

SUSTAINABILITY

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Toward Establishing a Sustainable Society

Interdisciplinary Research Report (Abridged)

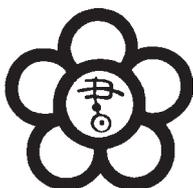
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Titles of people and corporate body names in this book may be out of date.

Toward Establishing a Sustainable Society
Interdisciplinary Research Report (Abridged)

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[Special Contribution]

Time has come to think about a “Sustainable Society”

Osamu Abe

Today, the world is heading towards an era of great change. The world enters the 21st century and a lot of serious and complex issues have arisen in fields of the environment, economy and society. We have to quest for solutions to these issues and new social models.

A number of global issues exist in the environmental field, including desertification, biodiversity crisis and global warming. In particular, shocking details about related to global warming were revealed in the IPCC (Intergovernmental Panel on Climate Change) “Fourth Assessment Report”(2007). In the economics field, the prices of crude oil and food drastically rose and energy and food crises were intensified during 2006-2008, the financial and economic crisis was triggered by the United States’ subprime loan in the September of 2008 and its effects struck worldwide and it caused a simultaneous worldwide recession. In addition, along with the continuing development of the global recession since the 1990’s, economic disparities continued to progress in the areas including economic disparities between and within generations, and also in the social field, a number of issues which require immediate response have began to accumulate such as issues plaguing developing countries.

How should we resolve these problems which continue to advance on a global scale? Toward which direction does our society progress now? One possible response to this question is “Sustainable Society”. At present, we must consider the sustainability in three fields of the environment, economy and society. Countries in Europe have already taken a large step forward in such fields. The main purpose of our interdisciplinary research report, “Toward Establishing a Sustainable Society” is to clarify the concepts of “Sustainable Society” and “Sustainability”.

Looking at international discussion on “Sustainable Society”, we can see that it goes as far back as the “U.N. Conference on Human Environment” (The Stockholm Conference) held in Sweden in 1972. At present, global warming and environmental issues are to be discussed at the international level. However, the beginning for these discussions was also the “U.N. Conference on Human Environment” in 1972.

Sweden in the 1970’s was known for a country with advanced welfare, education and social security. In the 1990’s, “Sweden in the Year 2021” was drawn up (1998) and is still often quoted even today. This report draws a picture of the vision of a sustainable Sweden⁽¹⁾.

The “Sustainable Society” and “Sustainable Development” were first formally clarified in a report

(1) For more information on “Sweden in the Year 2021” refer to “Toward Establishing a Sustainable Society – 2009 International Policy Seminar Report” (Research Materials 2009-3) 2010. Anita Linell’s seminar “Toward Establishing a Sustainable Society-A Message from Sweden”.

created at the World Commission on Environment and Development (Commonly known as the “Brundtland Commission”) in United Nations (1984) (and adopted at the United Nations General Assembly [1987]). It was a message for the entire world. It is said that the real originator of the Brundtland Commission was Japan, because Japan made the proposal for the creation of such a commission at the United Nations Environment Programme Special Session (Referred to as the “Nairobi Conference” [1982]). This is one example of why Japan’s initiative should be sought today.

In addition, “Agenda 21”, an international action plan aimed “Toward Establishing a Sustainable Society”, was drawn up at the “United Nations Conference on Environment and Development” (Earth Summit) held in 1992. This Earth Summit was also the catalyst for the drawing up of the sustainable Sweden vision in the “Sweden in the Year 2021” noted above, and also drove not just Sweden, but also the other countries of Europe to work towards materializing “Agenda 21” as soon as possible.

The UN CSD (Commission on Sustainable Development) was established so as to discuss further the progress of “Agenda 21”, and it has become a venue for sharing information on progress of sustainable development. At the Earth Summit, there were calls for the establishment of “National Agenda 21” for each country based on “Agenda 21” along with creation of a sustainable society vision through establishment of CSD.

At this time, Japanese government has not yet established the CSD. The visions for “Sustainable Development” and “Sustainable Society”, which integrate the three pillars of sustainability, environment, economic and social fields, are clarified in the “Basic Environment Plan”. However, the promotion of “sustainable development strategy” under a Japanese CSD has not yet realized.

The European countries, including Sweden, set up a “Commission on Sustainable Development” in the 1990’s, and the EU (European Union) established a vision for sustainable development and a sustainable future under these commissions. These visions do not stop at just environmental issues, but also they become collective visions which include every sustainability viewpoints including economic and social issues such as welfare, health and social equality.

Today, in Japan, the discussion on environmental issues is growing. In a wider sense, however, it is difficult to say that a clear vision for “Sustainable Development” exists.

This is why the second purpose of our interdisciplinary research report is to introduce the practices of various foreign countries which show their experiences.

Thinking about a sustainable vision and a societal image, “forecasting” and “backcasting” tend to come up as important approach methods which should be studied in Europe, and particularly in Sweden. “Backcasting” is a method by which the vision of “Sustainable Society” is drawn up and then all effort is put towards realizing that vision. “Forecasting”, on the other hand, is a method by which there is no clear sustainable vision but the final objective is stumbled toward through repeated trial and error. The former, “Backcasting” method, is also used in Japan in a variety of situations.

The third purpose of this report is to introduce examples related to the action plans (“Local Agenda 21”) which should be established by local municipalities based on “Agenda 21”.

These practices are beginning to be implemented by local municipalities in Japan. At the national level, the phrase “compartmentalized administration” is often used, however for a local municipality there is little interference with each other’s work. In addition, the head person has a lot of authority, so that any obstacles can be easily overcome and staff is able to maintain a creative viewpoint. However, this type of flexibility is said to be rare at the national level.

On the other hand, not all local municipalities’ practices are handled comprehensively enough deal with environmental, economic and social issues. Such practices always tend to center on environmental policy.

How can we make a comprehensive vision for a sustainable society? It depends that each and every resident has autonomy and begins activities in their immediate area, and starting from municipalities and regions which are already poised and ready. This is a bottom-up approach. At the same time, it is also vital that the government promotes in a top-down manner.

The Cabinet Office has established the “Multi-stakeholder Forum on Social Responsibility for a Sustainable Future” in the spring of 2009. The “Multi-stakeholder Forum” is not at all compartmentalized, but a place for the horizontal discussion with the government. This method is a multi-stakeholder approach, which can be thought extremely important because it encourages “dialog”. As dialog is carried out, the importance of regional viewpoints comes to be understood. Whether regional or national level, this type of multi-stakeholders’ role and their dialog lead to the awareness that every person is a central actor in a society. This also leads to the formation of the awareness and the cooperation among these actors, which is significant.

Finally, as well as the multi-stakeholder’s method, “Education” is an essential factor. This is not limited to school education, but regional learning and social education, and the roles that education play can be enormously large. An example is that the “United Nations Decade of Education for Sustainable Development (DESD)” has started since 2005. The program is carried out for the 10 years between 2005 and 2014, and it is needed to enrich substantial content. Furthermore, the “DESD” was proposed by the Japanese government and NGOs, and adopted at the 2002 Johannesburg Summit.

To realize a sustainable future, it is necessary to firstly draw up a vision for a sustainable future, then to make that vision concrete. It is necessary to gather as much information as possible and learn from it. Creativity is also important. In order to move Japan even slightly closer to a sustainable country, it is indispensable to draw up a sustainability vision, gather the capability to act and cooperate all through education and learning in every possible field.

1. Survey Purpose and Methods

The “Interdisciplinary researches” are done at Research and Legislative Reference Bureau aiming at the contribution to national deliberations by investigating and analyzing internal and external systems for cross-cutting and long-term important legal and policy issues.⁽²⁾

The interdisciplinary research with the theme “Toward Establishing a Sustainable Society” was implemented in 2009.

This report collects and summarizes the results of this interdisciplinary research.

In the international society, a lot of practices are carried out in a variety of fields to determine how to establish a “Sustainable Society” which balances limited global environments with development of economic societies, maintains equality between and within generations.

This interdisciplinary research focus on what type of philosophies the “Toward Establishing a Sustainable Society” issue would be based on, what type of discussions are being carried out on this issue internationally and how we can share the common understandings about that. In addition, this survey is done for the purpose of investigating what type of activities are practiced at the citizen level as bottom-up activities, not only looking solely on environmental aspects, but also investigating in a diverse and comprehensive manner in the policy, economic and social domains.

In this manner, this interdisciplinary research is aimed at contributing to national government discussions by reevaluating the various issues facing modern society from a “Sustainability” viewpoint and by clarifying issues with regard to “Toward Establishing a Sustainable Society”.

For the implementation of the survey, project teams were formed with the Research and Legislative Reference Bureau researchers in the policy, economic and social fields. Added to these members, four outside experts whose expertise was relative to these themes were also asked to participate and then the issues were tackled together with their assistance. Osamu Abe (Professor, Faculty of Sociology/Graduate School of Intercultural Communication, Rikkyo University, and Director at ESD Research Center) was appointed as a visiting researcher along with Kyosuke Kurita (Assistant Professor, Graduate School of Asian-Pacific Studies, Waseda University), Shino Namiki (Researcher, Graduate School of Interdisciplinary Information Studies, The University of Tokyo) and Toshiya Iwamatsu (Research Associate, Graduate School of Urban Environmental Sciences, Tokyo Metropolitan University) as doctoral research fellows.

This survey was conducted over one year with scheduled meetings one time per month during which the overall structure proposal was examined, the divided tasks were coordinated and each individual’s progress was verified, all members constantly sharing information, exchanging opinions and impor-

(2) Major interdisciplinary research reports published recently are as follows. All of these Research Materials published by Research and Legislative Reference Bureau, National Diet Library are available on the National Diet Library website. <http://www.ndl.go.jp/jp/data/publication/document_index.html> “Policy issues of Japan in international comparison” (Research Materials 2009-2), 2010; “First year of the Rudd Government of Australia” (Research Materials 2008-5), 2009; “Attempts at a solution for juvenile problems” (Research Materials 2008-4), 2009; “Problems of the immigrant policy and the foreign workers policy in a depopulation society” (Research Materials 2007-1), 2008; “Expanded EU” (Research Materials 2006-4), “Regional Revitalization” 2007; (Research Materials 2005-1), 2006; “Aging society with fewer children” (Research Materials 2004-2), 2005.

tant concepts. In addition, efforts were made to acquire and understand relevant information by inviting key people who were outside of the project and by holding meetings to listen to their explanations about related fields. Although limited in scope, local surveys were also implemented and all efforts were made to touch upon actual conditions as much as was possible.

As part of this interdisciplinary research, the international policy seminar “Toward Establishing a Sustainable Society - A Message from Sweden” was held for three days from November 25, 2009, with experts from overseas invited the event included a keynote speech, panel discussion and opinion exchange. Ms. Anita Linell from Sweden, who is carrying out advanced practices in this field, was invited as a speaker.⁽³⁾ In addition, Mika Obayashi (Director of Office Ecologist), Ikuo Sugimoto (President of the Citizens Environmental Foundation) and Sachiko Takami (Chief Executive of The Natural Step Japan), implemented a panel discussion organized by visiting researcher Abe Osamu and together with the library’s own Senior Specialist Katsuya Yaguchi.

The seminar was enthusiastic from start to finish, participants exchanged questions and various issues and opinions were talked about including comments from the specialists’ viewpoints of each of the panelists. We believe that we were able to obtain many valuable insights that will serve as reference for how to handle working “Toward Establishing a Sustainable Society” in Japan.

During the writing of this report, all care was taken to ensure the report remained as objective and empirical as possible and that all arguments were made from a neutral standpoint based on library’s large collection of books, magazines and other materials. The part of the opinions are the individual views of each contributor. The major special characteristic of this document is that it investigates matters from both legal and political perspectives and from a wide point of view which includes the situations in many foreign countries and to those based upon data and materials in Japan.

(3) An outline of Anita Linell’s career follows. Graduated Uppsala University 1969 (studied math, chemistry, statistics and education). Obtained master’s degree in economics in 1984. Has worked as a high school teacher (1971-80) and defense strategy research analyst (1980-89), before moving to the Swedish Environmental Protection Agency in 1989, where she worked in the public relations department and environmental laws department (1989-02). During this time she served as project leader for “Sweden in the Year 2021” (1994-1998) and as a researcher and research leader for production in the government’s “Environmental Objective Committee” (1998-02). Was in charge of “Environment and Health” and “Sustainable Development” in national health research from 2003. Was appointed as director of Community Planning and Health, Swedish National Institute of Public Health in 2006 and continues in the position today.

2. What is a “Sustainable Society”?

(1) Evolution of the Theory of “Sustainable Development”

The most important concept in this report is “Sustainable Development”, which is generally explained as (1) development which maintains nature and the environment at appropriate levels, in short a way of thinking which aims at balancing the environment and the economy, and (2) development which integrates participative development and social development centered on developing countries. The theme in this report is working “Toward Establishing a Sustainable Society” and we want to take a look at what type of views are held in regard to “Sustainable Development” and form new conclusions about these established concepts.

This concept was first publicized in the World Conservation Strategy which was created through cooperation with the World Wide Fund for Nature (WWF) by the International Union for Conservation of Nature and Natural Resources (IUCN) by request of the United Nations Environment Program (UNEP) in 1980. Thereafter a number of definitions of “Sustainable Development” were given, but the most widely used definition at present is that of the United Nations “World Commission on Environment and Development” (WCED). The commission was established by a proposal from the Japanese government in 1984, the commission took the name of then prime minister of Norway Gro Harlem Brundtland who was the chair of the commission and was called the “Brundtland Commission”. The “Sustainable Development” concept was presented in the commission’s final report, “Our Common Future” which was presented in 1987. The central concept of the report was “meeting the needs of the present without compromising the ability of future generations to meet their own needs” and the concept of “Sustainable Development” becomes known to the world from that viewpoint.

