Bilateral Joint Research Seminars
JSPS, Japan and ESRC, UK

Japan-UK Joint Seminar on Policy Integration between Environmental Assessment and Disaster Management

Proceedings

November 30 - December 3, 2012

Chiba University of Commerce and Onagawa Town, Miyagi

二国間交流事業　共同セミナー
日本学術振興会及び英国 ESRC

環境アセスメントと災害管理の政策統合に関する日英共同セミナー

会議成果報告

2012 年 11 月 30 日～12 月 3 日

於：千葉商科大学　及び　宮城県女川町

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Preface

We had very sad experience in March 11, 2011 by the attack of the huge earthquake on the Tohoku Region. Japanese society has been damaged not only by the earthquake and tsunami but also by the Fukushima Daiichi Nuclear Power Accident. Earthquake is a natural disaster and the nuclear accident supposed to be caused by mostly human errors such as mistake of the site location, ill design of the facility, and mismanagement in its operation.

By the tragedy, we learnt again that human beings have to be more cautious against disasters especially in the age of science and technology. For precaution of impacts of human actions, Impact Assessment (IA) has a quite important role, sometimes it is critical. IA researchers and practitioners from UK and Japan collected in Tokyo area had intensive discussions on policy integration between disaster management and IA based on rich information crossing over wide scope of the field. In this event, participants had not only presentations and discussions but also had a visit on an attacked area by the earthquake, Onagawa Town in Miyagi Prefecture, and could see efforts for recovering.

Though the seminar was a few days event, the participants from UK and Japan could have a fruitful opportunity to consider how IA would be contributable to disaster management. The result of the project should be sent to the world. This is the first report from us.

The project was coordinated by Prof Sachihiko Harashina and Prof. Thomas Fischer with colleagues from the two countries. And many of them are members of the International Association for Impact Assessment (IAIA), the leading society of IA experts in the world. The activity was financially supported by the Japan Society for Promotion of Science (JSPS) and the Economic & Social Research Council (ESRC) in UK. We could also have supports from Chiba University of Commerce, the University of Liverpool, and the Town of Onagawa. We heartily appreciate all of them.

from Japan **Sachihiko Harashina***
Professor, Chiba University of Commerce,
Professor Emeritus, Tokyo Institute of Technology

from UK **Thomas Fischer****
Professor, University of Liverpool

*Past President, IAIA, **Chair of Ireland-UK Branch, IAIA

まえがき

2012 年 3 月 11 日に東北地方を襲った大地震により、我々は大変悲しい経験をした。日本社会はこの大地震と津波だけでなく、福島第一原子力発電所の事故によっても大きく傷つけられている。地震は自然災害だが、原発事故は不適切な立地選定や施設設計、運用時のミスなど、主として人為的な失敗によるものだと思われる。

この悲劇から、特にこの科学技術の時代においては、人類は災害に対してより用心深くなければならないことを我々は学んだ。人間行為の及ぼす影響に対する予防措置のためには、インパクト・アセスメント（IA）が大変に重要な役割を果たし、時にはそれが決定的なものになる。IA の研究者と実践者が日本と英国から東京地区に集まり、災害管理と環境アセスメントの政策統合について、多様な領域にわたる幅広いスコープでの情報をもとに、集中的な議論を行った。この共同ワークショップでは、参加者は発表と議論をするだけでなく、被災地のひとつ宮城県女川町を訪ね、現地の復興について視察することもできた。

このセミナー自体は数日間のものだったが、日英の参加者は IA がいかに災害管理に貢献するかを考える充実した機会を持つことができた。このプロジェクトの成果は世界に情報発信されなければならない。この会議成果報告は我々からの最初の報告である。

このプロジェクトは、千葉商科大学教授の原科幸彦とリバプール大学教授の Thomas Fischer が主宰し、両国の当該分野の専門家の協力により行われた。そして、彼らの多くは、世界の IA 分野をリードする専門家団体である、国際影響評価学会（IAIA）のメンバーでもある。本活動は日本学術振興会（JSPS）と英国の経済社会研究カウンシル（ESRC）からの資金助成を受け、また、千葉商科大学、リバプール大学、女川町からの支援も得られた。これら諸機関に対し、心から感謝の意を表したい。

日本側代表　原科幸彦*
千葉商科大学　教授
東京工業大学　名誉教授

英国側代表　トーマス・フィッシャー**
リバプール大学　教授

* IAIA 元会長、　**IAIA、アイルランド・英国支部代表

1. Background, aim, and objectives

Disasters are caused by nature or human errors. For instance, Fukushima nuclear power plant accident is considered as one of the biggest disasters cause by human errors, and we can consider how to reduce the probability of the occurrence of the disaster by controlling human actions in a precautionary way. On the other hand, such natural events as earthquakes, tsunamis, hurricanes, storms etc. are caused not by human actions. As these are activities of the natural system, human beings cannot control them, even though we might be slightly influential on them. But we can consider how to mitigate the damage on human-side through appropriate land use and good planning of human actions on the certain site.

But, if the quality of the environment is not so healthy situation, it would be very difficult to mitigate the impact. In this meaning, environmental degradation often has a part to play in the occurrence and severity of damaging or disaster events. For instance, deforestation can increase the risk of flash flooding or landslides and wetland depletion can increase the risk posed by storm surges and tsunamis to coastal communities. The recognition of the relationship between environmental degradation and disaster events has meant that environmental management is now seen as a key means of reducing disaster risk.

As a result, one instrument that has gained much attention in this context has been environmental assessment (EA) or impact assessment (IA) in much wider concept, which encompasses not only environmental impacts but also social and economic impacts. Both EA and IA are tools for pursuing sustainable development, and EA is focusing mostly on environmental impacts, which attracts many stakeholders of each society as environmental degradation is the major concerns of their daily life and also future of them. EA is an environmental management tool that acts to promote the consideration of environmental issues in human development actions. It is often divided into EA of *projects*, generally referred to as environmental impact assessment (EIA), and EA of *programmes*, *plans and policies*, frequently termed strategic environmental assessment (SEA), which is a generic term. EA can help reduce the negative impacts of development action on the environment and in doing so can help prevent the underlying causes of disaster risk. However, it is recognised that the role of EA in this regard can be potentially further strengthened. In this context, three main points have been made:

1. EA has the potential to be a means through which disaster risk considerations can be embedded into development activity by expanding the tools methodologically to incorporate explicit disaster risk considerations. For instance, expanding the EIA process to explicitly consider how deforestation associated with a proposed development project could reconfigure the landslide or flood risk in a locality. And this approach should become more precautious if an SEA is applied to the land use planning of much wider area.
2. EAs should be fully integrated into activities in the post-disaster period in order to help prevent disaster recurrence and promote sustainability in two stages. The one is in emergent situation of

just after the event happened. This is often a time when EA considerations are sidelined officially or unofficially in order to hasten disaster response or recovery interventions. We need to have another type of EIA, that is quick or fast EIA.

3. And in the next stage of making a policy, plan, and program to really prevent disaster recurrence and promote sustainability, SEA should be applied to these.

However to date, the concept of using EA to reduce disaster risk is not something that has been widely researched, or indeed, been widely implemented in practice, despite its potential as a cost-effective means of reducing disaster risk with boosting to build consensus among the stakeholders. Accordingly, the proposed seminar aims to bring together Japan and UK based researchers and practitioners in the environmental assessment and disaster management fields to raise awareness of the potential role that environmental assessment can play in disaster risk reduction, promote dialogue, and, drawing on diverse experiences of the participants based on the two countries, develop new insights that can help advance the agenda in research and in practice in the UK, Japan and potentially further afield.

The **aim** of this seminar is to bring together Japan and UK based researchers and practitioners in the environmental assessment and disaster management fields to promote dialogue on the potential role that environmental assessment can play in meeting disaster risk reduction objectives and identify ways to progress the agenda in research and practice in the two countries and potentially further afield.

Accordingly, the seminar has the following **objectives**:

1. To raise the awareness of a range of Japan and UK based stakeholders of the relationship between environmental degradation and disaster events and the concept of using environmental assessment to reduce the risk of disasters;
2. To explore experiences of the two countries in environmental assessment, disaster management and any areas of overlap;
3. To disseminate the findings of available research on the role of environmental assessment in disaster risk reduction;
4. To develop new insights and highlight opportunities to progress the agenda in both research and in practice in the two countries and internationally;
5. To develop a sustainable platform for future collaboration.

2. Overview of the seminar

- Date: 30 Nov. ~ 3 Dec. 2012 (4 days)

- Place: Chiba University of Commerce, 1-3-1 Konodai, Ichikawa-shi, Chiba, 272-8512, Japan

- Participants list:

Japan	
Sachihiko Harashina*	Professor, Chiba University of Commerce
	Professor emeritus, Tokyo Institute of Technology
Takehiko Murayama	Professor, Tokyo Institute of Technology
Masahiro Osako	Director of the Center for Material Cycles and Waste Management Research, National Institute for Environmental Studies
Shigeo Nishikizawa	Associate professor, Tokyo Institute of Technology
Takuya Sugimoto**	Lecturer, Chiba University of Commerce
Yuki Shibata	Assistant professor, University of Shiga Prefecture
Ryo Tajima**	Research associate, National Institute for Environmental Studies
Keita Azechi	PhD student, Tokyo Institute of Technology
Kenichi Tanaka	Senior advisor (EIA), Japan International Cooperation Agency
Kayoko Yamamoto	Associate professor, University of Electro-Communications Tokyo
Tai-young Yi	Researcher, National Research Institute for Earth Science and Disaster Prevention
Tomohiro Tasaki	Senior researcher, National Institute for Environmental Studies
Atsuko Masano	Freelance journalist
Seiichi Suzuki	Masters student, Tokyo Institute of Technology
Kenichi Nakagami	Professor, Ritsumeikan University

United Kingdom	
Thomas B. Fischer*	Professor, University of Liverpool
Ross Marshall	Head, Environment Agency
Steve Swain	Evidence advisor, Environment Agency
Alan Bond	Senior Lecturer, University of East Anglia
Bridget Durning	Senior Research Fellow, Oxford Brookes University
Tom Gore**	Research Associate, University of Liverpool
Nebil Achour	Research Associate, Loughborough University
Samuel Hayes	PhD Student, Manchester University
Andrew Buchanan	Chairman, IChemE Environment Special Interest Group

NB: *coordinators, **core members for managing the WS

➢ Program:

Japan-UK Joint Seminar[1] on Policy Integration between Environmental Assessment and Disaster Management

Day 1 (Fri, 30 Nov.)

9:00 ~ 9:30	Registration
9:30 ~ 10:00	Opening plenary, Photograph
10:00 ~ 10:40	Keynote Speech
10:40 ~ 11:00	Short Break
11:00 ~ 12:00	Session 1: Disaster Management for sustainability in the UK/Japan (1), *Chaired by Takehiko Murayama*
12:00 ~ 13:30	Lunch Break
13:30 ~ 14:30	Session 2: Disaster Management for sustainability in the UK/Japan (2), *Chaired by Ross Marshall*
14:30 ~ 14:50	Short Break
14:50 ~ 16:30	Session 3: Youth Session, *Chaired by Alan Bond and Shigeo Nishikizawa*
16:30 ~ 17:00	Wrap up meeting
18:00 ~	Reception (Sky Tree View Restaurant & Bar "REN")

Day 2 (Sat, 1 Dec.)

9:00 ~ 10:30	Session 4: Disaster Management and Environmental Assessment tools (1), *Chaired by Thomas B. Fischer*
10:30 ~ 10:50	Short Break
10:50 ~ 12:30	Session 5: Disaster Management and Environmental Assessment tools (2)*, *Chaired by Sachihiko Harashina and Kenichi Nakagami* *Joint session with the Association for Policy Informatics
12:30 ~ 14:00	Lunch Break
14:00 ~ 17:00	Workshop: The potential role of EA in Disaster Management, *Chaired by Ryo Tajima and Tom Gore*
17:00 ~ 17:15	Closing Plenary

Day 3 &4 (Sun, 2 Dec. ~ Mon, 3 Dec.)

Site visit – stricken area in Onagawa town, Miyagi

[1] The original title of this event was 'Japan-UK joint workshop on ~'. However, for the sake of clarity, in this proceedings the term 'seminar' is used to indicate the whole event, whereas 'workshop' refers to the workshop session held on the second day afternoon.

Photo 1 Group photo of participants (30 Nov. 2012)

Photo 2 Seminar room

Photo3 Presentation session

Photo 4 Reception

Photo 5 Closing remarks from the leaders

3. Academic outputs of the seminar 1

Two keynote speeches and 20 presentations (12 from Japan, 8 from the UK) were made through the seminar. In this chapter, the abstracts, extended abstracts / short papers (if any), and the presentations slides are compiled for each of the keynote speeches and presentations. The abstracts are accompanied with Japanese translation.

注：

本会議成果報告に掲載された論文は、英文で執筆されたものであるが、読者の便を図り、アブストラクトについては日本語表記を加えた。なお、日本語表記に当たっては、以下のように取り扱った。

（和文）と表記されたものは著者自身が執筆した和文
（和訳）と表記されたものは、著者が執筆した英文を翻訳者が和訳したもの

ANNOTATION

Please note that the presentations or papers in this proceedings are draft versions, therefore, some of those might be published in scientific journals or books in the future.

本会議成果報告に掲載された論文または発表はドラフト段階のものであり、そのいくつかは今後、学術誌あるいは本として出版される可能性があります。

3.1 Keynote speech

Environmental Assessment is Manners in a Sustainable Society - Lessons on Environmental Assessment from Fukushima Nuclear Power Plant Accident

Sachihiko Harashina

Professor, Chiba University of Commerce
Professor Emeritus, Tokyo Institute of Technology

Abstract

Fukushima nuclear power accident gave us tremendous lessons to impact assessment (IA). Though, it was impossible to apply EIA to the plant as it had been built in 1960s, after operation, there had been many opportunities of taking measures against great earthquakes and tsunami on the occasions of repairs or periodical tests. If Japanese IA system includes a concise IA system, it could be done. Japanese EIA Law was amended in 2011, but no concise IA system was introduced, which should be manners in a sustainable society. The Annual number of environmental assessment on national level in Japan is only about 20, which is quite small compared to 30,000 to 50,000 under NEPA in the US. This is because Japanese systems have no concise IA like EA under NEPA. By the amendment of the Japanese EIA Law, there are some improvements, but the basic concept of environmental assessment was not changed. Why this was happened? There is a long history of struggles between pro development and pro environment in Japan. But we have to learn from the tragedy of Fukushima.

Just after the accident, as it is in an extraordinary situation, the type of IA is different from an ordinal situation. EIA, which usually takes one or two years, is not appropriate, and concise IA should be applied firstly in the emergency instead of EIA. Then if it was found that more examination would be necessary, EIA should be conducted. We must know how the concise IA is necessary.

Then the next stage is to make a recovering plan of the region. The nuclear accident is the additional cause of the disaster to the huge earthquake and tsunami. Another major lesson concerning IA is for future planning. To recover from the disaster, we have to conduct a good risk management. This means that it poses a challenge to the conventional Japanese energy policy, which has been biasing heavily to nuclear energy. . And we have to apply Strategic Environmental Assessment (SEA) effectively for making sustainable energy policy and plan with social consensus. SEA has to be applied to the policy, plan and program making stages, and the consecutive application of SEA on such various decision making stages could build consensus on each stage. It is quite effective for consensus building to use the Hybrid Model for the meeting based SEA. Under the Hybrid Model, member structure of the planning meetings is a hybrid of experts for rationality and stakeholders for fairness. On this setting, and by a transparent process through “discussion in public space” with sufficient information with thorough information disclosure and collecting public opinions, the real dialogue with “meaningful reply” would be conducted, and could build consensus in the society.

(和文)

環境アセスメントは持続可能な社会の作法
- 福島原発事故からの環境アセスメントへの教訓 -

原科幸彦
千葉商科大学　教授
東京工業大学　名誉教授

福島原発事故は、アセスメントに関して多大な教訓を我々に与えた。この原子力発電所は 1960 年代に建造されたため、EIA の適用は不可能であったが、その稼働後、修理あるいは定期検査の際に、大規模な地震と津波に対する措置を講じる機会が多く存在した。日本のアセスメント制度が簡易なアセス制度を含むものであれば、それは可能であったであろう。日本の環境影響評価法は 2011 年に改正されたが、持続可能な社会の作法であるはずの簡易アセス制度は全く導入されなかった。日本における国レベルの環境アセスメントの年間実施件数は、わずか 20 件余りであり、米国での NEPA に基づく 3 万～5 万件と比較すると、極端に少ない。日本の制度には NEPA の下での EA のような簡便なアセスがないことが、その理由である。日本の環境影響評価法の改正により、一定の改善がみられるが、環境アセスメントの基本概念は変わらなかった。なぜ、これが起こったのか？日本では、長い間、開発推進派と環境推進派が争ってきた。しかし、我々は福島の悲劇から学ばなければならない。

事故直後は非常事態なので、適用される IA の種類は平常時とは違う。1－2 年はかかる通常のアセスは不適当で、その代り、緊急時においては簡易アセスが、まず適用されるべきである。その結果、もし、さらなる検討が必要となれば、通常のアセスを行う。簡易アセスがいかに有効かを、我々は知るべきである。

そして、次の段階は地域の復興計画作りである。福島原発事故は大地震と津波に加えて、この災害の重大な原因である。アセスメントに関するもう一つの重要な教訓は、将来の計画に対するものである。この災害から復興するためには、十全のリスク管理をしなければならない。これは、原子力に過度に偏重してきた従来の日本のエネルギー政策に対する課題を提示する。我々は持続可能なエネルギー―政策とエネルギー計画を、社会の合意を得て作成するために、戦略的環境アセスメント（SEA）を効果的に適用しなければならない。SEA は政策、計画、プログラムの各段階で適用されねばならず、多様な意思決定段階における、連続的な SEA 適用が各段階における合意形成を可能とすることになる。会議ベースの SEA にハイブリッドモデルを適用することは合意形成に対して非常に有効である。ハイブリッドモデルでは、計画検討会議のメンバー構成は、合理性のために専門家と公正性のために多様なステークホルダーの混成となる。このもとで、徹底した情報公開と公衆意見の収集により十分な情報を与え、誰もがアクセスできる「公共空間での議論」を行う透明なプロセスを持つことで、「意味ある応答」がなされる真の対話が実現され、社会の合意形成が可能となろう。

Policy Integration between Environmental Assessment and Disaster Management

Japan-UK Joint Workshop
Chiba University of Commerce
11.30-12.3, 2012

Environmental Assessment is Manners in a Sustainable Society

Lessons on Environmental Assessment from Fukushima Nuclear Power Accident

Sachihiko Harashina

Chiba University of Commerce

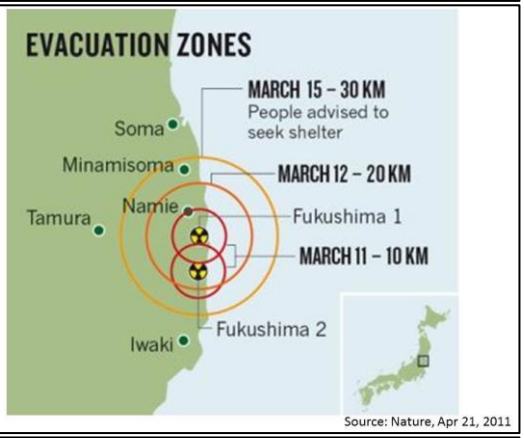
Tokyo Institute of Technology (Professor Emeritus)

Fukushima Nuclear Accidents, March 11, 2011

(AP Photo/AIR PHOTO SERVICE) MANDATORY CREDIT

Fukushima Dai-ichi Accident, 2011

- On 11th March 2011, an earthquake of Magnitude 9.0 and subsequent tsunami triggered a serious accident.
- Significant amounts of radioactive substances were released to the surrounding environment.
- Melt down of the fuels:
  Destroy of emergency power utilities by tsunami made blackout, then cooling systems were stopped



Source: Nature, Apr 21, 2011

The Role of IA

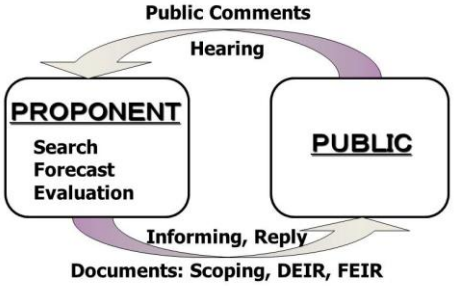
IA supports Rational and Fair Judgment

For rationality, we need
- Scientific Approach

For fairness, we need
- Public Participation
- Information Disclosure

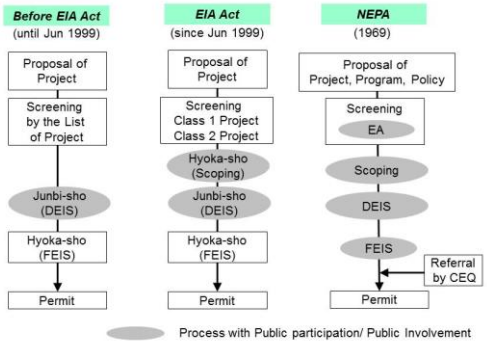
"IA should be a communication channel between proponents and public"

Communication in EIA process



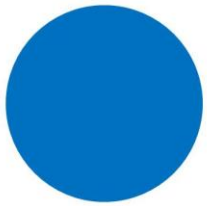
Documents: Scoping, DEIR, FEIR

National Level EIA Systems: Japan and the US



Comparison of concise/full EIAs

Applied numbers per year of USA and Japan



30,000-50,000
US, NEPA

20
Japan, EIA Act

A Few Targets of Japanese EIA Act

- No concise EIA, such as EA under NEPA, has been conducted even Japanese systems have screening processes.
- **EIA is focused to only huge projects.**
  eg. Express ways, Hydro dams, Air ports, High speed railways (Shinkansen), Power plants, etc.
- Very **narrow scope of impacts**,
  eg. Health impact by Radiation is out of scope

Good IA system could have made the accident smaller

For selecting the site location

- Fukushima Dai-ichi was constructed in 1960s
- It was impossible to apply IA at that time

After operation

- Safety test has been taken every ten years
- Small repairs had been done occasionally

If concise IA had been done in such occasions, what happened?

Anti Tsunami Measure

- A former director of TEPCO told last summer, in a newspaper interview, that he thought to move the emergency power supplies to much safer place to protect them from a huge tsunami
- If concise IA had been introduced into Japan, it might be applied to even small repairs of the power plants in the last 40 years

⇩

- **Anti tsunami measures had to be taken, and the impacts should be weekend**

Lessons: IA as a Workable Communication Channel for Disaster Management

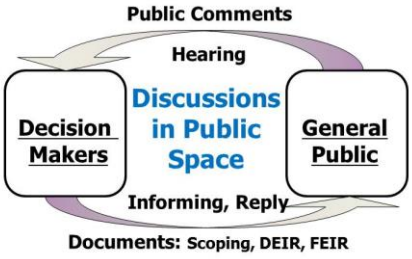
- First check on impacts from various human actions through **concise IA** should work for disaster risk management
- **Screening by a two stage system** with concise IA is a way to give a communication channel between proponents and society
- To make the process workable, **ethics of experts** (and stakeholders) is essential

Five Levels Model of Public Participation*

(1) Informing	**(Informing**)**
(2) Hearing	**(Consultation**)**
(3) Formal reply only	**(Placation**)**
(4) Meaningful reply	
(5) Partnership	**(Partnership**)**

* Harashina (1994-2001)、feedback process for meaningful discussions conducted in public space.
** Comparable levels of Arnstein's eight ladders model of participation (1969)

Meaningful Reply is Realized by Discussions in Public Space



Belated Legislation of EIA

It took a quarter century long
Started in 1972 and established in 1997

Oppositions from big public work leading agencies and industries, especially from electric companies

Belated Introduction of SEA

Preparation was started in 1998
SEA would be implemented from 2013

SEA Systems: Japan and the World

	Policy	Netherlands Env. Test (1995)
SEA	Plan or Program	Word Bank (1995-) EU SEA Directives (2004) China EA Act (2003) inc. SEA Shared SEA GL, Japan (2007) (Site location and Size)*
Project EIA	Project	Power plants were cut out of the GL among the 13 types of projects applied to the EIA Act

International Herald Tribune

Opinion 26 The Asahi Shimbun Friday, April 27, 2007

POINT OF VIEW / *Sachihiko Harashina*

Power plants cut out of new assessment plan

Two Ways of Discussions in Public Space

(1) Paper based way:
eg. Ordinal EIA process
major media are documents

(2) Meeting based way:
eg. Fixed members committee through open process
major media are meetings

SEA Conducted by the Two Ways

SEA: Policy → Plan or Program
Project EIA: Project

Meeting Based way > Paper Based Way

Paper Based way > Meeting Based way

Paper Based way

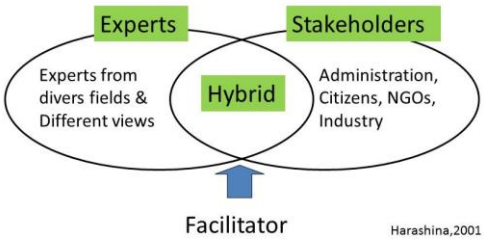
DISCUSSIONS in PUBLIC SPACE Through SEA of Meeting Based Way

Three Conditions for Success

1. **Setting the Arena**
2. **Transparency of Discussions**
3. **Sufficient Information**

DISCUSSIONS in PUBLIC SPACE Through Transparent Meeting Process

Hybrid Model



Harashina,2001

A Case of SEA (Meeting Based Way) Waste Management Program, Nagano Pref.

A Case of SEA (Meeting Based Way) Waste Management Program, Nagano Pref.

- Chusin-region, rural area with 520,000 residents
- Started for resolving a dispute happened in 2000
- Most Advanced PP process in Japan, 2001-2003
  - Citizen participated meetings
  - Open discussion process with CATV broadcasting
  - Very Positive information disclosure of the prefecture
- Four documents on each consensus building stage
  (Public comments on the SEA documents)
- Consensus was built to Construct Smallest Plants

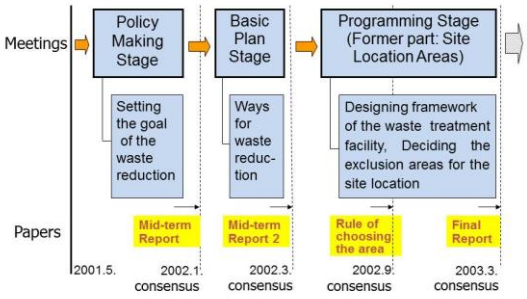
Meeting Based SEA: An Open Meeting in Nagano, 2001-2003

Consensus of constructing the plant was built after several months of discussions

Consensus Building Process of the Waste Management Dispute in Nagano

2000, Oct. New governor was elected (Yasuo Tanaka)
Nov. Project was refused by opinion poll
2001, Jan. The Governor met Prof. Harashina
Apr. '7 conditions' for the process were accepted
May. Open meetings of the Committee started (33meetings, 32 WS etc. until Mar. 2003)
2002, Jan. *Mid-term Report* (Policy level)
Mar. *Mid-term Report 2* (Basic Plan level)
Sep. *Rule of site selection*
2003, Mar. *Final Report* (Site Selection Program level)
2003, Apr. New committee was organized
Jun. Prepare for ordinal SEA (for site selection)

The Results of the SEA
Stepwise Consensus Building (2001-2003)



Another Application of the Hybrid Model: Revising the EIA guideline of JICA (2002-2004)

Roles of JICA and JBIC for Big Projects of ODA

JICA:
Assisting the planning process of big projects of recipient countries (up stream decision-making)
"Environmental Guidelines for 20 Infra. Projects" from 1990, Screening and Scoping

JBIC:
Financing after planning process
Yen Loan (activities of former OECF)

JICA +JBIC (ODA)～ Word Bank
(New JICA, After October 2008)

Expansion of the Role of New JICA

Before October, 2008

Project Cycle	Yen Loan	Grant Aid	Technical Cooperation
Project Formation	Former JICA	Former JICA	Former JICA
Appraisal / Approval	Former JBIC	MOFA	
Implementation/ Supervision			

After October, 2008

Project Cycle	Yen Loan	Grant Aid		Technical Cooperation
Project Formation	New JICA	New JICA	New JICA	New JICA
Appraisal / Approval			MOFA	
Implementation/ Supervision				

MOFA: Ministry of Foreign Affairs

An Open Meeting / Study Committee of JICA

Through highly transparent process, a very advanced GL was made

On the ability of environmental assessment to support better planning and management

Thomas B Fischer

Professor, University of Liverpool

Abstract

Environmental assessment (EA, including both, SEA and EIA) has been attacked by some particularly vocal critics for having no more than a negligible impact on policy, plan, programme and project making processes and for being largely ineffective. In this context, reference is frequently made to some particular poor case studies. In this paper, and based on the empirical evidence provided by various studies, I will argue that overall these claims are spurious and that in many countries and systems EA is able to contribute significantly to thousands of sustainable and better decisions. In fact, when compared with other decision support tools, including for example cost-benefit analysis, the instrument is proving to be remarkably robust.

（和訳）

よりよい計画づくりとマネジメントを支える環境アセスメントの効果について

トーマス・フィッシャー

リバプール大学

環境アセスメント (SEA および EIA を含む EA)は、ポリシー、プラン、プログラムそしてプロジェクト策定プロセスにわずかな影響を及ぼしているに過ぎず概して効果がないものであるとして、一部の批評家の声高な攻撃にさらされてきた。これに関連して、いくつかの特定の粗末な事例研究が、しばしば、引き合いに出されている。本論文では、様々な研究により与えられている経験的証拠に基づき、私は、これらの主張が概して誤っており、多くの国々と制度に於いて EA は、非常に多くの持続可能でより良い意思決定に大きく貢献することが出来ているということを、主張する。事実、費用対効果分析などの他の意思決定支援ツールと比較すると、これが著しくロバストな手段であることが証明されつつあるのである。

On the ability of environmental assessment to effectively support better planning and management

UNIVERSITY OF LIVERPOOL

Prof Thomas B Fischer PhD FIEMA
Head of Department of
Geography and Planning
School of Environmental Sciences

Aim of Paper

To reflect on (some of) the evidence provided for the overall effectiveness of environmental assessment (including EIA and SEA) and other decision making support instruments / tools ('venues') internationally

Introduction

- Over many years, both, EIA and SEA have been subjected to some fierce criticism
  - Academics (critical social scientists and communicative theorists)
  - 'disgruntled' investors, politicians and decision makers
- Some of the critics have denied that the instrument (or 'venue') is able to effectively influence decision making

Introduction

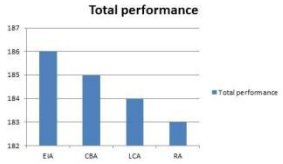
- And the reality?

Introduction

- And in comparison with other decision support tools?

Introduction

- And I don't mean it this way...

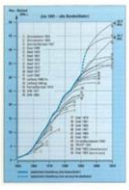


Introduction

- Existing criticism...
  - At best suggestions for improving the instrument have been made (Dalkmann, Herrera and Bongardt, 2004)
  - At worst, the instrument has been deconstructed and 'dumped' without providing for any alternatives (Richardson, 2005)

Evidence: Other policy, plan, programme and project decision support instruments

- Ex-ante 'models/methodologies'...
  - ***CBA***/CEA (cost effectiveness analysis)
  - ***MCA***
  - Risk assessment
  - ***LCA*** (& e.g. mat. flow analysis - MFA)
  - *Prediction models* (eg transport...)
- Expert systems (e.g. mortgage approval ...)
- SWOT (TOWS, PEST [political, economic, social, techn....])
- ***EIA/SEA***
- ***Alternatives to assessment approaches***



CBA

- CBA is notoriously faulty, as costs are underestimated and benefits are over-estimated, in particular by those advocating a project; e.g. Edinburgh tram: from just over £300M to over £1B (optimism bias; connected with Kahneman and Tversky's 'planning fallacy: underestimating time necessary to complete a task)
- Reference class forecasting, based on other similar projects (Flyvbjerg) seen as the way forward, but still underestimating costs.
- There are non-monetary values that are difficult to express in CBA .

346 Bent Flyvbjerg

Table 1: Inaccuracy of transportation project cost estimates by type of project, in constant prices

Type of project	No. of cases	Avg. cost overrun %	Standard deviation
Rail	58	44.7	38.4
Bridges and tunnels	33	33.8	62.4
Road	167	20.4	29.9

Source: Flyvbjerg 2009

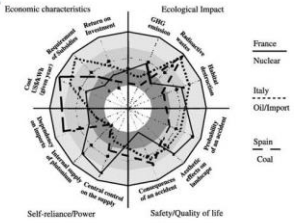
CBA

- *Cost-benefit analysis is a deeply flawed method that repeatedly leads to biased and misleading results. Far from providing a panacea, cost benefit analysis offers no clear advantages in making regulatory policy decisions and often produces inferior results, in terms of both environmental protection and overall social welfare, compared to other approaches.*

Source: Heinzerling and Ackerman 2002

MCA

- Used routinely in EIA / SEA
- Useful when used in a comparative way (not in terms of 'end' results); i.e. for aiding decision-making where there is a choice to be made between competing options
- Trade-offs and values underlying assumptions can be made transparent



Source: Giampietro et al, 2006

LCA

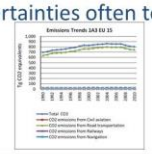
Table 3: Overview of tools available to address (reduce and/or illustrate) different types of uncertainty in LCA. Based on Huijbregts (1998a)

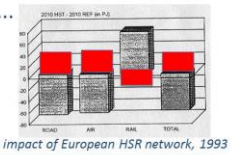
	Data inaccuracy	Data gaps	Unrepresentative data	Model uncertainty	Uncertainty due to choices	Spatial variability	Temporal variability	Variability in (representativeness	Epistemological uncertainty	Mistakes	Estimation of uncertainty
Standardisation				x						x	
Data bases		x	x								x
Data quality goals	x		x								
Data quality indicators	x		x							x	
Validation of data											
Parameter estimation		x									
Additional measurements	x	x	x					x			
Higher resolution models				x		x	x				
Critical review		x	x		x				x	x	x
Sensitivity analysis	x		x	x	x	x	x	x			
Uncertainty importance analysis	x		x	x	x	x	x	x			
Classical statistical analysis	x					x	x	x			
Bayesian statistical analysis	x					x	x	x			
Interval arithmetic	x										
Vague error intervals	x										
Probabilistic simulation	x							x			
Scenario modelling			x	x	x	x	x	x			
Rules of thumb	x										

Source: Björklund, 2002

Summary of 'ex-ante' models

- All current quantitative (modelling) based tools: limitations of data quality and uncertainties
- As a consequence, whilst they are pretending to be 'precise', they are often hopelessly wrong
- Uncertainties often too high...





