS (Japan Industrial Standard.)

Japanese manufacturers that faced the series of laws and regulations in the 1970s and 1980s were mostly about their compliance with legal requirements and standardizations. Companies tried to create production processes to satisfy requirements in the most cost-effective way. This reaction to a set standard was similar to the traditional manufacturer's concept of quality before the TQM movement. In the past firms defined quality as meeting product specifications, and quality management was handled by specialists. On the other hand, the TQM that revolutionized Japanese manufacturing processes regards quality as customer satisfaction, and it insists that

quality enhancement must involve everyone and every unit of the organization. Like the corporate ideological transition from the concept of quality as compliance to that to TQM for customer satisfaction in the 1970s and 1980s, the new environmental quality concepts in 1996 sparked much debate. ISO 14000 is not to set a particular product standard. It is, rather, a systematic approach to quality enhancement using a series of new indicators and new environmental cost accounting. It is far more than mere legal compliance. Corporate environmentalists and some progressive corporate leaders are urging voluntary, industry-led activities, stating that it is up to Japanese business, not the Government, or the Japanese Environmental Agency, to define environmental excellence and measures of success. They are assessing the value of moving beyond a posture of basic compliance into a much more operative position that will lead to integration of environmental issues with every day business practices, instead of relying on regulation and pressure from the general public on product liability. Industrial leaders who are conversant with the details of TQM's kaizen (continuous incremental improvement,) small-group activities, and the four steps of plan-do-check-act, have begun incorporating ecological management into conventional business operations and focusing on continuous improvement of their quality as an integral part of their environmental management system. They appraise the life-cycle of their products from the initial natural resource utilization, through raw material procurement, production processes, packaging, shipment, distribution, consumption, usage, and recycling, to final disposal. They calculate "environmental costs" at every step.

Environmentally conscious companies consider these environment factors as limited-resource issues. Many businesses are currently refining their financial analysis of products to identify in-house environmental costs previously lumped into overhead. Thus defining excellence can be coordinated with attainment of the benchmark, adapting ISO 14000, and, very importantly, developing future markets for environmental technologies.

SPREADING CORPORATE ENVIRONMENTALISM

Corporate claims of environmental progress may be dismissed by some observers as insincere public relations gimmicks. Critics of big business and many anthropologists have exercised healthy skepticism on such discourse by power elite organizations. However, the emerging ecological concerns in corporations may exemplify a different approach to doing business, that may shape corporate environmentalism in the future, just as Japanese industries' total quality management (TQM) methods have changed the way we consider quality and production. Let us analyze this new trend within the context of growing environmental understanding and responsiveness on the part of several important segments of the world population, including industrial elites.

Statistical data from JQA (Japanese Quality Assurance) shows that a majority of Japanese firms that did apply for and receive ISO 9000 (582 firms) in the early 1990s were heavily concentrated in the electric and electronic sector. Electric and electronic manufacturers are major exporters, with markets in advanced consumer societies. Although the ISO application for auditing is voluntary, those companies that want to trade, for example, in the EU, or do business with other companies that do trade in the EU, may be required to demonstrate adherence to the environmental standard because the EU will likely adopt the ISO standard as conforming to its environmental management directive. For some companies, registration under ISO may be a legal prerequisite to enter the environmentally regulated markets, while others may be asked by the purchasers of their products or services to be registered. Therefore it is logical to assume the overwhelming compliance of electronic firms to ISO 9000 a few years ago was mainly motivated by international trade. However, this time, with ISO 14000, a large number of firms are already showing interest. Those firms that answered in a survey conducted by the government, that they intend to apply for ISO 14000, are widely spread among diverse industrial sectors, some of which are not at all export-oriented. Firms in non-manufacturing sectors such as transportation, utilities,

and commerce, are also interested in applying to ISO 14000. Thus, it is reasonable to assume that environmentalism is becoming a mainstream philosophy in both industrial and non-industrial Japan.