This concept was more clearly affirmed in international society at the United Nations Conference on Environment and Development (Earth Summit) held in Rio De Janeiro in 1992. “Sustainable Development” was proclaimed as a future common issue for all humanity at this conference. 178 countries and over 1,200 NGOs participated in this conference, and “Agenda 21” was adopted as an “agenda for the 21st century” for “Sustainable Development”. This helped promote the shared awareness that the concept of “Sustainable Development” required balance among the three fields of sustainability, environment, economy and society.

At the 2002 Johannesburg Summit an awareness was reached that regarding the relationship among these three elements, there were economic and social development on a base of environmental protection and preservation, which made each element mutually dependent and reinforcing. This perspective made the idea and concept more clear and concrete. Please see the following figure 1 for the major international conferences and other bodies that are related to the formation of the concept of “Sustainable Development”.

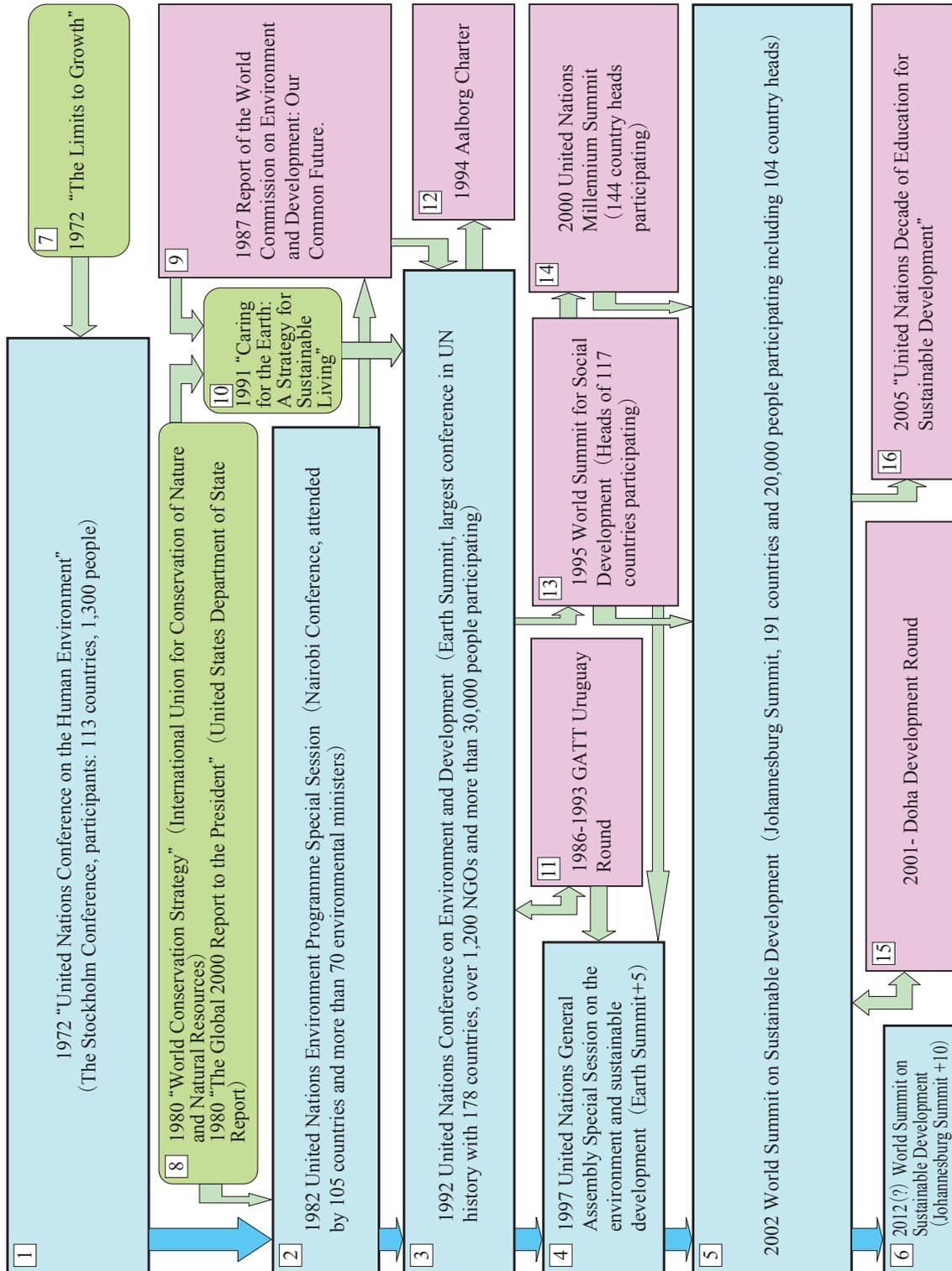
The root of “Sustainable Development” is the concept of “Sustainability”. Today “Sustainability” is

understood as a stable condition which balances three aspects, (1) environmental sustainability which consists of maintenance of use of nature and resources, (2) economic sustainability which maintains efficiency and technological innovation while building fair and appropriate economic systems, and (3) social sustainability which maintains lifestyle quality and welfare through a system that maintains basic rights, needs and cultural and social variety. Simply put, this is maintaining an affluent society for future generations in all countries and regions of the world without damaging the environment or human dignity from economic or social points of view, the realization of all of which is necessary for establishing a sustainable society.

In this report a variety of problems faced by modern society are examined from the aspect of maintenance of global environments, economic systems and human societies.

At the same time the investigations of the report were carried out with consideration paid to the following two points. Firstly, Education for Sustainable Development (ESD) advocated by Japan and promoted by the United Nations plays a large role in popularizing and fixing the concept of "Sustainable Development". Secondly, the backcasting approach is being given a lot of attention as a promotion method for building a "Sustainable Society". This approach requires the following actions: determining desired conditions of a society with a premise that the earth is limited, setting goals for the realization of those conditions, and carrying out reforms and good practices while reviewing present conditions.

Figure 1 Major International Conferences Related to "Sustainable Development" (Created by Author)



1

1972 "United Nations Conference on the Human Environment" (The Stockholm Conference, participants: 113 countries, 1300 people)

Background: Entering the late 1960's, environmental problems caused by economic growth based policies take on an international and global character and become larger, more complex and more serious. Consequently, it is no longer possible to deal with using stopgap measures and international cooperation is now required in every field including living environment issues in developing countries.

Slogan: Only One Earth.

Decision: The "Declaration of the United Nations Conference on the Human Environment" and "Action Plans" for 6 fields were adopted as follows:

(1) Planning and management for better living environments, (2) environmental aspect of natural resource management, (3) determination and regulation of internationally important pollutants, (4) environmental issue education, information, social and cultural aspects, (5) development and the environment, (6) international mechanism for action plans.

->London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, United Nations Environment Program established.

2

1982 United Nations Environment Programme Special Session (Nairobi Conference, attended by 105 countries and more than 70 environmental ministers)

Background: 10 year review for implementation status of actions plans adopted at the UN Conference on Human Environment and future 10 year UNEP action plan inspection.

Decision: 5 resolutions including "Environment in 1982: Retrospect and Outlook"

7 Points of concern: Economic growth and environment coexistence, wasteful mass consumption limits, human/resource/environment/development interconnectedness and mutual reinforcement necessity in total policies, necessity of interdependence of each nation and regional international cooperation, interrelation in biospheres, flexibility of environmental development and management planning, environmental allowance consideration.

3

1992 United Nations Conference on Environment and Development (Earth Summit, largest conference in UN history with 178 countries, over 1200 NGOs and more than 30,000 people participating)

Background: Examination of the 20 years since the Stockholm Conference. Necessity of management for new global environment issues including global warming and decrease in biodiversity.

Decision: Legal measures (United Nations Framework Convention on Climate Change, Convention on Biological Diversity), Rio Declaration on Environment and Development, Agenda 21, Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sus-

tainable Development of all Types of Forests (5 documents). There was no financial backing included in the Stockholm Convention, however in Agenda 21, 0.7% of the GNP is verified to be donated as environmental ODA, and procurement of usable financial resources was clarified. Sustainable development is achievable through the promotion of global partnerships.

4

1997 United Nations General Assembly Special Session on the environment and sustainable development (Earth Summit+5)

Summary of 5 years since the Earth Summit and adoption of the “Programme for the Further Implementation of Agenda 21” with representatives from approximately 180 countries. The global partnership established at the Earth Summit is affirmed.

5

2002 World Summit on Sustainable Development (Johannesburg Summit, 191 countries and 20,000 people participating including 104 country heads)

Background: Examination of the implementation of 1992’s Agenda 21 and other new issues. Social economic issues such as poverty and development are focused.

Decisions: “Action Plan”, “Johannesburg Declaration”, and “Type 2 Project” (3 documents) are adopted. “Type 2 Projects” are projects where partnerships are formed, implementation details announced and written promises made to the world. The Japanese government has registered 30 projects.

New Measures for Further Implementing Agenda 21: eradication of poverty, sustainable production and consumption models, energy problems, water and natural resource preservation and management, protection of forests, preservation of biodiversity, desertification prevention, etc., globalization merits and demerits, carbon dioxide emission growth, Official Development Assistance reduction and fund mechanism investigation result based determined action items.

6

2012 (?) World Summit on Sustainable Development (Johannesburg Summit +10)

7

1972 “The Limits to Growth”

“If population growth and economic development continue as they are now, the earth will reach its physical limits and collapse, however appropriate measures can be used to return to sustainable stability.”

8

1980 “World Conservation Strategy” (International Union for Conservation of Nature and Natural Resources)

Development is defined as: “the modification of the biosphere and the application of human, financial,

living and non-living resources to satisfy human needs and improve the quality of human life". 'Development' also requires biosphere usage management (preservation).

1980 "The Global 2000 Report to the President" (United States Department of State Report)

"The available evidence leaves no doubt that the world-including this nation-faces enormous, urgent, and complex problems in the decades immediately ahead."

9

1987 Report of the World Commission on Environment and Development: Our Common Future.

The concept of "Sustainable Development" is presented. "Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." "In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. (WCED⁽⁴⁾)."

10

1991 "Caring for the Earth: A Strategy for Sustainable Living"

The concept of "Sustainable Development" is clarified and 9 basic rules and 132 standards toward establishing a sustainable society are presented.

11

1986-1993 GATT Uruguay Round

Background: Over-production of agricultural products, etc.

Decisions: Reforms for trade policy, including tariffication and reduction of export subsidies.

12

1994 Aalborg Charter

The charter is adopted at the 1st European Sustainable Cities & Towns Conference. "Local Agenda 21" is actualized and promoted.

13

1995 World Summit for Social Development (Heads of 117 countries participating)

Background: Gap between the rich and the poor as a result of economic development, correction of social distortion.

Decisions: First ever UN poverty eradication and social integration measures, "The Copenhagen Decla-

(4) WCED, *Report of the World Commission on Environment and Development: Our Common Future*. Chapter 2: Towards Sustainable Development. (<http://www.un-documents.net/ocf-02.htm>)

ration”and “action plan” are adopted.

14

2000 United Nations Millennium Summit (144 country heads participating)

Background: International development goals adopted in the 90’s are integrated.

Decisions: “Millennium Declaration” is adopted.

15

2001- Doha Development Round

Background: Consideration of profits for developing countries through free trade is required.

Decisions: Cancellation of target agreement 2006. Measures to apply WTO rules mainly to G20 developing nations and remarkable tariff reduction are promoted.

16

2005 “United Nations Decade of Education for Sustainable Development” (UNESCO is the leading agency based on the UN resolution)

The Decade is proposed by Japanese government at Johannesburg Summit. “All sustainable development programmes, including Education for Sustainable Development, must consider the three spheres of sustainability – environment, society (including culture), and economy.” (UNESCO⁽⁵⁾)

(2) Various Sustainability Indicators as Good Tools for Practice

Clarifying and standardizing the concept and its attainment of “Sustainability” by summarizing, simplifying and quantifying a variety of information in a concrete manner is significant, which will be a guide for your action based on recognitions of the current situation. Until now, speaking of a society's affluence, development and growth were generally measured by GDP (gross domestic product) as an indicator. The use of GDP as an indicator has been supported by the following reason: if the economic activities across the country are affluent, the amount of added value is increased and also distributed among citizens, which makes the society affluent and developed as well. However, from the perspective of “Sustainable Development” noted above, GDP alone cannot be used as an indicator to measure affluence and development. The use of GDP alone as an indicator also does not make sense for the people who see the world without the point of view of “Sustainable Development”.

Therefore the U.N. Commission on Sustainable Development (CSD) set to establish indicators based on “Information for Decision-making”, in the Chapter 40 of “Agenda 21”. The indicators were established in 1996 (134 indicators), and in 2001, a second edition (15 themes, 58 indicators) was released. However, around the release of the 2nd edition, interest in the measurement of the attainment level of the

(5) UNESCO, *United Nations Decade of Education for Sustainable Development (2005-2014): International Implementation Scheme*, p. 28. (<http://unesdoc.unesco.org/images/0014/001486/148654e.pdf>)

2000 Millennium Development Goals (revised in 2007, with additions, 8 goals and 60 indicators) increased, then in the same manner, the methods of measuring the progress of the "Action Plans" from the 2002 Johannesburg Summit were required, so the CSD revised the 2nd edition and presented the 3rd edition in 2007.⁽⁶⁾

Based on the Millennium Development Goals and the 2nd edition, the 3rd edition has 14 themes and 50 core indicators. This edition is more comprehensive than prior editions. However, the measurement has not been comprehensively carried out for sustainability based on these indicators. Only some measurements by individual researchers can be found.