Predicted impact of European HSR network, 1993

EIA

- The ecological economist Söderbaum (1999), for example, suggested that EIA was introduced in order to overcome the rational-based planning approaches cost– benefit analysis (CBA) and multi-criteria analysis (MCA), developed in the 1960s and 1970s.
- Flexibility of EIA makes it successful (Wiklund, 2005)

Effectiveness of EIA: early examples

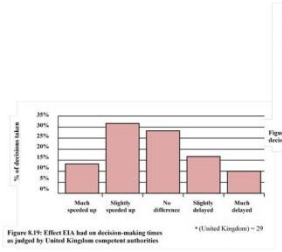


Figure 8.19: Effect EIA had on decision-making times as judged by United Kingdom competent authorities

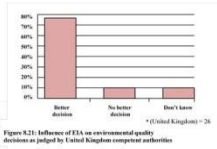
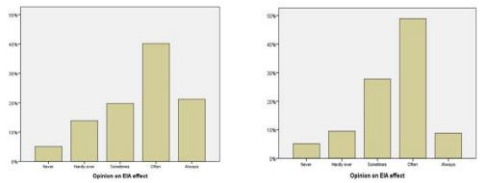


Figure 8.21: Influence of EIA on environmental quality decisions as judged by United Kingdom competent authorities

Source: Marr K 1998. EIA in the UK and Germany, ashgate, aldershot; in Fischer 2009

Effectiveness of EIA: recent examples

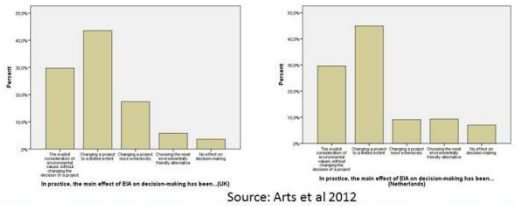
- Contribution of EIA to environmental awareness in the UK (left competent authority, right proponent)



Source: Arts et al 2012

Effectiveness of EIA: recent examples

- Perceived effect of project EIA on decision-making in the UK (left) and the Netherlands (right).

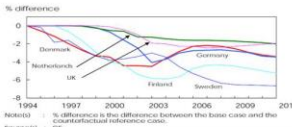


Source: Arts et al 2012

Alternatives to assessment approaches

- Adaptive management
  - Doesn't reflect current decision making culture
- Other governance instruments:
  - Environmental taxes
  - International agreements
  - *However, these aim at other levels and also have had mixed results...*

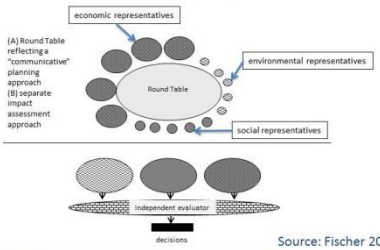
Figure 1: The effect of ETR on GHG emissions



Source: Green Fiscal Commission, 2009

Alternatives to assessment approaches

- 'Post-modern' alternatives; e.g. round tables



Source: Fischer 2004

Conclusions

References

- Arts, J.; Runhaar, H.; Fischer, T. B.; Jha-Thakur, U.; van Laerhoven, F.; Driessen, P. and Onyango, V. 2012. The Effectiveness of EIA as an Instrument for Environmental Governance – A Comparison of the Netherlands and the UK, *JEAPM*, 14(4).
- Björklund A E 2002. Survey of Approaches to Improve Reliability in LCA. *Int J LCA* 7 (2) 64 – 72
- European Environment Agency 2012. Annual EU greenhouse gas inventory 1990–2010 and inventory report 2012.
- Fischer, T.B. 2009. On the role(s) of (strategic) environmental assessment in 'greening' decision making, *University of Utrecht, 2 March*. www.twoeam-eu.net.
- Fischer, T.B. 2004. Mit der strategischen Nachhaltigkeitsprüfung zu einer besseren Berücksichtigung von Umweltaspekten? – Erfahrungen aus dem Vereinigten Königreich, *UVP Report*, 2004-4: 220-224.
- Flyvbjerg B 2009. Survival of the unfittest: why the worst infrastructure gets built—and what we can do about it, *Oxford Review of Economic Policy*, 25(3): 344–367
- Giampietro M, Mayumi K and Munda G2006. Integrated assessment and energy analysis: Quality assurance in multi-criteria analysis of sustainability, *Energy* 31(1): 59-86
- Green Fiscal Commission, 2009 . How Effective are Green Taxes?, London.
- Dalkmann H, Rodrigo Jilberto H and Bongardt, D 2004. Analytical SEA (ANSEA) developing a new approach to SEA , *EIA Review* 24(4): 385-402.
- Heinzerling and Ackerman 2002. Pricing the Priceless, Georgetown Environmental Law and Policy Institute, http://www.ase.tufts.edu/gdae/publications/C-B%20pamphlet%20final.pdf.
- Richardson T. 2005. EA and planning theory: four short stories about power, multiple rationality, and ethics, *EIA Review* 25(4): 341-365.
- Söderbaum P. EIA as philosophy and institution—how well will EIA compete with other philosophies and institutions? Unpublished paper; 1999.
- Wiklund H 2005. In search of arenas for democratic deliberation: a Habermasian review of EA, *IAPA*, 23(4): 281-292.

3.2 Disaster Management for sustainability in the UK/Japan

Current status and future challenges of disaster waste management in Great East Japan Earthquake

Masahiro Osako

National Institute for Environmental Studies

Abstract

Firstly, the main issues and countermeasures regarding the disaster waste management in Great East Japan Earthquake including the radioactively contaminated waste management will be presented, which will be followed by the discussion of the remaining future challenges. Finally the prepared conditions necessary for robust waste management system in the emergency of the disaster will be proposed.

（和文）

東日本大震災における災害廃棄物管理のこれまでと今後の課題

大迫政浩

（独）国立環境研究所

本発表では、東日本大震災の災害廃棄物処理を事例にして、災害発生以降、どのような問題が生起し、それをどのように解決してきたかの事実を振り返り、紹介する。また今後に向けてどのような課題が残っているかを抽出する。最後に、以上のこれまでと今後の課題を総括し、災害の非常時にも頑強な対応力をもつために、平時から備えておくべき災害廃棄物管理システムの条件について提案する。

Current status and future challenges of disaster waste management in Great East Japan Earthquake

Masahiro OSAKO and Ryo TAJIMA
National Institute for Environmental Studies

1 Introduction

The impact of the Great East Japan Earthquake was so huge. In addition to the damage caused by the shake itself (magnitude 9.0), tsunami waves destroyed wide area of human settlements near the pacific coastline, some reaching over 10m high. The total flooded area was 561 km^2. More than twenty thousand people were killed or missing, and massive disaster waste was left behind (Photo 1).

Photo1 Scenes of tsunami disaster stricken places

After this earthquake the National Institute for Environmental Studies has been conducting researches to provide scientific basis of the disaster waste management (DWM, hereinafter) scheme of the Ministry of Environment as well as to establish technical guidelines and manuals for DWM. This paper will provide information about current status of DWM in the Great East Japan Earthquake from the viewpoints of technological and administrative management.

2 Theory of DWM

2.1 Time-course scheme for DWM

According to the JSMCWM (2011), post-disaster management of disaster waste could be divided into 4 phases[2]. In the first *emergency phase*, it is urgently required to save lives, to alleviate suffering as well as to facilitate rescue operations. Identifying waste issues, characterizing, mapping, and assessing wastes are also taken as prioritized actions. Second, in the *early recovery phase*, the recovery of lifelines (i.e. systems

[2] The first three phases are the same as the disaster phases described in OCHA (2011). The fourth phase, “contingency planning”, emphasizes the importance of in advance planning, which is not included in the scope of this paper.

and facilities that provide services vital to the function of an industrialized society, including electricity, gas, water, transportation, etc.) is an important task. As for disaster waste, the main part of DWM program must be prepared. At the same time, wastes should be transferred to temporary storage sites. As social stock starts to recover and DWM progresses according to the program in the *recovery phase*, disaster wastes could be treated or recycled at a full scale. *Reconstruction phase* starts after the main part of DWM is completed.

Table1 Time-course scheme for waste management

Phases			Actions
Emergency Phase	Required to save lives, alleviate suffering, and Facilitate human rescue	10^2 hr (ca. 3 days＝72 hr)	Initial actions (identify waste issues), Characterize, map, and assess wastes Prioritize actions
Early Recovery (relief) Phase	Recovery of lifelines	10^3 hr (ca. 1 month)	Groundwork for a disaster waste management program to be implemented. Transfer of wastes to the temporary site
Recovery Phase	Recovery of social stocks (infrastructures)	10^4 hr (ca. 1 year)	Full-scale treatment or recycle of wastes
Reconstruction Phase	Recovery of industries	10^5 hr (ca. 10 years)	

Source: JSMCWM, 2011,p.30

2.2 Treatment flow of DWM

Figure 1 indicates the flow of separation and treatment for disaster wastes suggested by JSMCWM (2011). First, wastes generated from the disaster area are transported to temporary storage sites, or directly to the primary storage site designed for mid-term storage and intermediate treatment of wastes. Thereafter they are separated and intermediately treated prior to appropriate final disposal and recycling. Source separation and the separation at the temporary storage site are very important for safe, quick and cost-effective DWM.

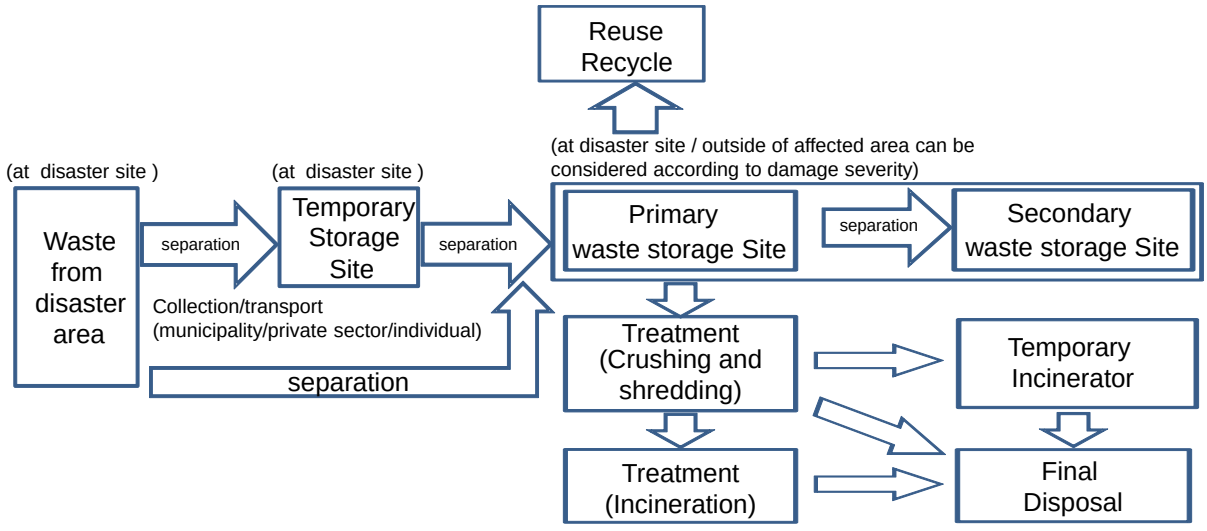


Figure1 Flow of separation and treatment of disaster wastes

(source: Japan Society of Material Cycles and Waste Management, 2011, p.52)

2.3 Key elements for effective DWM system

In Japan, each municipal government is responsible for the management of disaster waste generated in their area because disaster waste is categorized as "municipal solid waste" under the Waste Disposal and Public Cleansing Law[3]. In order to effectively/efficiently manage disaster waste by implementing the treatment flow shown in Figure 1, key elements composing the management system of the municipality must be administered appropriately. These are human resource (organization), finance (subsidy), and facility / technology (Figure 2).

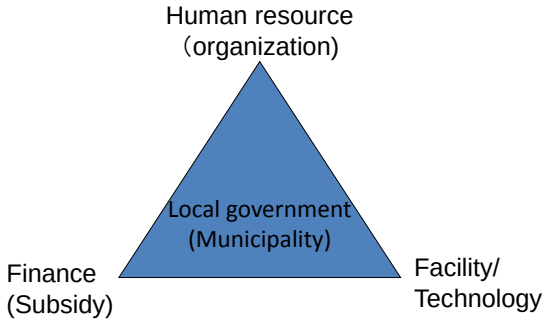


Figure2 Key elements of management system

3 DWM in the Great East Japan Earthquake

3.1 Amount and nature of the disaster wastes

In the most heavily damaged three prefectures (Iwate, Miyagi and Fukushima), around 20 million tons of disaster waste as well as 10 million tons of Tsunami sediment were generated. The total was around 30 million ton. Considering the total amount of municipal waste generated annually in the whole country, which was around 45 million ton in 2010, the mass is huge.

Table2 Amount of disaster wastes

	Total (million ton) (c=a+b)	Disaster waste (million ton) (a)	Tsunami sediment (million ton) (b)
Iwate Pref.	5.25	3.95	1.30
Miyagi Pref.	18.73	12.00	6.72
Fukushima Pref.	3.61	2.07	1.53
Total	27.58	18.02	9.56

c.f. Annual amount of municipal waste is around 45 million ton in 2010

Photo2 shows the initial situation of the disaster waste. As seen in this photo, the tsunami power mixed different kinds of wastes, including building materials, white goods, shrubs, sediments, and so on. This mixed waste is called "Minced waste". Minced wastes are hard to separate, contain highly concentrated salt, and adhere sediment. Other characteristics of the minced waste that makes its management difficult include; contains rotten materials (from Fischery etc.) and dangerous objects (gas cylinders, etc.), has a

[3] Under the Law, only two types of waste are defined; industrial waste (ashes, sludge, waste oil, waste acid, waste alkali, waste plastics and others specified by a Cabinet Order among all the wastes left as a result of business activity, and imported wastes with some exclusion), and municipal solid waste (=waste other than industrial waste)

risk of fire, and has a potential to emit odor. In addition to the above, some of the wastes were somewhat contaminated with radioactive substances discharged from the Fukushima Daiichi nuclear power plant.

Photo2 “Minced wastes” at a temporary storage site in Noda, Iwate
Photographed on May 6, 2011

3.2 Technical and administrative barriers

Many barriers existed in the DWM of this disaster, both from the technical and administrative point of view. On one hand, it was challenging to identify the proper technology to dispose of and recycle the minced waste containing salt, tsunami sediments, and radioactive substances, as there was no experience of treating such waste of this volume at the same time. On the other hand, from the administrative management point of view, the large geographical scale of the disaster-stricken area made it difficult for neighboring municipalities to mutually cooperate in an effective and efficient manner. Most of the stricken municipalities are small in population. So the human resource for the administrative management is very short. In addition, the administrative body itself in the small municipality was stricken by the disaster.

3.3 Roles and functions of each actor

The devastated municipality faced a lot of challenges in their DWM. One obvious challenge is the volume of the waste generated by the disaster. For example, Ishinomaki City, one of the most heavily damaged cities, would need 108 years to manage all the generated waste if they were to do it on their own, by their capacity in normal times. Therefore, a cooperative management scheme jointed by various relevant actors was required to progress the DWM. Figure 3 indicates roles and functions of each actor in the DWM of the Great East Japan Earthquake.

The Ministry of Environment has set the overall policy/framework of the DWM in a master plan published in May 2011, and has also eased some of their regulations which had been recognized as barriers to smooth progress of DWM. They also provide fiscal and technical assistance for the devastated municipality. The prefectural government has the role of overall coordination, and has set up inter-governmental committees, and prepared a prefectural DWM plan. Additionally, in this case, they took over the duty to manage disaster waste from some of the municipalities (upon request), considering their overwhelming burden. Supporting municipalities have provided human resource and machinery/materials necessary for the devastated municipality, and accepted some of the disaster waste generated outside of their administrative boundary. The private business contributed greatly to the devastated municipality by conducting the actual removal, collection, transportation, sorting, processing, recycling, reduction, combustion, and landfilling, subcontracted from them.

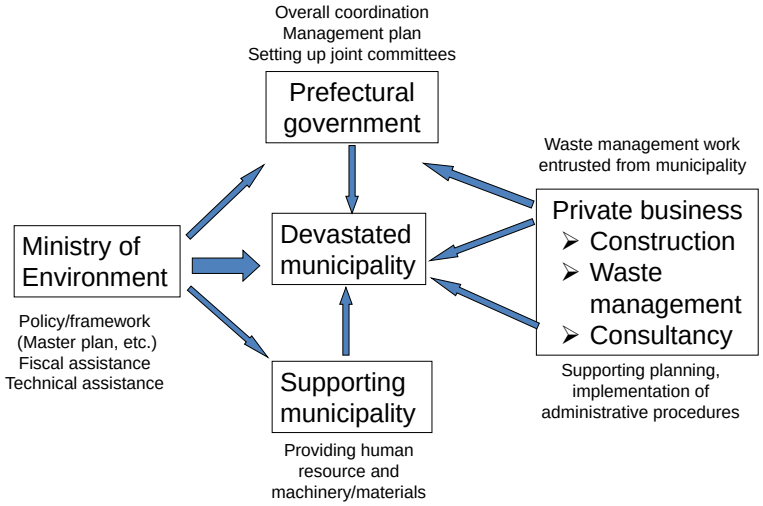


Figure 3 Roles and functions of each actor in the cooperative management scheme

3.4 Flow of separation and treatment of disaster wastes

Devastated municipalities basically followed the treatment flow shown in Figure 1, with some variations in details. The following will describe the actual treatment flow observed in general[4].

Firstly, the road was cleared at the emergency phase for life saving (mainly by the Japan Self-Defense Forces), followed by collection and transportation to the temporary sites. At this phase, minimum separation was conducted at site (e.g. combustibles and non-combustibles) in most of the municipalities. Here, construction industry was actively involved. Temporary storage site reached its capacity very quickly, so the municipalities had to quickly set up primary storage sites. As primary storage sites became ready, disaster wastes were directly transported to the primary storage site from the stricken areas, and were roughly separated (ca. 7~10 categories). Dangerous and hazardous objects were separated wherever possible. The main part of the disaster waste was removed from residential area by August, 2011. Some of the recyclables (e.g. concrete) were treated and reused at this phase.

As more and more wastes were piled at storage sites, there was increased risk of fire. Due to accumulated heat generated through biological and chemical reaction, fire broke out in many storage sites (see Photo3). This was seen as a risk to human health, since these fires have high possibility to bring air pollution and soil contamination. However, it was not easy to manage fire due to technical and managerial reasons, including shortage of land available for storage sites and pressure to push forward the DWM.

As soon as the existing / temporary incineration facilities were ready, full scale treatment, i.e. separation and incineration, started at secondary storage sites. Various advanced technologies have been actually applied here (see Photo4).

The present stage in the progress of the DWM is shown as Figure 4. The disposal ratio of the disaster waste is 20 to 30 % (in July, 2012). The government target to finish the disposal is March, 2014.

[4] This does not apply to DWM in the municipalities in Fukushima prefecture, as the disaster wastes in Fukushima is managed directly by the national government, in order to safely dispose of the wastes (relatively) highly contaminated by radioactive substances.

Photo3 Fire accident at a temporary storage site

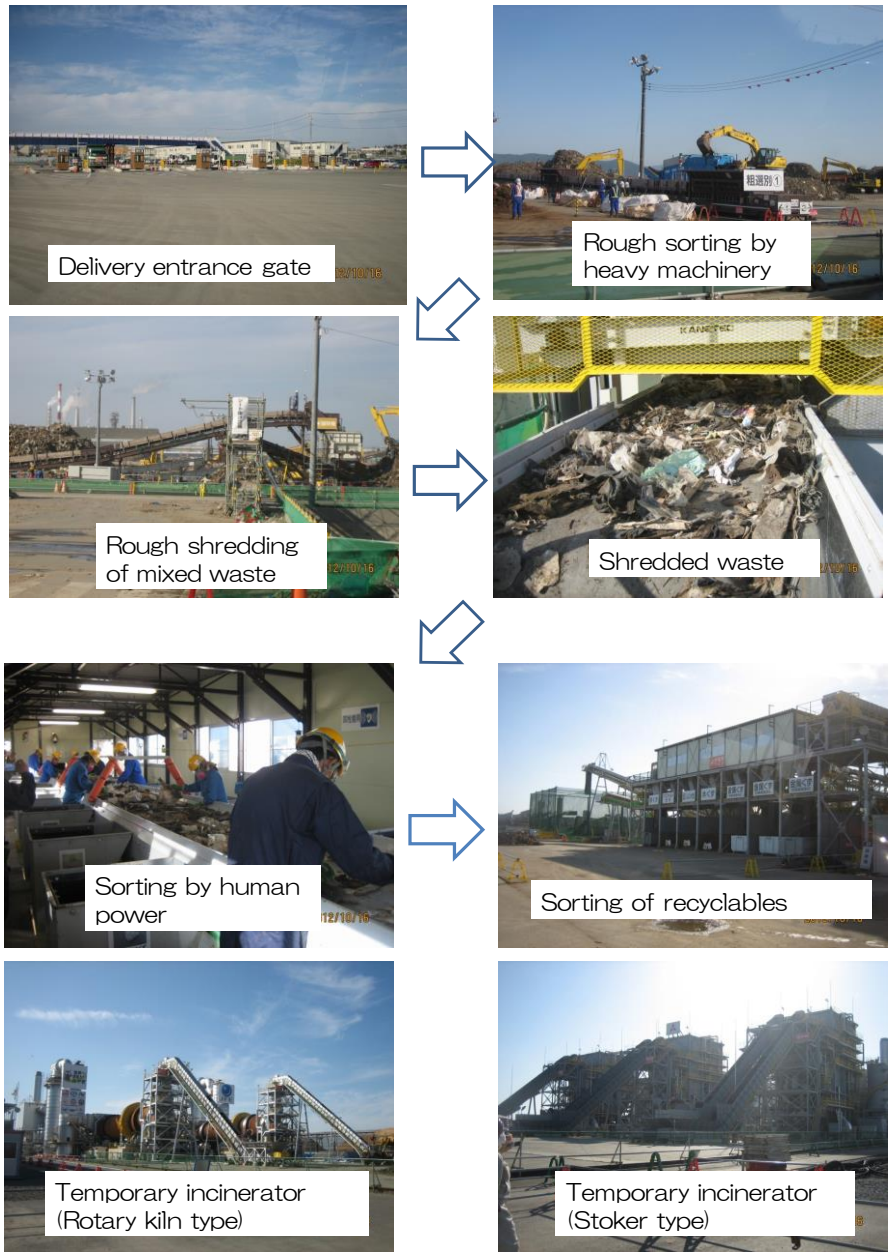


Photo 4 Various disaster waste management technologies being applied at Ishinomaki block, Miyagi prefecture

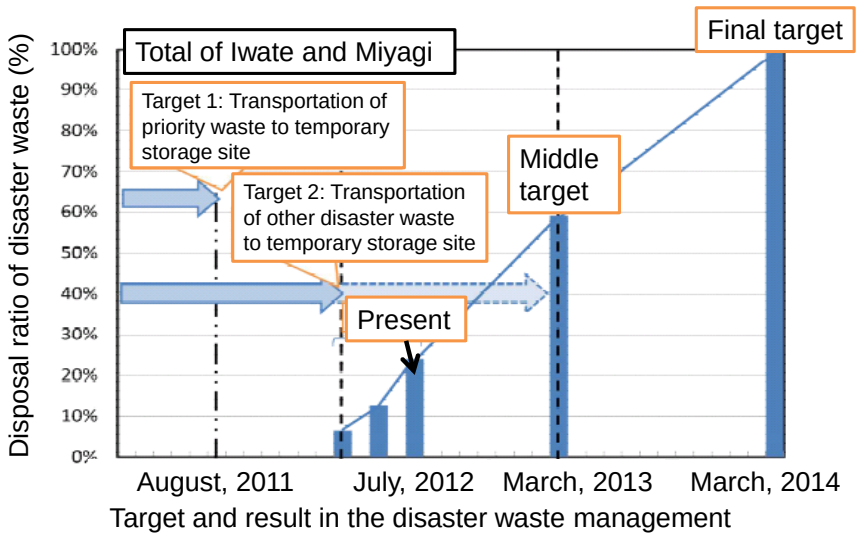


Figure4 Progress of disaster waste management

4 Discussion and concluding remarks

Here, we will discuss the characteristics of DWM in the Great East Japan Earthquake that has implication on the integration of DWM with EA, and will conclude with suggestion towards future DWM.

Firstly, the balance between rapid management of waste and consideration of environmental (and social) impact depends on the emergency phase and other contextual factors. On one hand, the pressure for early operation was/is very high in DWM, as this ran concurrently with lifesaving and search for missing at emergency ~ early response phase, and will be the basis of long term restoration. It would become impossible to achieve the national target of completing DWM within three years if every single temporary waste disposal facilities required full scale EIA (which normally takes 2 or more years in Japan). In addition, delay in DWM could cause secondary health impact from poor sanitary conditions, and piles of waste give people feelings of discomfort and uneasiness in the stricken area. Therefore, undertaking full scale EAs (which could take a couple of years) post-disaster will be especially problematic in the early phases, regardless of its environmental impact, and will remain challenging in latter phases.

On the other hand, if DWM is to be conducted without any consideration to environmental impacts, it might result in serious and long term environmental risks that could risk lives of the future generation. This could also impact the speed of DWM. In the case of the Earthquake, one major factor that is hindering the DWM process is the communication process of the health/environmental risks of incinerating/disposing wastes contaminated with radioactive substances. This implies that for projects necessary for DWM in the recovery phase, including alteration and construction of disposal facilities, some kind of EA (or an alternative way to fulfill accountability in a scientific manner) should be conducted if significant environmental effect is anticipated. In terms of EA methodology, this leads to the need to develop (1) a screening framework that enables quick decision of whether a project requires full scale EA, rapid EA, or does not require EA (e.g. a legal framework that automatically triggers full, rapid, or no EA, according to prescribed disaster categories), and (2) a scoping framework for efficient and focused rapid type EA.

Whether post disaster EA for temporary storage site is necessary or not requires further debate. Considering the potential environmental impacts of temporary storage sites (see 3.4), some EA should be undertaken, but the public pressure towards quick recovery is still very high at early recovery phase.

Secondly, pre-disaster planning for DWM is not always useful. Some small scale municipalities have

commented that the details of their Disaster Waste Management Plans, including separation categories and disposal options, were not fully utilized after the Earthquake. The location of temporary storage sites identified in-advance was considered useful, but they also needed to set up additional ones post-disaster, as the land availability changed, and the volume of disaster waste was way beyond their expectation. This clearly shows the limitation of in-detail preparedness planning under a single scenario, when there is high uncertainty. Pre-disaster EA for preparedness planning would face the same challenge.

However, pre-disaster EA still seems tempting, as more time and resource is available in normal times. Additionally, if scoping is the key for efficient post-disaster EA, in advance consideration of the potential environmental impacts through preparedness planning would help streamlining the post-disaster EA process for waste disposal facilities (by tiering the results). In any case, a method to deal with uncertainty in planning and EA, possibly scenario analysis, needs to be further developed and understood in the EA community.

Finally, as a concluding remark, we would like to propose a framework for designing future DWM system through lessons learned from the Great East Japan Earthquake (Figure 5). On one side, there is explicit knowledge, which means generalized lessons articulated as new rules or manuals. This could potentially include new rules on EAs for DWM. On the other side, as we know that there is no exact same disaster, tacit knowledge, or lessons learned from experiences which is accumulated at individual levels, is essential. A system to effectively inherit this type of knowledge should be established. A comprehensive and flexible management system should be based on *Practical knowledge*, which is an integration of the explicit and tacit knowledge, so that disaster wastes could be managed comprehensively and flexibly. It is extremely important to provide scientific knowledge that helps develop both explicit and tacit knowledge, by monitoring and evaluating (ex-ante) the impact of this Earthquake and DWM, to be better prepared for future disasters.

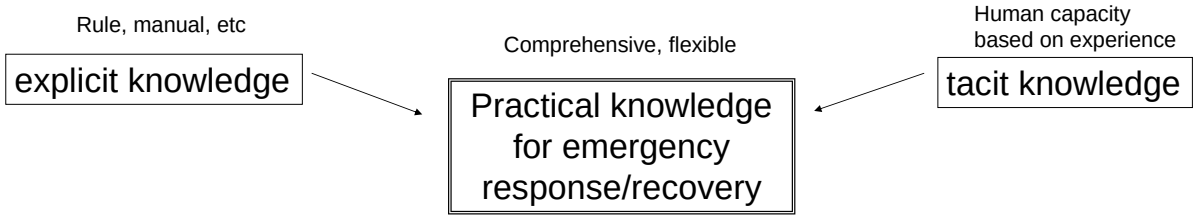


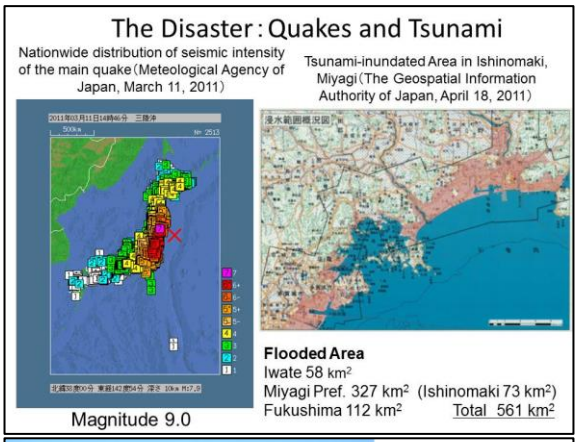
Figure5 A framework for designing future DWM system

References

JSMCWM [Japan Society of Material Cycles and Waste Management] (2011) *Disaster waste separation and management strategy manual*, Gyosei (in Japanese)

UNOCHA (2011) Disaster Waste Management Guidelines, Joint UNEP/OCHA Environment Unit, http://ochanet.unocha.org/p/Documents/DWG%20Annex%20XII.Disaster%20waste%20management%20contingency%20planning.pdf


Japan-UK joint workshop on
Policy Integration between Environmental Assessment and Disaster management
November 30, 2012
Current status and future challenges of disaster waste management in Great East Japan Earthquake
Masahiro Osako
Center for Material Cycles and Waste Management Research, National Institute for Environmental Studies
mosako@nies.go.jp


The Disaster : Quakes and Tsunami
Nationwide distribution of seismic intensity of the main quake (Meteological Agency of Japan, March 11, 2011)
Tsunami-inundated Area in Ishinomaki, Miyagi (The Geospatial Information Authority of Japan, April 18, 2011)
Magnitude 9.0
Flooded Area
Iwate 58 km²
Miyagi Pref. 327 km² (Ishinomaki 73 km²)
Fukushima 112 km²
Total 561 km²


Topics in this talk
Current status of disaster waste management
From viewpoints of technology
From viewpoints of management system


Ofunato, Iwate
(April 18, 2011)
Kamaishi, Iwate
(April 18, 2011)


Otsuchi, Iwate
(April 18, 2011)


Kesennuma, Miyagi
(April 16, 2011)


Minami sanriku, Miyagi
(April 16, 2011)


Miyagino District, Sendai
(April 6, 2011)

Time-course scheme for waste management

Phases			Actions
Emergency Phase	Required to save lives, alleviate suffering and facilitate rescue operations	10^2 hr (3 days=72 hr)	Initial actions (identify waste issues), Characterize, map, and assess wastes Prioritize actions
Early Recovery (relief) Phase	Recovery of lifelines	10^3 hr (> 1 month)	Groundwork for a disaster waste management programme to be implemented during the recovery phase Transfer of wastes to the temporary site
Recovery Phase	Recovery of social stocks (infrastructures)	10^4 hr (1 year)	Full-scale treatment or recycle of wastes
Reconstruction Phase	Recovery of industries	10^5 hr (10 years)	

Ref. Japan Society of Material Cycles and Waste Management, Taskforce on Disaster Waste Management and Reconstruction (2011): *Disaster waste separation and management strategy manual*, http://eprc.kyoto-u.ac.jp/saigai/report/files/manualVer2-Re2.pdf (in Japanese).

9

Amount of disaster wastes

	Total (million ton) (c=a+b)	Disaster waste (million ton) (a)	Tsunami sediment (million ton) (b)
Iwate Pref.	5.25	3.95	1.30
Miyagi Pref.	18.73	12.00	6.72
Fukushima Pref.	3.61	2.07	1.53
Total	27.58	18.02	9.56

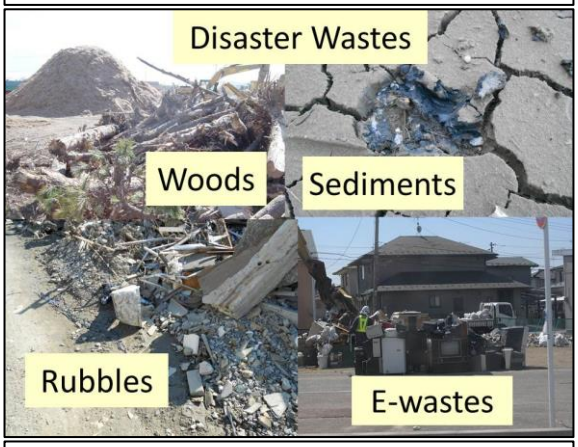
Ref. Annual amount of municipal waste is around 45 million ton in 2010.