There are also more concerted efforts by industrial associations and organizations. Keidan-ren, or Japan's largest Federation of Business Firms sent representatives to the Rio Conference, and the Keizai-doyukai, a leading Japanese industrial association, declared in 1990 the principle of corporate "symbiosis" as the basic business principle for the future. Symbiosis, or *Kyosei* in the Japanese, literally means "Living together in harmony," and this ecological principle of harmony with nature has been adopted by corporations such as Canon, Fujitsu, NEC, etc. The naturalistic and biological metaphors of symbiosis evoke Buddhist or Shintoist worldviews. In this sense corporate environmentalism is a socio-cultural, and value-laden ideology for progress, very much like the previous Modernistic ideology of Total Quality Management movement, *kaizen*, *gruupu*, and corporate identity movements. The following are the symbiosis principles announced by the Keizai-doyukai group as the foundation of their business philosophy:

- (1) What one takes out of nature must be return to nature. One must return it in the form that can be resolved back to nature by itself.
- (2) Do not take more than the nature can give and still revitalize itself.
- (3) Help nature to increase its revitalization process. We need to organize economic activities within the limits of nature.
- (4) Resources taken out of nature must be effectively utilized. One must constantly improve (*kaizen*) energy saving, recycling, waste management and cost reduction.
- (5) One must introduce quality control of waste in product design and manufacturing so that industrial waste and final products can be easily dismantled, dissolved, and/or re-cycled without causing undue environmental burdens.
- (6) Business must share the costs of social and economic stress caused by production, products, industrial waste, and recycled items.
- (7) The company is responsible for healthy maintenance and nurturing of all lives, both human and other creatures.
- (8) Each individual working for enterprise must contribute to all aspects of environmental conservation through appropriate corporate and social activities.
- (9) Corporate profits must be distributed equitably.
- (10) Corporate activities must be implemented and audited according to the principle of symbiosis (Chogin-soken, 1995).

The principle of symbiosis presented by Japanese firms connects economy and ecology, and places human activities within a larger framework of nature. Attention to the environmental cost analysis is a logical extension of long-term Japanese efforts for cost reduction for exports despite the appreciation of Yen. The strategies for developing environment-friendly organizations, come directly from the conventional TQM recipe for comprehensive planning, rigorous data collection, statistical analysis, auditing, employee training, and company-wide involvement. For example, the symbiosis project undertaken by Toyoko Riken (Toyoko group) has the following seven steps for developing an ecologically active organization:

1. Publicly declare the corporate commitment to environment improvement.
2. Collect accurate data on each unit and flow of operation, and set goals, strategies and limits. Create measurable and quantifiable, operational and financial data.
3. Undertake recycling and waste management projects.
4. Invest in R&D projects for energy saving, recycling and product cycle assessment. Constantly improve energy-cost reduction, 100 per cent recycling of materials and parts within industrial production processes.
5. Evaluate performance based on contribution to environment preservation. Devise and incorporate environmental auditing systems in personnel evaluation, cost appraisal, product development, recycling, waste management and marketing strategies.
6. Incorporate and systematize environmental impact assessments. Create measurable indicators, and collect longitudinal data.

- Establish new financial and accounting standards and incorporate environmental account as economic indicators for evaluating productivity and profitability.
7. Build solid communication networks and public relations with the general public and the outside community. Introduce new products that are environment friendly. Create new marketing strategies for these products. Publicize the new corporate image and let the public understand the ongoing organizational transformation. Provide environmental education services, and strive to gain the public confidence in the new corporate policy initiatives.
 8. Contribute to the regional communities' ecological efforts through voluntary and philanthropic activities.

In many respects, environmental corporatism described above is an extension of Japanese corporate ideology that pushed the past TQM movement, because both corporate environmentalism and TQM emphasize the manifested commitment of top management, total company-wide efforts, unit-level participation, small group activities, and needs to eliminate "the three Ms," (in the Japanese language)—*muchi* (ignorance), *muda* (waste), and *mushi* (neglect.) Both movements see that interventions and behavioral modification take places at multiple levels of the organizational structure, fully utilizing new cost calculation, statistical control, and company-wide coordination, (Chogin-soken, 1995).