At present, many indicators related to CSD indicators are being used. Items often used as sustainability indicators are "Ecological Footprint", "Human Development Index", and in Japan "People's Well-Being Index". All of these are Indexes which indicate results and attainment points. Simple introductions are provided below.

The size of EF⁽⁷⁾ indicates the demands placed on ecosystem services (ecosystem resource reproduction and waste processing services) for economic activities. In order to receive continuous ecosystem services, the supplied amounts (environmental capacity) cannot be exceeded. Temporary excesses are called 'overshoots', and are processes which can tear down the original natural capital, or lead to "collapse" if they continued for a long period of time. These indicators can be said to show environmental sustainability due to their relationship with economic activities.

EF is indicated as land area per person (gha/person: global hectares), and displays the size of the load placed upon the ecosystem by an individual's continued economic activities as land and water area. As of 2005, the earth's biological productivity was 2.1gha, against which EF was 2.7gha, $2.7/2.1 =$ consumption of 1.3 times the earth's productivity which means there is approximately a 30% overshoot.⁽⁸⁾ This overshooting continued past the mid 1980's, with an increasing carbon footprint particularly noticeable, which in 1961 was only 10% of the whole but which reached 50% in 2005. The biological productivity per person is approximately 2.1gha, but looking at it by country the United States EF is $9.4/2.1 = 4.5$ times the earth's productivity, the EU's $4.7/2.1 = 2.2$ and Japan's $4.9/2.1 = 2.3$.

Next let's take a look at HDI. This Index was announced in the U.N. Development Programme after 1990, and is calculated according to 3 indicators, GDP per individual, life expectancy at birth, and education factors such as adult literacy and school enrolment rate, which are evaluation indicators determining social sustainability such as preservation of human dignity. Incidentally, Norway (0.971) was no. 1 in the 2007 rankings of HDI, followed by Australia (0.970), Ireland (0.969), and Japan sank 2 places from the previous year to 10th place (0.960), the United States in 13th place (0.956), Korea in 26th place

(6) CSD, *Indicators of Sustainable Development: Guidelines and Methodologies-Third Edition*, 2007. (<http://www.un.org/esa/sustdev/natlinfo/indicators/guidelines.pdf>)

(7) Mathis Wackermagel & William E. Rees, *Our Ecological Footprint: Reducing Human Impact on the Earth*, 1996. Nicky Chambers, et al., *Sharing Nature's Interest*, 2000.

(8) WWF (World Wide Fund for Nature), *Living Planet Report 2008*, October 2008. (http://assets.panda.org/downloads/living_planet_report_2008.pdf)

(0.937), and China in 92nd place (0.772).⁽⁹⁾ Indicators of 0.8 and under are considered as the medium human development countries and those at 0.5 or under are considered as the low human development countries.

Recently HDI have been used in combination with EF. Combined use with EF is intended to aim towards a lifestyle with lowered environmental load but without lowered standard of living. Figure 2 looks at the correlation between HDI and EF. HDI at 0.8 or above is considered as the upper limit of biological productivity, and the countries near the intersection of these 2 lines are considered as “Sustainable Countries”.

At present, advanced nations have high HDI and EF, while developing nations have low scores for both. As such, it is clear that promotion of environmental and socioeconomic policies, technological innovation and lifestyle reform are necessary so that advanced countries' EF drops or developing countries' HDI increases.

In addition, policy development with emphasis on “Sustainable Development” glows popular in the EU and other countries, and at the same time, evaluation indicators for sustainability are significantly improved. Those indicators have played larger roles.

Study of a new indicator has been conducted in the EU in 2009.⁽¹⁰⁾ The study says that GDP is not suitable for measurement of progress and even more unsuitable as a sustainability indicator, and that it cannot be said as a balanced indicator because of lack of environmental or social components. The EU is working towards introducing new indicators by 2012 at latest, with the new indicators taking into account both HDI and EF, giving consideration to quality of life and health, and scientifically predicting environmental allowance standards in order to create limits for the use of natural resources as well. France is even looking at the introduction of a subjective indicator for “happiness”.⁽¹¹⁾

In Japan, a variety of indicators are being released, and the one deserves particular attention is the OECD countries' “International Comparison of People's Well-Being” released by the Japan Productivity Center for Socio-Economic Development, which is reported every year since 2004.⁽¹²⁾ The available 56 individual indicators are grouped in 6 categories of health, environment, labor economy, education, civilization and macroeconomics, with the average of the category scores (standard scores) being used as an overall Index of Well-Being for ranking. Japan in the comprehensive rankings for 2008 (using mainly data from 2006) was 7th place⁽¹³⁾ with Luxemburg in 1st place, followed by Norway, Sweden, Switzerland, Fin-

(9) UNDP (United Nations of Development Program): *Human Development Report 2009*, Summary. http://hdr.undp.org/en/media/HDR_2009_EN_Summary.pdf

(10) COM (2009) 433final, Communication from the Commission to the Council and the European Parliament: GDP and beyond Measuring Progress in a Changing World, 20.8.2009. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0433:FIN:EN:PDF>

(11) Commission on the Measurement of Economic Performance and Social Progress, *Draft Summary*, June 2, 2009. <http://www.stiglitz-sen-fitoussi.fr/en/documents.htm>

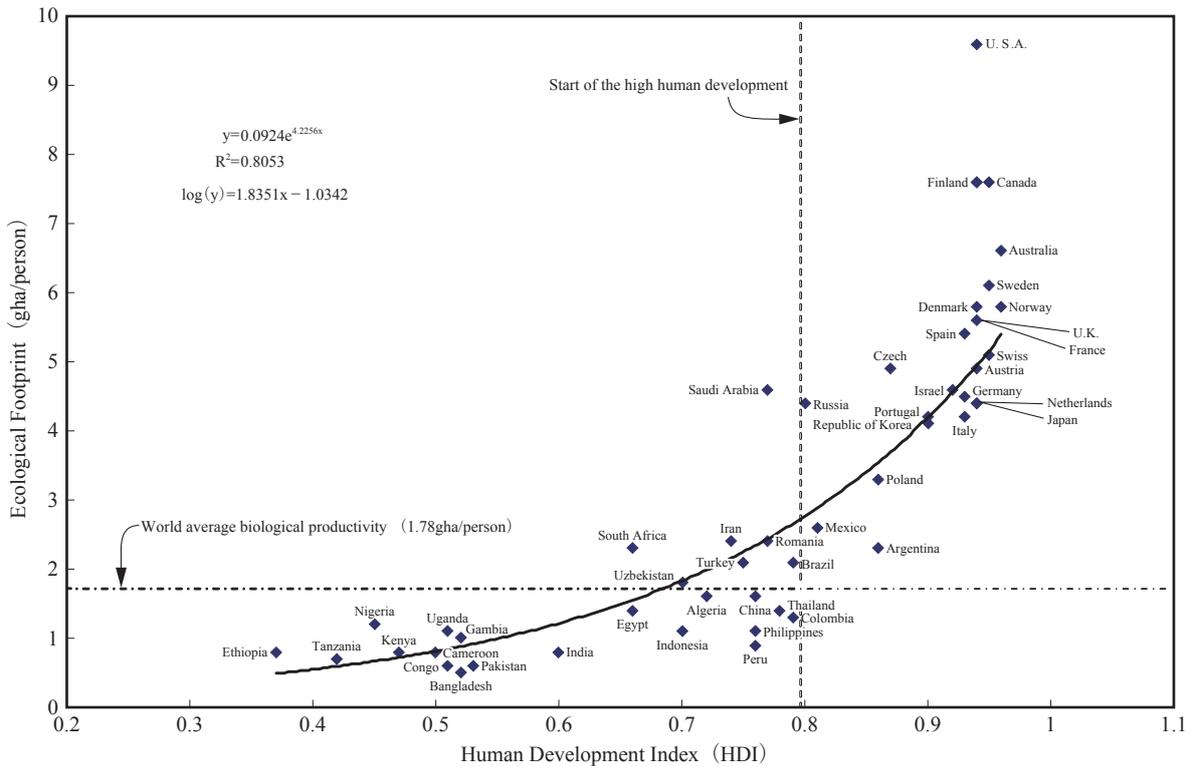
(12) Fiscal 2008 Edition <http://activity.jpc-sed.or.jp/detail/01.data/activity000890.html> <http://activity.jpc-sed.or.jp/detail/01.data/activity000890/attached.pdf>

(13) This means that Japan's degree of “affluence” was 7th place out of the 30 OECD countries, while on the other hand Japan was 4th place at 15.7% among OECD countries in “relative poverty ratio” (2007) (the ratio of citizens who's income distribution is less than half of the median income distribution) which was remarkably high (“Public Announcement of Relative Poverty Rate”, <http://www.mhlw.go.jp/houdou/2009/10/h1020-3.html>).

land and Austria, which showed that northern European countries ranked high.

Figure 3 shows the correlation between the Index of Well-Being and EF. As with Figure 2, countries with high social and economic indicators (affluent countries) also tend to have high EF and this clearly indicates that "People's Well-Being" places a high load on the environment. However, as noted above, there is still room for discussion on whether these type of indicators will be used to determine "People's Well-Being" (differences in quality of life) in the future. In addition, comprehensive indicators are also studied in Japan's "The Third Basic Environment Plan" noted earlier.⁽¹⁴⁾

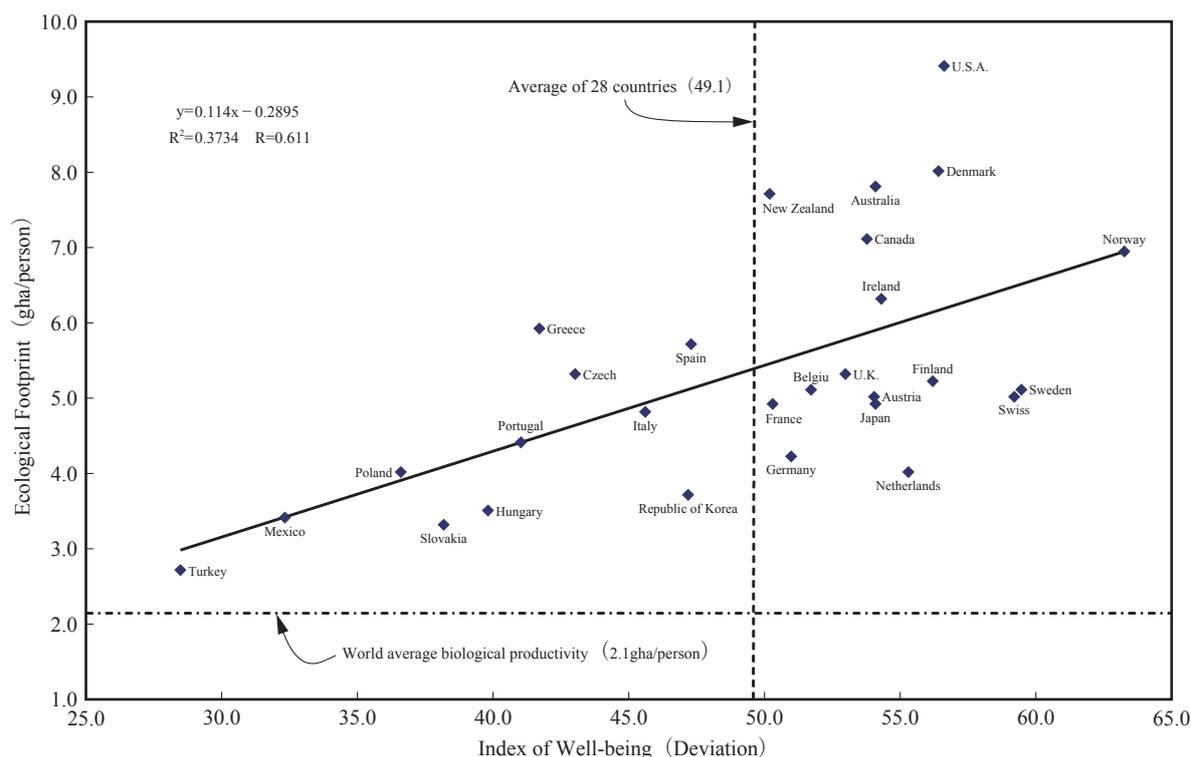
Figure 2 Correlation between Human Development Index and Ecological Footprint (2003)



(Source) WWF (World Wide Fund for Nature) "Living Planet Report 2006" (http://assets.panda.org/downloads/lpr_2006_japanese.pdf) 50 countries based on relative population from Table 2 are presented.

(14) Study continues in Ministry of the Environment "Exploratory Committee on Indicators used in the Third Environment Basic Plan" and is targeted for EF study. "Comprehensive Environmental Indicator Study Issues" (http://www.env.go.jp/policy/kihon_keikaku/ei/kentou/05/mat02_1.pdf)

Figure 3 Correlation between Index of Well-being and Ecological Footprint (2005)



(NOTE) Index of Well-being is composed of the following indexes as shown in the table below.