10

"Minced" wastes

(Temporary storage site in Noda, Iwate Photographed on May 6, 2011)

Disaster Wastes



Disaster Wastes

Difficulties in the waste management

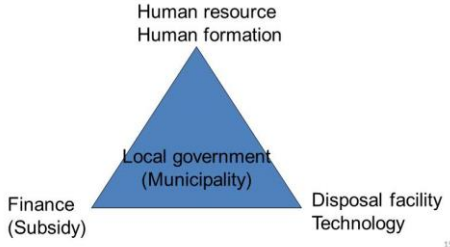
- Mixed waste
- Salt come from sea water
- Adhered tsunami sediment
- Partly radioactive contamination

- Stricken wide area
- Stricken small municipality
- Stricken administrative body

14

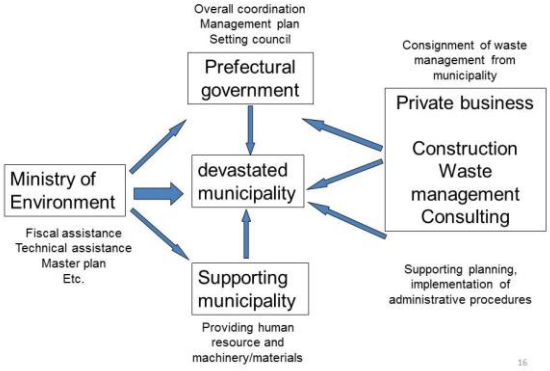
Necessary elements of disaster waste management system

The disaster wastes categorized into the municipal solid waste of which the municipality has responsibility for management



15

Role and function of each actor



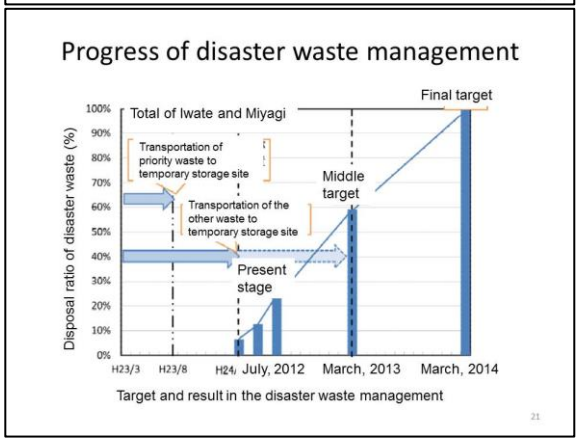
16

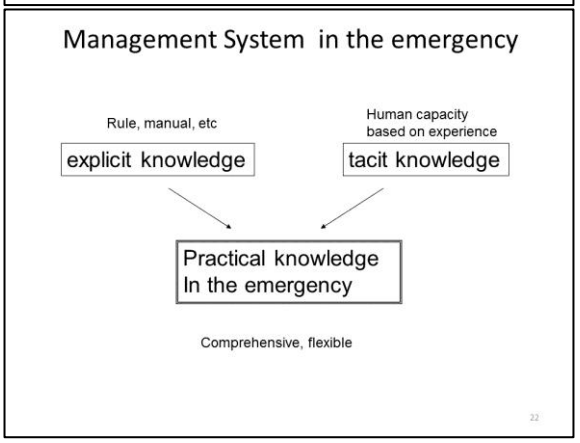

Flow of separation and treatment of disaster waste
Miyako, Iwate (April 18, 2011)
Reuse
Waste from disaster area
Final Disposal
(Incineration)


Fire accident in the temporary storage site
Air pollution and soil contamination


Processing of disaster waste in the secondary storage site (Ishinomaki, Miyagi, Octiober 16, 2012)
Delivery entrance gate
Rough sorting by heavy machinery
Rough shredding of mixed waste
Shredded waste


Processing of disaster waste in the secondary storage site (Ishinomaki, Miyagi, Octiober 16, 2012)
Sorting by human power
Sorting of recyclables
Temporary incinerator (Rotary kiln type)
Temporary incinerator (Stoker type)


Progress of disaster waste management
Disposal ratio of disaster waste (%)
Total of Iwate and Miyagi
Final target
Transportation of priority waste to temporary storage site
Middle target
Transportation of the other waste to temporary storage site
Present stage
H23/3
H23/8
H24/ July, 2012
March, 2013
March, 2014
Target and result in the disaster waste management


Management System in the emergency
Rule, manual, etc
explicit knowledge
Human capacity based on experience
tacit knowledge
Practical knowledge In the emergency
Comprehensive, flexible

COMAH Safety Report – Environmental assessment tool aimed at preventing major accidents to the environment

Andrew Buchanan

Chairman, IChemE Environment Special Interest Group

Abstract

The Seveso Directive is the main piece of EU legislation that deals specifically with the control of on-shore major accident hazards involving dangerous substances. It is implemented in Great Britain through the Control of Major Accident Hazards (COMAH) Regulations.

This paper will describe the requirements of a COMAH Safety Report specifically focussing on the guidance and methodology that should be applied when identifying potential impacts to the environment, identifying appropriate prevention/mitigation measures and developing appropriate emergency response procedures including assessing the capacity and infrastructure that is required to apply the procedures identified. The paper will summarise examples of submitted COMAH Safety Reports and discuss the UK's Competent Authority's (The Health and Safety Executive) response to these submissions.

（和訳）

COMAH 安全報告書―環境悪化を招く重大事故を防ぐための環境影響評価ツール

アンドリュー・ブキャナン

英国化学工学協会　環境特別委員会

セベソ指令は、主として、危険物質による陸上重大事故の危険性の管理に関する主な EU 法である。本指令は、英国では、大事故災害管理(COMAH)規制を通じて、施行されている。

本論文は、特に、潜在的環境影響の特定、適切な予防/緩和措置の識別、そして確認された措置の適用に必要とされる能力と基盤の評価を含む適切な緊急時対応措置の策定において適用されるべきガイダンスと方法論を主眼に置いて、COMAH 安全性報告書の要件を説明する。また、提出された COMAH 安全性報告書の例を要約し、これらの提出物に対する英国の所轄官庁（安全衛生庁）の反応を検討する。

COMAH Safety Report – Environmental assessment tool aimed at preventing major accidents to the environment

Andrew Buchanan, Chair Environment Special Interest Group, ICHEME

Japan-UK Policy integration between Environmental Assessment and Disaster Management

COMAH Principles

- SEVESO II and COMAH
- *"Prevent and mitigate the effects of those major accidents involving dangerous substances, such as chlorine, liquefied petroleum gas and explosives which have the potential to cause serious damage/harm to people and/or the environment"*
- Site must take *"all measures necessary"* to prevent major accidents and limit their consequences to people and the environment
- Development of a **Safety Report**

Safety Report

- Must include:
  - A policy on how to prevent and mitigate major accidents;
  - An effective method for identifying any major accidents that might occur;
  - Prevention and mitigation measures for major accidents
  - Information about the emergency plan for the site, which is also used by local agencies to put in place an off-site emergency plan.

Safety Report Assessment Method

- Series of Guidance notes intended to assist assessors from the Competent Authority
- Also provides a structure for operators to complete the safety report

COMAH Control of Major Accident Hazards

SRAM Section 13

Guidance For Environmental Assessment Of COMAH Safety Reports

Under Remodelled COMAH Assessment and Inspection procedures

SRAM Section 13 – Environmental Assessment

- Descriptive aspects
  - Source-Pathway-Receptors
  - Influencing factors
    - Geology
    - Hydrology
    - Sensitive sites and species
    - Meteorology
    - Material specifications and design details
    - Physical characteristics

SRAM Section 13 – Environmental Assessment

- Predictive aspects
  - Major Accident To The Environment (MATTE) scenario definition
  - Extent and severity of the identified scenario
  - Likelihood of occurrence – Risk
  - Tolerability of risk for all scenarios
  - As Low As Reasonably Practicable (ALARP)

SRAM Section 13 – Environmental Assessment

- Technical aspects
  - Containment design
  - Monitoring and maintenance
- Safety Management System (SMS) and Major Accident Prevention Policy (MAPP)

SRAM Section 13 – Environmental Assessment

- Emergency Planning
  - Prevention methodology
  - Testing the procedures
  - Used by offsite agencies to support MAPP
  - Potential MATTE exist right through to clean-up
- Climate Change adaptation
  - Overarching consideration to be applied where appropriate

Conclusions

- Environmental hazard identification (ENVID) involving knowledgeable people is essential
- MATTE potential is identified reviewing the full process and mitigation measures
- Off-site management of release of hazardous materials (for example fire water) equally critical to assess MATTE potential as site hazards

Conclusions

- Tolerability
  - Often misunderstood
  - Event and scenarios basis not establishment wide basis
  - UK Environment Agency currently developing guidance to aid understanding and reporting of this concept

Conclusions

- Section 13 of the COMAH SRAM provides a thorough and robust EA methodology
- Intended for industry but transferable and applicable whenever detailed environmental risk assessments are required

Post-earthquake town reconstruction applying ‘e-Community Platform’

Tai-young Yi

Researcher, National Research Institute for Earth Science and Disaster Prevention (NIED)

Abstract

In the stricken area of the Great East Japan Earthquake, the post-earthquake town reconstruction is carried out with promotion of the reconstruction work based on the reconstruction plan for livelihood rehabilitation and region reconstruction. For the sustainable post-earthquake town, in addition to an existing situation, it is necessary to take into consideration local inhabitant's value standard to long-term changes of social conditions. This study introduces the example which local inhabitants utilized "e-Community Platform", and suggests the reconstruction in consideration of the trade-off relation between the value standard and the receptiveness of risk.

復興まちづくりにおけるｅコミュニティ・ラットフォームの活用

李　泰榮

（独）防災科学技術研究所

（和訳）

東日本大震災の被災地では、生活再建と地域復興に向けた再建計画に基づく再建活動の推進により、地震後の町再建が図られている。地震後の持続可能な町の建設には 、現状に加え、社会的条件の長期的変化に対する地元住民の価値標準を考慮することが必要である。本論文は、地元住民がｅコミュニティ・プラットフォーム」を活用した例を紹介し、価値標準とリスク受容の間のトレードオフ関係を考慮した再建を提案する。

Post-Disaster Reconstruction using the e-Community Platform

Taiyoung Yi, Social Disaster Prevention System Dep., NIED, Tsukuba, Japan. (yi-ty@bosai.go.jp)

1. INSTRUCTION

NIED is developing e-Community Platform as the tool that local inhabitants can be active in disaster-related information, which is Japan's national research institute for disaster prevention. This study will presents how the e-Community Platform has been used for post-disaster reconstruction of disaster-afflicted areas, to the Great East Japan Earthquake and tsunami. First, I would like to begin with a brief discussion of the damage caused by the Great East Japan Earthquake and tsunami, focusing on one of the areas affected by the disaster. Then I will discuss how the e-Community Platform has been used in that disaster-afflicted area, using actual examples. After that, I will present about ways to help residents rebuild their lives. These will include the preparation of scenarios to help residents rebuild their lives, taking into account future long-term changes in living patterns, and the use of these scenarios to enable the study of future living conditions.

2. SUBJECT AREA; OFUNATO CITY

The Great East Japan Earthquake occurred on March 11, 2011. The epicenter was approximately 130km east of the Sanriku Coast of Tohoku, in the northern part of the island of Honshu. The earthquake intensity was recorded at magnitude 9.0. The shaking caused by the earthquake was measured at level 7 on the Japanese seven-point scale. It was felt throughout the Japanese archipelago, from Hokkaido in the north to Kyushu in the south. This was the most powerful earthquake to hit Japan in recorded history. The earthquake triggered a major tsunami. The maximum height of the tsunami tide was recorded at 9.3meters. And the maximum height of the flooded district was recorded at 15.3 meters. The damage caused by the tsunami extended over an extremely wide area and was even greater than the damage caused by the earthquake itself.

This study will focus on the city of Ofunato, one of the areas affected by the tsunami, which is located north of Sendai. Most parts of the city sustained damage in the tsunami. Figure1 is the e-community map as a result of the tsunami. The red areas on the map are the areas that were inundated, and the blue areas are the areas in which houses were damaged. This tsunami inundation map was created by the Association of Japanese Geographers, It constitutes one type of disaster-related information. This and other types of disaster-related information are overlaid and displayed using the e-Community Platform.

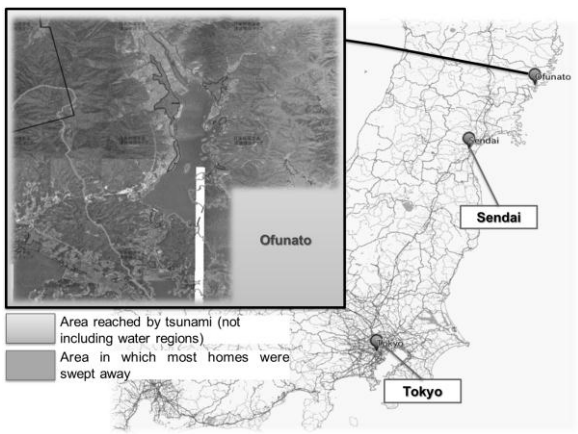


Figure1. Subject Area; Ofunato

Ofunato has a population of around 40 thousand. And thirty percent of the population consists of senior citizens aged 65 or over. The population has aged significantly in this area. The population is also decreasing yearly. As a result of the tsunami, 340 people were killed or are missing. In addition, some 3,000 buildings collapsed completely, and in all

approximately 5,500 households sustained damage. If this calculates based on the fact that there were approximately 15,000 households in the city, this means that 30% of all households in the city sustained damage. Many residents of Ofunato left the city in the wake of the disaster.

3. USE OF DISASTER INFORMATION COLLECTED USING THE E-COMMUNITY PLATFORM

3-1. Post-Disaster Reconstruction of Ofunato

In the areas affected by the tsunami, the cities coordinate the type of reconstruction projects that they conduct with the national and prefectural governments, and they prepare disaster reconstruction plans to help individual disaster victims rebuild their lives and to rebuild the community at large. At the same time that these reconstruction plans are prepared, the policies for land use and reconstruction projects that will be needed for post-disaster reconstruction are determined. In addition, the city holds briefings for local residents to explain the plans that have been prepared and the content and progress of projects and land use policies. However, as a result of coordination with the national and prefectural governments, the progress of the reconstruction projects in the city changes. For this reason, based only on the information through these briefings, it is difficult for the residents to determine where they should live and how they should go about rebuilding their lives, the e-Community Platform is designed to offer tools and techniques that will enable local residents to study how to rebuild their lives, using various types of disaster-related information.

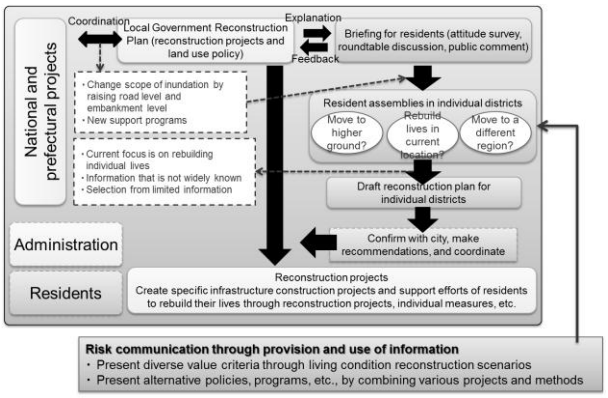


Figure2. Post-Disaster Reconstruction of Ofunato

Picture1 is shows photographs of resident briefings. About 200 residents gathered in individual districts in Ofunato, and the city's Reconstruction Bureau gave oral presentations to the residents using small paper maps and reference materials. For example, the small map that you see here is a land use policy diagram that shows the entire central area of Ofunato. It is an A3 size map. You can see how it would be difficult for residents to determine what will happen to their own homes by viewing only this policy diagram. Also, the map shows almost no location information regarding where residents should rebuild.


Picture1. Post-Disaster Reconstruction Briefing

In general, the city said that residents should find rebuilding locations by themselves. However, the explanations of reconstruction projects provided by the city in the briefings are difficult to understand. Examples include the "Disaster Mitigation Group Relocation Project," in which residents will move to higher ground; and the "Disaster Public Housing Project," in which residents will go to live in apartment buildings constructed by the city, and the "Downtown Construction Project," in which residents will rebuild their residences in the existing disaster-afflicted area. This kind of difficult-to-understand explanation makes it very difficult for the residents to even decide on a location, much less to determine what methods they should use or what type of project they should choose to help them rebuild their lives.

3-2. Structure of The e-Community Platform and Establishment of Reconstruction Map Center

As figure3, NIED constructed the e-Community Platform as a cloud-based SaaS, which is "software as a service". The e-Community Platform has two functions. One is a blog function uses a CMS(content management system). Using this function, disaster victims can send us questions on how to rebuild their lives. In answering these questions, NIED can make use of the NIED network of disaster mitigation specialists to provide specific information to help residents rebuild their lives. In particular, the e-Community Platform has a web-based GIS function called e-Community Map. NIED use the e-Community Map function to provide various map data released by the prefectural and city administrations in disaster-afflicted areas, as well as information on reconstruction released by universities and research institutions.

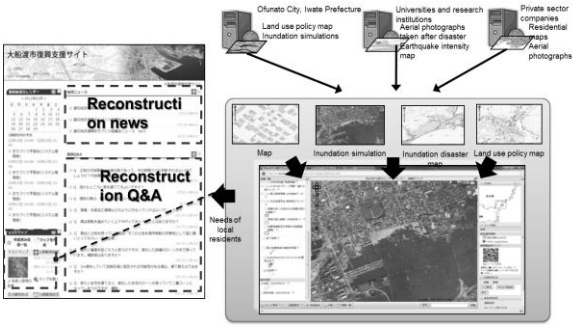


Figure3. Structure of e-Community Platform

Any of the maps provided by various institutions in WMS, WFS, KML or other international standard formats can be used with the e-Community Map function for overlay and display. Users can use an aerial photograph as a base and overlay on top of that various hazard maps provided by the government or research institutions, in order to assess disaster risks for an area at any scale. In this way, the e-Community Platform can be used as a tool for utilizing disaster information networks. Furthermore, in addition to disaster information from other sources, users can also record their own detailed disaster information for the area. Naturally, as NIED is a national research institution, the e-Community Platform is open source software and provided at no charge.

Soon after the tsunami, NIED used this tool to release a variety of maps aerial photographs taken prior to the disaster and aerial photographs taken by the Geographical Survey Institute in May following the disaster, a map showing the routes traveled by vehicles equipped with vehicle navigation systems made by automobile manufacturers Honda and Toyota, a tsunami damage map prepared by the Association of Japanese Geographers and so on and used these maps for reconstruction and recovery efforts in the area.

However, the population in this area has aged considerably, and it is difficult for some senior citizens to use this system. For this reason, NIED is working with local information systems companies to set up and operate temporary information centers called Reconstruction Map Center in Ofunato, as picture2. The Center provides information obtained from local residents on post-disaster reconstruction. Residents can also view the type of map data. Residents can also print out various types of maps on a printer or plotter. This makes it possible to use printed maps when residents gather to discuss rebuilding their lives.

Picture2. Reconstruction Map Center

4. METHODS FOR REBUILDING THE LIVES OF DISASTER VICTIMS

Ofunato holds briefings for local residents based on information about the current state of reconstruction efforts and information on future reconstruction projects. Residents affected by the disaster

commonly use this information when considering their current situation and how to rebuild their lives for example, to decide whether to move to a safe location on higher ground, or to wait until the city's reconstruction projects have been completed and rebuild on their former location, or to move to some other safe area. However, to achieve sustainable post-disaster reconstruction, I would like to propose the idea that these judgments should be made by considering not only the inclination of disaster victims to rebuild their lives based on their current situation but also long-term changes in living patterns such as future employment, income, health, and family structure, as figure4. Furthermore, I propose that post-disaster reconstruction should be pursued by taking into consideration not only changes in future living conditions but also the future special situation and changes in the local community, from the perspective of the individual, the district, and the region as a whole.

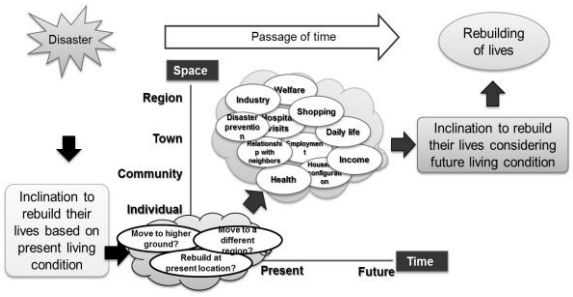


Figure4. Scenarios for Rebuilding Lives

Table1 shows three typical household patterns in Ofunato derived from an analysis of the living patterns of disaster victims in terms of employment, age, household configuration, and type of residence prior(praier) to the disaster. Then let's take a look at Person B. Before the earthquake and tsunami disaster, Person B was a self-employed person in his 50s. He lived with his wife and two children. They lived in a 2-story house. There was a shop on the first floor, and the family used the second floor as a residence. Person B wants to rebuild his shop as soon as possible and rebuild the family's home in a safe location at the earliest possible opportunity. The options for Person B and his family are to either resume operations at a leased shop in front of the train station, and to rebuild their single-family residence as part of the Disaster Mitigation Group Relocation Project, or to wait for the Land Readjustment Project to be completed and then rebuild a combined shop and residence.

Table1. Lifestyle Patterns for Residents

Lifestyle	Pattern		
	A	B	C
Occupation	Businessman	Self-employed	Unemployed
Age	30s - 40s	40s - 50s	70s - 80s
Household	parents and children		Parents only
Residence	Single-family dwelling in downtown area		

However, let's look at the future scenario for Person B in 20 years. The possible future scenario is as follows: I am now a senior citizen, but I'm still healthy. So I'd like to have my oldest son and his wife take over the shop. I'd like our two generations to continue living under the same roof, maintaining our relationship with the other households in the shopping arcade. In considering such future scenarios, first of all disaster safety must be a criterion. In addition, various value criteria should be used as guidelines when considering the method that residents should choose to reconstruct their lives based on a consideration of lifestyle risks. These criteria include the mode of two generations living together and operating a shop, the income

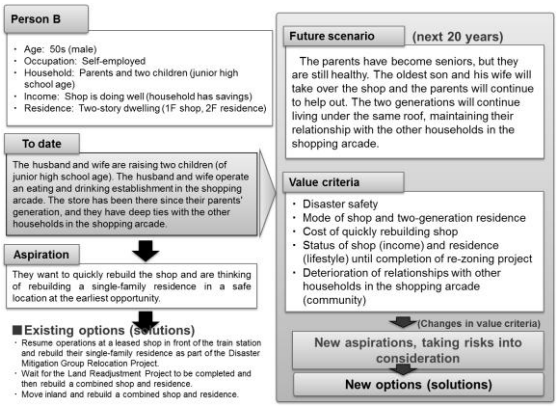
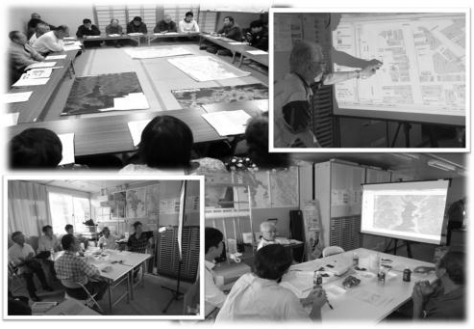


Figure5. Example of Scenarios

obtained from quickly re-establishing the shop, the family's income and living condition in the time until the Land Readjustment Project is completed, the relationships with the others in the shopping arcade (community) and so on. In this way, in order for them to consider ways to rebuild their lives, disaster victims must be provided with scenarios for rebuilding their lives, the necessary reconstruction-related information based on those scenarios, and map information that will make it possible for them to study locations for rebuilding.



Picture3. Roundtable Discussions

For this reason, as picture3, I propose that the e-Community Platform be used to provide reconstruction-related information to disaster victims, in addition to map data that they can use in discussions with one another. The photographs you see here are of actual roundtable discussions for residents held in Ofunato. As many of the individuals affected by the disaster are elderly, their future life expectancy will be a factor in some cases. Depending on the situation, scenarios may be drafted based on the inclination of their children's generation to rebuild, or maps may be viewed in order to study specific locations for rebuilding, or a location at which residents can move in a group may be sought.

5. SUMMARY

NIED is working to assist post-disaster reconstruction efforts in several ways. NIED have created the e-Community Platform as a tool for this purpose, and have set up Reconstruction Map Centers, and are providing specialist knowledge and map information. And I am preparing scenarios for living condition reconstruction for use in this effort. In order to help the post-disaster reconstruction effort, this tool and these various types of information should be used for discussion and study based on risk acceptability and tradeoffs in various value criteria. The decision should be made through risk communication that takes into consideration long-term changes in the situation of both individuals and the local community.

REFERENCES

National Research Institute for Earth Science and Disaster Prevention (2009). e-Community Platform 2.0, http://ecom-plat.jp

Yuichiro USUDA, Toshinari NAGASAKA (2008). The Role of the Interoperable Environment for Disaster Risk Information in Risk Governance. Japanese Journal of Risk Analysis, 17, 25-32.

Taiyoung YI, Yuichiro USUDA, Toshinari NAGASAKA (2010) Development and Applications of the Interoperable Platform for Disaster Risk Information, The 14th GIS international seminar, 49-66.

Taiyoung YI, Toshinari NAGASAKA (2011) Application of disaster-related information utilizing Disaster Risk Information Platform, J. Society Of Disater Information Seminar, 4-15.

Taiyoung YI (2012) Earthquake disaster prevention strategy in the Metropolitan area, the 2nd Korea-China-Japan International Conference of Korea Society of Disaster Information, 3-22.

Taiyoung YI, Toshinari NAGASAKA (2012) Local disaster prevention activity utilized Disaster Risk Information Platform in Japan, Journal of Korean Society of Hazard Mitigation, 58-66.

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Post-Disaster Reconstruction Using the e-Community Platform

Social System Research Dep.
Yi, Tai-young

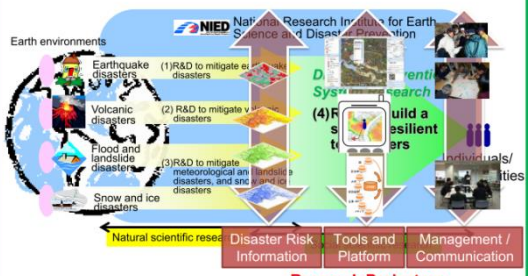
National Research Institute for Earth Science and Disaster Prevention NIED

1

Social System Research Dep. NIED

●Research area

Study of tools and techniques for building a disaster-resilient society, using knowledge and the results of studies of various natural disasters



Research Project on Disaster Risk Information Platform

2

Outline

1. **Target region**
   Overview of situation in target region and damage resulting from the Great East Japan Earthquake and tsunami (March 11, 2011)
2. **Use of disaster information collected using the e-Community Platform**
   Examples of the use of the e-Community Platform in post-disaster reconstruction of target region
3. **Techniques for rebuilding the lives of disaster victims**
   Prepare long-term living condition scenarios for disaster victims and study of future living conditions
4. **Summary**

3

1. Target region

Overview of situation in target region and damage resulting from the Great East Japan Earthquake and tsunami (March 11, 2011)

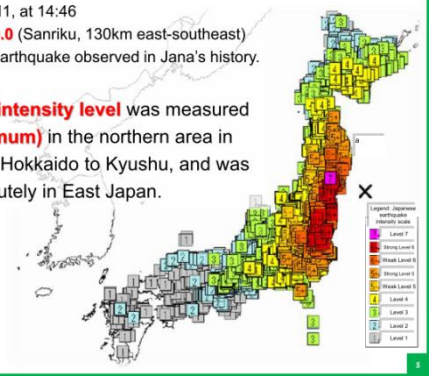
4

The Great East Japan Earthquake

Cabinet Office, Government of Japan

- 11 March 2011, at 14:46
- **Magnitude 9.0** (Sanriku, 130km east-southeast)
- The largest earthquake observed in Jana's history.

⇒**Seismic intensity level** was measured as **7 (maximum)** in the northern area in Japan from Hokkaido to Kyushu, and was felt most acutely in East Japan.



5

The Great East Japan Earthquake

Cabinet Office, Government of Japan

- **The earthquake generated a massive tsunami**
  - The maximum height of the tsunami tide was **9.3m**

⇒**Large tsunami wave were observed all over Japan**

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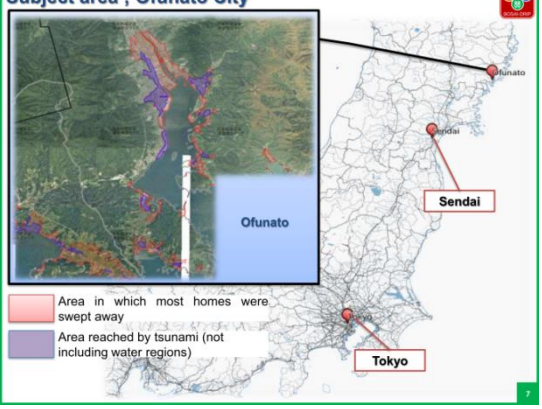
Subject area ; Ofunato City



7

Ofunato City

- Overview
  - Population: 40,738 (2010 survey) (proportion of population aged 65 or older: 30.9%)
  - Number of households: 14,814 (persons per household: 2.7)
  - Area: 323.3 km² (population density: 120 persons/km²))

⇒ **The population is declining yearly, with notable aging of the population and declining birthrates.**

- Disaster deaths/injuries and damage (as of April 30, 2012, according to the Ofunato City website)
  - No. of deaths: 340 (and 81 persons missing)
  - No. of buildings: 5,502 households (approximately 30% of the total) (Complete collapse: 2,784 Large-scale partial collapse: 428 Partial collapse: 715 Partial damage: 1,575)
  - Population movement (increase indicates population inflow; decrease indicates population outflow)

	Age 0 - 14	Age 15 - 64	Age 65 or older	Total
2011	-97	-435	-128	-660
2010	-5	-126	-21	-152

⇒ **Approximately 30% of all households were damaged, and the decrease in population due to population outflow has increased dramatically.**

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2. Use of disaster information collected using the e-Community Platform

Examples of the use of the e-Community Platform in post-disaster reconstruction of target region

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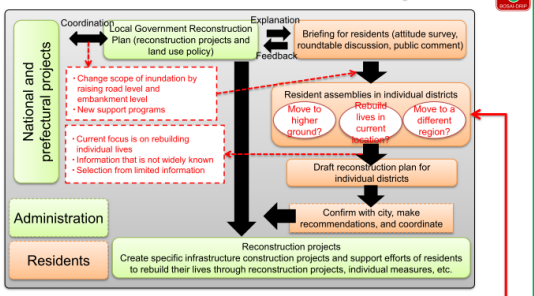
Post-Disaster Reconstruction of Ofunato City



Risk communication through provision and use of information
- Present diverse value criteria through living condition reconstruction scenarios
- Present alternative policies, programs, etc., by combining various projects and methods

⇒**Risk communication using various types of information (disaster and reconstruction information) is needed**

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Post-Disaster Reconstruction Briefing

- Date: December 2011 - March 2012
- Sponsored by: Ofunato City Disaster Reconstruction Bureau
- Conducted for: Local residents
- Content: Reconstruction projects and land use policy

Ofunato City → Explanation of post-disaster reconstruction in community as a whole

Local residents and disaster victims → Discussion of what is needed by individual residents to rebuild their lives:
- **Location => Where?**
- **Livelihood => How?**

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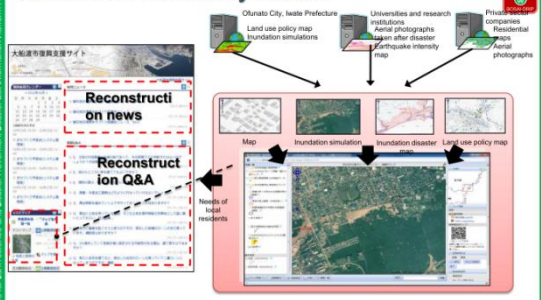
Structure of e-Community Platform



- Institutional specialized information relating to reconstruction and various types of map data are provided to and used by residents, in order to enable the residents themselves to study how to rebuild their lives and their communities

⇒**e-Community Platform is constructed and provided as a tool for information use**

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Web-GIS

"e-Community Map" developed by NIED (2009).

- Developed based on Free and Open Source Software for Geospatial.
- Provides the basic functions of GI and Uses international standard system interfaces for GIS data, including WMS, WFS, and KML.

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e-Community map

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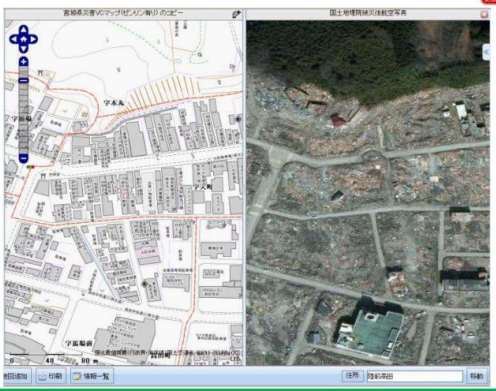
GIS Data: Residential map & Aerial photo



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Establishment of Reconstruction Map Center

- A Reconstruction Map Center was set up in the Ofunato Yume Shopping Arcade (temporarily constructed shopping arcade) in cooperation with local network and information system companies, local youth groups, etc.

⇒**The Center prepares and prints various types of maps needed for district reconstruction assemblies, etc., serves as liaison for listening to residents' reconstruction needs, assists in providing specialist information, etc. (since December 2011)**

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3. Techniques for rebuilding the lives of disaster victims

Preparation of long-term living condition scenarios for disaster victims and study of future living conditions

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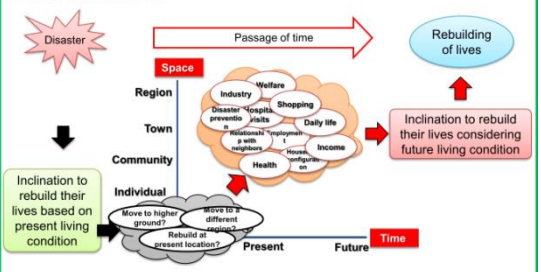
Scenarios for Rebuilding Lives

Exchange views regarding specific methods for rebuilding the lives of residents in the wake of a disaster.



To confirm the inclination of residents to rebuild their lives, scenarios for rebuilding lives are developed, taking into consideration the perspective of both long-term changes in rebuilding individuals lives and wide-area changes in rebuilding communities.

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Lifestyle Patterns for Disaster-afflicted Residents

・Three basic lifestyles were determined, based on the results of resident inclination surveys:

Person A

・Occupation: Businessman
・Age: 30s - 40s
・Household: Nuclear family (parents and children)
・Residence: Single-family dwelling in downtown area

Person B

・Occupation: Self-employed
・Age: 40s - 50s
・Household: Nuclear family (parents and children)
・Residence: Single-family dwelling in downtown area

Person C

・Occupation: Unemployed
・Age: 70s - 80s
・Household: Parents only
・Residence: Single-family dwelling in downtown area

⇒Future scenarios for rebuilding lives are established for each traditional lifestyle pattern

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Scenarios for Rebuilding the Lives of Residents

Person B

・Age: 50s (male)
・Occupation: Self-employed
・Household: Parents and two children (junior high school age)
・Income: Shop is doing well (household has savings)
・Residence: Two-story dwelling (1F shop, 2F residence)

To date

The husband and wife are raising two children (of junior high school age). The husband and wife operate an eating and drinking establishment in the shopping arcade. The store has been there since their parents' generation, and they have deep ties with the other households in the shopping arcade.

Aspiration

They want to quickly rebuild the shop and are thinking of rebuilding a single-family residence in a safe location at the earliest opportunity.

■Existing options (solutions)

・Resume operations at a leased shop in front of the train station and rebuild their single-family residence as part of the Disaster Mitigation Group Relocation Project.
・Wait for the Land Readjustment Project to be completed and then rebuild a combined shop and residence.
・Move inland and rebuild a combined shop and residence.

Future scenario (next 20 years)

The parents have become seniors, but they are still healthy. The oldest son and his wife will take over the shop and the parents will continue to help out. The two generations will continue living under the same roof, maintaining their relationship with the other households in the shopping arcade.

Value criteria

・Disaster safety
・Mode of shop and two-generation residence
・Cost of quickly rebuilding shop
・Status of shop (income) and residence (lifestyle) until completion of re-zoning project
・Deterioration of relationships with other households in the shopping arcade (community)

(Changes in value criteria)

New aspirations, taking risks into consideration

New options (solutions)

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Scenarios for Rebuilding the Lives of Residents

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4. Summary

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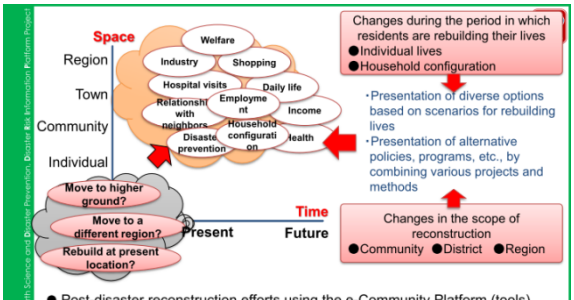

Changes during the period in which residents are rebuilding their lives
●Individual lives
●Household configuration

・Presentation of diverse options based on scenarios for rebuilding lives
・Presentation of alternative policies, programs, etc., by combining various projects and methods

Changes in the scope of reconstruction
●Community ●District ●Region

● Post-disaster reconstruction efforts using the e-Community Platform (tools), the Reconstruction Map Centers (objects), collection and provision of specialist knowledge (information) and scenarios for rebuilding lives (methods)

⇒Post-disaster reconstruction that is based on risk acceptability and tradeoffs in value criteria is needed. It should be determined through risk communication that takes into consideration changes in the situation of individuals and the local community.