COSTS AND BENEFITS OF CORPORATE ENVIRONMENTALISM

There are benefits to the individual firm's adoption of corporate environmentalism in terms of environmental risk management, new production methods and technology organizational development, and new product development. In addition, environmental accounting provides a way for tighter managerial control. Auditing by a third party will help regulatory authorities, investors, and the public verify that a company is doing all it can to decrease adverse environmental effects for its operations. The corporate environment statement, just like financial statement of profit and loss, can be published

in corporate annual reports or other public documents for public scrutiny. This is the opposite from the situation where the public perceives industry as doing as little as it can get away with to prevent environmental penalties—a perception that calls forth demands for strict regulation and legal procedures. By analogy, there are no regulations requiring industry to have a financial management system, even though enhanced profits benefit the government through enhanced tax revenues, because the public believes that industry is sufficiently motivated to that direction already. In the same way, once the public is convinced that decreased environmental impact is a primarily corporate goal, true cooperation among different stakeholders become possible. Being convinced that corporate environmentalism makes financial good sense, Japanese firms, and particularly multinationals, have begun to provide a basis to evaluate corporate performance in environmental areas in the same way that corporate financial disclosures allow analysts to evaluate a company's financial performance.

In theory, environmentally sound management tends to decrease competition from companies that do not adhere to it. First, by making them less acceptable to consumers and the general public, second, by eventually requiring environmental protection by law and other reinforcement, and third, by lowering environmental costs. This is particularly important for companies that participate in international trade, because global management standards are really an outgrowth of global product standards and competition for quality, and thus a benefit for free trade. Due to the successful introduction of ISO 9000, hope has been raised for the speedy implementation of ISO 14000. In mid-1996 many notable cases of corporate environmentalism and environmental accounting have been reported among large Japanese firms such as Seiko Epson, Mitsui Metal and Mining, Mitsubishi Chemical, Kirin Brewery, and NEC. When examining cases, one will notice that each firm has devised its own strategies with different foci of environmental investment. For example, Kirin Brewery operates under three Rs—reduce, reuse and re-cycle, backed up by two As (assessment and auditing) and thus emphasizing environmental stress

reduction and re-cycling through brewery operations. Morinaga Dairy Company, on the other hand, looked at energy costs. In 1993 alone, the company shifted fuel from heavy oil to LNG and LPG, and reduced CO₂ emission by 6000 tons. In 1994-95 the company targeted the reduction of environmental problems related to the air pollution, water pollution, noise pollution, and vibration. The company also set concrete, quantifiable targets in waste management, energy saving, and recycle rates. Consequently the 37 domestic dairy plants have new assessing, reporting and auditing systems, while the corporate PR office publishes a monthly newsletter called "Eco-News" to promote public understanding. Mitsubishi Chemical (one of the largest chemical manufactures in the world, established as the result of the 1994 merger of Mitsubishi Kasei and Mitsubishi Yuka) launched what they call "The Responsible Care Program" for promoting product safety, public health, environmental protection and occupational safety. The company has integrated assessment, auditing and management of all the processes based on the total product life-cycle model, from the development of environmentally safe chemical materials to recycling and final disposal. The list of Mitsubishi subsidiaries that have signed "The Ethics of Corporate Responsibility" is published annually, and is available for public scrutiny.

Japanese firms' enthusiasm for ISO 14000 indeed signals the beginning of new definitions of industrial excellence and organizational transformation (Fukuoka, 1993, 1996.) In Japan where energy is expensive, where quality enhancement has already revolutionized manufacturing processes, the business-norm that "waste is cost" is very much appreciated and accepted by industrialists. In addition, symbiosis is a vague and therefore malleable concept, that is nevertheless compatible to the traditional Japanese world view that integrates non-economic and economic activities, humans and non-humans. Corporate environmentalism, partly because it is voluntary and partly because it is based on the indigenous world-view and the recent success of TQM, may open up alternative, native, and innovative process technology, resource utilization, and accounting procedures.

OLD GAME, NEW NAME

Throughout the post-WWII era, Japan's manufacturers, trading firms, banks, wholesalers and retailers all continued productivity enhancement, zero-defect operation, and cost saving in order to increase the export market-share and to win the international oligopoly game where big was good, and bigger was better. New environmentalism, if it is indeed a new movement, must accompany a paradigm shift, from profit maximization philosophy to conservation philosophy. However, the Japanese firms seem to be thinking that green is actually gold, because by saving energy and keeping air-clean, they will reduce environmental costs, and create more competitive business for profit maximization. The following section will discuss some important caveats in understanding and furthering corporate environmentalism. We will try to predict how this shift will affect our international community. What does this green-gold-rush mean to the global echo-system?