Category of Index	Individual Indicator, Items marked with (*) are calculated at a negative deviation and are higher rank for smaller indicator values.
1. Health Index	Average lifespan, no. of doctors, no. of nurses, no. of hospital beds, infant mortality rate (*), no. of deaths (*), health expenditure, public health expenditure
2. Environment Index	CO2 emissions (*), Specific energy consumption (*), international tourism income, actual savings, freshwater resources, water pollutant discharge amount (*), arable land, forest area ratio, municipality refuse disposal amount (*)
3. Labor economy Index	Unemployment rate (*), long term unemployment rate (*), worker salary, GDP labor productivity, no. of engineers/researchers, no. of listed companies, social welfare expenditure, unit labor cost (*)
4. Education Index	15 year old student literacy, 15 year old student science capability, ratio of highly educated people, education expenditure, public education expenditure, no. of patents, no. of articles in scientific journals, student/teacher ratio (*)
5. Culture Index	No. of motorcars, electricity consumption, no. of mobile phones, no. of personal computers, no. of internet users, no. of daily papers, export of hi-tech products, no. of televisions, telecommunications expenditure, no. of traffic deaths (*)
6. Macro-economy Index	GDP deflator increase rate (*), economic growth, capital formation, export value, import value, Gross international reserves, Gross domestic savings, research and development expenditure, final consumption expenditure of households, fiscal balance, government accumulated debt (*), official development assistance

(Source) Ecological Footprints are from the WWF (World Wide Fund for Nature) Living Planet Report 2008, October 2008 (http://assets.panda.org/downloads/living_planet_report_2008.pdf), Table 1, and "Index of Well-being" are from the Japan Productivity Center for Socio-Economic Development "2007 International Comparison of People's Well-Being" (<http://activity.jpc-sed.or.jp/detail/01.data/activity000890/attached.pdf>). "2. Environment Index" were excluded here

(3) Surveys Aimed at Policy Making and Good Practice: What Kind of Success is Possible?

In recent years, NGOs, business sectors, researchers and citizens as well as public organizations are participating as actors in policy making processes. This has led to an increase in the number of multi-stakeholders' committees and discussions where the participants express their opinions from their own positions and work together towards solving issues. These types of activities make backcasting ap-

proaches possible, and have the benefit that a variety of public opinion can be incorporated into policy decisions and practices. On the other hand, another opinion is that the various interests are not always being in agreement, and the existence of some actors who do not even attempt to deepen mutual understanding can practically increase the time and money required for decision making compared to previous methods. In addition, it is difficult to say that Japan has successfully formed the type of climate where consensus can be formed through deliberation and debate. It is also pointed out that public opinion is not well reflected in the policy making arenas.

However, in order to build a sustainable society and to overcome these various issues, it is necessary to use a consensus forming process with respect given to mutual understanding and the interests of various actors in the policy making processes and practices, which inevitably bring out the need for multistakeholders' deliberation. What is required is surmounting issues as noted above, creation of a framework that ensures a decision-making process that allows for a variety of actors to interact can function properly and consideration of how best to reach a mutual understanding. It is now required that each actor tackles issues in differing ways while respecting reciprocal relationships in a backcasting approach that is aimed at forming this the above type of society.

The examples and analysis in this report do not always argue the processes of consensus formation itself. They rather discuss how practices are carried out in order to overcome issues in each field and research area, aimed at working toward establishing a sustainable society. For instance, the discussion of sustainability indicators has been made in the report can be appropriate information for the purpose of overcoming issues, which leads us to take the next step to consider how to use those indicators.

At present, almost 40 years after the 1972 U.N. Conference on Human Environment, what exactly are the specific practices for working towards establishing these "Sustainable Societies"? What conclusions has this report reached? Summary of the analysis from the report are described below.

3. Analysis of Actors in Policy Formation

We introduce below a variety of policies about “Sustainable Development” at the national and local levels while providing examples of multiple countries and municipalities.

(1) Sustainable Development Strategy at the Regional and National Level

“Agenda 21”, which was adopted at the United Nations Conference on Environment and Development in 1992, created the opportunity for the concept of “Sustainable Development” to be directly settled on by each country as “Sustainable Development Strategy”. Therein, each country must have their own “Development Strategy” for “Sustainable Development”. Further, this should be used as an opportunity, to begin putting “Local Agenda 21” into practice.

In the EU, “Sustainable Development” is already established as one of the basic goals in the Maastricht Treaty on European Union. This was established as the EU’s “Sustainability Strategy” in 2001. This strategy is not limited to only the environment in a narrow sense, but also states social equality as well as economic prosperity as goals to be achieved. Each EU country is building their own national level strategy based on that of the EU. This same strategy was revised in 2006. Then, a status of achievement report was published in 2009.

In Germany, “Perspectives for Germany - Our Strategy for Sustainable Development” was established in 2002 by federal government as the sustainability strategy for the government. Fairness between generations, quality of life, social cooperation and international obligations were set as the 4 main axes of this strategy, and 21 action areas and indicators are given to correspond to these axes. The “Sustainable Development Congress” formed by the actors from various fields, plays an important role in the determination and implementation of “Sustainability Strategy”.

The United Kingdom established “Sustainable Development: the UK Strategy” in 1994, and then published “A better quality of life: a strategy for sustainable development for the United Kingdom” in 1999. In 2005, the U.K. released “Securing the future: The UK Government sustainable development Strategy” as a revision of the 1999 edition. This strategy sets as goals an economy that delivers high levels of employment, a society that promotes social inclusions. Special feature of the strategy is that it does not only focus on environmental protection but put more emphasis on personal wellbeing, fairness and equality.

In 2003, France established the “National Sustainable Development Strategy (La Stratégie Nationale de Développement Durable – SNDD)” which prescribed a large framework for environmental policy and economic and social policy through discussion between the government and stakeholders. In 2005, the “Sustainable Development” concept was added to the country’s constitution. In 2006, as a result of the revision of the EU’s strategy, the national strategy was revised and 12 new indicators for determining current circumstances were added. In 2007, a nationwide environmental conference was held, and environmental laws were enacted based on the results of this conference.

In the United States, no strategy has been established at the national level, and even at the state level only the three states of Minnesota, New Jersey and Oregon have established comprehensive sustainable development strategies which cover the environment, economy and society. In the state of “Oregon Shines”, the state’s development strategy, and “Oregon Benchmarks”, a measure to evaluate its progress, were introduced in a strategy formulation and evaluation process in which citizens participate in 1989 and this process has been maintained to this day, for over 20 years.

Australia’s national strategy is the “National Strategy for Ecologically Sustainable Development” established in 1992, which is characterized by tying sustainable development with the environmental issues. Its background is the unique environment of Australia which has an amazing biodiversity and is said to hold 10% of the world’s ecosystems. In 1999, the Environment Protection and Biodiversity Conservation Act was enacted. The governmental organizations have to make annual reports on the operation of the Act.

(2) Sustainable Development Strategy at the Local Level

Public administrations, citizens, businesses and other relevant organizations are working to cooperate and work towards resolving regional issues in order to work towards establishing sustainable regional societies. “Local Agenda 21” indicates such action plans and practices based on “Agenda 21”. The role of local governments working together with citizens is important, and the participation of citizens and regional cooperation is indispensable in the determination process. Municipality plans are expanded to target other fields in addition to the environment through policy cooperation with the national government and other municipalities.

Local agendas were first created in Germany in 1994. As of 2005, 2,605 cities, towns and villages, or approximately 20% of the total, enacted “Local Agenda 21”. One of the most important examples is the practices of Neumarkt, Bayern. These cities have comprehensively sustainable strategy in the city planning. A lot of projects are implemented through the entire city and citizens are involved in these projects in a wide variety of ways.

In England, sustainable development has been regarded as an important policy issue at regional and local level. Nine regions have established their own Regional Sustainable Development Frameworks and all local authorities are obliged to draw up a Sustainable Community Strategy. In addition, the central government is engaged in implementing various measures proposed by local authorities for the promotion of the sustainability of local communities.

In Japan in 1993 the Basic Environment Law was established and the “‘Agenda 21’ Action Plan” was decided, then in 1995, the “Local Agenda 21 Planning Guide” was put together for regional municipalities. By 2003 the plan was established at all prefecture and government-ordinance-designated city levels; however adoption at the city, ward, town and village level did not exceed 10%. Japan’s Local Agenda 21 programs often involve environment plans and projects on energy, air pollution, changing climate and similar items, but scarcely incorporate comprehensive plans. Some outstanding examples are

as follows: the “Toyonaka Agenda 21” which uses an interactive type of management system with related parties including citizens and businesspeople, the “Sustainable Shiga Society Vision” which draws a vision for the Prefecture in the year 2030 using backcasting approach aimed at their own comprehensive regional development, and the “4th Minamata City Comprehensive Plan” which reflects citizen proposals in planning and makes use of the results of cooperation between the public administration and citizens.

4. Practices in each Field Aimed at Establishing a Sustainable Society

This section introduces policy and good practices in each field for “Toward Establishing a Sustainable Society” and also provides analysis of these politics and practices. As noted earlier, the consideration from the three pillars of sustainability, environment, economy and society, are necessary for “Toward Establishing a Sustainable Society”. In addition, the backcasting approach is effective for this establishment. This section will explain a variety of policies and good practices and use the backcasting method to categorize these policies and practices.

(a) Science and Technology toward Sustainable Society

The roles performed by science and technology in the society were clarified through a number of practices, mainly of the United Nations, aimed at “Sustainable Development”. These are to resolve environmental issues, economic and social inequality, and contribute to people’s social welfare and “Quality of Life” all with regard for the finiteness of natural environments. However, the development of science and technology alone should give no solution to the problem. Pursuit of science and technology based on “knowledge” which is composed of both scientific knowledge and wisdom gained and accumulated through tradition and experience becomes the issue for working towards the establishment of a “Sustainable Society”.

Looking at current trends in science and technology, advanced nations are oriented towards knowledge and innovation, while technology governance remains an issue on the one hand, while newly emerging countries and developing countries are oriented towards growth. In order to make future science and technology something which supports world development that balances environment, economy and society, the methods for building cooperative relationships between newly emerging countries, developing countries and advanced countries becomes an issue.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • How should usage of science and technology be thought to establish sustainable societies? 	<ul style="list-style-type: none"> • “Knowledge” explosion and necessity of structuring for it • In order to fully utilize science and technology a system of laws, government organizations and other social systems must be replete in addition to development of hard technologies. • Improvement of science literacy throughout society 	<ul style="list-style-type: none"> • Individuals develop understanding of balance of all three pillars of sustainability through science and technology • Attainment of a new sustainable science and technology supported by high level literacy of science and technology, and social systems

(b) Reverse Osmosis Membrane Technology for Water Resources Problems

The majority of water on the planet is salt water (sea water), and the amount of usable freshwater is very small. The problems facing the world's water resources are serious and include the inability to use safe water, inability to provide water in a manner corresponding to economic development and contamination of environments from discharged water and this problem is related to a lot of issues including provision of food, sanitation, disaster prevention and security and not just sustainability for natural environments.

In this paper, focus is placed on desalination technologies as a means of securing fresh water. Japan has a high level of technology in the manufacture of the membranes required for modern desalination technologies. Membrane products are used not only as measures against water shortages within Japan, but also exported to countries throughout the world, including many coastal Middle Eastern countries, and Japan holds a high share of the world's market in this field.

In addition to Japan playing an important role in water resource issues in international society, it is necessary for Japan to cultivate the basic research that supports membrane technologies so as to reduce the cost of the desalination process, and to take measures through cooperation with industry, government, academia, NPOs and the other relevant parties.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • A enterprise, which is a micro actor, carries out R&D and production activities to overcome water environmental issues 	<ul style="list-style-type: none"> • Requires collaboration between administration, government, academia and citizens • Requires maintenance of fundamental research system aimed at sustainable technology development (role of politics) 	<ul style="list-style-type: none"> • Harmony between environmental and economic aspects in all three pillars of sustainability • Establishment of technology improvements, promotion, development systems and green economics which lead the world

(c) Progress of “Sustainable Agriculture” that Supports Society

Sustainable agriculture is defined as the one which perpetually satisfies human needs where environments and resources are preserved, farmers earn appropriate profits, and safe food and fiber materials are provided at appropriate prices over a long period of time by appropriate use of machinery and agricultural technology considering climate and natural conditions.

In order to establish this type of agriculture at each national, regional and individual farm level, agricultural policy needs to be improved and integrated with environmental and food safety policies at the national level, while at the regional and individual farm levels applying these policies requires practices suited to the conditions and characteristics of the region.

In order for agriculture to be sustainable, it is necessary to establish healthy regional cycles of

“economy”, “ecology” and “climate”, and maintain these in balance. To establish sustainable agriculture revitalization and maintenance of societies of rural region and provision of safe food are particularly required in advanced countries, while eradication of poverty, halving the number of undernourished people and environmental improvements are necessary in developing countries.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • Establishment of healthy regional cycles of economy, ecology and climate = Increasing sustainability for rural society • Improving the sustainability of agriculture itself 	<ul style="list-style-type: none"> • Development of environmentally conscious and diverse agriculture which extends from primary to tertiary industries • Improving of conditions for such development that can include trade policies as international level measures or agriculture/environment/food safety policies as country/regional level measures. 	<ul style="list-style-type: none"> • Establishment of sustainable rural societies with healthy ecological, economic, climatic and cultural regional cycles

(d) Sustainability of the Built Environment and Urban Environment: Introduction of Actual Energy Use and the Examples of Built-Environmental Education

In addition to the development and use of environmentally conscious technologies, lifestyle reform is important for establishing a sustainable society. In buildings, use of material resources and fossil fuel sources is reduced and practices are carried out to maintain and improve the health and comfort of living environments, and it is important in the future to use highly inventive building envelopes and high performance equipment to maximize use of natural energies while reducing the energy use derived from fossil fuel.