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감사합니다!! Thank you!!

ありがとう!! 謝謝!! Gracias!!

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Information Infrastructure for Recovery and Reconstruction after the Great East Japan Earthquake

Kayoko Yamamoto
Associate Professor, University of Electro-Communications Tokyo

Abstract

This study considers the extent of the damage caused by the Great East Japan Earthquake and makes proposals for recovery and reconstruction of the areas affected by this disaster as well as for a reduction of the impact of natural disasters that may occur in the future with GIS as an information infrastructure. Due to the fact that social media that used ICT was useful in the days directly after the disaster, it can be said that it is necessary to investigate the provision of an information infrastructure that uses ICT to reduce the impact of disasters.

東日本大震災の復旧・復興のための情報インフラストラクチャ

山本　佳世子
電気通信大学

（和訳）

本論文は、東日本大震災がもたらした被害の規模を検討し、被災地の復旧復興について提案を行い、また、情報基盤としての GIS を活用して将来発生し得る自然災害の影響を緩和することを提案する。災害直後の数日間、ICT を活用したソーシャルメディアが有効であったことから、災害影響を緩和するために ICT を活用する情報基盤の提供を検討することが必要であると言える。

Presentation paper
Japan-UK Joint workshop on Policy Integration between Environmental Assessment and Disaster Management
November 30-December 3, 2012, Chiba University of Commerce, Ichikawa, Japan

Information Infrastructure for Recovery and Reconstruction after the Great East Japan Earthquake

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Abstract: This study considers the regional characteristics of the Tohoku region and the extent of the damage caused by the Great East Japan Earthquake and makes proposals for recovery and reconstruction of the areas affected by this disaster as well as for a reduction of the impact of natural disasters that may occur in the future with GIS (Geographic Information Systems), which focus on handling unique information such as geographical information including longitude and latitude, as a social infrastructure positioned at the heart of the information infrastructure. Due to the fact that social media that used ICT (Information and Communication Technology) was useful in the days directly after the disaster, it can be said that it is necessary to investigate the provision of an information infrastructure that uses ICT to prevent or reduce the impact of disasters. Therefore, this study proposes the construction of a geographical information database using GIS and the provision and sharing of information using social media GIS after discussion of the relationship between GIS and the development of the computerization of Japan as a valid example of using information systems for recovery and reconstruction after the Great East Japan Earthquake.

Keywords: Information Infrastructure, GIS (Geographic Information Systems), ICT (Information and Communication Technology), Recovery and Reconstruction, Strategic Environmental Assessment (SEA)

1. INTRODUCTION

On the 11th March, 2011, a great earthquake of magnitude 9.0 occurred in the Tohoku region of Japan. There was widespread damage not only due to the earthquake but also to a giant tsunami and many lives were lost. In addition, the Fukushima Daiichi Nuclear Power Station was also damaged and people all over the world became concerned about the effects of radioactive contamination. In this way, Japan was struck by the triple disaster of a great earthquake, a giant tsunami and an accident at a nuclear power plant all at the same time. Since the Great Hanshin Earthquake (January, 1995), there has been remarkable development in the computerization of Japan but although ICT (Information and Communication Technology) played an important role in the days directly after the Tohoku earthquake, it had diverse as well as major effects such as the spread of financial damage caused by misinformation both inside and outside the disaster zone.

Consequently, due to the fact that social media that used ICT was useful in the days directly after the disaster, it can be said that it is necessary to investigate the provision of an information infrastructure that uses ICT to prevent or reduce the impact of disasters as well as for the revitalization of the whole area struck by the disaster. I conducted a field survey from May to December, 2011 and visited the Pacific coast of Japan which is designated as a disaster zone from Aomori Prefecture to Ibaragi and Chiba Prefectures to see the extent of the damage for myself. Taking this kind of experience, the regional characteristics of the Tohoku region and the extent of the damage caused by the Great East Japan Earthquake into consideration, this study aims to make proposals for the recovery and reconstruction of the areas affected by this disaster as well as for a reduction of the impact of natural disasters that may occur in the future with GIS (Geographic Information Systems), which focus on handling unique information such as geographical

information including longitude and latitude, as a social infrastructure positioned at the heart of the information infrastructure.

2. THE DEVELOPMENT OF COMPUTERIZATION AND GIS

2.1 The Development of Computerization in Japan

In Japan, the Basic Law on the Formation of an Advanced Information and Telecommunications Network Society (Basic IT Law) was put into effect in the year 2000 and the e-Japan Strategy which began in the same year proposed ideas, strategies and policies with the aim of implementing a Japanese-style IT society. The aim of the 2006 u-Japan policy was to implement a society in which anyone could link up any device to a network anywhere at any time by 2010. In 2010, i-Japan Strategy 2015, which proclaimed the implementation of a digitally safe and dynamic society, was proposed. Further, there is a current transition from the ubiquitous network society that was aimed for in u-Japan policy to a cloud computing society that makes it possible to access the internet with diverse information tools. The result should be the manifestation of a society in which anyone can access the internet if they are in possession of any kind of device as long as there is an environment in which it is possible to access the internet at any time in any place.

The above information shows the remarkable development of computerization since the Great Hanshin Earthquake and the information environment that surrounds us is changing radically. At the time when the Great Hanshin Earthquake occurred, the use of the internet via PC and the popularity of mobile phones among the general public were just beginning. Conversely, the current information environment is complex and as it is possible to access the internet with PCs as well as mobile phones (including smart phones), it has become possible for anyone to transmit information easily. Further, through social media such as Blogs, Twitter, You Tube and Facebook, it is possible to transmit information not only with words but with complex formats combining still and moving images.

This series of social media is used on an everyday basis mostly by the younger generation in recent years in Japan and such media are in the process of permeating into the everyday lives of the general public. However, in advanced information-oriented societies such as Japan, at the same time as playing a very useful role, social media has an unknown side and may have had both large-scale positive and negative effects on the Great East Japan Earthquake (I will expand on this later on).

2.2 The Function and Roles of GIS

As shown in Figure 1, GIS has 4 major functions: a database creation function, an information analysis function, an information sharing/provision function and a decision making support function. These functions are used to link the real world to the virtual world and it can be said that GIS is an information system that has a close relationship with people and society. GIS that has such superior and unique functions may become, even in diverse information systems, the basis for an information infrastructure that plays an important role in recovery and reconstruction and disaster prevention and reduction measures in future disaster zones. In the following sections I make 2 proposals for disaster prevention and reduction measures and recovery and reconstruction that will be possible with the use of an ad hoc combination of the 4 GIS functions mentioned above.

3. LOCAL INFORMATION DATABASE CONSTRUCTION WITH GIS

3.1 The Necessity of constructing Databases with GIS

There are areas within the disaster zone where depopulation and ageing is advancing more rapidly than the national average and as there are also areas that have had a remarkable outward flow of population since the great earthquake, it is necessary to fully consider population structure and distribution as well as industry structure in reconstruction plans. For this purpose, it is essential to first construct GIS databases with basic local

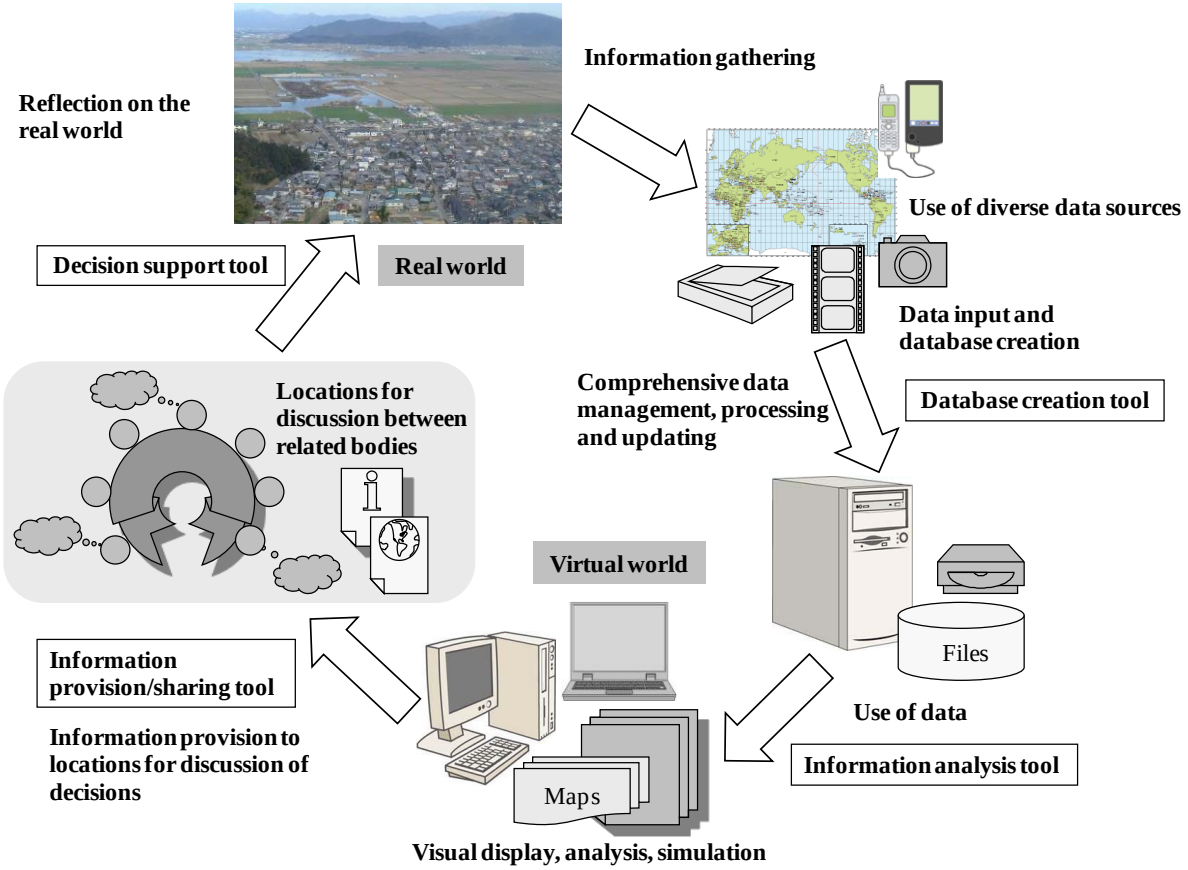

Figure 1 The relationship between society and the various GIS functions
Note) References from Yamamoto (2009)

information about natural conditions such as the extent of damage, degree of danger for communities, geographical features and both new and old uses of land, and about the local economy and society such as industry and population. In addition to the above, by making special and experiential knowledge about the community held by specialists in diverse fields, the administration and the general public into visible information using digital maps, it would be beneficial to construct GIS databases of local knowledge that can be shared as explicit rather than tacit knowledge. Further, these may be essential to conduct recovery and reconstruction for the disaster zones in the Great East Japan Earthquake and to reduce damage in disasters that may occur in the future in combination with a GIS database of basic local information, positioning local information databases at the centre of the information infrastructure.

The disaster zone has a history of damage from a number of tsunamis in the past and local knowledge of natural disasters has been communicated to the present day as explicit knowledge in the format of historical records, tradition and folklore as well as stone monuments. Particular examples of these are shown in photograph 1 with the monument of the expected height of future tsunamis from the Empo Earthquake (1677) that was built on the coast in Choshi City in Chiba Prefecture, photograph 2 with the Namiwake Shrine in Wakabayashi Ward in Sendai City and photograph 3 with the stone monument stating ‘do not build houses below this point’ in Miyako City in Iwate Prefecture.

In particular, the name of Namiwake Shrine in photograph 2 comes from the fact that the tsunami caused by the Jogan Earthquake (869) split into two at the point where the shrine stands and, despite that fact that it is

located approximately 5.5km as the crow flies from the coast, it appears that the giant tsunami of the Great East Japan Earthquake also reached this point. Consequently, this shrine was built in order to pass on the story of the damage caused by the great earthquake and giant tsunami to future generations and, in the end, it has been proven to be an appropriate message by the Great East Japan Earthquake.

In addition, the text that is carved into the stone monument in photograph 3 tells us that the settlement was wiped out in this place when a giant tsunami hit at the times of the Meiji Sanriku Earthquake (1896) and the Showa Sanriku Earthquake (1933), and it is famous as a warning message from the past generations to their future descendants. Further, this kind of stone monument has been built in many locations on the Sanriku coast as a reminder of the tragedy and damage caused by giant tsunamis in this area up to the present day. How to use this kind of local knowledge as explicit knowledge in response to disasters that may occur in the future is not only an important issue for people who are currently alive but also for future generations.

Consequently, first of all, a database containing basic local information such as natural conditions, local economy and society needs to be constructed. Combining local knowledge that exists as tacit knowledge in information that citizens possess, records of past tsunami and the damage caused and databases of local knowledge that has been accumulated by past generations may be required to reduce damage in disasters that are expected to happen in the future through widely sharing information as a local information database. The Great East Japan Earthquake disaster zone is not only spread over a wide area but as there are also large regional differences in extent of damage, it is important to construct a detailed local information database using GIS and to decide on a regional revitalization plan based on this and execute this

Photograph 1 The expected height of future tsunamis from the Empo Earthquake, Choshi City in Chiba Prefecture (June, 2011)

Photograph 2 Namiwake Shrine in Wakabayashi Ward in Sendai City, Miyagi Prefecture (October, 2011)

Photograph 3 Stone monument stating ‘do not build houses below this point’ in Miyako City, Iwate Prefecture (September, 2011)

with the participation of diverse bodies connected to the area. Further, I would like to propose that local information databases as mentioned above should be constructed not only for disaster zones but for all areas nationwide. This kind of database is composed with a base of disaster prevention and reduction measures and can play the role of the foundations of information in the recovery and reconstruction stages after a disaster. It can also be expected to be used for diverse purposes in normal times, too.

3.2 Using Local Information Databases

The disaster zone comprises small scale farming, mountain and fishing villages that are widely distributed in addition to large cities such as Sendai City and this region already had many inherent local economic and social issues before the earthquake struck such as the decline of many different industries and medical care issues in addition to depopulation and ageing. For that reason, along with local revitalization in areas with large regional differences, it is necessary to also simultaneously respond to pre-existing local economic and social issues. Moreover, land subsidence occurred mostly in areas near the coast and in settlements that sustained catastrophic damage in the giant tsunami, it has become essential to review relocation in terms of settlements, families and individuals to high ground or other areas. With the local information database proposed above as a base, it may be possible to propose land and space usage plans with the purpose of creating areas that are strong in resistance to disasters. Moreover, especially in the interim reconstruction areas, it is possible to provide effective information to construct temporary urban areas comprised in various kinds of temporary buildings including houses, stores, offices and factories.

At the same time, it may be possible to review the introduction of new ways of thinking such as compact or low carbon cities into local revitalization plans in order to simultaneously create areas that co-exist well with the environment. Further, it can be said that the greatest attraction of the Sanriku coast is the beautiful scenery that is dotted with agricultural and fishing settlements in every nook and cranny of the deeply indented coastline. For that reason, in the general concept of the environment, the landscape is adopted as an indicator showing the idiosyncrasies of the area and, while preserving the beautiful scenery, it can be said that it is essential to conduct land and space use in a manner that co-exists with the environment and that has strong resistance to disasters.

In addition, the general public in areas outside of the Tohoku region is also double-checking hazard maps that are published by the administration. Further, there was not only liquefaction in reclaimed land in coastal areas but also inland and it seems that this liquefaction occurred in reclaimed land in water areas such as rivers and marshlands. For this reason, ancient maps were consulted and the former use of the land was investigated. Through such spontaneous initiatives, local vulnerabilities are discovered and conditions that can be expected at the time of a disaster are understood along with a thorough everyday knowledge of evacuation shelters and routes, conducting evacuation simulations individually or as families can be considered to be important as measures to reduce the impact of disasters. Therefore, not only hazard maps but also old maps are required in local information databases, and through suitable reference to this kind of local information database by the general public, the recognition of disaster risks that can affect one personally will become the basis to conduct risk communication between diverse bodies within the community.

In addition to the above, in the areas where natural disasters frequently happened under the present land use, it is essential to conduct strict land use controls and risk assessment to draw up development plans. It is also necessary to conduct disaster influence assessment by all means to carry out development plans (Kaji, Izum and Yamamoto, 2012). In other words, I insist on the necessity of strategic environmental assessment (SEA). In this manner, it is possible to assume the effects of natural disasters, and examine the prior reconstruction leading to

city planning and community design to minimize damages.

4. INFORMATION PROVISION AND SHARING WITH SOCIAL MEDIA GIS

4.1 Proposal for Social Media GIS

Secondly, as an information infrastructure that can be used as a communications tool, I can propose Web-GIS, a social media GIS structure born of the use of digital maps and social media. In Japan in recent years, the development of computerization has been remarkable and directly after the occurrence of the Great East Japan Earthquake, in addition to ICT which was used conventionally, through the wide use of methods to transmit and gather information with social media, their validity in times of disaster was recognized. The mayor of Minami Soma City in Fukushima Prefecture, Katsunobu Sakurai, used YouTube to ask the world for support, subtitling his video in English and at the same time as shocking the world with the extent of the serious situation in the disaster zone and the influence of social media and the widespread diffusion of information was recognized.

Further, ESRI Japan[1)] published social media maps for the disaster zone immediately after the major earthquake in New Zealand and the Great East Japan Earthquake and it can be said that these were used as collective intelligence information that it is possible to update in real time based on digital maps. From the above, social media maps using these kinds of Web-GIS in areas outside of disaster zones can be created. Furthermore, it is necessary to maintain these so that they can be used in normal times for general hobbies and pleasure as well as for transmitting and gathering diverse information during disasters such as checking people's safety, disaster information and evacuation information.

For this reason, it is indispensable to consider the future development of computerization as well as to develop information systems that can be used by the general public in emergencies such as during the occurrence of natural disasters. One test of this is social media GIS as a base for a local knowledge GIS database as proposed in the previous section. For example, hazard maps have been created and made public by many local authorities, but by creating social media GIS/hazard maps that concentrate collective intelligence with respect to hazards that include local information from the general public in addition to information that is made public by the administration or specialists, it may be possible to greatly enhance disaster prevention and reduce impact on communities. Through such initiatives as these, I can expect to conduct effective risk communication between diverse bodies in the community through systems that make tangible the visibility of the characteristics of the area with digital maps.

In these kinds of situations, it is possible to investigate open source GIS for those with restricted budgets. The open source desktop tool GIS Grass that was originally designed at the U.S. Army Construction Engineering Research Laboratories and Mapserver that was developed at Minnesota University in the U.S. are well known. These open source GIS are generally known as FOSS4G (Free Open Source Software for Geospatial) and the international non-profit foundation OSGeo supports the user community. This organization also has a branch in Japan and it conducts support for the Great East Japan Earthquake[2)] .

My laboratory participated in the "Denshi Kokudo" Web System Project conducted by the Geographical Survey Institute at the Ministry of Land, Infrastructure, Transport and Tourism to develop an outdoor education program in school education and a website for it. With the cooperation of elementary and junior high schools in Musashino City, Tokyo, I and my staff have actual experience of running this program[3)] . At that time, considering the possibility of actually introducing this program into elementary and junior high school curricula,

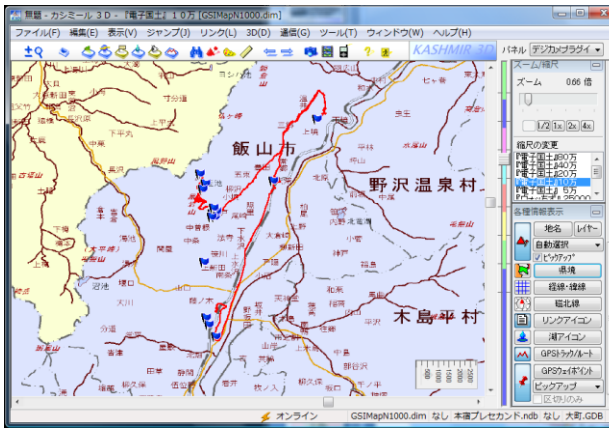

Figure 2 Kashmir 3D version digital map
Note) References from Hosoya and Yamamoto (2011a)

Figure 3 Map using the "Denshi Kokudo" Web System
Note) References from Hosoya and Yamamoto (2011a)

we used the Japanese-developed open source GIS Kashmir 3D[4] and MANDARA[5]. Figure 2 shows a route for outdoor activities in Iiyama City, Nagano which is made by Kashmir 3D. Figure 2 shows all routes including the same route as shown in Figure 1 which is prepared with the "Denshi Kokudo" Web System. Experiments considering this kind of cost performance first of all may be important in order to enhance the possible introduction and implementation of GIS in communities.

In disaster zone support for the Great East Japan Earthquake, essential relief supplies and human resources such as medical personnel, volunteers, NPOs and diverse technical experts did not reach the areas that required them in an organised manner and there were some cases in which the demands of the victims and those who were there to support them were not met by supply. In such cases, information exchange inside and outside the affected areas would be more smooth with social media GIS that can link the affected areas with communities outside those areas and the sending of relief supplies and dispatch of human resources would have been carried out more appropriately. A concrete example of this is the sinsai.info[6] website created and operated by a volunteer staff which uses Ushahidi, an open source software. Diverse information such as damaged areas, evacuation shelters, shops, facilities and employment sent by the general public through Twitter or e-mail is arranged on this website and is displayed in an easy-to-understand manner. It can be said that this method of using GIS as a communications tool will be important in the future in various fields.

4.2 Operation of Social Media GIS

It is preferable that social media GIS as proposed above are operated voluntarily by the local community and that active users are local people. It is essential to customize these sites taking usability into account so that system management can be performed even by those who are not system specialists and it is possible that community business opportunities could be born out of this. In addition, people who are familiar with information transmission and reception using some kind of information tool in normal times may be able to use them appropriately at the time of a disaster. By linking people within the community with each other as well as those on the outside with these kinds of information tools in times of disaster may reduce feelings of isolation and make it possible to feel safe even when feelings of tension continue. It has been said that, at the time of the Great Hanshin Earthquake, there were more than a few deaths from isolation in temporary housing, mostly among the elderly. Of course, face-to-face relationships between people are preferable but relationships between people who have met through the internet in this way can be considered to be, even in some small way, a substitution for the role of face-to-face relationships.

In the days directly after a disaster, the disaster zone and its vicinity is divided by traffic networks such as rail and road and it may be very difficult to check the safety of people in person. For that reason, checking people's safety through the medium of the internet may give people a great sense of relief. Further, as the phases of the aftermath of an earthquake progress, it is essential to share, manage and update diverse supply and demand information in bundles so that it is possible to send the necessary supplies and personnel to the area that requires them.

As the disaster zone in the Tohoku region is so wide, it has been difficult to obtain information about the extent of damage and to have an overall grasp of what kind of relief supplies and human resources are required where. Further, as western and southern Japan are far away from the disaster zone, it is perhaps a reality that NPOs and volunteers cannot easily participate in recovery and reconstruction support activities. It has been pointed out that many NPOs and volunteers rushed to the scene from all over the country to conduct recovery and reconstruction activities and support at the time of the Great Hanshin Earthquake. The importance of the spontaneous activities of such people and their social necessity was widely recognized and there were also results such as the enforcement of the Law concerning the Promotion of Specific Non-profit Organization Activities (the NPO Law) in 1998. Further, as there was little damage in the surrounding large cities such as Osaka and Kyoto, it has been said that it was possible to conduct support activities with these cities as a base. Taking heed of the above, digital maps of a number of areas based on information sharing and exchange concerning objects and people may be beneficial.

4.3 Information Ethics and Literacy

There are already many different types and formats of social media and as propagation power is higher in comparison with traditional mass media such as TV, radio and newspapers, their influence in society is increasing more and more. In this way, the online public sphere was formed and all kinds of people became able to freely transmit their diverse opinions and, along with accepting the advantages of being able to come into contact with a great variety of opinions, there is now a need to cultivate the ability to be able to scrutinize information. As a darker side of social media, I can point out that, due to financial damage caused by misinformation which is mainly caused by false rumours and chain mail that spreads with speed and on a scale that exceeds expectations through ICT, there was a huge negative impact on all kinds of industries in Japan, not only on agriculture and the fishing industry. In particular, in the disaster zone and the surrounding area, there is real and great damage that is not a direct effect of the triple disaster of the great earthquake, the giant tsunami and the accident at the nuclear power station.

For this reason, along with consistency and respect of information ethics by those who transmit information, as information transmission using social media becomes information transmitted with detailed location information such as longitude and latitude through using digital maps on social media GIS, it is necessary to make sure to transmit it with care. Further, it may be fairly difficult for people who receive information at times of emergency in disasters, but they have to acquire the information literacy that makes it possible to calmly scrutinize information. In computerization education in schools, these points can also be expected not only to use information tools but also to consistently incorporate information ethics and literacy.

The dark side of information such as groundless rumours about disasters could be spread in good faith or with malice, through mischief, misunderstanding or prejudice or because of a simple mistake, but it is difficult to appropriately distinguish authenticity in a great variety of information. In the immediate aftermath of a disaster, it is the situation that many people both in the disaster zone and outside it are shocked and even the most stout-hearted person may not have the capacity to be able to think calmly and make judgments about the validity and authenticity of information. In particular, as the number of characters on Twitter is limited, there are cases in which

there is a lack of explanation or words and even in normal times, misunderstandings between recipients of information occur easily. Precisely because there are these kinds of problems, it is essential for those who transmit information to respect information ethics and to pay close attention to what is transmitted. As it is possible to send and receive information using an information device with just a touch of the send button, there has been focus on netiquette at the time of transmitting information since the beginning of use of e-mail. These basic guidelines for using the internet need to be recognized anew in modern societies such as Japan where the online public sphere is taking form.

Further, in addition to people with disabilities or elderly people, as non-Japanese people who do not have a good command of the Japanese language are more likely to be vulnerable in a disaster, well-considered and suitable information transmission should be conducted and it is expected that evacuation action support will be conducted.

5. CONCLUSIONS

This study had the aim of making proposals for a reduction in the impact of disasters that may occur in the future and for recovery and reconstruction in the Great East Japan Earthquake disaster zone with GIS as social infrastructure positioned at the centre of an information infrastructure. Specifically, after discussion of the relationship between GIS and the development of the computerization of Japan, this study proposed the construction of local information databases using GIS and information provision and sharing with social media GIS as a valid example of using information systems for recovery and reconstruction after the Great East Japan Earthquake.

In addition, I referred to literature related to various international cases such as Finland which is a country with an advanced computerization policy while compiling this study. In Miettinen (2010) and Ilkka (2008), Finnish scientists introduce social innovation including the computerization of their own country and analyze in detail the causes of success and failure. The reasons behind Finland becoming an advanced ICT state include the NIS (National Innovation System) which is an initiative based on state level concepts and the decisive action of a number of social innovations that was taken.

Reconstruction in the aftermath of the Great East Japan Earthquake is also an opportunity for Japan to implement social innovation as an opening in fields in which future development can be expected such as information systems, not only in the disaster zone but on a national scale. Since the Great East Japan Earthquake, the values of the Japanese people have been changing gradually and we are in a situation where it is possible to investigate changes in lifestyle in order to reduce energy consumption levels. I believe that this is a good chance to progress with social innovation.

Notes:

1) In addition, in the same way ESRI Japan supports map making activities as a member of the Tohoku Region Pacific Offshore Earthquake EMT (Emergency Mapping Team) formed by research institutions and private businesses in order to support emergency response and reconstruction support activities. This is the Great East Japan Earthquake social media map website: <http://175.41.145.246/tohoku_taiheiyooki/index.html>, Accessed March 6, 2012.
2) OS Geo Foundation, Japan branch: <http://www.osgeo.jp>, Accessed March 6, 2012.
3) Outdoor education program: <http://www.ohta.is.uec.ac.jp/yamamoto/gis>, Accessed March 6, 2012. See Hosoya, N. and Yamamoto, K. (2011a, 2011b) in the references for details of the proposal and operation of the outdoor education program.
4) Kashmir 3D: <http://www.kashmir3d.com/>, Accessed March 6, 2012.
5) MANDARA:

<http://ktgis.net/mandara/>, Accessed March 6, 2012.

6) sinsai.info Great East Japan Earthquake / Reconstruction Support Platform created by Everyone http://www.sinsai.info/

References:

1) Yamamoto, K. (2009) Present State and Future Prospects for GIS as an Environmental Information System –A Case Study of Land-Use Analysis in the Lake Biwa Drainage Basin-. *Journal of the Society of Environmental Science,* Japan, **22**(2), 143-154. (in Japanese)

2) Hosoya, N. and Yamamoto, K. (2011a) Web-GIS based Outdoor Education Program as Environmental Education for Elementary Schools. *Journal of Scio-Informatics*, **4**(1), 49-62.

3) Hosoya, N. and Yamamoto, K. (2011b) Web-GIS based Outdoor Education Program for Junior High Schools. *World Academy of Science, Engineering and Technology*, **60**, 316-322.

4) Kaji, H., Izumi, J. and Yamamoto, K. (2012) Policy Recommendations of Reconstruction after the Great East Japan Earthquake. Gihoudousyupan. (in Japanese)

5) Miettinen, R. (author) / Mori, Y. (translator) (2010) Finnish National Innovation System. Shinhyoron. (in Japanese)

6) Taipale, I. (author) / Yamada, M. (translator) (2008) 100 Social Reforms that led Finland to be World Number One -Finnish Social Innovation-. Koujinnotomo. (in Japanese)

7) Yamamoto, K. (2011) Great East Japan Earthquake Proposal: Construction of Local Information Databases as Information Infrastructure. *Planning Administration*, **34**(3), 11. (in Japanese)

8) Yamamoto, K. (2012a) Using Information Systems for Recovery and Reconstruction after the Great East Japan Earthquake. JOINT CONFERENCE PROCEEDINGS 9th International Conference on Urban Earthquake Engineering / 4th Asia Conference on Earthquake Engineering, 1841-1847.

9) Yamamoto, K. (2012b) GIS as an Information Infrastructure for Recovery and Reconstruction after the Great East Japan Earthquake. *Journal of Earth Science and Engineering*, **2**(8), 461-471.

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INFORMATION INFRASTRUCTURE FOR RECOVERY AND RECONSTRUCTION after the Great East Japan Earthquake

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1-1. Background

- The Great East Earthquake (2011/03/11)
  A great earthquake of magnitude 9.0 occurred in the Tohoku region of Japan.
- Since the Great Hanshin Earthquake (1995), there has been remarkable development in the computerization of Japan
- ICT (Information and Communication Technology) played an important role in the days directly after the Great East Japan Earthquake.
- It had diverse as well as major effects such as the spread of financial damage caused by misinformation both inside and outside the disaster zone.

2

1-2. Purpose of This Study

- Social media that used ICT was useful in the days directly after the disaster.
- It is necessary to investigate the provision of an information infrastructure that uses ICT to prevent or reduce the impact of disasters as well as for the revitalization of the whole area struck by the disaster.
- This study aims to make proposals for the recovery and reconstruction of the areas affected by this disaster as well as for a reduction of the impact of natural disasters that may occur in the future with GIS as a social infrastructure positioned at the heart of the information infrastructure.

3

2-1. The Development of Computerization in Japan

- 2000 Basic Law on the Formation of an Advanced Information and Telecommunications Network Society (Basic IT Law),
  e-Japan Strategy
- 2006 u-Japan Policy
- 2010 i-Japan Strategy 2015
  ↓
- Ubiquitous Network Society → Cloud Computing Society
- Though Social Media (Blogs, Twitter, YouTube, Facebook and etc.) played a very useful role, it had large-scale positive and negative effects on the East Japan Earthquake.

4

2-2. The Function and Roles of GIS

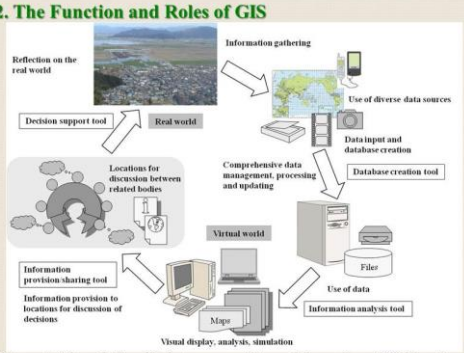

Figure 1 The relationship between society and the various GIS functions

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3-1. The Necessity of Constructing Databases with GIS

- **Basic Local Information**
  - natural conditions such as the extent of damage, degree of danger for communities, geographical features and both new and old uses of land,
  - local economy and society such as industry and population
- **Knowledge shared as explicit rather than tacit knowledge**
  - by making special and experiential knowledge about the community held by specialists in diverse fields, the administration and the general public into visible information using digital maps

6

3-2. Examples of Local Knowledge

Photograph 1 Namiwake Shrine in Wakabayashi Ward in Sendai City, Miyagi Prefecture (October, 2011)
The Jogan Earthquake (869)

Photograph 2 Stone monument stating 'do not build houses below this point' in Miyako City, Iwate Prefecture (September, 2011)
The Meiji Sanriku Earthquake (1896) and The Showa Sanriku Earthquake (1933)

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3-3. Using Local Information Databases

- Using this local information databases, I propose
  - Land and space usage plans with the purpose of creating areas that are strong in resistance to disasters.
  - Compact or low carbon cities into local revitalization plans in order to simultaneously create areas that co-exist well with the environment
  - In the interim reconstruction areas, it is possible to provide effective information to construct temporary urban areas
- Not only hazard maps but also old maps are required.
- Referring to the local information by the general public, the recognition of disaster risks will become the basis to conduct risk communication between diverse bodies.
- Strategic Environmental Assessment (SEA)
  ← Risk Assessment, Disaster Influence Assessment
- Prior reconstruction for city planning and community design

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4-1. Proposals for Social Media GIS

- Social media GIS as a base for a local knowledge GIS database
- By creating social media GIS/hazard maps that concentrate collective intelligence with respect to hazards that include local information from the general public in addition to information that is made public by the administration or specialists, it may be possible to greatly enhance disaster prevention and reduce impact on communities.

- Open source GIS for those with restricted budgets
  - GIS Grass, Mapserver
  - FOSS4G (Free Open Source Software for Geospatial)

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4-2. Social Media Map operated by ESRI

Figure 2 Social Media Map for the Great East Japan Earthquake

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4-3. Example of Open Source GIS

"Denshi Kokudo" Web System

Japanese-developed open source GIS, Kashmir 3D and MANDARA

Web-GIS Based Outdoor Education Program

Figure 3 Web-GIS based Outdoor Education Program for Elementary Schools

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4-4. Example of Social Media GIS

Figure 4 Sinsai.info website

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4-5. Operation of Social Media GIS

- Usability
  - It is preferable that social media GIS are operated voluntarily by the local community and that active users are local people.
  - It is essential to customize these sites so that system management can be performed even by those who are not system specialists.