MACRO-ANALYSIS OF JAPANESE CORPORATE ENVIRONMENTALISM

One of the main characteristics of the 21st Century global manufacturing is the global division of labor and consumption, where multiple steps of manufacturing processes, from raw material procurement, parts assembly, and final production to consumer marketing, are being handled by plants, centers, institutions and individuals located in different parts of the world (Aoki, 1991). Very often raw material procurement and purchase of energy begin in a developing country, while the labor intensive processes of part-manufacturing is done in another country with low wages. Parts are then shipped to another country for semi-assembly, and final products are shipped to the market, which is in another (often developed) location.

A major concern in promoting ISO 14000 relates to the deepening of the gap between the North and the South. It should be pointed out that the problem of global environmental issues such as global warming or acid rain will be impossible to resolve without the efforts of developing countries, as they will make up around

90 per cent of the world's population and will consume the majority of the world's energy by the middle of the 21st century. These developing countries also have much more leeway in which to improve energy efficiency and environmental management systems in terms of cost-effectiveness than do industrial countries. The only way developing countries can cope with the cost, energy and sophistication of ISO 14000 level operation is through technological assistance from their more developed neighbors. It is vital to transfer advanced energy technology rapidly to less developed nations, so that these countries that seek economic growth will be also able to control carbon-dioxide emissions and to create energy-saving, environmentally effective production systems. Yet, anthropologists involved in international technological transfer projects often point out that transferred technology must be compatible to local practice and local interests. Improving local knowledge of environmental management is vital if one is to introduce advanced energy technology rapidly to less developed nations.

Unfortunately, the current hype over ISO 14000 and state policies to favor procurement from ISO 14000 firms may actually accelerate a stratification among firms in the North and the South. It is obvious that with the introduction of new corporate excellence, the competitive advantages of environmentally excellent firms for global business increase, (and they are located predominantly in developed countries) while less excellent firms in less developed countries may not be even allowed to export to the lucrative markets of Europe, America and Japan. Weaker ones will sink further in environmental protection schemes, as they will not be able to compete to meet the environmental standard met by resource-rich firms, and smaller firms become further marginalized in the Capitalistic world. This will accelerate global oligopoly, and the increased control of natural resources and means of production by multinational corporations in the world, and the consequent peripherization of local population in the international division of labor and capital. Already a significant portion of the local population have become alienated from their own food production, agriculture, fishery, and manufacturing processes in their own

countries, to satisfy the consumer demands in the First World, as developing countries struggle to keep the balance of payment with countries such as Japan. The export drives of indigenous businesses transform the ecological make-up of their societies.

One example of this phenomenon can be found in the world's marine resource utilization in South Asian countries that have a large trade deficit with Japan. Japan has a chronic trade surplus with most third world societies, Europe and US, except with China and oil-producing countries. As Japan's environmentally friendly electronic and auto-makers with ISO 14000 guarantees sell more environmentally friendly VCRs, computers, and cars to Indians, Thais, Malays and Indonesians, Asian fishermen and farmers are stripping more and more of their natural resources to feed the affluent Japanese, often converting the mangrove marsh land to shrimp farms (Murai and Tsurumi, 1992). Japan is the largest marine resource market in the world, that annually consumes more than 40 per cent of the marine resources of this globe. Every day bonitos, tunas, shrimps, lobsters and prawns are flown from India, Indonesia, Korea, Taiwan, Thailand, the US, the former USSR, Canada, and Australia, to feed Japan. With an increased affluence created by industrial Japan, consumers demand protein rich lobsters, prawns, and shrimps. And the Japanese love them as well for Japanese household rituals, from the ritual of providing a new born with its first food to the wedding and New Year celebrations, which endorse the consumption of the red and pick crustaceans. Japanese VCRs and Indian prawns are all part of the global ecological chain in international trade, that constitutes international balances of payment. In the last five years, for example, Japanese prawn consumption jumped five times, accelerating over-harvesting of wild prawns and building of aqua-culture pools in South Asia and India. Ebi (Shrimp and Prawn) as a category has become no.2 export item of India to Japan, second only to iron ore. Unfortunately, Indian fishermen are using environmentally destructive fishing technology, sea bottom trolling, developed and transferred from Norway to India through Norway's overseas development aid project, the fishing method that was banned in Norway in 1936.