Resident awareness of built environment and lifestyle are closely related to these practices, and education regarding built environments is important so that the residents can actively adjust to the environment. It is expected that schools will be charged with teaching use of natural energy and reduction of overall energy use, and that school building will be used as environmental teaching materials and serve a role as a base for regional environmental activities. In Japan, good practices are developed to educate residents through cooperation between the Ministry of the Environment and the Ministry of Education, Culture, Sports, Science and Technology.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • How should a sustainable city be established? What are the conditions (construction technologies, citizen conditions) required when doing so? 	<ul style="list-style-type: none"> • Development of construction technologies (hard technologies) is required • Cultivation of residents with an affinity for hard technologies • Importance of education to promote linkage between the parties 	<ul style="list-style-type: none"> • Attainment of sustainable construction environment/city environment (harmony between social and environmental aspects) • Establishment of individuals with an awareness of involvement with region and environment • Intensification of communication inside region

(e) Integrating the Millennium Development Goals into National Development Strategies

“Millennium Development Goals (MDGs)” are goals which integrate the targets adopted in the 2000 “United Nations Millennium Declaration” and at major international conferences and summits up until that point as a common framework which is shared globally and monitored. By setting express numeric targets of halving the malnourished population by the year 2015, MDGs are said to have built outcome-oriented management in the international cooperation. A number of recipient countries are making progress in integrating localized MDGs with their nation’s development strategy in accordance with local conditions, and this is expected to lead to realization of a sustainable development process where a variety of actors, including the poorest segments of society, participate and national ownership is ensured. A system for monitoring MDG results was established, however the obligations of donor countries and organizations are unclear, and the developing mutual accountability frameworks for both the donor and recipient sides remains an issue for the future.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • How are each country (national) and international society (global) working towards the attainment of MDGs? • Is independent development of developing countries possible? 	<ul style="list-style-type: none"> • Need to understand in more detail the social and economic conditions which differ for each country • Need to maintain a forum for discussion between donors and recipient countries as equal partners in order to cultivate ownership of developing countries during the development process 	<ul style="list-style-type: none"> • Union of three pillars of sustainability at national and global levels • Establishment of development strategy which respects the ownership and autonomy of developing countries and attainment of MDGs

(f) Question for Labor and Sustainability: From a Viewpoint of Nonstandard Work

An undignified labor environment has been created by the low cost labor power of foreign countries caused by the globalization of the economy and businesses reduction of personnel expenses as a result of the recessions since the bubble burst, and “decent work” is no longer guaranteed in the amount or quality of employment. Increases in atypical workers in the labor market and intensification of the “working poor” issue provide “social exclusion”.

To reform this labor environment, it is necessary to reexamine the current practice of distinguishing between regular and irregular workers. Activation policy which pays benefits for efforts to cooperate with finding work, job training, child care and nursing services for the unemployed, and work fair policy which requires entry into the labor market to receive social welfare benefits are necessary. Flexicurity policy which provides labor market flexibility and stability for the entire labor market are paid attention and we think there is a room for the basic income policy which does not impose any obligation to work, but unconditionally provides a minimum income.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • Reform of labor environment in Japan • Existence of working poor (dystopia) 	<ul style="list-style-type: none"> • Need for government systems/ financial support • New method of labor (work share, etc.) and support development (basic income) 	<ul style="list-style-type: none"> • Harmony between economic and social policies. • Establishment of a labor system that maintains human dignity

(g) Media Diversity in a Sustainable Society: Current Situation of Community Media

In order to realize sustainable development for a region, it is necessary for the citizens who play a central role in such development to make decisions through communication and work to resolve various issues. Community media such as community FM radio and cable television is given a lot of attention as a means to achieve it because it is opened to community and available by all community members to express their opinions.

In both the United States and Germany, there are community access channels and open channels using cable television which are used for expression of citizen options and for other purposes. In Japan, a lot of unique activities are carried out including “CHUKAI CABLE TELEVISION” which shows programs created through cooperation with communities and residents, “FMYY” which aims at building multicultural symbiotic communities by broadcasting programs in 10 languages, and “Kyoto Sanjyo Radiocafe”, Japan’s first NPO to hold a broadcasting license. Establishment of legal framework of community media and improvement of media literacy of citizens are required for realization of media diversity.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> Working towards development of community media which is effective for issue resolution within the region 	<ul style="list-style-type: none"> Need for establishment of positioning of community media within society and legal system and financial support Improvement of media literacy of general citizens 	<ul style="list-style-type: none"> Strengthening of communication within the region through establishment of a system which allows for sharing of regional information through ICT and sharing and resolution of issues Stable community media Establishment of freedom of speech which is supported by diverse media in harmony

(h) Significance of Evaluation by Citizen Engagement and the Creation of Communication Channels within a Regional Community

In order to resolve the problems faced by regional society and realize development, it is necessary for citizens to utilize their creativity and to clarify and establish the regional sense of values and long term goals through cooperation. For this reason, it is important for the various actors who make up the region to collaborate and deepen their understanding of various issues, so as to smooth communication of intentions, maintain diversity internally and maintain external communication channels. Regional society requires maintenance of internal diversity and external communication channels. Regional residents then receive and send regional information through these communication channels which remain both diverse and open. Regional information is evaluated from many viewpoints by citizens who hold a variety of values, and discussion about solutions to regional issues will be promoted through these evaluation activities. For regional autonomous development, it is necessary to aim towards appropriate communication and embodying citizens' opinions through these kinds of participation process by citizens.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> What is necessary to build good relationships between local governments and citizens? 	<ul style="list-style-type: none"> Cultivation of trust and sense of security from residents towards regional community Strategy, communication channels and system designs for involving citizens in administrative decision making 	<ul style="list-style-type: none"> Harmonization of all three pillars of sustainability at local level Establishment of a regional society which has mutual aid systems and opportunity for communication where social discussion and evaluation based on regional information can be carried out

(i) Cultural Diversity as a Pillar of Sustainable Society: An International Perspective

When working towards a sustainable society, it has been pointed out that culture, especially respect for cultural diversity, has great significance for issues related to the environment, economy and society aspects including adapting to the environment, establishing development strategies, protection of human rights and urban policy. It is also understood that culture is the fourth pillar of sustainable development.

This recognition has been widely accepted through international discussions over many years, and the necessity of a development strategy which suits vernacular culture, and it is commonly agreed upon that a development strategy which suits the vernacular culture is necessary and that we need to pay attention to the traditional knowledge of the indigenous peoples suitable for the area's ecosystem. After the end of the cold war, with frequent outbreaks of ethnic and religious conflicts, intercultural dialogue has become vastly more important, and in recent years with the advance of globalization, there have been moves to maintain cultural diversity. Various international treaties to protect cultural diversity have been developed. Thus, cultural diversity can be understood to be one of the pillars which support a sustainable society.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • What roles does culture play in sustainable development? What types of culture are involved in what types of issues? • What is the culture required for this? 	<ul style="list-style-type: none"> • Development strategy which suits local culture • Respect for traditional lifestyles and knowledge suited to the each area's ecosystem • Human rights protection for minorities • Intercultural dialogue aimed at peace building • Promotion of cultural industry and social integration in urban policy 	<ul style="list-style-type: none"> • Maintenance of cultural diversity • Understanding of cultural roles which underlies three pillars of sustainability, environment, economy and society and integrates these elements • Establishment of policies and good practices which suit the above concepts

(j) Perspectives of the Community-Based ESD (Education for Sustainable Development): Learning from Good Practices in Japan

In order to establish a sustainable society, the role of education is essential, through which people learn the principles of sustainability and put them into practices in their everyday lives. The United Nations Decade of Education for Sustainable Development (2005-2014), which was proposed by the Japanese government, has started since 2005.

However, the concept of ESD has not been well known because of such reasons as follows; the definition of ESD is difficult, the variety of practices can be found because of the approach of ESD is lo-

cally relevant and culturally appropriate, and the relationship between Environmental Education and ESD can be questioned.

In Japan however, the practices of community-based ESD are promoted, supported by the government. ESD is education and learning which create responsible citizens, who can look at various problems related to environmental and other interdisciplinary fields on a global scale and take action to solve the problems by their locally relevant approaches. Also, the process of education and learning currently available can be ESD when it is developed for the purpose of establishing a sustainable society. In Japan, most outstanding practices in which people learn from each other using their own locally relevant topics are found in the advanced ESD promotion areas, Greater Sendai area in Miyagi prefecture and in the Okayama City area in Okayama prefecture.

[Process for Reaching Targets from Current Circumstances Using a Backcasting Approach]

Current Conditions/Start/Questions	Processes/Issues	Goals/Attainment Points
<ul style="list-style-type: none"> • Improve the degree of understanding and interest of people in sustainable societies through ESD 	<ul style="list-style-type: none"> • Establishment of a learning process in which people can discover their own spontaneity locally relevant and learn from each other using their own topics. 	<ul style="list-style-type: none"> • Individuals are able to understand integration of three pillars of sustainability on a variety of levels. • Establishment of individuals who can 'think globally, act locally,' which establishes regional communities based on collaboration and cooperation among those individuals.

5. Reflections and Conclusion

(1) Emerging Issues

As previous sections have shown, despite the differences in the regions, topics, and actors focused on, some notable similarities can be found in the issues and arguments described in this report.

First of all, in order to establish a sustainable society, reconstructions of almost every system in the various fields such as legal structures, administrative systems and supports for private sectors are required. It seems obvious that system design has the key in the application of science and technology, aid implementation, labor environment reform, improvement of citizens' independence and urban environments' reform, etc.

Therefore, it is indispensable for various actors to work together for reconstructing these system designs so that they can successfully progress towards establishing a sustainable society (see Section 3, 4-(e), (h)). In particular, coordination among the various actors' interests and construction of communication channels are necessary because personnel, materials and services must be made maximum use of their potential through the mutual cooperation among different actors.

At the same time, it should be noted that the necessity of change in the attitudes or behaviors of individuals is recognized. Individuals, including citizens or residents, are the primary actors in establishing such a society, and as mentioned earlier, "scientific literacy", "media literacy" or "good practices of ESD (Education for Sustainable Development)" etc. can catalyze the processes of change (see Section 4-(a), (g), (j)).

These issues are described in many other sources as well. For example, the rise of recent years' debate on governance came because of the loss of confidence in both national and international government organs. In essence, with the advance of globalization, the government and international authorities have found themselves less able to resolve problems effectively, which has led to debate on governance among a number of decision-making bodies. Under these circumstances, the boundaries between preexisting countries, regional municipalities, and citizens are recognized to be blurred, and their interdependency to be increased. Thus, the debate on governance has been studied as a good tool to analyze current societies and to bring possible solutions. These studies have also shown some similarities as follows: the problem is that how the partnerships among actors with different organizational systems and interests are treated, or what type of systems are required to make such partnerships function effectively.

On the other hand, as for solutions to global environmental problems, it is not hard to imagine that considerable restrictions (ethical burdens) across all aspects of life are imposed on the individuals by advocating their obligations and virtues for protecting the environment. How should this trade-off problem be considered? The issues in this report cover a wide range, and expert groups exist and work to find solutions in the each given field. However, how should an ordinary individuals work on dealing with these types of issues? There is an "asymmetric" relationship between experts and ordinary people in the degree of understanding and the amount of knowledge. Is it possible for various actors to work together under

these circumstances and to arrive at concrete solutions for these issues?

(2) Prospects for a Japanese-style Sustainable Society

As an answer to the questions above, establishment of a sustainable society is required. Finally we present here a picture of Japanese-style Sustainable Society for the future. In this context, the practice of ESD, which provides a deep understanding of the “relationships” between things, is the key.

It should be noted that people have “fun” while learning from each other in ESD and environment education (see Section 4-(d), (j)). Processes and system designs in which people think “fun” will lead to the successful practical implementation of environmental learning programs and ESD. What matters is that the beginning of developing a “fun” process comes from the ideas of the regional residents. Interestingly, although the key individuals who have stood out in successful examples of ESD in Japan are different in their social positions, they have had in common a deep understanding of their own regional society and the expectations came from that society. It is not hard to anticipate that their social sense of awareness and presence in each regional society have been certain factors for providing learning processes in which people can have “fun”.

However, even with such key persons, everything does not always work out. The regions where ESD has been successfully practiced tend to have their own history of environmental and regional activities, and have already developed the foundation required for smooth implementation of ESD. Based on recent discussions, these regions can be seen as the ones where trust for community has been built and social capital has been successfully established. This trusted community is an essential condition to establish smooth regional communication, which fosters individuals who have a deep affection for the region and also leads to develop such key persons. Looking at the areas of Agenda 21 in Japan or the Oregon in the United States (see Section 3-(1), (2)), those regions which have already built up social capital are presented as successful examples. In this sense, whether this social capital exists or not in the region can be used an indicator which measures the potential of various local actions towards a sustainable society to succeed.

Therefore, in order to construct a sustainable society in micro or local areas, it is necessary to cultivate individuals with a deep insight into the regional society and to design a regional system that allows people to be comfortably familiar with the regional relationships so that they can communicate with each other (see Section 4-(g), (h)). Additionally, the knowledge and advice from experts are useful for cultivating such individuals (see Section 4-(a)).