- Advantages
  - As the disaster zone in the Tohoku region is so wide, it has been difficult to have an overall grasp of what kind of relief supplies and human resources are required where.
  - Digital maps of a number of areas based on information sharing and exchange concerning objects and people may be beneficial.

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4-6. Information Ethics and Literacy

- The necessity of Information Ethics and Literacy
  - As information transmitted with detailed location information on social media GIS, it is necessary to make sure to transmit it with care.
  - Though it may be fairly difficult for people who receive information at times of emergency in disasters, they have to acquire the information literacy that makes it possible to calmly scrutinize information.

- Netiquette

  These basic guidelines for using the internet need to be recognized anew in modern societies such as Japan where the online public sphere is taking form.

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5. Conclusion

- **The purpose of this study**
  - Making proposals for a reduction in the impact of disasters that may occur in the future and for recovery and reconstruction in the Great East Japan Earthquake disaster zone
  - GIS as social infrastructure positioned at the centre of an information infrastructure

  ↓

- This study proposed the construction of local information databases using GIS and information provision and sharing with social media GIS as a valid example of using information systems for recovery and reconstruction after the Great East Japan Earthquake.

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Thank you very much for your attention !

Matsushima, Miyagi Prefecture

Jodogahama, Iwate Prefecture

If you need more information about our study, please send E-mail to k-yamamoto@is.uec.ac.jp !

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Opportunities associated with the integration of environmental and resilience appraisal tools

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Abstract

Recent research outcomes suggest that the number of natural hazards, both environmental and geo-physical, will increase due to the effect of global warming. Researchers have been investigating various approaches to reduce environmental degradation and to improve the physical resilience to natural hazards. However, most of these approaches are fragmented and when combined with cultural barriers it often results into a less efficient assessment tools. The aim of this study to explore environmental impact and resilience assessment tools with the view to develop a more integrated approach able to assess efficiently both the impact and the resilience.

（和訳）

環境影響評価ツールとレジリエンス評価ツールの統合の機会

ネビル・アシュール、エフティミア・パンツァルティス、フェデリカ・パスカル、アンドリュー・プライス
ラフバラ大学

最近の研究成果は、地球温暖化の影響により、自然災害が、環境的なものも地球物理学的なものも、増加することを示唆している。研究者は、環境劣化を軽減し自然災害に対する物理的レジリエンスを改善するために、様々なアプローチを研究してきた。しかし、これらのアプローチの大半は断片的であり、文化的障壁と組み合わせると、しばしば、効率の良くないアセスメントツールに終わる。本研究の目的は、影響とレジリエンスを効率的に評価できる、より統合的なアプローチを策定するために、環境影響・レジリエンスアセスメントツールを探求することである。

Opportunities associated with the integration of environmental and resilience appraisal tools

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Abstract
Recent research outcomes suggest that the number of natural hazards, both environmental and geophysical, will increase due to the effect of global warming. Various approaches have been investigated to reduce environmental degradation and to improve the physical resilience to natural hazards. However, most of these approaches are fragmented and when combined with cultural barriers they often result into less efficient assessment tools. The aim of this study is to explore environmental impact approaches with the view to develop more comprehensive approach able to preserve the environment at ease and disaster times. The major finding of the study is that there is lack of integration among environmental impact and resilience approaches and that there is strong potential to reduce this fragmentation within a combined approach.

Keywords: *disasters, resilience, environment, appraisal tool, built environment, infrastructure*

1. Background
During the last few years there have been several highly disruptive natural events that demonstrate the complexity and diversity of impact associated with natural hazards. Disasters "*are not always singular or isolated events…they can occur in complex combinations and, or rapid succession*" (EEA, 2003), as demonstrated by the experience of many countries such as Japan in 2004 and 2011, and China in 2008. Recent research outcomes suggest that the number of natural hazards, both environmental and geo-physical, will increase due to the effect of global warming (Sauber and Ruppert, 2008, Hetzel and Hampel, 2006). Although, the connection between geo-physical hazards and global warming is still debatable, there is an urgent need to design more resilient and sustainable buildings and infrastructures able to cope with both natural hazards and sustainable enough to mitigate contribution to global warming and climate change. Researchers such as Mileti (1999) and Achour and Price (2010) linked disasters risk reduction and sustainability stating that a "*community that wants to become more sustainable will: maintain and, if possible, enhance, its residents' quality of life; enhance local economic vitality; ensure social and intergenerational equity; maintain and, if possible, enhance, environmental quality; incorporate disaster resilience and mitigation; and use a consensus-building, participatory process when making decisions*" (Mileti, 1999) due to "*the close interrelationship between disaster reduction and sustainable development, which was already recognized at the United Nations Conference on Environment and Development and taken into account in Agenda 21*" (UN General Assembly, 1994). However, in practice individuals tend to treat these two important aspects separately which ends with compromising environmental preservation, or resilience. The aim of this study is to explore environmental impact approaches with the view to develop more comprehensive approach able to preserve the environment at ease and disaster times.

2. Environmental preservation and resilience: unbalanced attention
The historical records of the United Kingdom (UK) suggest that the country is hardly a disaster prone area, such as Japan. Consequently the country priorities were dedicated to environment preservation more than resilience. Substantial amount of resources and attention have been dedicated to environmental preservation activities including financial, legislative and even political resources: the previous Prime Minister, Gordon Brown, established a new department within the governmental in October 2008. Since this date, the Department of Energy and Climate Change (DECC) has been responsible for leading the Country to save, deliver and manage energy more efficiently with emphasis to follow a low carbon energy

route. Major refurbishment work has been conducted to improve the sustainability of public and private, commercial and residential buildings stock. Refurbishment activities involved mostly insulation, day lighting, heating and natural ventilation in order to meet with the targets set by the Climate Change Act 2008, "*to cut emissions by 80% of their 1990 levels by 2050 with a mid-term target of 34% cuts by 2020*" (McGrath, 2009). Although these targets are still debatable, it shows the devotion to protect the environment. On the other hand, during the 2000s a series of extreme weather events took place and affected hundreds of thousands of people across the country and raised concern for resilience up to higher priority levels. However, the level of attention to resilience is still not as expected as "*large parts of the UK's infrastructure including energy and transport networks are vulnerable to bad weather*" (BBC, 2009) and that "*infrastructure investment was not considered a priority in the competition for government resources. Between 2000 and 2007, the UK was the lowest investor in infrastructure of all the OECD countries – with an estimated infrastructure deficit of £500bn over the next decade*" (Weather Online, 2012). Most of the UK infrastructure is old, some of it is dated back to the Victorian era, and highly vulnerable, such as the Dungeness power plant which is built few meters above sea level on an "*unstable geological formation*" (Paskal, 2009), which could be a source of an 'environmental disaster'. Government plans are to update and upgrade these critical infrastructures. Risks such as earthquake damage and heavily populated sites "*would be dismissed as possibilities*" but flood risks "*will not stop*" the plans (BBC, 2008). Therefore, despite the efforts to improve resilience in the UK, there is risk that the unbalanced attention between environmental preservation and resilience to disasters could lead to a major environmental disaster.

There are many drivers for integrating disaster resilience in the environmental impact approaches. However, there is delay in doing so due to the lack of awareness among people and decision makers, the lack of technical and financial resources, and of legislations to ensure that the minimum requirements are guaranteed. There is significant amount of information and datasets available worldwide that can be used for the integration, which level and boundaries between choices of action should be left to the stakeholders and private parties to define as needed. The conceptual model proposed in this paper suggests that the integration of resilience in the environmental impact approaches needs to move from the development of the theory where the major guidelines are defined up to the development of a framework to identify strategies to reduce vulnerability and enhance environment preservation. The latter needs a clear engagement of the different parties: social, technical and political to ensure that tools are developed and enforced. The model showed in Figure 1 illustrates the four steps of integration and shall support to move from '*no integration*' to a '*full integration*' state.

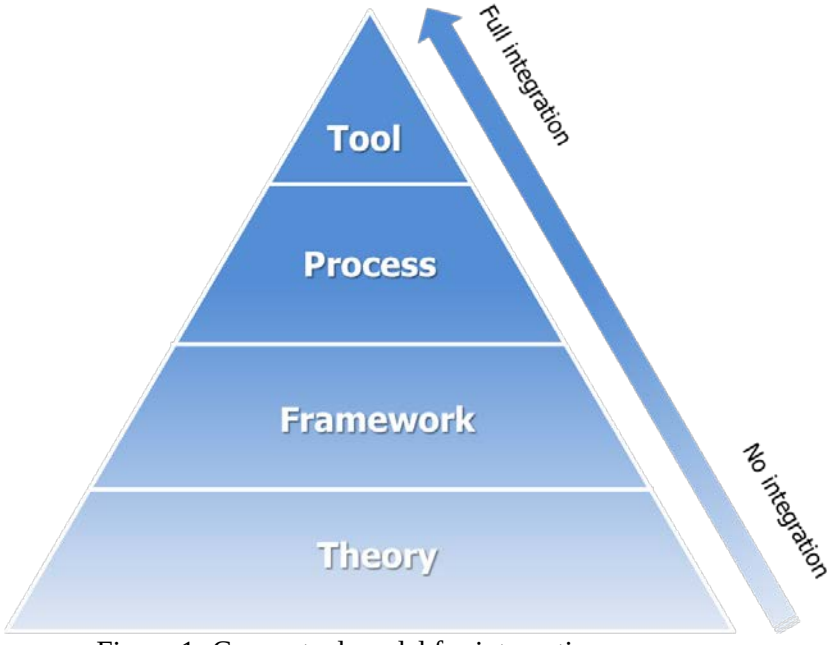

Figure 1- Conceptual model for integration

3. Integration model for resilience and environment preservation

Environmental Impact Assessment (EIA) is about assessing of the potential impact, positive or negative, a project or an activity could have on the wide sense of environment, often covering environmental, social and economic issues. Consequently, a project or an activity is considered 'sound' only when it meets these 3 major aspects, see Figure 2. This model has been first developed in the United States of America (USA) in 1969 and later adopted in many countries (IIED, 2009) such as the UK, where a number of strategies and targets have been set and enhanced with guidance, legislations and tools and clarifies some of the reasons for which there is an 'unbalanced' attention between resilience and environmental preservation. Disasters are now firmly on the agendas of many countries specifically after the recent experiences of 2010 oil spill USA and the Japanese mega-earthquake of March 2011, in addition to the speed climate is changing, the potential risks and the high vulnerability of critical infrastructure and built environment in many countries.

Environmental Impact Assessment is carried out, leaving often aside social and economic impacts, which are separately taking into consideration, as they are already recognised as driving factors. Resilience impacts, on the other hand, does not come into account if not after a disaster has reported an evident impact on the environment. Despite a significant effort dedicated to resilience and environmental preservation, most of it is yet to be integrated in order to ensure that environment is preserved pre, during and post disasters. As this already supports the Hyogo Framework for Action (HFA) 2005-2015, time has come to investigate opportunities to put in action an integrated applicable tool for the combination of EIA and resilience assessment. Environmental impact assessment aspects need to be extended further to include resilience, so that a project or an activity is considered sound only when it meets with social, environmental, economic and resilience criteria as shown in Figure 3. This will challenge the planning more than previously, but will potentially reduce impact due to disasters.

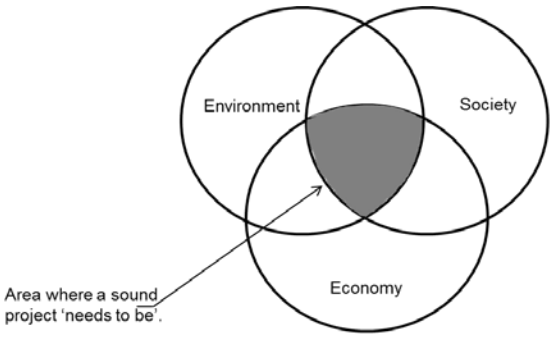

Figure 2- Aspects of Environmental Impact Assessment

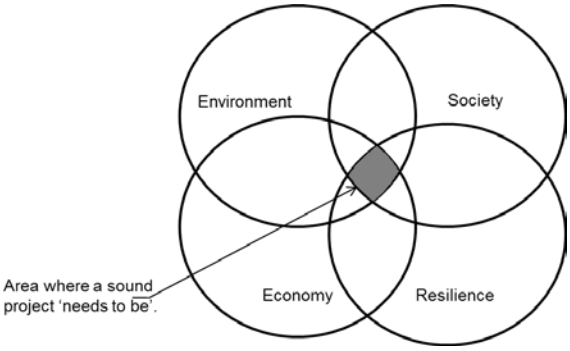

Figure 3- Improved Aspects of Environmental Impact Assessment

4. Adapted DPSIR framework

The European Environment Agency (EEA, 1999) developed a Drivers-Pressures-State-Impact-Response (DPSIR) framework that suggests ways of reasoning about "*the interplay between the environment and the socio-economic activities*" emphasising that the environmental preservation is driven mostly by social risk perception and response. The framework strength is in its logical approach and clear steps; however, it might be challenging when is implemented to disaster resilience and environmental preservation due to the connection of the component 'Response' with the other components. Table 1 illustrates the analogy of each of the framework components, which are adopted for the *Adapted DPSIR framework*. The component 'Response' remains playing a major role in the framework, but in its new role it is expected to adopt a more pro-active approach applied directly the 'State' component specifically in terms on enforcing environmental and resilience requirements in order to reduce impact on the environment and mitigate hazard drivers. It has therefore two indirect connections: the first is with the 'Impact', and the second is with 'Drivers' in terms of mitigation source of risks, as shown in Figure 4.

Table 1- Modified DPSIR framework components

DPSIR component	**Description**
Drivers	*Hazard Drivers* (e.g. global warming, tectonic plate instability etc.)
Pressure	*Hazard*
State	Damage
Impact	Impact on environment
Response	Resilience and sustainability

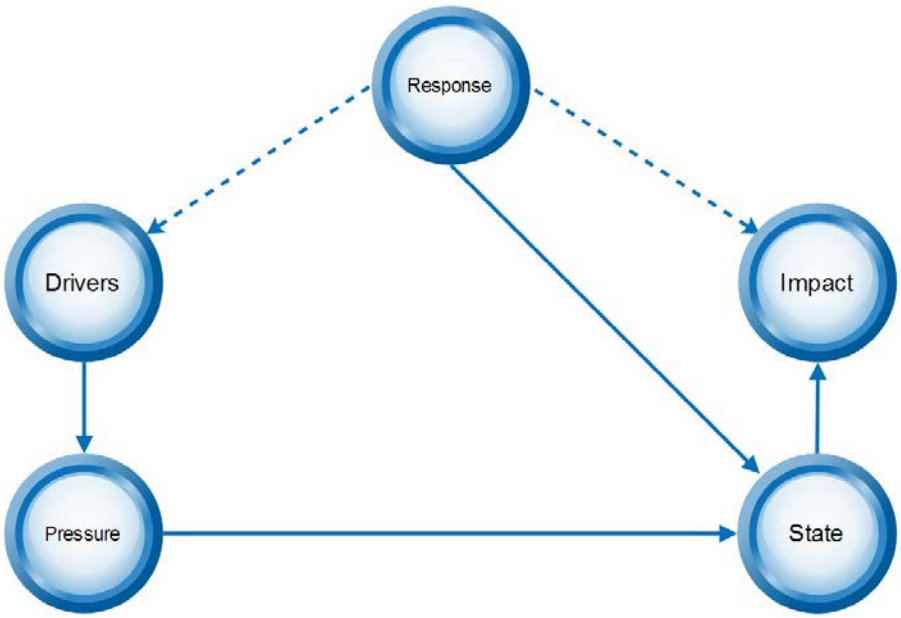

Figure 4- Modified DPSIR framework

5. Resilience and environment preservation integration process

The World Conference on Disaster Reduction, held in Kobe in January 2005, has set a clear strategy towards increasing the attention to the resilience of nations and communities to disasters. The outcome of this activity was the development of the Hyogo Framework for Action (HFA) 2005-2015 where five priorities have been identified supported by a set of guidelines to consider while improving resilience as shown in Table 2. When re-arranged, according to '*who can do what*', the guidelines could be classified into four major elements: *political*, *social*, *technical* and *strategic planning* which are related to each other with an 'action-reaction' process as that shown in Figure 5. The initiative could start from any particular side: technical, political or social to inform the strategic planning which is required to develop the necessary strategies, targets and feedback to technical and political for execution and enforcement; and inform social about the emerging strategies. The process seems to be easy and straightforward; however, there is a number of barriers some of which are due to technical capability, resources and psychology due to risk perception and prioritisation as often individuals tend to prioritise their need and tend to neglect risk because "*deaths and injuries from natural hazards are serious, but are not statistically large on an annual basis (e.g., compared to deaths from automobile accidents); nor have we recently encountered the number of deaths caused by the Johnstown, Pennsylvania, dam failure and flood of 1889 (3,000 killed) or the Galveston, Texas, hurricane of 1900 (6,000 killed)*" (Arnold et al., 2004).

Table 2- Integration of resilience and environmental preservation in HFA

HFA priorities	Guidelines	Observation
Assurance that disaster risk reduction (DRR) is a national and a local priority with a strong institutional basis for implementation.	• DRR institutional mechanisms (national platforms); designated responsibilities • DRR part of development policies and planning, sector wise and multi-sector • Legislation to support DRR Decentralisation of responsibilities and resources • Assessment of human resources and capacities Foster political commitment • Community participation	Prioritisation to disaster risk reduction (DRR) [***politically driven***]
Identify, assess and monitor disaster risks and enhance early warning	• Risk assessments and maps, multi-risk: elaboration and dissemination • Indicators on DRR and vulnerability • Data & statistical loss information • Early warning: people centred; information systems; public policy • Scientific and technological development; data sharing, space based earth observation, climate modelling and forecasting; early warning • Regional and emerging risks	Identification, assessment and monitoring of disaster risks [***technically driven***]
Use knowledge, innovation and education to build a culture of safety and resilience at all levels	• Information sharing and cooperation; • Networks across disciplines and regions; dialogue • Use of standard DRR terminology • Inclusion of DRR into school curricula, formal and informal education • Training and learning on DRR: community level, local authorities, targeted sectors; equal access • Research capacity: multi-risk; socioeconomic; application • Public awareness and media	Awareness, cooperation, training and learning **[*socially driven*]**
Reduce the underlying risk factors	• Sustainable ecosystems and environmental management • DRR strategies integrated with climate change adaptation • Food security for resilience • DRR integrated into health sector and safe hospitals • Protection of critical public facilities • Recovery schemes and social safety- nets • Vulnerability reduction with diversified income options • Financial risk-sharing mechanisms • Public-private partnership • Land use planning and building codes • Rural development plans and DRR	Risk reduction and integration with sustainability principles **[*strategic planning driven*]**
Strengthen disaster preparedness for effective response at all levels	• Disaster management capacities: policy, technical and institutional capacities • Dialogue, coordination & information exchange between disaster managers and development sectors • Regional approaches to disaster response, with risk reduction focus • Review & and exercise preparedness and contingency plans • Emergency funds • Voluntarism & participation	Preparedness, effective response and resources **[*technically driven*]**

6. Environmental impact assessment tools

Many countries have developed tools to assess and rate the environmental impact of their projects such as the Building Research Establishment Environmental Assessment Method (BREEAM) in the UK and the Leadership in Energy and Environmental Design (LEED) in the United States of America (USA). Although both tools exist in the UK, BREEAM tends to be more predominating as "*government departments require BREEAM ratings of all their buildings; most local authorities require BREEAM as part of planning approval for developments over a certain size*" (Parker, 2009).

As EIA tools are expected to cover the 'most' common factors affecting the environment, they are often very similar in their views. The investigations of 10 international EIA tools, from Australia, Brazil, Canada, France, Germany, Honk Kong, Japan and UK (see Table 3), demonstrated that there is significant similarity between these tools as most of them are focused on:

- **Environment**, where buildings are assessed according up to 14 different criteria, divided into two sub-categories: the first is ecological where factors such as pollution, waste and energy have been

identified; and the second is building indoor comfort quality such as thermal comfort and microbiological contamination;

- **Society**, where buildings are assessed according to two to five criteria including: staff, safety, working conditions, accessibility and mobility, and promotion of heritage; and
- **Economy**, where all tools have to assess the management practice in each building.

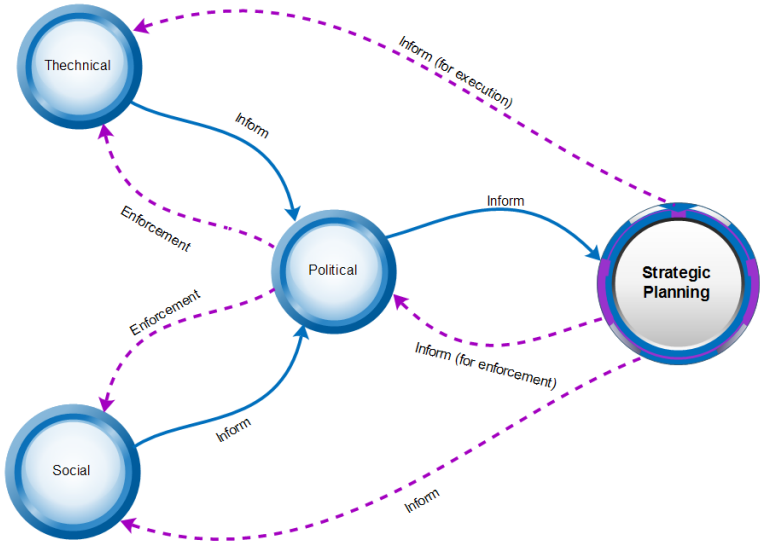

Figure 5- Resilience and environmental impact assessment process

Table 3- International environmental impact assessment tools for the built environment

Name of tool	Code	Country
Haute Qualité Environnementale - Etablissement de santé	HQE® Etablissement de santé (FR)	France
Green Start Healthcare	*Green star (AUS)	Australia
Building Research Establishment Environmental Assessment Method for Healthcare	BREEAM Healthcare (UK)	UK
Leadership in Energy and Environmental Design	LEED (USA)	USA
Green Globes	Green Globes ™ (CA)	Canada
Green Mark	Green Mark (SG)	Singapore
Comprehensive Assessment System for Building Environmental Efficiency	CASBEE®	Japan
German Sustainable Building Certificate	DGNB (DE)	Germany
AQUA Process	AQUA Process (BR)	Brazil
Building Environmental Assessment Method	BEAM (HK)	Honk Kong

"*Environment*" and "*Economic*" assessment criteria are very much the same between the tools, which shows that there is a cross-learning during the development of these tools but also that the environmental concern of most countries is the same. The difference starts to emerge in the "*Society*" category where countries have different priorities and concerns. Most of these tools exceed the 'ecological' aspect of *environmental impact* to cover social and economic aspects which are often looked at as a major proportion of the '*sustainable development*'. The German and Japanese views of the environmental impact and sustainable development are much wider as they cover resilience as well, although their views are relatively different, see Table 4. Whilst the German approach limits resilience to flexibility and adaptability of the building to changing requirements (DGNB, 2009), the Japanese approach accredits buildings for improved "*durability and reliability*", which takes environmental problems within the hypothetical closed space to: (a) mean danger to human life, and (b) reduce occupant comfort in extreme events such as earthquakes and wind (IBEC, 2008). The Japanese and German approach indicate the acknowledgement of the need to integrate resilience in environmental approaches and tools which has been identified in literature such as the UN General Assembly (1994), Mileti (1999) and Achour and Price (2010). In the UK, this integration has been 'hinted' in official and non-official documentations, but needs clearer acknowledgment and further strengthening. The Country has put in place a remarkable strategy towards

Table 4- EIA International tools components

TOOLS	IMPACTS																									
	Environmental														Social					Economic	Resilience				
	Ecology									*Quality /Confort*											*Structural*		*Non Structural*		*Functional*
	Material use	Energy use	Water use	Waste	Pollution to water	Pollution to land	Greenhouse gas emission	Pollution to air	Ecological respect	Daylight/ lighting	Thermal Confort	Acoustic	Indoor air quality	Microbial contamination	Staff	Safety	Working conditions	Accessiility Mobility	Promotion of heritage	Management pratice	Location	Flexibility	Equipment	Supplies	Disaster Risk Mngmt
HQE Etablissement de santé	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X		X	X					
GREENSTAR Healthcare	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X		X					
BREEAM Healthcare	X	X	X	X	X		X	X	X		X	X	X	X	X	X		X		X					
CASBEE New Construction	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
LEED Healthcare	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X						
GREEN GLOBES New construction	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X	X		X					
DGNB Office and administration buildings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
GREEN MARK Non Residential Building	X	X	X	X	X		X	X	X	X	X	X	X	X	X			X		X					
AQUA New buildings	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X		X	X					
BEAM New buildings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					

preserving the environment, enhanced with legislations, guidelines and tools, which needs to be strengthened further by integrating resilience through the development of new, or the support of international tools, many of which are already available in literature. Some of these are generic such as in Johnson et al. (1999), whilst others specific for particular type of construction such as the "*Hospital Safety Index*" developed by the World Health Organisation (WHO).

7. Conclusions

The increasing number of hazards, the vulnerability of buildings and infrastructure and the recent experience of environmental impacts drive us to think differently and to adopt new strategies to reduce potential environmental impacts in order to preserve next generations from major impacts. Countries such as the UK have made a significant step toward environment preservation through its dedication of remarkable amount of resources enhanced with legislations and appropriate guidelines. These efforts need to be enhanced further to integrate resilience specifically with the vulnerable building and infrastructure stock it has to ensure that environment is well preserved, or at least insignificantly affected in case of disasters. A real example for this is the Japanese case where resilience is very well integrated in its official EIA tool, CASBEE. The integrated model provides a clear set of steps that could support the movement from no-integration to a full-integration state.

Acknowledgement

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References

Achour, N. & Price, A. D. F. 2010. Resilience Strategies of Healthcare Facilities: Present and Future. *International Journal of Disaster Resilience in the Built Environment,* 1**,** 264-276.

Arnold, C., Lyons, J., Munger, J., Quinn, R. G. & Smith, T. L. 2004. Design Guide for Improving School Safety in Earthquakes, Floods and High Winds. *Risk Management Series.* Washington D.C.: Federal Emergency Management Agency (FEMA).

BBC. 2008. *Flood risk 'won't stop nuclear'* [Online]. BBC. Available: http://news.bbc.co.uk/1/hi/uk_politics/7519759.stm [Accessed 28 September 2012 2012].

BBC. 2009. *UK's infrastructure 'vulnerable'* [Online]. BBC. Available: http://news.bbc.co.uk/1/hi/8116013.stm#map [Accessed 25 May 2012 2012].

DGNB 2009. *German Sustainable Building Certificate,* Stuttgart, Germany, German Sustainable Building Council (DGNB).

EEA 1999. Environmental indicators: Typology and overview. Copenhagen, Denmark: European Enviornment Agency (EEA).

EEA 2003. Mapping the impacts of recent natural disasters and technological accidents in Europe. Copenhagen: European Environment Agency (EEA).

Hetzel, R. & Hampel, A. 2006. Long-Term Rates of Faulting Derived from Cosmogenic Nuclides and Short-term Variations caused by Glacial-Interglacial Volume Changes of Glaciers and Lakes. *International Journal of Modern Physics B,* 20**,** 261-276.

IBEC 2008. *Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) for New Construction - Technical Manual,* Tokyo, Japan, Institute for Building Environment and Energy Conservation (IBEC).

IIED 2009. Environmental Impact Assessment (EIA). London: International Institute for Environment and Development (IIED).

Johnson, G. S., Sheppard, R. E., Quilici, M. D., Eder, S. J. & Scawthorn, C. R. 1999. *Seismic Reliability Assessment of Critical Facilities: A Handbook, Supporting Documentation, and Model Code Provisions,* Oakland, California, MCEER.

McGrath, M. 2009. *UK climate targets 'unachievable'* [Online]. British Broadcast Corporation (BBC). Available: http://news.bbc.co.uk/1/hi/8358077.stm [Accessed 18 February 2010].

Mileti, D. 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States,* Washington D.C., The Joseph Henry Press.

Parker, J. 2009. *BREEAM or LEED - strengths and weaknesses of the two main environmental*

assessment methods [Online]. BSRIA Online: Building Services Research and Information Association (BSRIA). Available: http://www.bsria.co.uk/news/breeam-or-leed/ [Accessed 1 October 2012].

Paskal, C. 2009. The vulnerability of energy infrastructure to environmental change. London: Chatham House.

Sauber, J. & Ruppert, N. 2008. Rapid ice mass loss: Does it have an influence on earthquake occurrence in southern Alaska? *In:* HAEUSSLER, P. J., WESSON, R. & EKSTROM, G. (eds.) *Active Tectonics and Seismic Potential of Alaska.* Geophysical Monograph Series.

UN General Assembly. 1994. *International Decade for Natural Disaster Reduction* [Online]. New York. Available: http://www.un.org/documents/ga/res/49/a49r022.htm [Accessed 25 February 2009].

Japan-UK Joint workshop on Policy Integration between Environmental Assessment and Disaster Management 30 Nov. – 3 Dec 2012, Ichikawa Japan

Opportunities associated with the integration of environmental and resilience appraisal tools

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Loughborough University, UK （ロフバラ大学、英国）

Contents

- About Loughborough University
- Background
- Environment preservation vs Resilience
- Integration of environmental preservation and resilience
- Theory: Sustainable development
- DPSIR framework
- Integration process
- Environmental impact assessment tools
- Conclusion

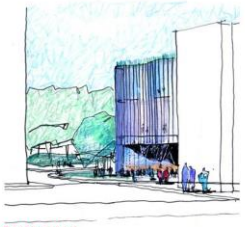
About Loughborough University

- The University dates back to 1909
- Dr Herbert Schofield, Principal, Loughborough Colleges, 1915-1950
  - his concept of "training on production" in an "institutional factory" set the scene for the development of sandwich courses & practical short courses
- The University received its Royal Charter on 19th April 1966
- 23 departments with nearly 16,000 students & 3,000 staff
  - Including over 2,000 international students from over 120 countries
- The UK's leading sports university
- The largest single-site campus in the country, with over 437 acres of land




School of Civil and Building Engineering

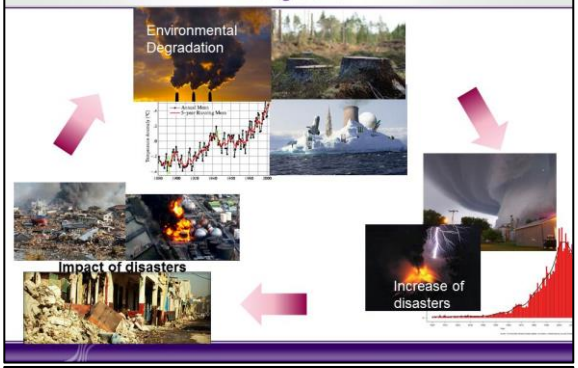
Staff	70
Support staff	23
Technicians	14
UG students	800
PG students	267
Researchers	250



Research Assessment Exercise (RAE) 5*/4* rated

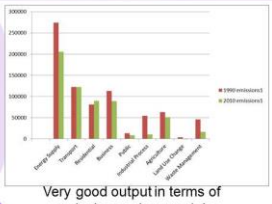
Average of 1 PhD every 15 days

Background



Environment preservation vs Resilience

- **2008:** Department of Energy and Climate Change (DECC) was established
- **2008** Climate Change Act:
  80% CO2 emission reduction of 1990 levels, and 34% by 2020
- Major **refurbishment** work has been conducted to comply with new Building Regulations



Very good output in terms of reducing environmental degradation

Good progress on environmental preservation!

…but what about resilience of infrastructure?

Environment preservation vs Resilience

- Vulnerable infrastructure and building stock [age and location]

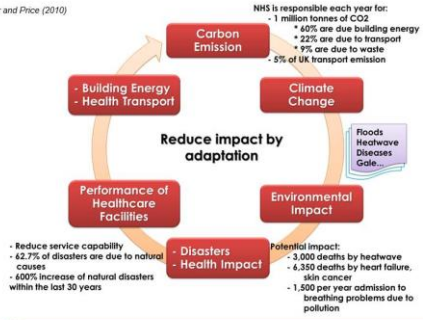
Unbalanced attention between environmental preservation and resilience…
What can be done to improve resilience while preserving the environment?

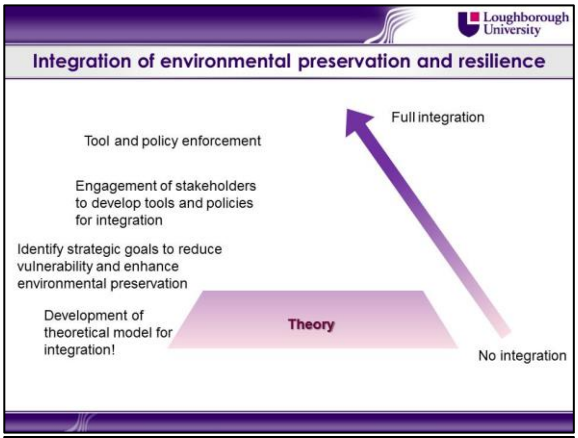
uncertainties)…"making the social system more adaptive to surprises" (Klinke and Renn, 2002).