Indian fishermen are using bottom trolling fishing technology to catch shrimp, not to feed the local population but to satisfy Tokyo diners of sushi and shrimp cocktails. While India imports Japanese cars, computers, VCRs and equipment that may all pass ISO 14000 standards of environmental excellence, local Indian fisherman are destroying their marine resources, and converting marsh lands and mangrove woods into shrimp farms.

The product-specific life-cycle analysis done by corporate environmentalists in Japanese firms will not be able to capture this bigger picture of international trade and the ecological chain of marine resources and industrial goods. Shall we blame Indian consumers to buy too many VCRs. Or shall we blame Japanese consumers to eat too much shrimp? Or shall we blame Japanese manufacturers who manufacture these ISO14000 items? One needs to examine the over-all household consumption patterns, their waste disposition patterns, and the recycling patterns in order to analyze how and where and why a particular manufactured product of a company end up, what the manufacturers can and cannot do with it, and who should bear the environmental costs incurred in the chain.

Anthropological analysis of Japanese corporate environmentalism reveals a need for a wider analytical framework that can connect the roles of the State, household production and consumption, and business ideological formation. This analysis also calls for investigation of corporate environmentalism of individual firms in connection with the macro-level capital and labor movement and trade between the North and the South. ISO 14000 will no doubt link into the Japanese top businesses' quest for global market share. We have also observed that the operative methods used for corporate environmentalism derive from their TQM experiences that had a manifest objective of achieving higher and superior quality and efficiency, while they eliminate waste, save energy, reuse parts and materials, and control the whole operation through statistical data analysis. Already top Japanese companies are

becoming more lean and efficient, as consumers continue to demand higher "quality" VCRs and higher "quality" shrimp in their mass-consumption.

While no doubt many corporate environmentalists are quite sincere in their environmental concern, a more holistic approach to the health of this earth is needed. We need to create a true environmental synergy, instead of compartmentalizing the roles and functions of individual manufacturers, consumers, producers, and government agencies. We need to take into account that, in this global equation, it is possible that an individual firm's sincere efforts for ISO 14000-certification may not produce positive results for global environment, because the epistemological foundation for such thinking continues to be positivistic, evolutionary, and linear. Environmental conceptualization of lives on the earth, on the other hand, requires more lateral, interconnected configuration of many different constituents. We need both time and space dimensions, and pay close attention to unequal allocation of resources among members. We need a paradigm shift to connect more saliently activities of corporations, consumption patterns, flows of international trades and industrial waste within and between industrialized and developing countries. We need to analyze movements and linkages within and between sectors and regions.

REFERENCES

- Aoki, Takeshi. 1991. *Ajia Taihetyo keizai no Seijuko*. Tokyo: Keiso sha.
- Chogin-soken. 1995. *ISO 14000*. Tokyo: Nikkan kogyo-shinbun-sha.
- Fukuoka, Katsuya. 1993. "Kankyo-jidai to kigyō no taio," *Environmental Era and Corporate Response Shookoo Journal*, 18(9):24-27
- . 1996. *Ecolomation no chosen (Challenge of Ecolomation)*. Tokyo: Keizaikai
- Iijima, Nobuko. 1993 *Kankyo-shkaigaku (Environmental Sociology)* Tokyo: Yuhikau
- Kamioka, Namiko 1987. *Nihon no Kogaishi (History of Pollution in Japan)* Tokyo: Sekai shoin
- Murai, Yoshitaka and Yoshiyuki Tsurumi (eds.). 1992. *Ebi no mukou ni Ajia ga mieru (We See Asia Beyond Shrimps and Lobsters)* Tokyo: Gakuyo-sha