Concerning the multi-stakeholder processes (see Section 2-(3)) in which a variety of people bring different opinions and debate on those opinions, such processes might not be well applied in Japan, where conforming behavior is preferred, as can be seen in the proverb “Value harmony above all else.” However, in order to reflect diverse opinions and values in the politics and decision-making processes, as discussed earlier, some sort of communication is indispensable. What matters most is not to put the starting point of the decision-making process at a western-style debate (battling arguments), but rather, to

start from trying to know each other among the people gathered. Learning from each other, in other words, the practice of ESD which encourages people to be aware of relationships between people and environment or regional society, can bring people “fun” and change their attitude so that they are willingly to participate in a debate. As mentioned above, this process requires such key persons and a regional attractiveness (social capital) that makes for smoother communication.

Individuals who possess these types of experiences can recognize the relationships between not only micro or local problems but also national and global issues, and act accordingly. In a society where individuals can image the relationships between things appropriately and create something new through their actions, based on a high level of science and technology and policy formation ability, a sustainable society, which maintains human dignity and is balanced in the three pillars of sustainability, environment, economy and society, can be realized.

Special Insert

Policy work for a sustainable society
– experiences and key success factors

The example “Sweden in the Year 2021”
and environmental objectives

Anita Linell

As part of this interdisciplinary research, the international policy seminar “Toward Establishing a Sustainable Society - A Message from Sweden” was held for three days from November 25, 2009. Ms. Anita Linell, Director of Community Planning and Health, Swedish National Institute of Public Health, and former project leader for “Sweden in the Year 2021”, was invited to the seminar as a speaker. The following paper is her keynote speech at the seminar.

Summary

This presentation describes how to establish comprehensive policy work for a sustainable society, leading to actions on national, regional and local levels. The example is from Sweden. Important experiences and key success factors are also presented.

It began with Agenda 21 in Rio de Janeiro in 1992, which was an important reason for the Swedish Environmental Protection Agency's (EPA) initiation of the futures study "Sweden 2021". This study involved several new challenges. It was important to find futurological study methods for complex problem solving. At the same time, methods were needed that could get the stakeholders involved in creating a sustainable future.

The study, which was conducted in different steps, began with the experts defining long-term environmental objectives in scientific terms. Stakeholders from various sectors of society described their own sectors with the long-term objectives as the guide, using the back casting method. The stakeholders had vastly different views of the future. This led to the formation of two diametrically opposed visions of Sweden's future, the Taskminder and the Pathfinder. The Taskminder is characterised by large-scale technology and specialisation, densely built-up areas with large supply areas from a global to a regional level. The Pathfinder is characterised by small-scale technology, diversification, sparsely built-up areas and small supply areas, primarily on a regional and local level. Researchers and experts then conducted impact assessments of the visions of the future. Financial consequences and the ability to function in various scenarios in the surrounding world were investigated. The assessments showed that in most cases, elements from the Taskminder and Pathfinder needed to be combined to make sufficient progress towards sustainability. Lastly, researchers, experts and stakeholders jointly described the way forward to the final visions in the form of various types of measures. The project showed that the objective to achieve a sustainable society within one generation was within reach.

The results from "Sweden 2021" were first used as a basis of the 1997/98 environmental bill where the Swedish parliament (Riksdag) ratified 15 environmental quality objectives. The results were then used by a national commission that laid the foundation of the 2000/01 bill. In the latter bill, the Riksdag adopted interim targets that could be measured and monitored as well as three strategies to achieve the interim targets, including the continuous follow-up and evaluation of the targets. Stakeholders, researchers and experts participated in these efforts as well.

Ten years has now passed. Sweden has come half way. In a hearing recently arranged by the Riksdag's Committee on Environment and Agriculture, it was confirmed that the Swedish environmental targets are unique in the world, are comprehensive and are based on political unity. The political ambitions are

clear from the objectives and grant legitimacy to the stakeholders' work on measures. Good progress has been made on most of the interim targets.

The following are some of the important lessons learned from the policy work. The participation of the stakeholders is an important pre-requisite for a policy to be accepted and implemented. The Swedish system of environmental objectives works well, but requires a great deal of resources for monitoring and evaluation. It is important to formulate realistic objectives.

The key success factors can be described based on Drucker's theory in *The Practice of Management*. Policy work should be **Specific, Measurable, Accepted, Realisable and Time-delimited**, or in other words **SMART**. The conclusion is that Swedish efforts for a sustainable society have been successful because they are built on the five important characteristics for successful policy work at the same time that politicians, researchers, experts and stakeholders accepted responsibility for their roles and made constructive contributions.

Aim

How can policy work for a sustainable society be established that leads to action on the national, regional and local level? What are the lessons learned and the key success factors?

I will provide answers to these two questions based on Swedish experiences from the future study “Sweden 2021” (1, 2). This presentation is about policy work in the environmental field, but the working process and methods presented can come to good use in other areas of policy such as public health and the social dimension of sustainable development.

Background of the futures study

In January 1993, there were three important events that gave rise to the initiation of the project “Sweden 2021” (1). All of them indicated a need for long-term thinking. In the Rio conference’s document on Agenda 21 in 1992, the countries of the world were encouraged to develop plans for a sustainable society from an ecological, social and economic perspective (3). To be able to support this work on a national level, comprehensive analyses of the sustainability issues were needed. The second important event was the fact that the government introduced sector responsibility for environmental issues in Sweden in the early 1990s. This meant that authorities and organisations would assume responsibility for environmental issues in their respective areas. A wish was then expressed that the Swedish Environmental Protection Agency (EPA) should take a more long-term approach to visions, objectives and strategies for sustainable development. The third event was the Swedish EPA’s own report “How will Sweden Thrive in the Year 2020?”, which showed that the majority of the decisions made to-date were inadequate to improve the state of the environment and that there was a wide gap between policy and sustainable development (4).

Challenges

The “Sweden 2021” project was initiated by the Swedish EPA and with that agency’s Director-General as project principal.

It was the Swedish EPA’s first major action-oriented forward-looking study. The first challenge was the application of investigative methods that were well tried elsewhere, but had not been used in the Swedish EPA’s own organisation, were to be applied. Consequently, the project needed to begin with extensive skills development.

The second challenge was that the Government had recently introduced sector responsibility. This meant

that a completely new investigation process was needed where representatives for various sectors could participate in the entire project and contribute ideas to future solutions. Such proposals had previously been put forth by the Swedish EPA.

The complexity of the study was the third major challenge, involving a meta-analysis of important sectors in Sweden and the interaction with the surrounding world. Accordingly, it was important to find methods that were suitable to both complex problem-solving and the generation of participation in the investigative process.

Policy work – an overview

An overview of the policy work from the beginning to the present can be seen in figure 1. The “Sweden 2021” project took place between 1993 and 1998. It was used as one of many foundational documents for two Government bills, the first in which passed in 1997/98, when the Swedish parliament (Riksdag) adopted 15 environmental quality objectives (1, 2, 5). In the second bill in 2000/01, interim targets were adopted (7). The Committee on Environmental Objectives prepared a report with background facts for the last Government bill on behalf of the Government (8). The aim of both bills was to create an environmentally sustainable Sweden in the course of one generation, approximately 25 years. Now, ten years have passed since these policy decisions were made. Sweden has come halfway. This means that policy implementation to date can be assessed.

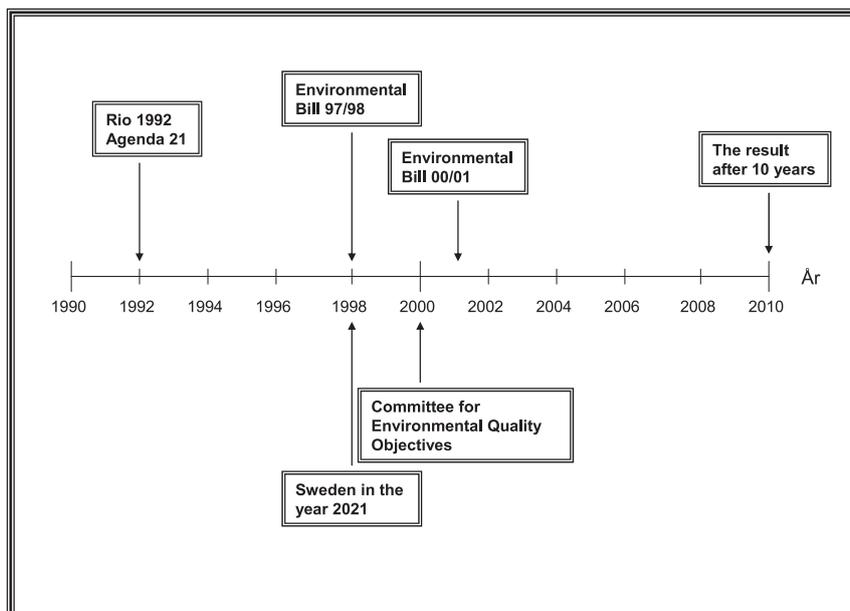


Figure 1. Schedule for policy work and report publication.

I will now review some more facts about the strategically important events in figure 1.

- The “Sweden 2021” project
- The report produced by the Committee on Environmental Objectives
- The Riksdag’s adoption of environmental Bills
- How has it gone? Ten years since the policy decisions
- Lessons learned and success factors

The “Sweden 2021” project illustrates a sustainable society

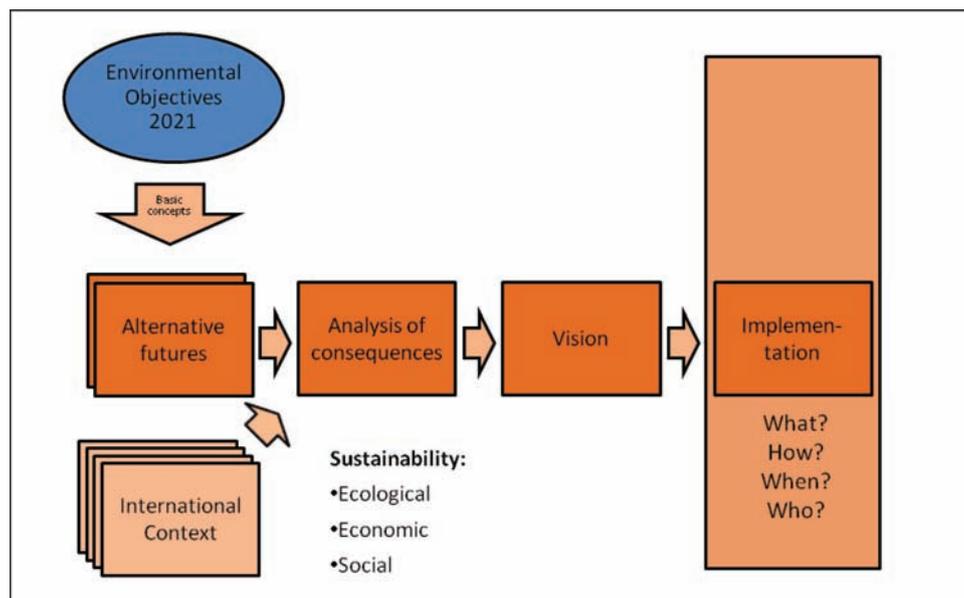


Figure 2. The different steps in the study.

The study was conducted in different steps (1, 2, 9; Figure 2). First, long-term environmental objectives were defined in scientific terms with the help of researchers. They established how much environmental hazardous pollutants in the air, soil and water must be reduced for the environment to become sustainable, as well as the need to manage natural resources and the need to take various ecosystems into account. Stakeholders from various sectors participated and described their sector in the year 2021 in concrete terms with the long-term objectives as the guide. It turned out that the stakeholders had widely divergent ideas of the future. This led to the construction of two diametrically opposed views of Sweden, the Taskminder and the Pathfinder. See fact box 1.

Models of Sweden's future and characteristics	Taskminder	Pathfinder
Material flows	Large supply areas (global/regional) Extensive logistical systems Finite resources in closed systems Resource conservation by recycling	Small supply areas (regional/local) Modest logistical systems Renewable materials, incorporated in natural cycles Resource conservation by Factor 4 principle
Structural features	Densely built-up areas Infrastructure maintained and optimised Intensive agriculture Forestry with focused conservation	Sparsely built-up areas Infrastructure replaced or eliminated Low-intensive agriculture Forestry with mixed conservation
Technology	Large-scale and specialised	Small-scale and varied

Fact box 1. Two alternative models of Sweden's future, a comparison of the Taskminder and the Pathfinder.

The researchers then conducted impact assessments of the visions of the future from ecological, economic and social perspectives if the surroundings were to develop in different ways. Four different scenarios for the surrounding world formed the basis of the analyses: 1) World in crisis, 2) Centre Pacific Ocean, 3) European renaissance, 4) World in balance⁽¹⁰⁾. The results from the impact assessment were used to create a new vision of the future, a "final vision" for each sector. Elements of Taskminder and Pathfinder were in many cases combined in the final visions for the sectors. Finally, strategies for realising the visions were devised based on the questions: What actions should be taken? How should this be done? Who should be responsible for implementing the measures? When should it be finished? The final report was published in 1998.

The methods used for the analyses at the project's macro-level are also described in a separate report on system analysis in Sweden⁽¹¹⁾. It was important to choose methods that could meet the needs for both problem-solving and a well-functioning participative process. Problem formulation indicated a need for methods that could handle a long-term perspective, describe the interaction between the studied system and its context, manage uncertainties, and contribute to providing structure and transparency to the analyses. In order to create a good process, methods were needed that could incite the participation of many of the stakeholders, gather several different points of view, and establish conditions for innovation and an holistic understanding on a macro level. The methods chosen were scenarios, back casting, morphological analysis, brainstorming and manual games^(9, 11). In addition to this, a large number of other methods were used in the various sub-projects.