Dungeness nuclear power plant. Location on geological unstable ground few meters above sea level

Integration of environmental preservation and resilience

Source: Achour and Price (2010)

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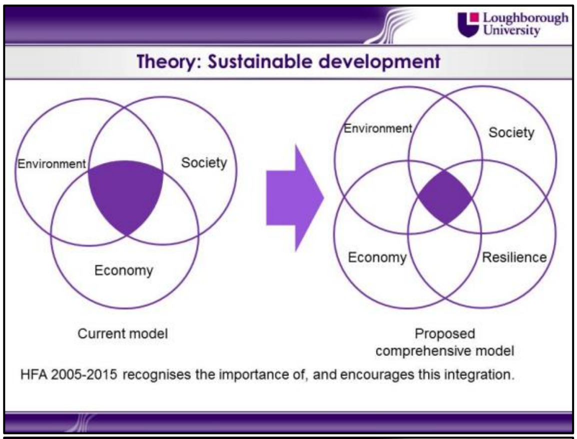
Integration of environmental preservation and resilience
Full integration
Tool and policy enforcement
Engagement of stakeholders to develop tools and policies for integration
Identify strategic goals to reduce vulnerability and enhance environmental preservation
Development of theoretical model for integration!
Theory
No integration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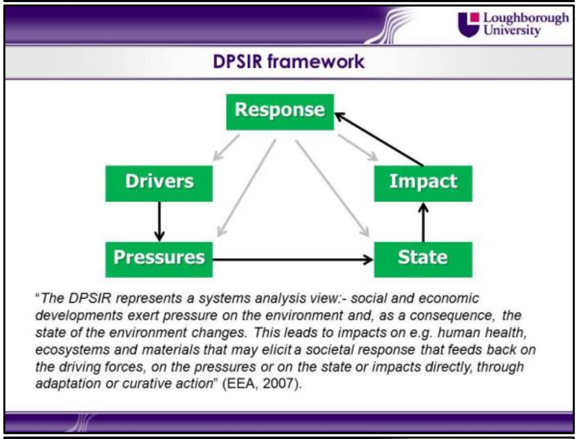
Theory: Sustainable development
Environment
Society
Economy
Current model
Environment
Society
Economy
Resilience
Proposed comprehensive model
HFA 2005-2015 recognises the importance of, and encourages this integration.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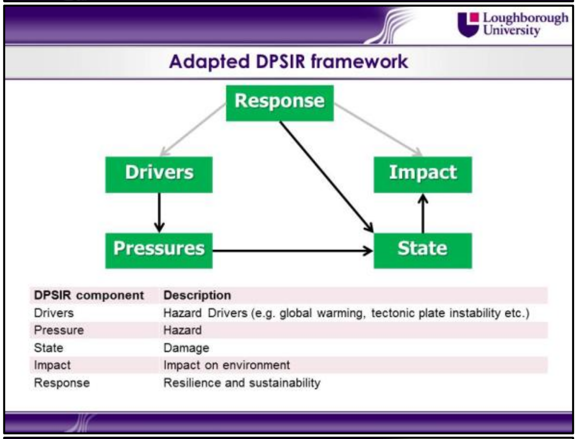
DPSIR framework
Response
Drivers
Impact
Pressures
State
"The DPSIR represents a systems analysis view:- social and economic developments exert pressure on the environment and, as a consequence, the state of the environment changes. This leads to impacts on e.g. human health, ecosystems and materials that may elicit a societal response that feeds back on the driving forces, on the pressures or on the state or impacts directly, through adaptation or curative action" (EEA, 2007).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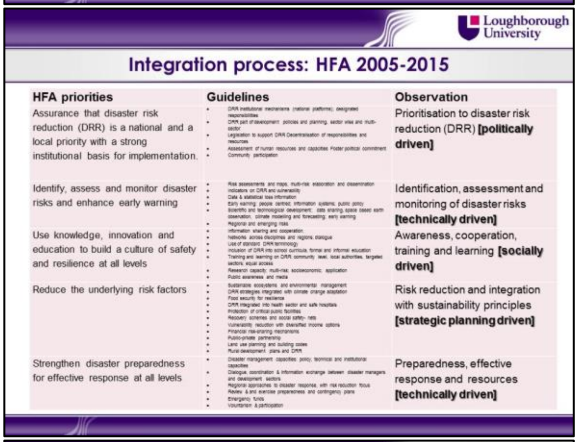
Adapted DPSIR framework
Response
Drivers
Impact
Pressures
State
DPSIR component | Description
Drivers | Hazard Drivers (e.g. global warming, tectonic plate instability etc.)
Pressure | Hazard
State | Damage
Impact | Impact on environment
Response | Resilience and sustainability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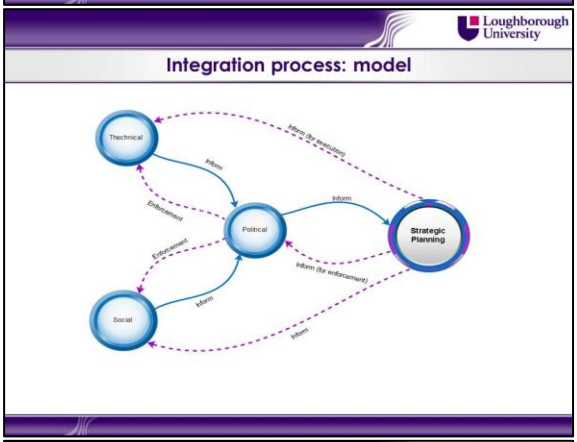
Integration process: HFA 2005-2015
HFA priorities
Guidelines
Observation
Assurance that disaster risk reduction (DRR) is a national and a local priority with a strong institutional basis for implementation.
Prioritisation to disaster risk reduction (DRR) [politically driven]
Identify, assess and monitor disaster risks and enhance early warning
Identification, assessment and monitoring of disaster risks [technically driven]
Use knowledge, innovation and education to build a culture of safety and resilience at all levels
Awareness, cooperation, training and learning [socially driven]
Reduce the underlying risk factors
Risk reduction and integration with sustainability principles [strategic planning driven]
Strengthen disaster preparedness for effective response at all levels
Preparedness, effective response and resources [technically driven]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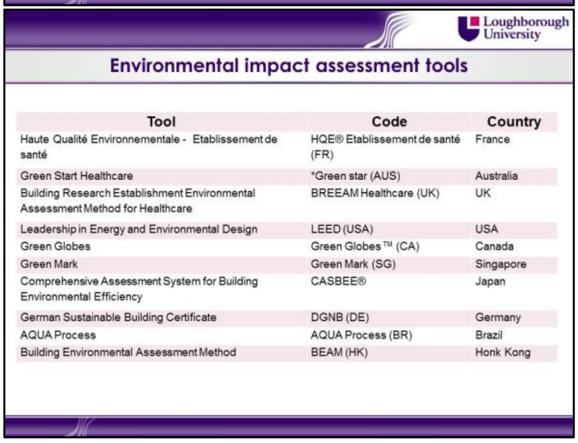
Integration process: model
Technical
Political
Strategic Planning
Social
Inform
Inform
Inform
Inform (for evaluation)
Inform (for enforcement)
Enforcement
Enforcement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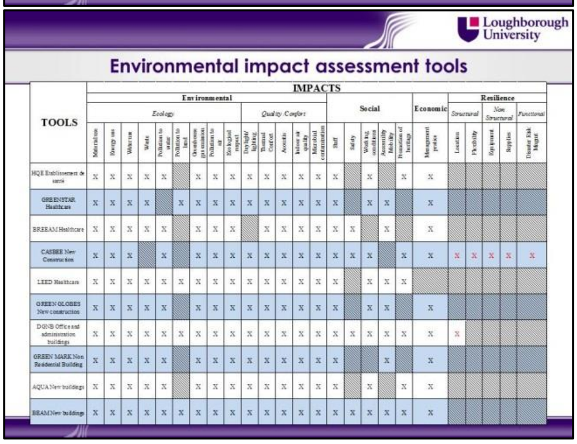
Environmental impact assessment tools
Tool | Code | Country
Haute Qualité Environnementale - Etablissement de santé | HQE® Etablissement de santé (FR) | France
Green Start Healthcare | *Green star (AUS) | Australia
Building Research Establishment Environmental Assessment Method for Healthcare | BREEAM Healthcare (UK) | UK
Leadership in Energy and Environmental Design | LEED (USA) | USA
Green Globes | Green Globes ™ (CA) | Canada
Green Mark | Green Mark (SG) | Singapore
Comprehensive Assessment System for Building Environmental Efficiency | CASBEE® | Japan
German Sustainable Building Certificate | DGNB (DE) | Germany
AQUA Process | AQUA Process (BR) | Brazil
Building Environmental Assessment Method | BEAM (HK) | Honk Kong


Loughborough University
Environmental impact assessment tools
TOOLS
IMPACTS
Environmental
Ecology
Quality Comfort
Social
Economic
Resilience
Structural
Non Structural
Functional
HQE Etablissement de santé
GREEN STAR Healthcare
BREEAM Healthcare
CASBEE New Construction
LEED Healthcare
GREEN GLOBES New construction
DGNB Office and administration buildings
GREEN MARK New Residential Building
AQUA New buildings
BEAM New buildings


Loughborough University
Conclusions
UK is one of many countries with significant achievement on environment preservation which needs to be developed further by integrating resilience;
The integration of resilience and environment preservation requires a comprehensive process that involves all components of society;
International organisations has recognised the need to integrate resilience and environment preservation;
Current EIA frameworks (e.g. DSPIR) allow the integration;
EIA tools provide the most appropriate way to turn the integration from theory into practice, i.e. full integration.


Loughborough University
Thank you for your kind attention
ご清聴ありがとうございました
Comments/Questions?

Activities and guidelines of the Japan Society of Material Cycles and Waste Management (JSMCWM) for disaster waste management after the Eastern Japan Disaster

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Abstract

Shortly after the massive March 11th earthquake and tsunami in eastern Japan, an academic Task Team for Disaster Waste Management and Reconstruction was established by members of the Japan Society of Material Cycles and Waste Management (JSMCWM). All the members voluntarily worked on conveying information from/to disaster area and gathering information into a guidelines entitled, Strategies for Separation and Treatment of Disaster Waste. As an original member of the task team, I will explain how situations the team faced were and how the team reacted to the disaster as well as the outline of the guidelines.

（和訳）

東日本大震災の災害廃棄物管理における廃棄物資源循環学会の活動とガイドライン

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*（独）国立環境研究所

**京都大学

3 月 11 日の東日本での大規模な地震と津波の直後、廃棄物資循環学会(JSMCWM)は災害廃棄物対策・復興タスクチームを発足した。全ての学会員は、自発的に、被災地からの、あるいは被災地への情報伝達と情報収集に取り組み、災害廃棄物分別・処理戦略と題するガイドラインを作成した。タスクチームのオリジナルメンバーとして、チームが直面した状況、災害へのチームの対応、ガイドラインの概要を説明する。

Activities and guidelines of the Japan Society of Material Cycles and Waste Management (JSMCWM) for disaster waste management after the Eastern Japan Disaster

Tomohiro Tasaki (National Institute for Environmental Studies, Japan)
Misuzu Asari (Kyoto University, Japan)

Introduction

The massive earthquake of magnitude (M) 9.0 was occurred in eastern Japan on March 11, 2011, approximately 130km away from the seashore. The Great East Japan Earthquake is the largest earthquake in Japan (the Second was M 8.2) and caused unprecedented huge Tsunami affecting the Tohoku area. Shortly after that, an academic Task Team for Disaster Waste Management and Reconstruction was established by members of the Japan Society of Material Cycles and Waste Management (JSMCWM). All the members voluntarily worked on conveying information from/to disaster area and gathering information into a guidelines entitled, *Strategies for Separation and Treatment of Disaster Waste*. As original members of the task team, the authors explain how situations the team faced were and how the team reacted to the disaster as well as the outline of the guidelines.

Preparedness for natural disasters in the field of waste management in Japan

Japan lies in an area where the earthquakes frequently happen. For instance, the Hanshin-Awaji Earthquake of M7.2 occurred in January 1995, and the Niigata-Chuetsu Earthquake of M6.8 in October 2004, and the Niigata-Chuetsu-Oki Earthquake of M6.8 in July 2007. Other types of natural disaster have occurred in happen as well in Japan. In 2004, many typhoons landed on Japan and caused the Niigata-Fukui flood. The natural disasters cause large amount of demolished waste and various disaster waste. In the case of the Hanshin-Awaji Earthquake, 25 municipalities were damaged, 6,429 people died, and 43,662 people injured. It was estimated that 15 million tons of waste were generated, 112,012 houses and buildings were fully destroyed, 144,502 was partly destroyed, and 7,493 were burnt by subsequent fire[1)].

Japan gradually prepared for these disasters experiencing these disasters one by one (For disaster waste management in the other countries, see a review article by Brown et al. (2011)[2)]). The Ministry of Environment (and the former ministries) had published two guidelines. One is Earthquake Waste Guideline of 1998[1)], and the other is Flood Waste Guidelines of 2005[3)]. However, these guidelines did not take waste caused by tsunami into account. Waste caused by tsunami generates from a wide area and its amount is huge. In addition, it is wet with salt water and contains lots of mud (The characteristics of different disaster waste are presented in Table 1). The characteristics pose a lot of difficulty for waste management. A new or revised guideline has been needed.

Table 1. Characteristics of disaster wasted caused by different types of disasters.

Type	Characteristics
Earthquake	Collapsed buildings, bridge, wall, etc. Some buildings and houses remain uncollapsed.
Flood	Widespread. Wet. With mud.
Tsunami	Widespread. Wet with salt water. With mud.
Hurricanes, etc.	Tear the roof off. Small items blown. Damages in line.
Conflict	Damaged by rockets, missles, and bombs. Often burnt. Landmines remain.

Note: Retrieved from the OCHA Disaster Waste Management guidelines[4] and modified by the authors.

Activities of the task team of JSMCWM

Between the March 11 earthquake and tsunami and March 14, there were many suggestions from researchers belonging to the Japan Society of Material Cycles and Waste Management (JSMCWM) to formulate a task team which tackles disaster waste. The Task Team on Disaster Waste Management and Reconstruction was established after discussions and preparations within the society on 18th of March. Active opinion and information exchange has been made through the website (http://eprc.kyoto-u.ac.jp/saigai/) and the mailing list. Not only researchers but also private engineers, citizens and local government officers, with a total of more than 150 have joined the task team (as of 31st March, 2012).

The objectives of the Task Team are as follows.

1) Formation of an information platform for disaster waste related information.
2) A wide social network for countermeasures of disaster waste
3) Derivation of basic knowledge for academic records of disaster waste and renewal of its countermeasure policies.

The activities of the team include 1) estimation of the amount of disaster waste, 2) field activity in the disaster area and fact (issue) finding, and 3) learning experiences of the management of disaster waste. The information on the amount of disaster waste is important and basis for planning disaster waste management. The first estimate[5] was publicized on March 31 and was 26 M ton as a result of the activity 1). As an activity of 2), members of the team enter the disaster two weeks after the disaster. Arrangement between a municipality in the disaster area a municipality trying to support disaster waste management as well as the team took time. In the early stage of the activity 3), the members of the team reviewed guidelines by other countries and international organizations such as UNOCHA guidelines[4] and .US guidelines[6, 7]. Main (re-)findings of important points in disaster management through the review were phased management, benefit of sorting and recycling, importance of local employment, and sound environmental monitoring and the utilization of temporary storage sites later.

The phased management was employed in the UNCHAO guidelines, which divides phases of disaster waste management into emergency phase, early recovery phase, and recovery phase. The Task Team divided the phases of management in a more concrete way as shown in Table 2.

Table 2 Phases of disaster waste management proposed by the Task Team

Disaster management (disaster area) phases		
Emergency Phase	Occurrence of disaster (prioritize lifesaving) *Transportation security is basically implemented in this phase.	10^2 hours (approximately 3 days ＝72 hours)
Early Recovery (Relief) Phase	Implement until recovery of victims and distribution of goods (lifeline recovery)	10^3 hours (approximately 1 month)
Recovery Phase	Implement until recovery of social stock (removal of evacuation shelter)	10^4 hours (approximately 1 year)
Reconstruction Phase	Implement until recovery of industry	10^5 hours (approximately 10 years)

Benefit of sorting and recycling is sometimes disregarded by practitioners in waste management such as local government officers. The reason would be that one of their duties is to remove waste as soon as possible. Putting the collection of waste in the first priority, they tend to mix and collect waste and to put and treat waste in a temporal collection site without separation. However, this often increases the cost of waste treatment without recovering salable materials and with increasing the amount of residues and sometimes generates difficult-to-disposed-of residue. Besides, this issue was reported from the Hanshin-Awaji Earthquake experiences as well.

These four (re-)findings were somehow reflected in a recommendation by CSTP (Council for Science and Technology Policy) on April 5, 2011[8)]. The CSTP recommendation on disaster waste included 1) emergent treatment/disposal (Sanitation, Separation of hazardous waste), 2) creation of temporal storage site taking account of water environment and separation of waste to some extent, 3) consider recycling for smart use of resources, and 4) local employment and regional collaboration. The UNOCHA guidelines were translated by a group in the Task Team into Japanese and the translated document was shared with the members of the task team on April 6, 2011 for dissemination of the above-mentioned (re-)findings.

A new manual on disaster wastes

One of the major tasks for the task team was to make a manual, *Strategy of separation and treatment of disaster waste*. Of the many reasons for making the manual, the two points below are the main ones.

- There was a need to gather and compile knowledge and wisdom to tackle the unprecedented volume and quality of tsunami waste.
- Sharing the good practices in a municipality would help other authorities that are behind in treating the waste.

The procedure of writing the manual was as follows. First, the contents of the manual were determined based on needs from disaster areas identified through discussion between members of the task

force and stakeholders and discussion through the mailing list among the members. Second, the team assigned a person responsible for each part of the manual. Third, the drafts written by them were discussed through the mailing-list, then edited so as to reflect these discussions, and compiled into one. All works were done voluntarily. The first version of the manual with 30 pages written was publicized on April 4, 2011. The second 100-page version which covered the whole process of waste management including treatment and final disposal was able to be publicized on April 30. Finally, the technical manual was published as a book (104 pages)[9)] in May, 2012. The manual was translated into English and completed in December 2012.

The manual put emphasis on 1) promotion of reuse and recycling, 2) appropriate, concrete treatment practices for hazardous waste, and 3) understandability (The manual includes photos to provide a visual image of good practices with regard to disaster waste management). The manual mainly target the following three kinds of waste: waste from evacuation shelters, earthquake waste, which is waste resulting from the earthquake, and tsunami waste, which is waste resulting from and affected by the tsunami. The content of the manual is as follows.

【Guide 0】Flow of measures and process
【Guide 1】Identification of category and sorting for disaster waste
【Guide 2】Estimation of quantity generated
【Guide 3】Phase of recovery or reconstruction and waste management
【Guide 4】Outline of the processes of separation and disposal of disaster waste
【Guide 5】Planning of separation and disposal strategy
【Guide 6-1】Removal of collapsed houses etc. (Government guidelines)
【Guide 6-2】Selection and operation of temporary storage sites
【Guide 6-3】Selection and operation of storage sites (Primary and secondary waste storage sites)
【Guide 7-1】Examples of types of waste: Waste management in evacuation shelters
【Guide 7-2】Examples of separation ~ garbage from emergency accommodation facilities, household disaster waste, tsunami-soaked waste, at early recovery phase
【Guide 7-3】Examples of separation ~ tsunami debris and earthquake rubble at initial recovery phase
【Guide 7-4】Removal and separation of waste from collapsed buildings
【Guide 7-5】Countermeasure against airborne dust using dust masks
【Guide 8-1】Mixed wastes containing combustibles
【Guide 8-2】Desalination of wood waste soaked in seawater
【Guide 8-3】Wood waste (reuse, recycle)
【Guide 8-4】Tsunami sediment
【Guide 8-5】Marine industrial waste
【Guide 8-6】Cement concrete, asphalt concrete
【Guide 8-7】Tires
【Guide 8-8】Specified Electrical Home Appliances under the Recycling Law
【Guide 8-9】Other WEEE (Waste Electrical and Electronic Equipment)

【Guide 8-10】Automobiles
【Guide 8-11】Motorcycles
【Guide 8-12】Boats and ships
【Guide 8-13】Asbestos
【Guide 8-14】Hazardous/dangerous articles
【Guide 8-15】Personal valuables

Regarding 1) promotion of reuse and recycling, the Task Team provided the outline of the processes for separation and disposal of disaster waste as shown in Fig.1. Temporary waste storage site here refers to a place where disaster waste is temporarily stored in disaster areas to secure space/ living environment, and to enable smooth reconstruction. The site is usually set up close by houses. Then or directly disaster waste is carried to primary waste storage site, where waste is kept/sorted for a certain period of time before disposal (including reuse/recycling). In case that waste is not sufficiently separated if space for separation of waste at the primary storage site is insufficient, a secondary waste storage site is used. Disaster waste carried into these waste storage site, are separated and reused/recycled/treated/disposed of according to types of waste. As the content of the manual shows, the manual provided detailed information to deal with a variety of disaster waste.

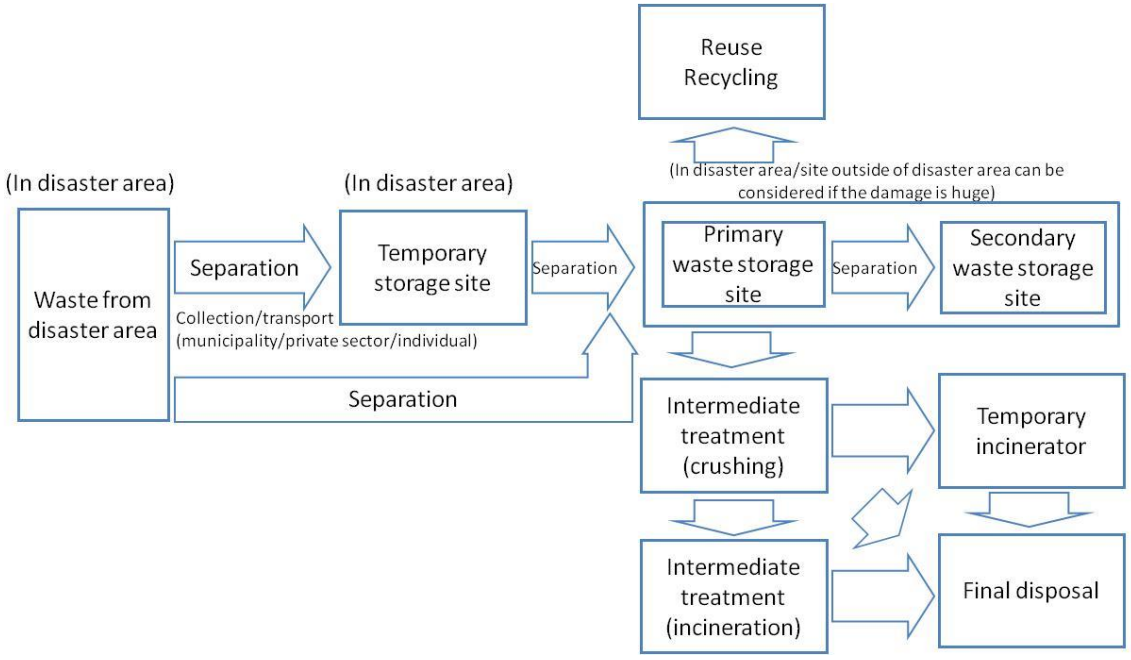

Fig. 1. Outline of the processes for separation and disposal of disaster waste, put forwarded by the Task Team.

Future tasks

Disaster waste management in Japan has progressed for the last two years although it is still an on-going activity (Especially, about waste contaminated with radioactive substances). New experiences

about disaster waste management after the Japan East Disaster have been accumulated. The experiences and knowledge as well as the manual should be fully utilized in the future. Dissemination of these insights would be important and well preparedness should be understood by all stakeholders of disaster waste management on a daily basis.

References

1) Ministry of Health and Welfare (MoHW, the former ministry in charge of waste management) (1998) Earthquake Waste Guidelines (in Japanese).
2) Brown, C., Milke, M., Seville, E. (2011) Disaster waste management: A review article, Waste Management, 31, pp. 1085-1098.
3) Ministry of Environment (2005) Flood Waste Guidelines (in Japanese).
4) United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) (2011) Disaster Waste Management Guidelines. (http://ochanet.unocha.org/p/Documents/DWMG.pdf)
5) Hirayama, S. (2011) Estimation of the amount of tsunami waste generated by 0311 Tohoku Region Pacific Ocean Offing Earthquake (in Japanese) (http://eprc.kyoto-u.ac.jp/saigai/report/files/20110331Estimate.pdf)
6) US FEMA (2007) Public Assistance−Debris management guide. (http://www.fema.gov/government/grant/pa/demagde.shtm)
7) US EPA (2008) Planning for Natural Disaster Debris. (http://www.epa.gov/osw/conserve/rrr/imr/cdm/pubs/pndd.pdf)
8) Great East Japan Earthquake Task Force of Science Council of Japan (2011) Urgent proposal related to measures for earthquake disaster waste and prevention of environmental impact, April 5, 2011. (http://www.scj.go.jp/ja/info/jishin/pdf/t-110405-2.pdf)
9) Japan Society of Material Cycles and Waste Management (2012) The technical manual: Separation and treatment of disaster waste. (in Japanese), Gyosei.

Activities and guidelines of the Japan Society of Material Cycles and Waste Management (JSMCWM) for disaster waste management after the Eastern Japan Disaster

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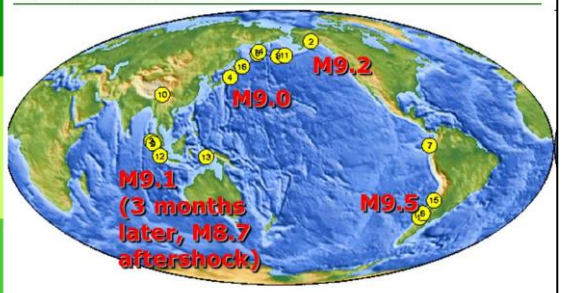
National Institute for Environmental Studies

Asari Misuzu
Kyoto University

11 March 2011

- 14:46 the Great East Japan Earthquake
  - M 9.0 (depth 24km) [2nd M 8.2; World 4th, 1900-]
  - 130km away from the seashore
- 16:00 Tsunami

Largest Earthquakes in the World Since 1900



Source: USGS (http://earthquake.usgs.gov/earthquakes/world/10_largest_world.php) 3

Establishment of the JSMCWM task team

- By 14 March, many suggestions from researchers of JSMCWM to deal with disaster waste.
- 18 March, the Task Team on Disaster Waste Management and Reconstruction was established.
  - More than 150 members, including not only researchers but also private engineers, citizens and personnel related to local authorities.
- Opinions and information have been exchanged actively through a website and a mailing list.
  - http://eprc.kyoto-u.ac.jp/saigai/

Source:

The objectives of establishing the task team

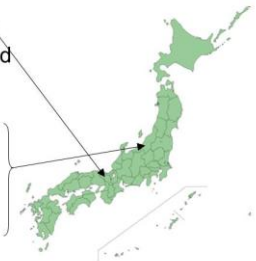
1. Establishment of a platform for information about disaster waste.
2. Networking of different stakeholders for better management against disaster waste
3. Documentation and dissemination of experiences and knowledge obtained through activities in disaster area (Revision of the Japanese guidelines).

One of the major tasks was to make the manual "Strategy of separation and treatment of disaster waste" which is taken into account ….

Source:

Recent disaster in Japan

- 1995.1 Hanshin-Awaji Earthquake (M7.2)
- 2004 Typhoons: 10 landed (2.6 on average)
  - Niigata-Fukui flood
- 2004.10 Niigata-Chuetsu Earthquake (M6.8)
- 2007.7 Niigata-Chuetsu-Oki Earthquake (M6.8)



Source: Data from MoE (1998) Earthquake Waste Guidelines 7

1995 Hanshin-Awaji Earthquake

- M7.2
- 25 municipalities damaged
- 6,429 deaths; 43,662 injured
  - Full destruction 112,012 (190,574 households)
  - Part destruction 144,502 (276,472 households)
  - Burnt buildings 7,493 (9,378 households)
- Waste generated: 15M tons

Source: Data from MoE (1998) Earthquake Waste Guidelines 8

Preparation for disaster waste in Japan

- 1998 Earthquake Waste Guidelines (ex-MoE)
- 2005 Flood Waste Guidelines (MoE)

Source: 9

Earthquake simulation car

Source: 10

Characteristics of disaster wastes

Type	Characteristics
Earthquake	Collapsed buildings, bridge, wall, etc. Some buildings and houses remain uncollapsed.
Flood	Widespread. Wet. With mud.
Tsunami	Widespread. Wet with salt water. With mud.
Hurricanes, etc.	Tear the roof off. Small items blown. Damages in line.
Conflict	Damaged by rockets, missles, and bombs. Often burnt. Landmines remain.

Source: Tasaki (2011) based on UNEP/OCHA, Disaster Waste Management guidelines 11

Sea water covered by Tsunami (Sendai city

Onagawa City
(Goo, Picture gallery, Accessed 2011.4.10)

Source: Geographical Survey Institute HP (Accessed 2011.4.12) 12

2011.3.15 MoE Policy (draft)

- Excreta and waste from shelters, etc.
- Prompt removal and treatment of debris
- Monitoring of environment
- Caring pets
- Creation of a head office in the area

Source: MoE (Ministry of Environment) (http://www.env.go.jp/jishin/kihon-hoshin.pdf); Translated by Tasaki (2011) 13

Activities of the task team at the early stage

1. Estimation of the amount of disaster waste.
   - Basis to plan disaster waste management
     - First estimate: 26 M ton (http://eprc.kyoto-u.ac.jp/saigai/report/files/20110331Estimate.pdf)
2. Field activity and fact (issue) finding
   - Took 2 weeks (26 March) to enter the disaster area
3. Learn experiences
   - Guidelines by other countries and international organizations

Source:

Existing guidelines for disaster waste

- In Japan…2 Guidelines
- In other countries…US FEMA, EPA and some states in USA etc.
- In the World…
  - United Nations Office for the Coordination of Humanitarian Affairs Environmental Emergencies Section Disaster Waste Management Guidelines (UNOCHA guidelines, 2012)
  - The WHO Technical Notes on Drinking water, Sanitation and Hygiene in Emergencies etc.

No information about TSUNAMI wastes or detailed management techniques

Source: Asari (2012)

(Re-)Finding of disaster waste management

- Phased management
  - UNOCHA report clearly states.
- Benefit of sorting and recycling
  - Reports as well as experiences from the Hanshin-Awaji Earthquake
- Importance of local employment
  - Experiences from developing countries
- Sound environmental monitoring and the utilization of temporary storage sites later

2011.4.6 Translated UNOHCA report (Japanese) was shared with the members of the task team.

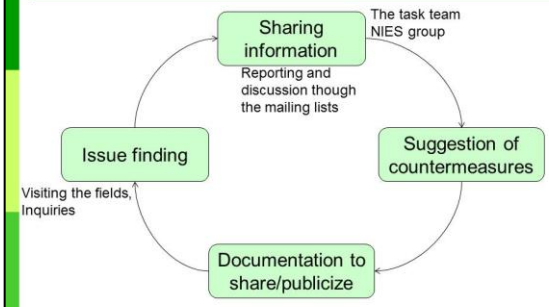
Source:

2011.4.5 CSTP recommendation on disaster waste

- Emergent treatment/disposal (Sanitation, Separation of harzardous waste)
- Creation of temporal storage site taking account of water environment and separation of waste to some extent
- Consider recycling for smart use of resources
- Local employment and regional collaboration

Source: CSTP (Council for Science and Technology Policy) (2011.4.5) Translated by Tasaki (2011) 17

Field activities and documentation



Source: 18

The procedure of writing the manual

- 1st: the contents of the manual
  - based on identified needs from disaster areas obtained through discussion between members of the task force and stakeholders in the field of the disaster and discussion through the mailing-list
- 2nd: Assignment of writers
- 3rd: Scrutinization
  - The drafts were discussed through the mailing-list, then edited, and compiled into one.
  - Voluntary-base

Source:

Dissemination of the manual

- 1st version (30 pages) on 4 April 2011
- 2nd version (100 pages) on 30 April 2011
- A book published in May 2012.

Source:

Contents of JSMCWS manual, ver.2

【Outline】
【Guide 0】Flow of measures and process
【Guide 1】Identification of category and sorting for disaster waste
【Guide 2】Estimation of quantity generated
【Guide 3】Phase of recovery or reconstruction and waste management
【Guide 4】Flow for disaster waste separation and disposal
【Guide 5】Planning of separation and disposal strategy

【Guide 6】 Selection and operation

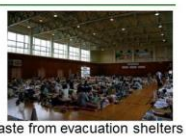
【Guide 7】 Examples of separation

【Guide 8】 Recycling or disposal methods for each item

Outline of JSMCWS manual (1)

3 main targeted kinds of waste

- Waste from evacuation shelters
- Earthquake waste
- Tsunami waste


Waste from evacuation shelters

Earthquake waste

Tsunami waste

Source:

Outline of JSMCWS manual (2)

Emphasis put on…

- Promotion of reuse and recycling.
  - The manual suggests ways of separation and options for reuse and recycling.
- Appropriate, concrete treatment practices for hazardous waste
  - The manual outlines the most practical hazardous and toxic waste countermeasures.
- Understandability
  - The manual includes photos to provide a visual image of good practices with regard to disaster waste management.

Source:

1. Waste from evacuation shelters

24

Sanitary issue about excreta

- Among 272 evacuation camps in three area (Ishino-maki, Higashi-matushima, Onagaw)
  - Sanitation states worse (107 have issues)
    - Overflow of waste water
    - No temporary toilets,
    - Do business onto newspapers and into bags
    - Put them into buckets or holes in the ground
  - No. of the infected increasing
  - 50 diarrhea, 20 vomit

Source: Sankei newspaper 2011.3.31 (http://sankei.jp.msn.com/affairs/news/110331/dst11033108250009-n1.htm) 25

Treatment of excreta and the states

- Flushing toilets
- Lack of water supply
- Pipes; broken
- Human waste treatment facilities; damaged
  - 16/336 halted (MoE, 2011.4.9)

Source: Data from Ministry of Environment (2011.4.12) (http://www.env.go.jp/jishin/index.html) 26

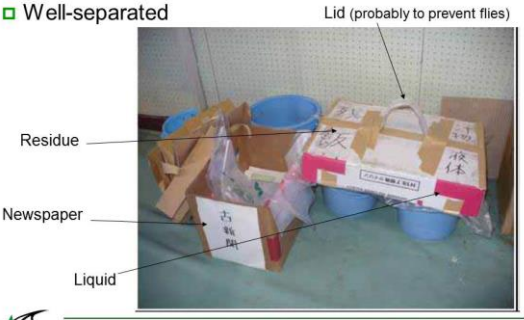
Waste water treatment and the states

- Among 147 in Iwate, Miyagi and Fukushima (MLIT, 2011.4.1),
  - 47 damaged, 21 halted
  - 2-3 years require to recover
- Why this happened?
- Facilities: lower places in altitude
  -> resulted in relatively severe damage by tsunami

Source: Ministry of Land, Infrastructure and Transportation (2011.4.1) (http://www.mlit.go.jp/saigai/saigai_110311.html) and news (http://water-news.info/1401.html) 27

Garbage boxes at a refugee camp

- Well-separated



Source: JSMCWM task team 28

Incinerators after the disaster

- 75-80% of MSW treatment
- 25/576 halted (MoE, 2011.4.9)

Reasons (including other past experiences)

- Damaged furnace
- Leakage of cooling water
- Lack of electricity (e.g. Pumps, EP)
- Lack of chemicals (e.g. Ca(OH)2)
- Blockade of access roads (e.g. bridge)

Source: Data from Ministry of Environment (2011.4.12) (http://www.env.go.jp/jishin/index.html) 29

2. Earthquake waste

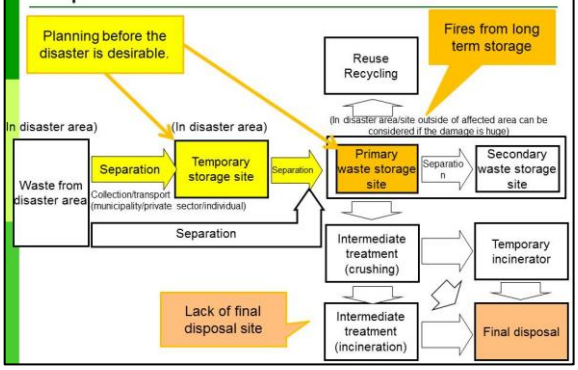
30

Difficulties of dealing with debris

- Huge amount
- Planned storage and treatment

Source: 31

Flow for disaster waste separation and disposal



Collection and separation for recycling



Wait their turn and report items

Sorted storage (e.g. WEEE)


Metals



Mixed waste (to separation)

Wood, tires, combustible waste, dishes, concrete, etc.

In Sendai city (2011)

Source: JSMCWM task team

Examples of recycling

- Wood waste


- Concrete and asphalt


- WEEE


- ELVs


Source: JSMCWM task team

Tatami mat (Japanese grass carpet)

- Get wet
  -> smell


Source: JSMCWM task team 35

3. Tsunami waste

36

Tsunami-sediments in Iwanuma city
(Sand, approx. 50cm thick)


Source: JSMCWM task team 37

Collection site of Tsunami-sediments (Higashi-matsushima city)


Source: JSMCWM task team 38

Issues about Tsunami-sediment

- Huge amount
- Sanitary issues
  - Contains sea organics -> decay -> Smell
  - Dried up -> flying dusts

  Quick removal is required
- Possible contamination by toxics

Source: Documents of the Shinsai Taiou Network, translated by Tasaki (2011) 39

Temporal treatment for tsunami-sediment

- Alkalize (disinfection): Ca(OH)2
- Smell reduction: zeolite, wood chips, shreded paper
- Aggregation (solidify): Adding gypsum, cement, steel slag, or coal ash; hydration

Source: Documents of the Shinsai Taiou Network, translated by Tasaki (2011) 40

4. Others

41

Hazardous wastes

- Asbestos
- Hazardous/dangerous articles
- WEEE
- Automobiles
- Motorcycles
- Boats and ships
- Marine industrial waste
- Tires
- Tsunami sediment
- Combustible mixed waste (Incineration)

Safety for volunteers

In Japan, a volunteer died from inhaling dust and molds (Chuetsu Earthquake).

Source:

Fish and seafood

- 60,000 tons of rotten seafood
  - Due to blackout
- 170 storages and process factories in Miyagi
- Miyagi prefecture asked for disposal into sea

Source: Asahi newspaper 2011.4.2 (http://www.asahi.com/national/update/0401/TKY201104010520.html)

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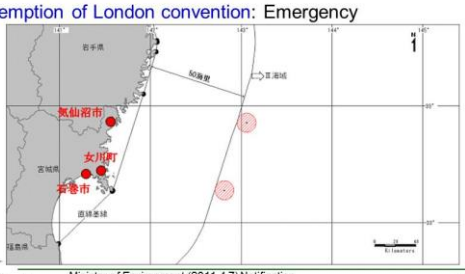
Site to dump into sea

- MoE admitted dumping into sea 92.6 km away from seashore: 35,000 tons
- Exemption of London convention: Emergency



Source: Ministry of Environment (2011.4.7) Notification (http://www.env.go.jp/jishin/attach/an23_44a.pdf)

44

Personal valuables

Governmental staff of Sendai city collected personal valuables. Volunteers removed dirt from them and posted at the entrance of a cultural center for finding. (April 2011, Sendai city)

Source: JSMCWM task team

Summary

- JSMCWM actively has contributed to disaster waste management.
  - Sharing information (Issues identified and potential remedies)
  - Networking different stakeholders and streamlining dialogues between researchers and practitioners
  - Documentation of experiences as a manual
- Disaster waste management requires preparation on a routine basis and increased capacity of relevant stakeholders to deal with.
- This manual is being translated into English.
  - For regions affected by a large earthquake and tsunami in the future.

Source:

3. 3 Youth Session

Tiering system on the amended EIA regulation of Yokohama city

Takuya Sugimoto
Lecturer, Chiba University of Commerce

Abstract

In Yokohama city, EIA system was introduced in 1980, developed a regulation in 1998, and amended in 2010. SEA-type system, which was named project-consultation system, was introduced as internal system of the local government in 1995. The SEA-type system was abolished and integrated in EIA system when EIA regulation was revised. New EIA system inherited some know-how from former system. This presentation is included in results of interview with the administrative officer involved with EIA division about tiering system to conduct reasonable environmental consideration in early step of project planning..

（和訳）

横浜市における改正環境影響評価条例によるティアリング

杉本卓也
千葉商科大学

横浜市では、1980 年に EIA 制度が導入、1998 年に規制が策定され、2010 年に改正された。1995 年、事業調整制度と呼ばれる SEA 型制度が地方政府の内部制度として導入された。SEA 型制度は廃止され、EIA 規制改正時に EIA 制度へと統合された。 新しい EIA 制度は、旧制度の一部のノウハウを継承した。本プレゼンテーションは、プロジェクト計画立案の初期段階に合理的な環境配慮を行うためのティアリング制度についての、EIA 部署に関与する行政官とのインタビュー結果に含まれている。

Tiering system on the amended EIA regulation of Yokohama city

Takuya Sugimoto

Lecturer, Chiba University of Commerce

1. Introduction

In Yokohama city, EIA system was introduced in 1980. SEA-type system, which was named project-consultation system, was introduced as internal system of the local government in 1995. The SEA-type system was abolished and integrated in EIA system when EIA regulation was revised. New EIA system inherited some know-how from former system. This presentation is included in results of interview with the administrative officer involved with EIA division about tiering system to conduct reasonable environmental consideration in early step of project planning. About disaster management, I interviewed EIA officer in Yokohama, I report on EIA officer's understanding of operation of EIA

2. Timeline of EIA in Yokohama

EIA was established as a guideline in 1980. In 1998, EIA regulation was established. EIA regulation was amended in 2010. The new regulation was implemented in 2011. About SEA, project consultation system as SEA-type system was introduced in 1994. On amendment, project consultation system and EIA were unified. And new regulation includes EIA and SEA. A total of more than 60 practices has been conducted EIA since 1980. But there is no case of SEA after amendment of new EIA regulation.

3. Project consultation system (former and SEA-type system in Yokohama)

Yokohama's New EIA regulation takes over from former system, which was called project consultation system. The characteristics of former system were as follows.

The system was internal system of local government. Actors are local government officers who belong to EIA sector and sectors of some project.

Environmental sector has an initiative in this system. Especially, EIA unit selected environmental consideration items. These were 3 types of items which are items on planning, items about environmental impacts and items on consultation work (see slide no.6 and 7). EIA unit chose items by each project when they considered environmental Impact from the project.

About timing of consultation, the commencement of deliberation is for route selection or rebuilding in road project, for example. The system targeted 10 kinds of projects (see slide no.4).

Consultation between EIA unit and project sector was managed in written form. Project sector requests for commencement of consultation. After that, EIA unit chose environmental consideration items. Project sector considered the items, and responded (see slide no.8). If the project would be applied EIA regulation, the response would be included in EIA documents. But, the response is not concrete and only to be written that on construction work, project sector were concerned to prevent air pollution. And on EIA, advisory committee has not consulted about the responses

4. New EIA regulation in Yokohama

By amendment of EIA regulation, the former system was disused. And SEA was introduced. The timing is on planning of location and size of the facilities. Other points are publication of EIA documents on the internet and relaxation of project scale requirement on screening

Items on construction work used in former system is disused in amended regulation in SEA. These items are considered on EIA. About items on planning and about environmental impact, these are also used in former system; these are continuously used in SEA system. Items' list was newly made out. The items are called as items on planning and about environmental impact. Unlike former system, project sector has an initiative on choosing the items from the list in SEA

The newly SEA/EIA process on Yokohama city is shown in slide 11 to 13. In consequence of amendment, advisory committee comments on SEA document. The committee gives comments about not only environmental impact but also project planning. (This is obtained through an interview to EIA unit). On EIA documents, Actions based on SEA documents are mentioned in EIA documents. The committee checks the substance

5. Disaster management in conducting SEA/EIA

EIA officers' understanding is as follows. On prescription of EIA regulation, Disaster prevention and reduction are not covered in EIA regulation. But on officers' experiences on implementation of EIA system, experts of the advisory committee have given some opinions about disaster risk. Disaster risk is taken seriously in society after the Great East Japan Earthquake. The officer takes cognizance of necessity of comprehensive checks which are not only SEA/EIA but also building certification or building code regulation.

Tiering system on the amended EIA regulation of Yokohama city

Takuya Sugimoto
Chiba University of Commerce
Faculty of Policy Information

Contents

- Timeline of EIA of Yokohama city
- Project consultation system (former system)
- Point of amendment of the regulation
- Newly process of EIA by amendment
- Disaster management in SEA/EIA (from an interview with officer of EIA)
- Wrap up

Timeline of Yokohama - EIA

- 1980 EIA Guideline
- 1994 Project Consultation System as a SEA-type system
- 1998 EIA regulation
- 2010.12 amendment of the regulation
- 2011.8 effectuation of new regulation

✓ total number of EIA practice
- more than 60

✓ There is no SEA practice of on new regulation

Project consultation system (since 1994)

- System of internal consultation for government
  - internal rule
    - not to be a regulation of local government
  - public involvement
    - is not provided in the rule
  - target of the system
    - 10 kinds of projects
      e.g.) roads, railroads, research institutes, waste treatment facilities, high-rise buildings etc.

Project consultation system (since 1994)

- Sector for Environment policy has a initiative role in the system
  - jurisdiction of the system
    - unit of EIA
  - environmental items
    - are selected by unit of EIA
    - items' list for each kind of project
- Timing of implementation
  e.g.) transport plan
  deliberation of commencement for route selection or rebuilding

Environmental Consideration items

- Items on planning drafts (a case of road project)
- 7 items ;on selection of route and construction
  - to mitigate impacts around the area
  - to choice subsurface structure as possible
  - to catch the current state of environmental resources and meteorological phenomenon
  - to set up zones of environmental facility
  - to avoid disjunction of green space and nesting site of precious animals and plants
  - to mitigate the area of land changing
  - to avoid disjunction of locality and disappearing cultural properties
- 1 item ; promoting of saving resource and energy

Environmental Consideration items

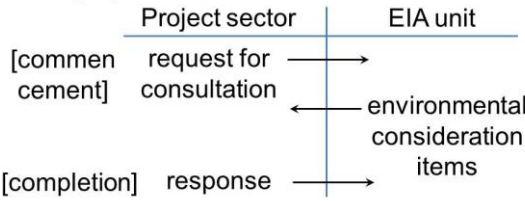
- items about environmental impact
- items on construction work

[items list]
Air, Water quality, Soil, Noise, Vibration and low frequency, Subsidence, Smell, Interference of air and sunshine, Waste product, Pollution, Hydrology, Animals and plants, Community, Landscape, Cultural property ,Saving resource and energy, Heat island, Grobal warming

EIA unit choses items by each project by consideration of environmental Impact

Framework of Project consultation system

- consultation in writing between EIA unit and project sector



- If the project would be applied EIA regulation, the response would be included in EIA documents.

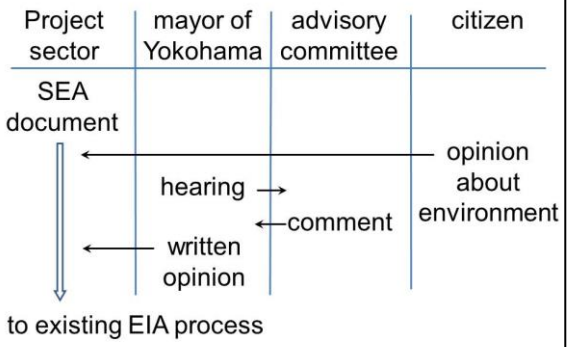
Point of amendment of the regulation

- introduction of assessment on planning of location and size of the facilities
  - disuse of the former system (project consultation system)
  - unification the system for EIA regulation
- publication of EIA documents on the internet
- relaxation of project scale requirement on screening
  - high – rise building

items on SEA (after the amendment)

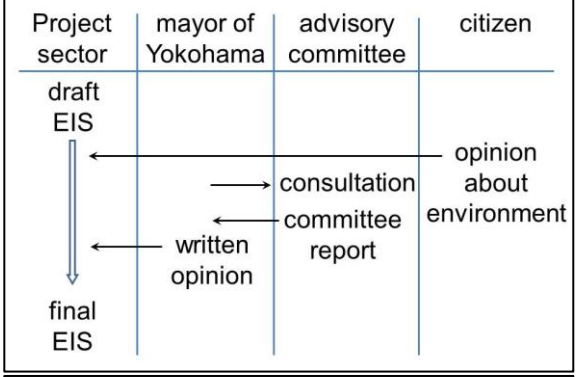
- disuse of items on construction work
  - to be considered on EIA
- continuing using of items on planning drafts and about environmental impact
  - items' list was made out
  - Project sector has a initiative on choosing the items

Newly process of EIA by amendment



EIA process of Yokohama city

EIA process of Yokohama city



Consultation on SEA

- convening the advisory committee after publishing a SEA document
  - The committee gives comments about not only environmental impact but also project planning
- description on EIA documents
  - Actions based on SEA documents are included in EIA documents
  - The committee checks the substance

Disaster management in SEA/EIA

- prescription of EIA regulation
  - Disaster prevention and reduction are not covered in EIA regulation
  - On operation of EIA system, experts of the advisory committee give some opinions about disaster risk
- understanding of officer on EIA unit
  - After the Great East Japan Earthquake, disaster risk is taken seriously
  - Comprehensive checks are required not only SEA/EIA but also building certification, building code regulation and so on

Wrap up

- Amendment of EIA regulation, tiering system is developed compared with former system
- On operation of the system, the advisory committee would not reply to consultation of environmental impact but comment to the proposed plan on SEA document
- About disaster management, disaster prevention and reduction are not covered in EIA regulation
- Officers of EIA cognize the necessity of cross-sectional approach

Consideration of Flood Risk in UK SEA and SA

Samuel Hayes

PhD Candidate, University of Manchester, School of Environment and Development

Abstract

Reflections are presented on the consideration of flood risk in Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) from four case studies of assessment in UK spatial planning. Data highlight several areas of assessment practice as potentially influential on the consideration of flood risk in strategic level assessment. Discussion is of key themes identified through document analysis of environmental reports and semi-structured interviews with those involved in each assessment case study. Examples from case studies are given to highlight how each of these themes can influence how flood risk is dealt with in SA and SEA. Themes include; how flood risk is included in assessment frameworks, the use of flood risk data, consultation on flooding, potentially conflicting objectives, how flood risk is included in plan policies, and commitment to plan policies.

（和訳）

英国 SEA と SA による洪水リスクの考慮

サミュエル・ヘイズ

マンチェスター大学

英国空間計画における 4 件のアセスメントから、持続可能性評価(SA)と戦略的環境アセスメント(SEA)における洪水危険の検討についての感想が提出される。データは、戦略的レベルのアセスメントにおける洪水危険の検討に影響を及ぼす可能性がある、複数のアセスメント業務分野を浮き彫りにしている。環境報告書の文書分析と各アセスメント事例の関係者への半構造化インタビューから特定された主要テーマが、議論される。SA と SEA における洪水危険の取り扱い方法にこれらのテーマがいかにして影響を及ぼし得るのかを浮き彫りにするために、事例研究からの実例が示される。テーマは、洪水危険がどのようにアセスメントの枠組みに含まれているか、洪水危険データの使用、洪水についての諮問、相反する可能性がある目的、洪水危険がどのように計画ポリシーに含まれているか、計画ポリシーへのコミットメント、である。

DRAFT PAPER - Environmental Assessment and disaster events:
JSPS/ESRC 'collaborative seminar' programme supported event;
30 November – 2 December 2012

Consideration of Flood Risk in UK SEA and SA Practice

Sam Hayes
PhD Candidate – University of Manchester, School of Environment and Development

Abstract

Reflections are presented on the consideration of flood risk in Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) from four case studies of assessment in UK spatial planning. Data highlight several areas of assessment practice as potentially influential on the consideration of flood risk in strategic level assessment. Discussion is of key themes identified through document analysis of environmental reports and semi-structured interviews with those involved in each assessment case study. Examples from case studies are given to highlight how each of these themes can influence how flood risk is dealt with in SA and SEA. Themes include; how flood risk is included in assessment frameworks, potential conflicts, the inclusion of flood risk in plan policies, and commitment to plan policies for flood risk.

Introduction

Given the many years of development and numerous influences, strategic level assessment can take many forms and its purpose has been framed in many ways. Early conceptions commonly framed the process as Environmental Impact Assessment applied to policies, plans and programmes (PPP), however, literature gradually began to reflect a distinction between EIA applied to projects and assessment at higher tiers of decision making (Fischer, 2007). In this paper, discussion is of Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) in England and Scotland respectively. Specifically considering how strategic level assessment considers and contributes to discussion of flood risk.

Considering the existence of multiple forms of assessment it is useful to start by considering definition. Thérivel et al. (1992, p. 19-20) define SEA as;

> the formalised, systematic and comprehensive process of evaluating the environmental impacts of a policy, plan or programme and its alternatives, including the preparation of a written report of the findings of that evaluation.

This definition, along with others (Sadler and Verheem, 1996, p. 27), suggests possible common characteristics of SEA, framing SEA as a process involving distinctive stages, identify PPP as the focus and highlight that SEA should consider environmental consequences or impacts.

SA, like SEA, can take several forms and has been defined in various manners (Pope et al., 2004). Gibson

(2006) highlights that the concept of sustainability is essentially about integration and affirms that SA should reflect this. Smith and Sheate (2001) argued that SA can be seen as a shift towards integrated assessment and decision making as consideration is given to social, economic and environmental implications.

However, it is useful not only to consider definitions of SEA and SA, but also on the substantive purpose of assessment (Brown and Therivel, 2000). Bina (2007) highlights that decades of research has moved between focusing on the theory of SEA and its practical application, gaining a full understanding of neither and argues that since the emergence of EIA in the 1960s experience from practitioners and researchers has failed to achieve consensus on strategic assessment's basic foundation.

Fischer (2007) proposed that the raison d'être for SEA comes from shortcomings in PPP formulation processes. More specifically, multiple purposes or roles for SEA have been suggested, including; stronger environmental representation (Morrison-Saunders and Fischer, 2006), promotion of sustainable development (Bond and Morrison-Saunders, 2009; Glasson et al., 2005; Fischer, 2007), support of good governance, more effective reasoning in PPP formulation and the need for more effective decision making (Fischer, 2007). Devuyst (2001) specifically described the purpose of SA as to aid decision and policy makers when deciding on actions aimed at making society more sustainable. This is echoed by Hacking and Guthrie (2008) who frame SA simply as a process to direct decisions towards sustainability.

It is recognised in the literature that strategic level assessment (both SEA and SA) has a close relationship with the plan it appraises (Therivel, 2004) and it can be seen from the purposes listed above that it is expected to have some degree of influence over the plan. Understanding the relationship between assessment and the plan it appraises is therefore also crucial to understand more about the influence of assessment. Specifically, as noted by Kørnøv and Thissen, (2000), consideration should be given to whether strategic level assessment is influential by providing information or by acting as an advocate for a particular environmental or sustainability position. Assessment as an information provision tool does not represent a problem per se, however, if assessment is to be applied as an decision supporting tool it has been argued that a neutral base is required (Kørnøv and Thissen, 2000; Elling, 2008).

The primary difference between each form of assessment is the inclusion of a wider breadth of topics within SA. Arguably the most fundamental critique of SA are concerns raised regarding the marginalisation of environmental considerations through the inclusion of social and economic factors and the possible curtailment of the benefits achievable from a more environment focused form of SEA (Morrison-Saunders and Fischer, 2006; Sheate, 2003; Smith and Sheate, 2001; Sheate et al., 2004; Sheate et al., 2003; Carter et al., 2003; Scrase and Sheate, 2002). Morrison-Saunders and Fischer (2006) also identified poorly defined objectives for testing sustainability as problematic, particularly highlighting that often only economic objectives are sufficiently defined to be useful and environmental objectives are often open to considerable

interpretation.

Relationship to flood risk

Flooding has been recognised as Europe's most common natural hazard (Wilby et al., 2008) and in the UK specifically, flooding is found to be one of the most damaging and costly natural hazards (Brown and Damery, 2002). It is also recognised that traditionally in the UK flood defence has taken the form of hard engineered defences (ibid).

Following on from the Pitt Review[5] and published in 2008, the *National Flood and Coastal Erosion Risk Management Strategy for England* provides guidance for the management of flood risk in England. The strategy notes the importance of flooding for many unique landscapes and for wildlife in the England, and the need for flood risk management to be sustainable. It also highlights the need to move away from traditional engineering interventions to cope with flood risk sustainably.

> More sustainable approaches to [flood and coastal erosion management] generally work with natural processes and include managed re-alignment and upland grip blocking […]. These are often more resilient to extreme events and provide better value for money over the long-term than more traditional approaches based on structural or engineered interventions.
>
> *(Defra and Environment Agency, 2011, p. 15)*

In Scotland the guidance document, *Delivering Sustainable Flood Risk Management*, also highlights that the National approach to flood risk has moved on from a focus on engineering solutions and notes that future management will require a more nuanced and sustainable approach.

> To deal with current and future flood risk, we need to improve our understanding of flood risk and deploy more sustainable approaches to tackling these risks. This will mean managing whole flooding systems, be they catchments or coastlines, in a way that takes account of all interventions that can affect flood risk.
>
> *(The Scottish Government, 2011, p. 5)*

Research into the flood risk management in the England has highlighted the potential contribution and use of strategic level assessment in delivering flood risk management goals through fostering integration with spatial planning (Carter et al., 2009). It was found that particular elements of the SA process acted as potential barriers, limiting the consideration of flood risk within SA. Specifically highlighted as influential were; the prominence of flood risk within SA objectives, the integration of plan preparation and SA stages, difficulty predicting flood impacts at a strategic level and the possible marginalisation of flood risk impacts during the SA process (Carter et al., 2009). Related to problems highlighted here regarding the prominence of flood risk within SA objectives, as already highlighted, SA literature has highlighted that poorly defined

[5] The Pitt Review reported on the flooding which occurred during June and July 2007 in England and Wales, their impacts on people, property and critical infrastructure, and the implications for flood risk management.

objectives may also limit their influence (Morrison-Saunders and Fischer, 2006).

UK Strategic Level Assessment Context

The primary legislation driving strategic level assessment at the European level is Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive). Introduced in 2001 it formalised requirements for the application of strategic level EA to for all European Union member states. However, the principle of subsidiarity has led to variation across the EU as member states and further variation arises in the UK as powers in this respect are devolved to the four administrations of the UK (Jackson and Illsley, 2007).

In England, the legislative regime creates the requirement for Core Strategies[6] to be subject to SA. *The Environmental Assessment of Plans and Programmes Regulations 2004* transpose the requirements of the SEA Directive into English planning. While Planning and Compulsory Purchase Act 2004 requires *'an appraisal of the sustainability'* (UK Government, 2004). In Scotland the primary piece of legislation requiring SEA of Local Development Plans[7] is *The Environmental Assessment (Scotland) Act 2005*.

The consideration of issues related to water is listed in Annex I of the SEA Directive as information to be included within an environmental report. Guidance on SA in England lists the consideration of water within issues related to climate change when setting SA objectives (Communities and Local Government, 2009). In Scotland guidance highlights the consideration of flooding within the environmental topic 'water' (Scottish Executive, 2006, Section 6, p. 13).

Methods

Data presented here forms part of PhD research broadly considering the sustainability and environmental outcomes of SA and SEA. Evidence is gathered through case study analysis of individual applications of SA England and SEA in Scotland in spatial planning. Data has been collected through document analysis of the relevant environmental reports and planning documents produced in each case as well as through semi-structured interviews with professionals involved in the processes of SA and SEA in each case. The cases (shown on Figure 1 below) include, in England; the Black Country Joint Core Strategy and the Tunbridge Wells Borough Council Core Strategy, and in Scotland; the TAYplan Strategic Development Plan and the Falkirk Council Local Plan.

[6] The Core Strategy is the primary Local Authority spatial planning document in England.
[7] Local Development Plans are the primary Local Authority spatial planning documents.

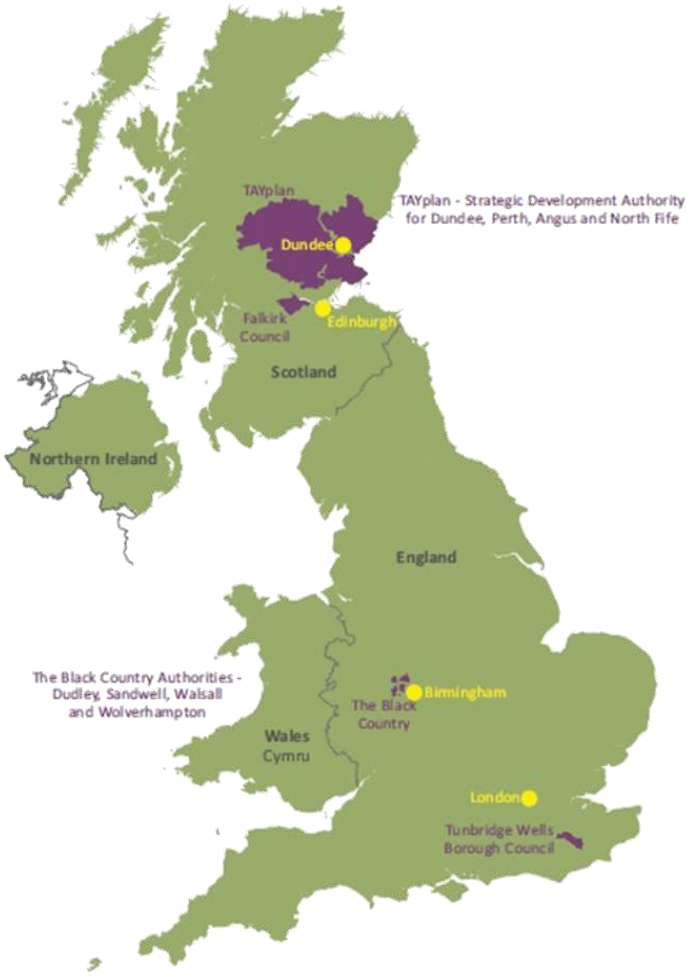


Figure 1: Map showing the location of the case studies

Findings

Each of the case studies includes in some respect within their SA or SEA objectives an objective which considers flood risk. Table 1 shows assessment objectives identified as potentially related to the consideration of flood risk.

It can be seen that not each of the case studies has a specific assessment objective considering flood risk; however, possible related objectives are identified in each of the cases. As noted by Carter et al. (2009), assessment objectives for flood risk vary with respect to their position or visibility in the assessment, with some including a primary objective on flood risk and others having a sub-objective as part of a wider objective. The clearest inclusion of flood risk is from the Falkirk case which includes a specific objective related to flood risk. The Tunbridge Wells and TAYplan cases also included sub-objectives related to flooding. With respect to the Black Country case in addition to general SA objectives which potentially cover flood risk the report also presents information around a series of Sustainability Topic Areas, one of which, 'Water and Soil', includes information on flooding within that topic area. However, it can also be seen that objectives vary with respect to the detail and potential action they might require.

Table 1: SA and SEA objectives potentially related to flooding or flood risk.

Black Country Joint Core Strategy SA	Tunbridge Wells Borough Core Strategy SA	Falkirk Council Local Plan SEA	TAYplan Strategic Development Plan SEA
Plan for the anticipated different levels of climate change. Maintain, and where necessary, improve, the overall quality of the natural and built environment.[8] Sustainability Topic Area: Water and Soil – including flooding.	To reduce pollution (to land, air and soil) and maintain and improve the water quality of the Borough's rivers, and to achieve sustainable water resources management. Sub-objective: Will it prevent inappropriate development in areas at risk of flooding?	Reduce flood risk.	To maintain catchment processes and hydrological systems within the TAYplan area. Assessment Question: Will it reduce the number of properties, and infrastructure, at risk from flooding?
Source: *Sustainability Appraisal of the Black Country Joint Core Strategy: Publication SA Report*, p. 13 & 26	Source: *Final Sustainability Appraisal Report*, p. 17 & *Sustainability Appraisal Scoping Report*, p. 42	Source: *Falkirk Council Local Plan Post Adoption Strategic Environmental Assessment Statement*, p. 19	Source: *Environmental Report TAYplan Main Issues Report*, p. 45

Turning to consider specific examples from the case studies in greater detail one can begin to understand a little more about how flood risk featured and was dealt with in assessment. Considering first an instance where it can be seen that flood risk information in assessment may have been influential over the plan.

Within the TAYplan case, among other considerations, flood risk information contributed to the selection of spatial options. The Main Issues Report discusses two strategic options and specifically refers back to conclusions from the SEA related to flood risk in an area called the Carse of Gowrie. The Main Issues Report cites SEA conclusions that flood risk is likely to be exacerbated by climate change as part of the justification for the final selection of Strategy A which avoids this area.

> The Strategic Environmental Assessment concludes that substantial parts of the Carse of Gowrie are already at medium to high flood risk which could increase with sea level rise.
>
> *(TAYplan Main Issues Report, p. 38)*

In this instance a conflict identified in SEA between current and future flood risk and one spatial option was utilised as part of the justification for option selection. However, what is also clear is that there were a considerable number of additional reasons for selection against Strategy B. These included potential negative or significant negative effects on; biodiversity; population and human health; prime agricultural

[8] Defined as concerned with the sustainability topic area; air quality, water and soil.

land; surface water and groundwater; air pollution; and material assets (TAYplan Main Issues Report: Environmental Report, p. 79-85). Moreover, even with the selection of one option over another citing flood risk as part of the justification, flood risk is still considered to be a potential concern in other areas in of the plan area.

> Flood risk will increase as climate change brings sea level rise and more extreme weather events. This is an issue for both strategies [spatial options] as areas within both the Perth Core Area and the wider Perth Housing Market Area [including the Carse of Gowrie] are at risk from flooding. […] Although Perth City Centre and some sites along the Tay and Almond rivers experience high flood risk there are already some defences and the critical mass of development and economic interest to make further defence measures comparatively viable.
>
> *(TAYplan MIR, p. 38-39)*

This highlights that the identification of areas at risk from flooding through assessment such as SEA is not necessarily sufficient to curtail development and decisions are taken with regard to many other factors. It can be seen that the influence of identified flood risk is considered along side factors such as established communities and the economic viability of other forms of flooding defence. However, it can be said that the SEA conclusions related to flood risk were utilised in describing decision making and contributed to a list of other conflicts identified through the consideration of options in the Main Issues Report.

Moving on to consider the Black Country case consideration of flood risk provides an example with respect to the commitment to flood risk conclusions. Through the SA process information from the strategic flood risk assessment was utilised and various flood risk issues in the Black Country were identified and ultimately specific policies were included in the plan with concern for tackling issues of flood risk. However, one interviewee, discussing the consideration of flood risk throughout the SA process noted that initially flood risk had not featured as strongly as expected in the SA process and that perhaps concern for flood risk varied between the partner authorities. Moreover, they noted that perhaps the plan policies primarily concerned with flood risk were suffering from a lack of commitment in implementation of the plan, highlighting the ultimate reliance of strategic level assessment on plan implementation.

> The policy [for flood risk] addresses quite a lot of our concerns and that is why we were happy with the Core Strategy… But obviously now it is coming to implementing these policies it would appear that certain members of the policy team are somewhat concerned that [the policy] will […] restrict growth…
>
> *(Black Country 06)*

Evidence regarding other issues considered within strategic level assessment and across each of the cases also suggests that concern regarding how policies are implemented, either through development control or lower tiers of planning, is recognised.

These examples highlight how single issues within strategic level assessment form part of the broader consideration within assessment and also fit within the broader process of planning and plan implementation.

Conclusions

From the evidence and analysis presented here it is possible to draw several conclusions, although, it should be remembered that observations are situated within the wider context of each case and therefore not necessarily generalizable to the respective assessment system at large.

Both systems, SA in England and SEA in Scotland, include consideration of flood risk within their guidance for conducting assessment of spatial plans. It has been seen that flood risk is included in some form within the assessment objectives of each case study, although this varies from general consideration, to sub-objectives and headline objectives specifically for flooding. It is considered that data presented here largely supports the findings Carter et al. (2009), that the consideration of flood risk is often subsumed under other assessment objectives. It is not apparent from the evidence gathered if this variation in visibility or position of objective results in variation in the influence afforded to impacts and conclusions related to flood risk.

More detailed consideration of flood risk within the TAYplan and Black Country cases does, however, provide evidence of how conclusions related to flood risk are viewed alongside other aspects of plan preparation. Evidence highlights that the influence of conclusions related to flood risk is complicated by other contextual factors, including existing flood defences and communities. In addition, concern for and commitment to issues of flood risk may also very by local authority. The implementation of plan policies also continues to influence how flood risk is managed beyond the adoption of plan policies and beyond the reach of assessment.

From this review of flood risk consideration in these four cases it can be seen that while flood risk is generally included within assessment legislation, guidance and practice - in terms of objectives, its influence on how the issues of flood risk are dealt with relate closely to the wider context of the area and plan in question, and, at least partially, extend beyond the time scales of strategic level assessment.

References

Bina, O. (2007). A critical review of the dominant lines of argumentation on the need for strategic environmental assessment. Environmental Impact Assessment Review, 27(7), 585-606.

Bond, A. J. & Morrison-Saunders, A. (2009). Sustainability appraisal: jack of all trades, master of none? Impact Assessment & Project Appraisal, 27(4), 321-329.

Brown, A. L. & Therivel (2000). Principles to guide the development of strategic environmental assessment methodology. Impact Assessment and Project Appraisal, 18, 183-189.

Brown, J. D. & Damery, S. L. (2002). Managing flood risk in the UK: towards an integration of social and technical perspectives. Transactions of the Institute of British Geographers, 27(4), 412-426.

Carter, J. G., White, I. & Richards, J. (2009). Sustainability appraisal and flood risk management. Environmental Impact Assessment Review, 29(1), 7-14.

Carter, J. G., Wood, C. M. & Baker, M. (2003). The Environmental Appraisal of National Park Management Plans in England and Wales. Journal of Environmental Planning and Management, 46, 271-288.

Communities and Local Government. (2009). CLG Plan making manual: Sustainability Appraisal [Online]. Communities and Local Government. Available: http://www.pas.gov.uk/pas/core/page.do?pageId=152450 [Accessed 15.04.2010].

Defra & Environment Agency (2011). Understanding the risks, empowering communities, building resiliance. In: Affairs, D. f. E. F. a. R. (ed.). London.

Devuyst, D., Lannoy, W. d. & Hens, L. (2001). How green is the city?: sustainability assessment and the management of urban environments. New York ; Chichester: Columbia University Press.

Elling, B. (2008). Rationality and the environment: Decision-making in Environmental Politics and Assessment. London: Earthscan.

Fischer, T. (2007). Theory and Practice of Strategic Environmental Assessment: towards a more systematic approach. London; Sterling, VA: Earthscan.

Gibson, R. B. (2006). Beyond the Pillars: Sustainability Assessment as a Framework for Effective Intergration of Social, Economic and Ecological Considerations in Significant Decision-Making. Journal of Environmental Assessment Policy & Management, 8(3), 259-280.