The sectors studied in the project were:

- Agriculture and the food supply chain
- Production and consumption of goods and their lifecycle

- Forestry and the forest industry
- Housing/business premises and sewage systems
- Transports
- Structural features in urban and rural areas.

The interaction between these various sectors also needed to be analysed with the aim of creating a uniform view of Sweden, so that measures in one sector would agree with the changes in another sector. For example, the use of the amount of biofuel in the transport and energy sector must be adjusted so that the harvesting of timber in forestry becomes sustainable. After processing, organic waste can provide biogas and nutrients such as phosphorous for agriculture. Used packaging and other goods can be recycled and become new raw goods. For energy production, a scenario was used that had previously been worked out by a Government commission⁽¹²⁾. A popular science report on consumers was also prepared⁽¹³⁾. It showed that the consumers cause a large part of the various environmental problems and that there is a great deal that the consumers can do to address this. Important actions concern housing, eating habits, transportation, consumption of goods and waste management.

The following is a presentation of the results from some of the sectors studied in the project: agriculture and food, production and consumption, transport, energy consumption in homes/offices and the structure of urban and rural areas.

Agriculture: Organic or intensive and environmentally adjusted agriculture (2)?

The Taskminder model means that agriculture is made more rational, efficient and environmentally friendly through, among other things, the precise application of commercial fertilisers, herbicides and pesticides. It can be described as conventional agriculture that has been adapted to the needs of the environment. Animal production is based to a large extent on the use of grains as fodder and focuses on pigs and poultry for meat production.

The alternative model, the Pathfinder, can be described as organic farming without the use of commercial fertilisers, herbicides and pesticides. The principal crops are various grasses and clover ("ley") which are used as fodder. Cattle and sheep make use of grazing land.

The impact assessments indicate that neither the Taskminder nor the Pathfinder meets all environmental objectives. In order for that to occur, it is necessary to combine the two alternatives in a careful balance. Production and profitability objectives require that Taskminder methods need to be used in the production of pork, poultry, grains and energy crops such as willows (*Salix*) and red canary grass. The organic methods of the Pathfinder model are profitable for the major portion of milk production and for the raising of cattle and sheep. Grazing animals are also needed to meet biological diversity objectives.

Making agriculture production methods environmentally friendly is not enough. A distribution of production is needed among the various regions of the country to change the imbalance between the growing of crops and the raising of livestock for the better. The final vision means that Sweden is self-sufficient in agricultural food production and still has a surplus of 600,000 hectares of farmland which can be used for energy crops.

The food supply chain: Large scale efficiency or small-scale local production (2)?

If the food supply chain is to be sustainable, energy reduction is necessary. Phosphorous and other nutrients must be recycled. The Taskminder model entails large supply areas, a large scale food products industry and more readymade food products. Organic household waste is collected and converted to biogas in large digesters. Phosphorous and other nutrients are returned to farmland. The Pathfinder model is characterised by small supply areas and local production and processing. More home-made food is cooked with energy effective methods. Organic household waste is composted before being returned to farmland.

The impact assessments show that both models have the potential to reduce energy consumption in the food supply chain by at least 30 per cent and to incorporate the phosphorous from organic food wastes into an efficient cycle. The final vision is a combination of the two models. The Taskminder solutions are needed because Sweden has a cold climate and is not self-sufficient, for example, when it comes to fruit and vegetables.

The greatest savings of energy would be in the retail trade with a 30 per cent energy reduction and in households with a 50 per cent reduction. Individuals contribute by using energy-efficient kitchen equipment, environmentally adjusted shopping, recycling packages and organic waste. They also contribute by switching to more energy-efficient eating habits. They substitute some of their meat consumption with vegetarian proteins, reduce their food waste, and choose environmentally labelled food products and products with low environmental impact from transportation.

Production and consumption: Non-toxic closed cycles or the factor 4 principle (2)?

The production and consumption of goods causes pollution of substances that are harmful to the environment and health. Non-renewable nature resources like metals and oil are used. Two different strategies to make the production and consumption of consumer goods more sustainable were studied. The Taskminder model represents a society based on fully developed cyclic processes. Consumer goods are re-used or recycled. Raw materials that are non-renewable are substituted with renewable materials. Toxic substances that are harmful to the environment are not used.

The other alternative, the Pathfinder model, means that material and energy consumption is decreased.

The amounts of those resources used in manufacturing can be cut in half, while their usefulness is doubled. Consequently, the total increase in utility is multiplied by four – “factor 4”.

Examples of the factor 4 principles are:

- efficient use of materials and energy; small cars in stead of big ones
- increased longevity by second hand shopping
- substitution; vegetables rich in protein instead of meat
- multipurpose products, computers for communication, film, music, reference
- common usage; car pools and flexible offices.

By combining the two models, the Taskminder can save non-renewable resources and create non-toxic cycles while the Pathfinder reduces the need for energy and raw materials.

Transports: The traffic package or the technology package (2)?

Two different strategies to environmentally adapt the transport system were reviewed, the traffic package and the technology package.

The traffic package entails efficiency enhancements of transports so that total transport work is reduced. This is especially important in rural areas, i.e. in a Pathfinder model. Long-distance transports are made by train or ship. Transshipment then takes place at efficient transshipment centres for combined traffic and in the very last stretch, transports are made by lorry. The load factor in the lorries increases through smarter loading. Transport work is also reduced through better organisation so as to keep lorries from travelling empty.

Passenger traffic is environmentally adapted by increasing the possibilities of combining rail travel with car travel in so-called travel centres. Social planning that gives people access to public transport, shops and service in the local area decreases the need for short-distance car travel, which accounts for a large part of the environmental burden from traffic. This is combined with access to bicycle and walking paths. Information technology can contribute to reduced travel through remote work and e.g. remote healthcare.

The technology package decreases the environmental burden by cars, lorries, ships, aircraft and other vehicles using new and improved technical solutions. Some examples are lighter cars, engines that use fuel more efficiently, better exhaust purification and environmentally adapted and renewable fuels.

The impact assessments show that the technology package achieves the targets for emissions of carbon dioxide, nitrogen dioxide, sulphur dioxide and hydrocarbons, but not for encroachment and air quality in

urban areas. The traffic package achieves the latter targets, but not the targets for nitrogen oxide, sulphur and noise. Through a combination of the two packages, a solution can be achieved that is more sustainable overall.

Energy use in housing and commercial property: Efficiency enhancement and investments in new energy sources (2)

In 1996, housing and commercial property accounted for 40 per cent of energy consumption and 50 per cent of total electricity consumption in Sweden. Sweden's per capita electricity consumption was three times larger than the EU average. A previously developed scenario for energy production was used in "Sweden 2021" (12). To achieve sustainability in energy consumption, an investment in energy efficiency enhancement was combined with an investment in renewable energy. Of twelve nuclear power reactors, only three will remain in 2021. Energy efficiency enhancements will mean that new buildings built in 2021 will be passive buildings, i.e. they will need almost no energy for heating. Older buildings will have been equipped with energy-efficient windows and additional insulation. In total, buildings will reduce their energy consumption by 60 per cent. Through smart taps and thrift with hot water, energy consumption for hot water can be cut in half. If the indoor temperature is lowered by two degrees, energy consumption will decrease by 10 per cent. Refrigerators, freezers and other household appliances can be operated with increasingly less energy.

Renewable energy will have had a major breakthrough by 2021. In the urban areas, the cogeneration plants will be fired with biofuels and provide both electricity and heat. The nutrient-rich ash will be returned to the forest. In rural areas, biofuels and heat pumps will be used. Clusters of wind power plants will have been installed in areas with good wind conditions. Solar heat, solar cells and wind power will provide energy and at the same time reduce the need for transports, since these energy sources do not need any addition of fuels.

Society structure in built areas: The Taskminder or the Pathfinder model (2)?

There are great opportunities for progress towards sustainability in both rural and urban areas. However, each area requires its own technical solutions, including material flows adapted to local circumstances. In urban areas, the Taskminder model works, allowing for large scale technology which requires an infrastructure both above and below ground. Some examples are heating plants, large sewage treatment plants and sewer systems, rail-based public transport and telecommunications networks. Such facilities require large quantities of material to construct and non-renewable materials are necessary in order to attain desirable technological effects. Since the materials are concentrated within a limited area, it is possible to incorporate them into effective cyclic processes for recycling and reuse.

By planning urban communities so that they do not expand into undeveloped areas, surrounding landscapes and green areas can be preserved. Compact housing, flexible offices and working from home reduce the amount of floor space needed for housing and office buildings. Urban areas can be linked together with efficient public transport and freight transport, minimising environmental impact.

In areas where the buildings are widely dispersed, large-scale central facilities are inefficient. In such cases, it is better to use small-scale technology for settlements and individual buildings, i.e. the Pathfinder model. The abundance of available space provides excellent opportunities for the exploitation of renewable energy with the use of heat pumps, wind generators, solar cells and collectors. Transportation presents the most difficult problem to solve in rural areas. In a sustainable future, individual trips would be taken in energy-efficient cars and IT would help reduce the overall need for transportation. The overall demand for transportation would also be reduced by increased local production of food products, energy sources and building materials.

In larger cities and in rural areas, the appropriate strategy is quite evident. In medium-sized towns and on the perimeters of cities, local conditions determine which alternative model is the most appropriate.

In summary (2)

The “Sweden 2021” project has shown that the fundamental goal of establishing a sustainable society is a genuine possibility. The vision of a sustainable future presented is based on technology that is currently under development or already available. Thus, it is not a lack of technology that will determine whether or not the proposed objectives will be realised. The study identifies the changes in energy and transportation systems as well as the production and consumption patterns as the toughest challenges on the path to sustainability.

Parliamentary Committee on Environmental Objectives proposes interim targets

In 1998, the Government appointed a parliamentary commission and tasked them with the preparation of interim target proposals for the 15 different environmental quality objectives adopted by the Riksdag in 1997/98(8). The emphasis was that Sweden should become a sustainable society within one generation. A parliamentary commission means that representatives for all parties in the Riksdag were included in the steering committee. The results from “Sweden 2021” were used in various ways. The visions of the future for the various sectors were used to assess the extent to which it would be possible to reduce emissions of pollutants and other environmental impact by 2010, in other words the halfway point to 2021. The interim targets were required to be measurable, time-delimited and realistic. For every interim target, three different levels of ambition were analysed and their consequences were described in terms of the environment and economics. The committee then recommended one of the three levels of ambition

depending on the results of the impact analysis. Three strategies were also proposed in the report: 1) more efficient energy use and transports, 2) non-toxic and resource-efficient ecocycles, and 3) resource management of soil, water, the developed environment and sustainable development structures(8). Another important message in the report was that the environment of the future is everyone’s responsibility, from citizens and municipalities to enterprise and authorities. The aim of the three strategies was also to make it easier to get this message across. Three different areas of action are easier to understand and implement than 15 different environmental quality objectives. A sixteenth quality objective was added later on, A Rich Diversity of Plant and Animal Life. Figure 3.



Figure 3. Sweden’s environmental quality objectives.

The Riksdag adopts a new environmental bill with interim targets

In 2000/01, the Riksdag adopted the bill with environmental quality objectives and associated interim targets(7). An important message in the bill was that the objectives and interim targets must be followed up every year. Every four years, an in-depth evaluation will be conducted that assesses progress on the targets and new measures will be proposed to ensure that the interim targets will be achieved on time. The responsibility for this lies with various central authorities, depending on the area of responsibility. The county administrative boards are charged with influencing and reporting on regional development. The need for coordination between municipalities, enterprise and other stakeholders is emphasized. The three action strategies were emphasized as a primary message regarding what must be done. An Environ-

mental Objectives Council was formed with the Director-Generals from various authorities, as was a drafting committee that together with a secretariat prepares the matters the council will discuss. The most important tasks of the Environmental Objectives Council are to monitor and evaluate, coordinate informational efforts, coordinate regional adaptation, distribute economic funding for monitoring, and report to the Government.

Ten years have passed – what has happened?

In October 2009, in other words this autumn, a hearing on the status of the environmental objectives work was arranged by the Riksdag's Committee on Environment and Agriculture. The annual follow-up report had just been published⁽¹⁴⁾. At the hearing, it was confirmed that the Swedish environmental quality objectives are globally unique, comprehensive and founded on political unity. The political ambitions become clear based on the objectives and provide legitimacy to the stakeholders' work on measures. There is considerable confidence in the working methods among central authorities, county administrative boards and other organisations. The environmental work of the municipalities is well developed. International interest in the Swedish model is growing⁽¹⁵⁾.

The most successful environmental objectives are *Clean Air*, *A Protective Ozone Layer*, *Natural Acidification Only* and components of *A Good Built Environment*⁽¹⁴⁾. The diagrams show examples of air quality trends in Swedish cities, the exceeding of critical loads of acidifying substances in lakes in 1980 and 2002-2004, respectively, and energy consumption in housing and the service sector in 1970-2007. Oil has been replaced by more environmentally aware alternatives. Figures 4, 5 and 6.

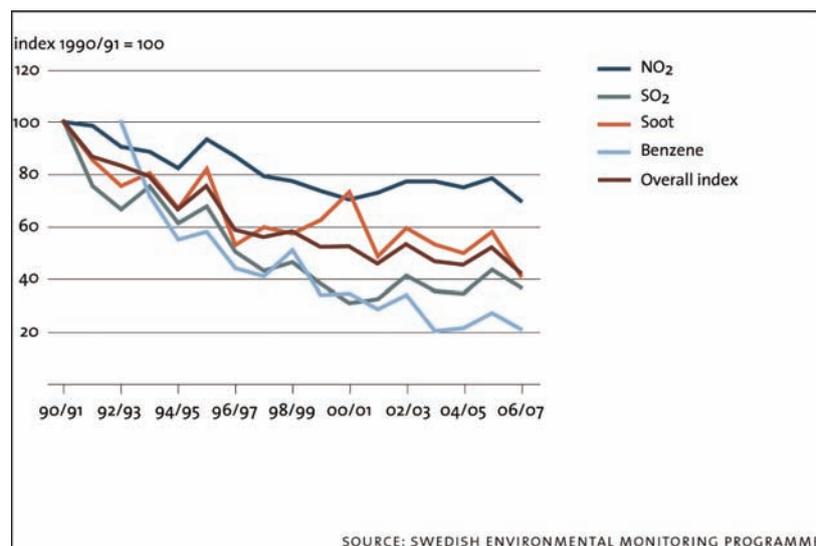


Figure 4. Air quality trend in Swedish towns and cities during the winter period, 1990/1991-2006-2007

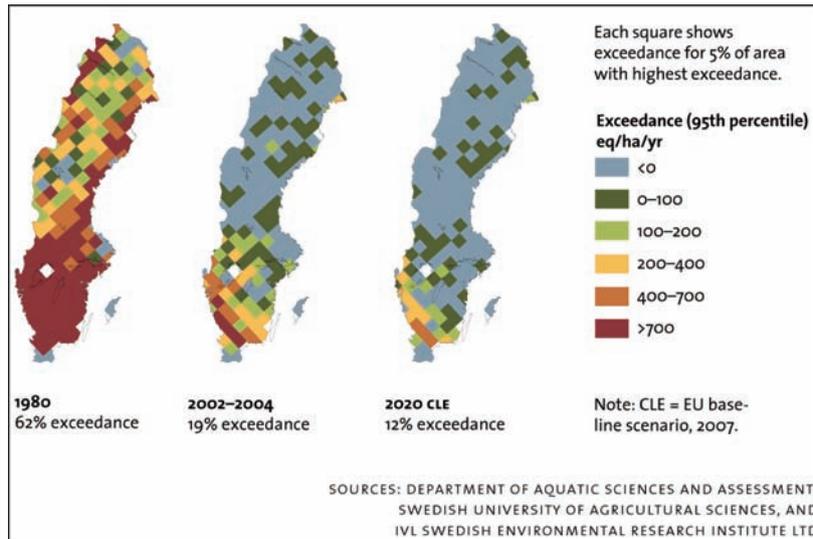


Figure 5. Exceedance of critical loads for acidification of lakes.

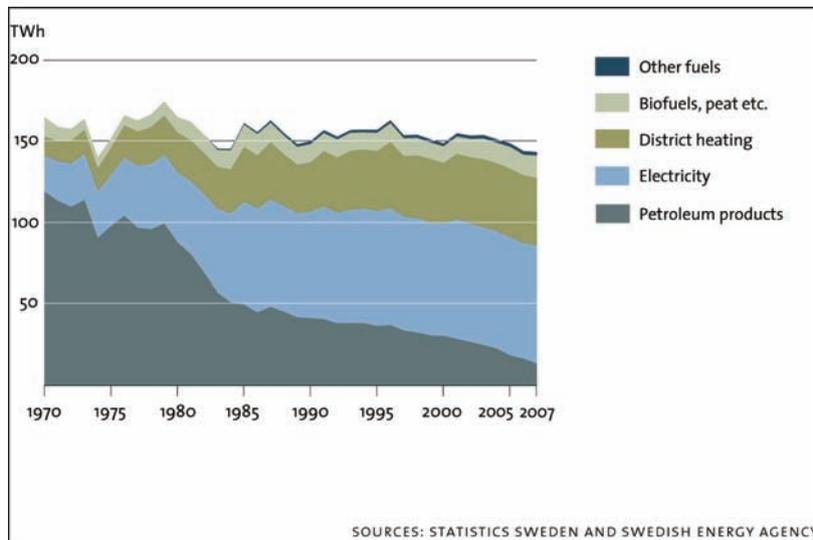


Figure 6. Final energy use in residential and service sector, 1970-2007.

The challenges that require major efforts are *Reduced Climate Impact, A Non-Toxic Environment, A Balanced Marine Environment and Flourishing Coastal Areas and Archipelagos, and A Rich Diversity of Plant and Animal Life*(14). Environmental toxins in products are a problem that is difficult to manage due to the fact that many goods are imported without a content declaration. There are many areas with polluted soil. It will take a long time to remedy the sea, which suffers from over-fertilization, environmental toxins, overfishing and effects of the growing climate changes. The climate changes also affect biological diversity, which is threatened in many ecosystems such as the sea, forest and agriculture. See figure 7 and 8.

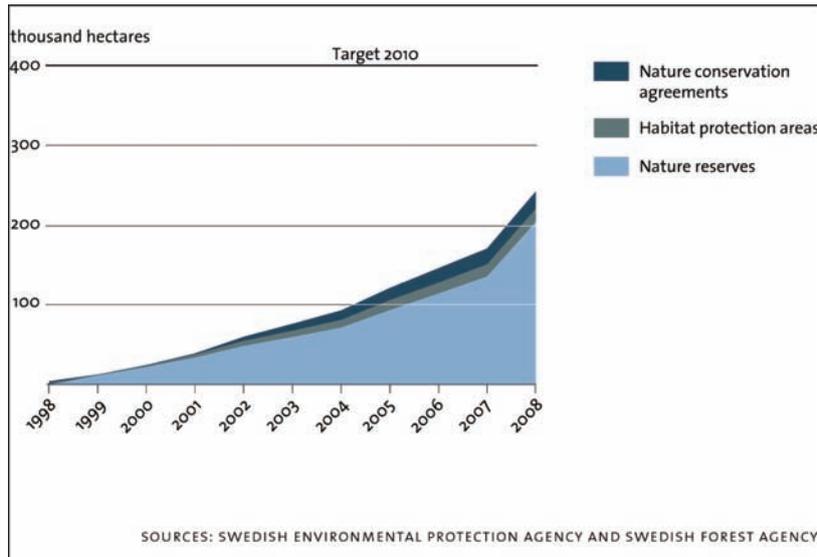


Figure 7. Increase in area of formally protected forest outside mountain forest zone, 1998-2008. The purpose is to protect the biological diversity.

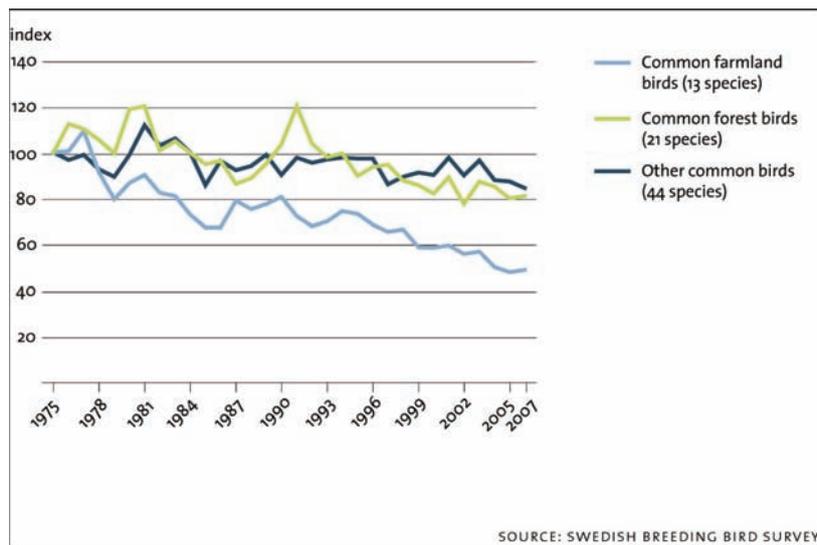


Figure 8. Population trends for some common bird species in Sweden, 1975-2007.

Good progress can be noted in all quality objectives. However, not all interim targets will be achieved by the appointed time, i.e. 2010. There are three important reasons for this. One is due to international influence such as pollutants transported over a long distance, and the fact that the rate of recuperation in nature is slower than previously estimated. Finally, some proposed measures have not been implemented. An example is shown in figure 7. The most recent evaluation of the environmental objectives was published in 2008(16). There it is clear that citizens and enterprise are groups that can do a great deal more in their efforts to improve the environment.

What are the lessons learned?

There are many lessons learned from such extensive policy work. I have chosen to focus on three of them. These are participation, organisation of the work in the futures study and the formulation of the environmental quality objectives in the environmental bills.

The different reference groups with stakeholders enriched the “Sweden 2021” project with a variety of ideas and expertise⁽⁹⁾. By taking part and creating visions of the future, and by participating throughout the entire project, the stakeholders took “ownership” of the final visions that were to be realised in practice. At the same time, the project contributed to making several conflicts clear by letting the stakeholders’ various views being expressed in widely divergent visions of a sustainable Sweden’s future. With the help of researchers, knowledge was developed about various areas of conflict. The discussions that followed led to more nuanced approaches among the participants and greater understanding for each other’s values. The first lesson is that the stakeholders’ participation is an important pre-condition for the policy to be accepted and realised on national, regional and local levels.

The way work is organised is more important than one can imagine⁽⁹⁾. Preparations must be afforded a great deal of time in order to create mental readiness for systematic thinking, new investigative methods and new work processes. The preparations among the stakeholders and in the project’s workgroups worked well. During the course of the project, it became apparent that the steering committee felt uncertain. A lesson here is that the project principal (the Director-General) and the steering committee may have needed to set aside more time to understand the completely new analysis methods and the participative process with the stakeholders. The perceived uncertainty led to the project organisation being changed to a mixture of a line and a project organisation. Roles, responsibilities and authority then became unclear. A lesson here is that a pure project organisation is preferable in investigations where holistic thinking is important and the results in sub-projects are dependent on one another. Thanks to a small, main project group of ten people that worked very closely, the project was nonetheless able to achieve its goals. How work with environmental objectives is organised in Sweden was mentioned in the previous section. The lesson learned is that this is a well-functioning system apart from the fact that monitoring and evaluation require a lot of resources.

The Riksdag’s decisions on the environmental quality objectives in the 1997/98 bill set forth that sustainable environmental quality should be achieved within one generation⁽⁶⁾. This formulation should instead have been that *society* should be sustainable within one generation so that nature can recover over the long term. The recuperation processes in the environment take a very long time, sometimes up to a century or more. The thinning of the ozone layer, polluted soil and acidified and over-fertilized waters are a few examples. Due to this unrealistic formulation, the follow-ups on the environmental quality ob-

jectives have shown that almost no long term quality objectives can be achieved within one generation. There is now a new proposal that the formulations should be changed to state that a sustainable society, not environmental quality, should be achieved within one generation.

What are the key success factors?

Let us take a closer look at what has made the Swedish policy work successful. Success is generated by people working together. This means politicians who make important decisions, researchers and experts who contribute to the basis of decisions, and stakeholders who implement the environmental work in practice.

- Stakeholders participated throughout the “Sweden 2021” project and provided opinions in the Environmental Objectives Committee’s investigation of the interim targets. They contributed proposals on how their sectors could look in a sustainable society and on what actions to take. This meant that they obtained a clear view (Specific) of what should be done and understood why (Accepted). It could be said that the implementation was continuously under way. When the Riksdag adopted the Environmental Bill regarding interim targets and strategies, the stakeholders were in agreement with what awaited in the form of measures.
- Researchers and experts contributed to shaping long-term objectives on scientific grounds and describing future visions so concretely (Specific) that their consequences could be assessed. They contributed to system analysis methods to generate participation and handle complex analyses with the goal of finding final visions that can function in an uncertain future (Realisable). The impact assessments contributed to an understanding of what could be implemented and what could not be implemented. This gave the stakeholders a more nuanced view of what was possible.
- The politicians demonstrated agreement and a desire to make decisions in the form of environmental bills. They adopted environmental quality objectives and interim targets that could be followed up (Measureable) and that showed when the targets should be achieved (Time-delimited). The politicians decided that the follow-up of the environmental objectives should be done every year and that an in-depth evaluation should be conducted every four years. They have followed and been involved in the reporting of how the environmental work is proceeding.

The keywords in parentheses in the above text summarise five characteristics of successful policy work. It should be SMART according to Drucker’s theory in *The Practice of Management*(17). See table 1. Swedish authorities and public administration are encouraged to apply this theory in practice(18).

Characteristics of successful policy work	Who contributes?
Specific	Stakeholders, researchers and experts
Measureable	Politicians
Accepted	Stakeholders
Realisable	Researchers and experts
Time-delimited	Politicians

Table 1. Characteristics of successful policy work according to Drucker's theory(17)and important actors.

The conclusion is that Swedish efforts for a sustainable society have succeeded because they have been based on the five important characteristics of successful policy work at the same time that the politicians, stakeholders, researchers and experts have taken responsibility for their roles and made constructive contributions.

Final reflexions

Is it possible to develop similar policy work in an entirely different country such as Japan? Is it possible to create participation on a broad front so that the stakeholders are ready for action when political decisions are made? Are researchers and experts ready to contribute their expertise to very complex problem-solving based on an interdisciplinary perspective? Do the politicians have the desire to make decisions that provide clear guidance towards a sustainable society? What are the obstacles and the opportunities?

These are questions that I hope we can exchange experience on in the coming Q&A sessions and round-table discussions.

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