Glasson, J., Therivel, R. & Chadwick, A. (2005). Introduction to environmental impact assessment. London: Routledge.

Hacking, T. & Guthrie, P. (2008). A framework for clarifying the meaning of Triple Bottom-Line, Integrated, and Sustainability Assessment. Environmental Impact Assessment Review, 28, 73-89.

Jackson, T. & Illsley, B. (2007). An analysis of the theoretical rationale for using strategic environmental assessment to deliver environmental justice in the light of the Scottish Environmental Assessment Act. Environmental Impact Assessment Review, 27(7), 607-623.

Kørnøv, L. & Thissen, W. (2000). Rationality in decision- and policy-making: implications for strategic environmental assessment. Impact Assessment and Project Appraisal, 18, 191-200.

Morrison-Saunders, A. & Fischer, T. (2006). What is wrong with EIA and SEA anyway? A sceptic's perspective on sustainability assessment. Journal of Environmental Assessment Policy and Management, 8 (1), 19-39.

Pope, J., Annandale, D. & Morrison-Saunders, A. (2004). Conceptualising sustainability assessment. Environmental Impact Assessment Review, 24(6), 595-616.

Sadler, B. & Verheem, R. (1996). Strategic Environmental Assessment: Status, challenges and future directions. The Hague: Ministry of Housing Spatial Planning and the Environment.

Scottish Executive (2006). Strategic Environmental Assessment Tool Kit. Scottish Executive.

Scrase, J. & Sheate, W. (2002). Integration and integrated approaches to assessment: what do they mean for the environment? Journal of Environmental Policy & Planning, 4(4), 275 - 294.

Sheate, W. (2003). The EC Directive on Strategic Environmental Assessment: A Much-Needed Boost for Environmental Integration. European environmental law review, 12 (12), 331-347

Sheate, W., Byron, H. & Smith, S. (2004). Implementing the SEA Directive: sectoral challenges and opportunities for the UK and EU. European Environment, 14(2), 73-93.

Sheate, W., R. , Dagg, S., Richardson, J., Aschemann, R., Palerm, J. & Steen, U. (2003). Integrating the environment into strategic decision-making: conceptualizing policy SEA. European Environment, 13(1), 1-18.

Smith, S. & Sheate, W. (2001). Sustainability appraisal of English regional plans: incorporating the requirements of the EU Strategic Environmental Assessment Directive. Impact Assessment and Project Appraisal, 19, 263-276.

The Scottish Government (2011). The Floor Risk Management (Scotland) Act 2009: Delivering Sustainable Flood Risk Management. Edinburgh.

Therivel, R. (2004). Strategic environmental assessment in action. London; Sterling, VA: Earthscan.

Therivel, R., WIlson, E., Thompson, S., Heaney, D. & Pritchard, D. (1992). Strategic Environmental Assessment London: Earthscan Publications Ltd.

UK Government (2004). Planning and Compulsory Purchase Act 2004. In: Government, U. (ed.). London The Stationary Office

Wilby, R. L., Beven, K. J. & Reynard, N. S. (2008). Climate change and fluvial flood risk in the UK: more of the same? Hydrological Processes, 22(14), 2511-2523.

Case study sources

Black Country:

Sustainability Appraisal of the Black Country Joint Core Strategy: Sustainability Appraisal Report to accompany the Publication Version of the Joint Core Strategy, November 2009

Tunbridge Wells:

Tunbridge Wells, Final Sustainability Appraisal Report: Tunbridge Wells Borough Core Strategy Submission Report, April 2009

Sustainability Appraisal Scoping Report: Local Development Framework, Tunbridge Wells Borough, December 2005

Falkirk:

Falkirk Council Local Plan: Post Adoption Strategic Environmental Assessment Statement, March 2011

TAYplan:

Environmental Report: TAYplan Main Issues Report, 2009

TAYplan Main Issues Report: Options for Scotland’s SusTAYnable region 2012-2032, April 2010

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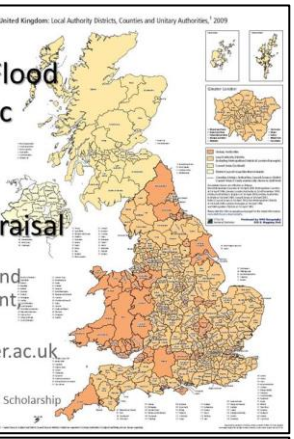
Consideration of Flood Risk in UK Strategic Environmental Assessment and Sustainability Appraisal



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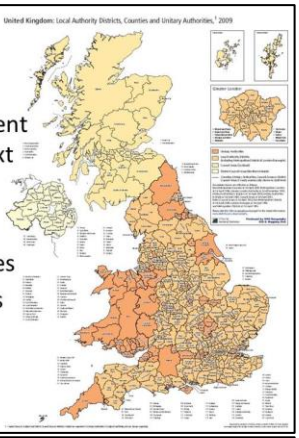
Overview



- UK context assessment and flood risk context
- SEA and SA
- Case studies
- SEA and SA objectives
- Case study examples
- Conclusions

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Flood risk in the UK

- Recognised as Europe's most common natural hazard (Wilby et al. 2008)
- Traditional flood risk management in UK has taken engineering approach (Brown and Damery, 2002)
- Some policy movement towards inclusion of other forms of flood risk management (Defra & EA, 2011; The Scottish Government, 2011)
- Spatial planning, SEA and SA highlighted as potential processes to achieve flood risk management goals (Carter et al, 2009; Howe and White, 2004)

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SEA and SA

- SEA; 'the formalised, systematic and comprehensive process of evaluating the environmental impacts of a policy, plan or programme and its alternatives, including the preparation of written report of the findings of that evaluation.' (Therivel et al. 1992, p. 19-20)
- SA; to help decision and policy makers when deciding on actions aimed at making society more sustainable (Devyust, 2001)

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UK context

- Responsibility for Environmental Assessment is devolved to each administration;
  - SEA is practiced in spatial planning in Scotland
  - SA is practices in spatial planning in England
- SEA has a more environmental focus – limited to EU SEA Directive topics
- SA considers environmental, social and economic factors

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English Case Studies

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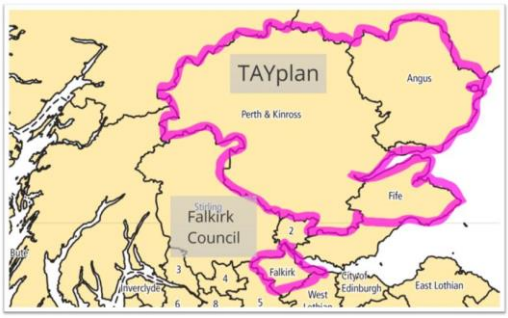
Scottish Case Studies



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Flood risk in assessment objectives

	Tunbridge Wells	Falkirk Council	TAYplan
Assessment objective related to flood risk		SEA Objective: 'Reduce flood risk.'	
Sub-objective related to flood risk	Sub-objective: 'Will it prevent inappropriate development in areas at risk of flooding?'		Assessment Question: 'Will it reduce the number of properties, and infrastructure, at risk from flooding?'

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Flood risk in assessment objectives

	Black Country
Other objective or topic area which may introduce consideration of flood rick	SA Objective: 'Plan for the anticipated different levels of climate change.'
	Sustainability Topic Area: 'Water and Soil' – includes flooding.

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Case study examples – TAYplan

- SEA conclusions regarding flood risk in Carse of Gowrie formed part of the justification for directing development away from this area
- Formed one element of argument against development in the area
- Other areas where economically viable to protect existing communities still at risk of flooding

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Case study examples – Black Country

- Flood risk concerns used to form policies specific to deal with areas of flood risk within the Black Country
- Concern about flood risk varied among partner authorities
- Commitment to policy has been questioned – concerns about policy restricting development varies by each partner authority

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Conclusions

- Inclusion of flood risk within assessment objectives is variable – varying visibility/clarity
- Influence of flood risk in assessment and on the plan itself is complicated by other factors.
- Implementation of policies is influential on how flood risk is dealt with in practice

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Thank you.

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References

- Brown, J. D. & Damery, S. L. (2002). Managing flood risk in the UK: towards an integration of social and technical perspectives. Transactions of the Institute of British Geographers, 27(4), 412-426.
- Carter, J. G., White, I. & Richards, J. (2009). Sustainability appraisal and flood risk management. *Environmental Impact Assessment Review,* 29(1), 7-14.
- Howe, J. & White, I. (2004). Like a Fish Out of Water: The Relationship between Planning and Flood Risk Management in the UK. *Planning Practice & Research,* 19(4), 415-425.
- Defra & Environment Agency (2011). Understanding the risks, empowering communities, building resilience. In: Affairs, D. f. E. F. a. R. (ed.). London.
- Devuyst, D., Lannoy, W. d. & Hens, L. (2001). How green is the city?: sustainability assessment and the management of urban environments. New York ; Chichester: Columbia University Press.
- Therivel, R., Wilson, E., Thompson, S., Heaney, D. & Pritchard, D. (1992). Strategic Environmental Assessment London: Earthscan Publications Ltd.
- The Scottish Government (2011). The Floor Risk Management (Scotland) Act 2009: Delivering Sustainable Flood Risk Management. Edinburgh.
- Wilby, R. L., Beven, K. J. & Reynard, N. S. (2008). Climate change and fluvial flood risk in the UK: more of the same? Hydrological Processes, 22(14), 2511-2523.

Institutionalization and operation of Special-EIA for recovery from the Great East Japan Earthquake

Yuki Shibata

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Abstract

Recovery Special Zone Act, established nine months after the Great East Japan Earthquake, has excluded the Special Reconstruction Project for the earthquake reconstruction from the application of the EIA Law. However, the Act established Special-EIA for the Special Reconstruction Projects. The Special-EIA is marked by the simplification of the assessment process and the environmental investigation. At the same time, the Special-EIA is also marked by the application of the ex-post environmental monitoring survey and follow-up measures. Now, this Special-EIA is expected to accelerate the environmental consideration in the rapid recovery construction and has been conducted in three earthquake hit prefectures and partially seven prefectures. In this paper, we present the overview of the Special-EIA system and the current situation of the operation.

東日本大震災復興に向けた環境アセスメント迅速化の工夫

柴田裕希

滋賀県立大学

（和訳）

東日本大震災 9 か月後に制定された復興特別区域法は、地震再建 に向けた特別再建プロジェクトを EIA 法適用除外とした。しかし、同法は、特別再建プロジェクト向けの特別 EIA を設けた。特別 EIA は、アセスメントプロセスと環境調査の簡素化を特徴とする。同時に、特別 EIA は、事後環境監視調査とフォローアップ措置の適用も特徴とする。現在、この特別 EIA は、迅速な復興再建における環境への配慮を促進することが期待されており、被災した３県で、また、７県で部分的に、実施された。本論文で、我々は、特別 EIA 制度の概要と運用の現状を紹介する。

Institutionalization of Special-EIA for recovery from the Great East Japan Earthquake

Yuki SHIBATA, University of Shiga Prefecture

1. Introduction

Environmental consideration measures need to be taken not only in normal development project, but also in post disaster reconstruction. In the post disaster situation, reconstruction projects must be formulated quickly with considering the risk of the future disaster and the environmental impact to prevent the secondary disaster and ecological destruction. In order to addressing the urgent situation, the project proposals need to be approved rapidly. This paper reports the institutionalization of Special- EIA for the recovery projects from the Great East Japan Earthquake in 2011.

2. Disaster and reconstruction

The great earthquake caused serious damage to the coastal urban area by the tsunami rather than the vibration. Urban infrastructure including residential housings, retails, industrial facilities and transportation facilities located near the coast area completely destroyed by the disaster (Photo 1). There are two main legislative systems for the urban reconstruction in Japan. One is a "Disaster-affected District Reconstruction Promotion Special Measure Act (1995)" enacted in the year of previous huge earth quake hit west part of Japan. This act established a system for the zoning of Disaster-affected District

This photo was taken 9 months after the earthquake, in MIYAGI Prefecture. Most houses in Japan are made of wood, but all wooden buildings were washed away, only a little concert building was left. Many people lost their hoses in this Minami-Sanriku town by the tsunami.

Photo 1 Tsunami affected area.

These are the temporary houses for the people who survive the earthquake and tsunami. These houses are very simple house, it is hard to live in for a long time.

Photo 2 Temporary housing.

Reconstruction Promotion. Another is a "Great East Japan Earthquake Reconstruction Special Zone Act (2011)" enacted as a result of this earthquake. This act established a system for the Reconstruction and Development Plan and the Project (R/D Plan, Project) which applied to Land Relocation Project, Railway Reconstruction Project and Public Facilities Reconstruction Project. Local governments adopt their R/D plan and reconstruction projects are conducted based on those plan.

3. Progress situation of reconstruction projects

One of the most difficult reconstruction projects is Collective Relocation Project. Right after the earthquake, governments designated the coastal low land as development restriction area, because these low land areas have high risk of affected another tsunami in the future. People who had lived in this area plan to move collectively to the higher land. Currently, in 276 areas, 20,000 housings are designated as the target of the collective relocation projects (see Fig. 3). These large scale and in many different locations of these Collective relocation Projects expected to cause environmental impacts to the planned site. Therefore, environmental impacts of the post-disaster construction, countermeasure against disasters in the future and sustainability of the reconstructed community need to be considered in the EIA process of the R/D plan.

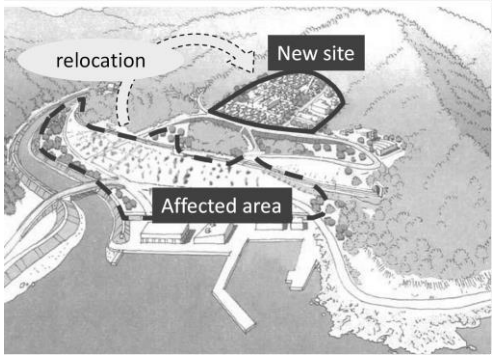


Fig. 3 Image of Relocation Project.

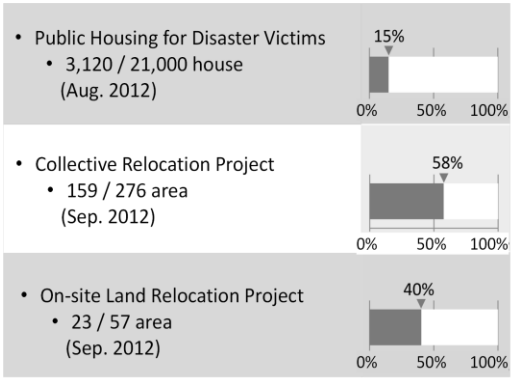


Fig. 4 Progress of reconstruction project.

4. Amount of time for EIA

On the other hand, project progress has become a biggest issue in this earthquake disaster reconstruction. Due to some problems in the project process including bureaucratic obstacle procedures, consensus building and project budgets, as of September 2012, one and a half year after the disaster, progress situation of the reconstruction projects are insufficient (see Fig. 4). In response to the unfavorable progress situation, government discussed the simplification of the development permitting process including EIAs which take more than 3 years on average in Japan (Table 1).

Table 1. Time needed to Assessment Process (Scoping – Final EIS)

EIA Law	Ave. 54.8 months
EIA ordinance	Ave. 34.8 months

5. Shortcut EIA process

As the results, Aug. 2011, Ministry of Land and Transportation & Ministry of Environment published “EIA Exemption Notice” which announced EIA Law Article 52-2 “exemption from application of EIA” apply to all projects under the Disaster-affected District Reconstruction Promotion Special Measure Act. The developers are required voluntary effort to reduction of the environmental impact form the projects which applied the exemption (Box 1).

1. Consider possible measures to reduce the environmental impact.
2. Explain the result of environmental consideration to affected municipalities and the residents.
3. Monitoring report.

Box 1. Required voluntary effort

Japanese Government took another measure for timesaving. Recovery Special Zone Act, established nine months after the earthquake, has excluded the Special Reconstruction Project for the earthquake reconstruction from the application of the EIA Law and, the Act also established Special-EIA for the Special Reconstruction Projects. The Special-EIA is marked by the simplification of the assessment process and the environmental investigation. As you can see in figure 5, under the special-EIA, developer can omit the part about scoping step which requires the scoping report available for 30 days public inspection and 45 days comment period. Special-EIA also admits simplify the environmental research by rejecting the field investigation or seasonal variation research.

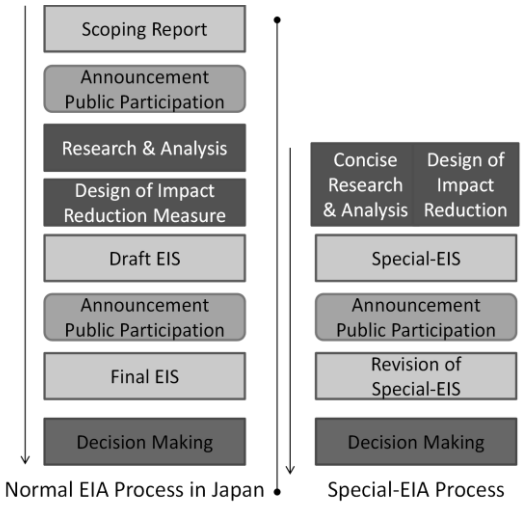


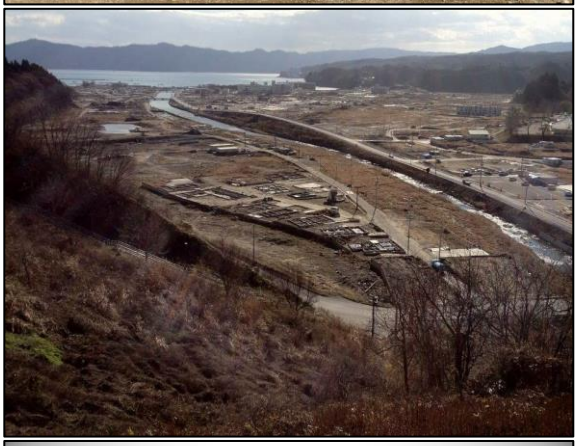
Fig. 5 Assessment process.

At the same time, the Special-EIA is also marked by the application of the ex-post environmental monitoring survey and follow-up measures. This ex-post effort is expected to complement the reduced ex-ante efforts.

Now, this Special-EIA is expected to accelerate the environmental consideration in the rapid recovery construction. If there is a next time, I will present a study of the effects of the Special-EIA.

Institutionalization and operation of Special-EIA for recovery from the Great East Japan Earthquake

Yuki SHIBATA, University of Shiga Prefecture



Great East Japan Earthquake

Urban Infrastructure destroyed by Earthquake and Tsunami Disaster

- Residential districts
- Retail districts
- Industrial facilities
- Transportation facilities

Quick recovery is needed.

- Onsite reconstruction
- Collective relocation

Recovery: Legislative Framework

1. Disaster-affected District Reconstruction Promotion Special Measure Act (1995)
   - Zoning of Disaster-affected District Reconstruction Promotion
   - Land Relocation Project
2. Great East Japan Earthquake Reconstruction Special Zone Act (2011)
   - Reconstruction and Development Plan
   - Reconstruction and Development Project
     - Land Relocation
     - Railway Reconstruction
     - Public Facilities Reconstruction etc.

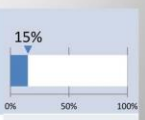
Impacts of Recovery Project

- Project of Collective Relocation for Disaster Prevention
  - 276 areas
  - 20,0000 buildings
  - ¥240 billion

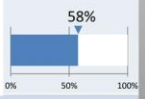
- Environmental consideration of the post-disaster construction
- Countermeasure against disaster in the future
- Sustainability of the reconstructed community

Progress Situation

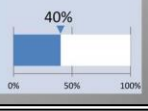
- Public Housing for Disaster Victims
  - 3,120 / 21,000 house (Aug. 2012)



- Collective Relocation Project
  - 159 / 276 area (Sep. 2012)



- On-site Land Relocation Project
  - 23 / 57 area (Sep. 2012)



Japanese EIA: Time consuming ?

Time needed to Assessment Process (Scoping – Final EIS)
- EIA Law: Ave. 54.8 months
- EIA ordinance: Ave. 34.8 months

After the Earthquake, local governments required acceleration of the permitting process including EIA.

National Government discussed shortening of the permitting process.

Exemption of EIA

Disaster-affected District Reconstruction Promotion Special Measure Act (1995)

Aug. 2011
Ministry of land and Transportation & Ministry of Environment announced "EIA Exemption Notice"
EIA Law article 52-2, exemption from application of EIA.

1. Consider possible measures to reduce the environmental impact.
2. Explain the result of environmental consideration to affected municipalities and the residents.
3. Monitoring report.

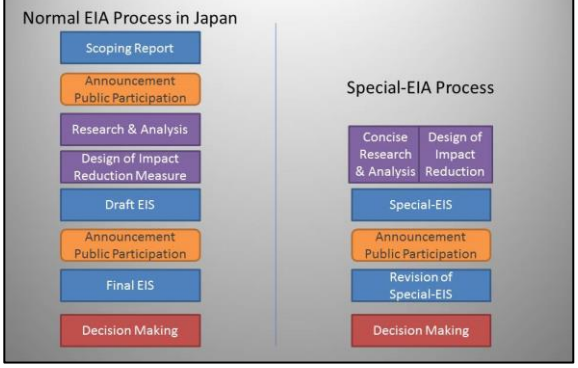
Special-EIA for reconstruction zone

Great East Japan Earthquake Reconstruction Special Zone Act (2011)

Article 46-3, Special-EIA is applied to Reconstruction and Development Project which stated in the plan.
- Land Relocation (more than 75 ha)
- Railway Reconstruction (more than 7.5 km)

EIA process is shortened for acceleration of the permitting process.

Special-EIA for reconstruction zone



Identifying the factors that support and hinder EIA following disaster events

Tom Gore and Thomas B Fischer
University of Liverpool

Abstract

In recognition of the close relationship between environmental degradation and the occurrence of disaster events, the importance of fully integrating environmental assessment techniques into activities in the aftermath of disasters has now been widely emphasised. Yet, despite the apparent desirability of such action in helping prevent disaster recurrence, questions regarding the feasibility of this in practice have also been raised. Post-disaster environments generally differ substantially from the normal 'developmental' context in which such techniques are usually applied which may in fact make such applications problematic. Using a case study of the situation in Aceh Province, Indonesia, following the impact of two tsunamigenic earthquakes in 2004 and 2005, this paper reports on a study that was undertaken to investigate more specifically the factors which can both impede and support the practice of one EA methodology, environmental impact assessment, following such events in a developing country context.

（和訳）

災害後に実施される環境アセスメントの促進要因と阻害要因の抽出

トム・ゴア、トーマス・フィッシャー
リバプール大学

環境悪化と災害発生の密接な関係に鑑み、環境アセスメント技術を災害後の活動に全面的に統合することの重要性が、現在、広く浮き彫りにされている。しかし、そのような行動が災害再発防止に望ましいことは明らかであるにもかかわらず、実際には、この実行可能性についての疑問も提起されている。災害後の環境は、概して、そのような技術が通常適用される通常の「開発的」背景とは大きく異なっており、それが、そのような適用を、事実上、問題のあるものにする可能性がある。本論文は、２００４年と２００５年の地震と津波の影響を追跡調査したインドネシアのアチェ州の状況の事例研究を用いて、発展途上国という背景において、EA 方法論、環境影響アセスメント、そのようなイベントの追跡調査を阻害する要因と支援する要因を、より具体的に調査するために行われた研究について、報告する。

Post-disaster EIA in developing countries: identifying the factors that can support and impede its practice

Tom Gore & Thomas Fischer (University of Liverpool)

Structure

- Background
- Methodology
- Findings
- Recommendations

Background to the Project

- Environmental assessment in the context of disaster risk reduction? (Not much.)
- Two main points:
  1. The expansion of environmental assessment tools to include more explicit disaster risk considerations
  2. The importance of fully integrating environmental assessment tools into post-disaster decision making to help prevent recurrence

EA in the post-disaster context?

- *"This slow process [EIA] is clearly incompatible with the time compressed, chaotic and difficult operating conditions encountered in disaster response"* (Kelly 2001)
- *"Each country has its own environmental assessment requirements that are applied at the project level but there may be pressure to suspend them in a post-disaster environment"* (Jha et al 2010)
- *"Environmental Impact Assessment (EIA) was well recognized ... but rarely used due to the time required to undertake such an assessment"* (Barrett et al 2007)

Aim of the research

To identify the factors that can support and impede **EIA** practice in **developing countries** following disaster events.

Began from an initial literature review:

Potential impeditive factors	Potential supportive factors
1. Pre-existing weakness in the EIA system	1. **Policies and practices of development banks and aid agencies**
2. **Physical damages to assets**	2. **Internationally supported capacity building efforts**
3. **Abnormal loadings in the EIA system**	3. Information opportunities from the application of post-disaster context specific environmental tools
4. **The desire of governmental actors to act in haste**	

Research strategy

Case study: Aceh Province, Indonesia

1. Sumatra-Andaman earthquake (December 2004)
   - "Boxing Day" Tsunami
2. Nias earthquake (March 2005)

Data collection

- Semi-structured interviews with individuals that worked in the EIA field (9 Interviews)
- An array of documentary sources:
  - Published academic literature
  - Grey literature (progress and evaluation reports) (2005-2009)

Findings

1. Physical damages to environmental management assets?

Disasters are generally associated with widespread physical destruction which could involve physical components of an EIA system

- Loss of human resources (EIA administrative staff and environmental expertise)

  "BAPEDALDA, the local authority responsible for environmental assessment and management, suffered a high level of staff loss (30 percent of the employees died in the tsunami)" (BRR and International Partners, 2005)

- Loss of facilities and equipment (administrative agency's mobile and provincial testing laboratories)
- Impact on data and records

  "Social aspects and data collected from before the tsunami are no longer accurate ... For this reason, the ideal way to describe the social component is by collecting new primary data".

Findings

2. Abnormal volumes of EIA activity in the EIA system?

Disasters are often followed by large scale construction programmes

In Aceh:

- Widespread consensus of a post-disaster 'peak' in EIA activity
- Effects amplified by other factors, but:
  - Put strain on the available expertise in the province
  - Pressurised the functions of the administrative agency - ability to process the work and monitor activity

Findings

3. Desire of governmental actors to act in haste?

There can be a lot of pressure on governmental agencies to act quickly to restore facilities and services. This could mean that the time required for EIA procedures is a concern.

- BRR (Agency for Rehabilitation and Reconstruction)
  - Ministerial level agency
  - Tasked with coordinating and later implementing the recovery effort
  - April 2005 – April 2009
- Handling of EIA procedures:
  - Time required for EIA was a concern (infrastructure sector)
    1. Projects progressed in absence of EIA
    2. For other projects EIA conducted simultaneously with construction
- Streamlined EIA procedures (Ministerial Decree 308/2005)
  - Introduced September 2005 – April 2009
  - Reduced the time required for scoping (5 month-1 month)

Findings

4. Policies and practices of development banks and aid agencies?

A significant presence in developing countries and frequently include EIA as a condition for financing and facilitate the process

- Encouraged EIA conduct by ensuring compliance with EIA procedures:

  '[f]or works funded by donors, environmental procedures could not be eliminated or skipped over. All infrastructures had to be accompanied by Environmental Impact [Assessment] documents …' (BRR, 2009).

- Facilitated its conduct (e.g. consultants, technical guidance, financing)
- However, there was a concern with the time associated with EIA procedures:
  - Some early activities were exempted from EIA - possible under some donor policies
  - Avoided projects for which EIA was necessary

Findings

5. Capacity building efforts supported by international actors?

A number of international organisations have become actively engaged in efforts to develop EIA capacity

In Aceh there were numerous capacity building efforts supported by external agencies:

- Facilitating the development and implementation of streamlined EIA procedures
- Provision of in-service training to administrative staff (e.g. in environmental monitoring)
- The reconstruction of environmental laboratory facilities.
- Provided human resources to augment staffing levels at the administrative agency.

Recommendations

1. **Need to take actions to minimise the impact of hazard events on the EIA system**
   - Siting of facilities and storage of equipment, records and data, etc
   - For organisations, formal business continuity management
   - Help reduce reliance on ad hoc post-disaster interventions

Recommendations

2. Developing accelerated EIA procedures

- A desire by post-disaster actors to act quickly is inevitable
- In Aceh a reactive measure (over 9 months)
- Such arrangements don't necessarily need to reduce the quality of EIA (e.g. greater human or financial resourcing)

Recommendations

3. Look at how it could be integrated into 'pre-disaster recovery planning'?

- An approach where decisions about reconstruction after a disaster are made before a disaster.
- It can include making decisions regarding e.g. site selection for:
  - Long term temporary housing (i.e. not tents)
  - Debris disposal
  - Permanent relocation of development situated in hazardous areas
- Still uncommon globally
- Informing these decisions with EIA (or SEA)?

Thank you!

References

- Barrett E, Murfitt S, Venton P (2007) "Mainstreaming the Environment into Humanitarian Response: An Exploration of Opportunities and Issues", Environmental Resources Management, London
- Berke P R, Campanella T J (2006) "Planning for Post-disaster Resiliency" *American Academy of Political and Social Science* 604 192-207
- BRR (2009) "Infrastructure: Stimulating the Triggering Sector" BRR, Banda Aceh
- BRR and International Partners (2005) "Aceh and Nias One Year After the Tsunami: The recovery effort and way forward", BRR, Banda Aceh
- Coppola D P (2011) *Introduction to International Disaster Management* 2nd edition (Elsevier, Burlington)
- Kelly C (2001) "Rapid Environmental Impact Assessment: A Framework for Best Practice in Emergency Response", paper presented at Sharing Experiences on Environmental Management in Refugee Situations: A Practitioner's Workshop, 22-25 October
- Jha A, Barenstein J, Phelps P, Pittet D, Sena S (2010) *Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters* (World Bank, Washington DC)

EIA and Landslide Disaster in Wind Farm Development in Japan

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Abstract

In Japan, the momentum to shift to renewable energy was enhanced by the Fukushima Dai-ichi Nuclear Accident on March 11, 2011. Wind energy should be one of the important options of Japanese renewable energy policy as in other countries. However, wind farm developments in mountain area produce an increased risk of landslide disaster and it becomes issues of concern of local residents. This presentation focuses a relationship between EIA and landslide disaster in the development and discusses the challenges in current situation and future by specific case studies.

（和訳）

日本の風力発電事業における環境アセスメントと地すべり災害について

畦地啓太

東京工業大学

日本では、２０１１年３月１１日の福島第一原子力発電所事故により、再生可能エネルギーへの移行の機運が高まった。他の国と同様に、風力エネルギーは、日本の再生可能エネルギー政策の需要な選択肢の１つであるべきである 。しかし、山岳地帯での風力発電所の開発によって地滑り災害の危険が高まり、地域住民の間で問題となっている。本プレゼンテーションは、開発における EIA と地滑り災害の関係に注目し、具体的な事例研究で現状及び今後の課題を議論する。

EIA and Landslide Disaster in Wind Farm Developments in Japan

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Introduction

In Japan, the momentum to shift to renewable energy was enhanced by the Fukushima Dai-ichi Nuclear Accident on March 11, 2011. Wind energy should be one of the important options of Japanese renewable energy policy as in other countries. However, wind farm developments in mountain area produce an increased risk of landslide disaster and these become an issue of concern by local residents. In response, this presentation focuses on a relationship between EIA and landslide disaster in the wind farm developments and discusses the need and feasibility to integrate landslide disaster prevention in Japanese EIA by looking at a specific case study.

Landslide disaster in Japan

Japan is one of mountainous countries and flat land suitable residential area is comparatively limited. Therefore many hamlets are located just next to slopes of mountains. This physical feature leads to high risk of landslide disaster in Japan. Figure 1 shows a classification of disaster victims for a decade from 1998 to 2007. According to the chart, 55% of total disaster victims are dead or missing by wind and flood damage and 1/4 of them are caused by landslide disaster. Looking at the trend of past 9 years shown in figure 2, the annual average of approximately 1,200 landslides has occurred and 30 people have been victimized by the disaster every year.

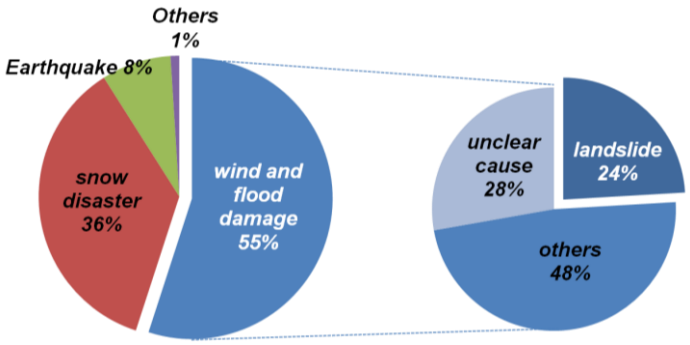

Figure 1: Classification of disaster victims (dead & missing) for a decade (1998-2007), source: Cabinet Office (2008)

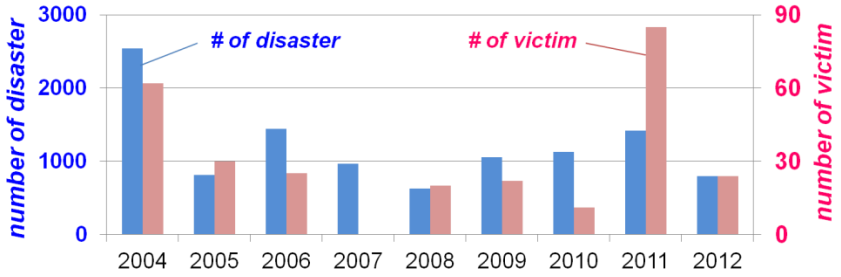

Figure 2: Annual number of landslide disaster occurrence and victims (dead & missing)
source: MLIT: Ministry of Land, Infrastructure, Transport and Tourism (2013)

As presented above, landslide disaster is one of the dominant disasters in Japan and countermeasures to the disaster have been taken from long time ago. Figure 3 sorts of the measures by two aspects. First aspect is a type of the measures whether hard measure (e.g. infrastructure) or soft measure (e.g. regulation) and second is a target of the measures whether disaster source side (to prevent disaster occurrence) or damage side (to limit disaster damage). By this sort, the upper left corresponds to hard infrastructures such as mud control dam. Until 2001, the measures had mainly focused on only this area under the following relevant 3 laws; the Erosion Control Act from 1897, the Landslide Prevention Act from 1958 and the Act on Prevention of Steep Slope Disaster from 1969 (hereinafter referred to as "the relevant 3 laws"). From 2001, after the Landslide Disaster Prevention Law was enacted, the lower right measures that are evacuation plans and siting control to developments in vulnerable area to the disaster have been conducted as well as the upper left measures. However, even now, the upper right measures that fall into land use zoning and siting control to developments in hazard area that would encourage disaster occurrence have not been taken sufficiently and they are challenges for landslide disaster prevention. In response, this presentation focuses on the upper right measures and discusses the need and feasibility of EIA as a measures corresponding to this area.

Figure 3: Countermeasures to landslide disaster

Relationship between Japanese EIA and landslide disaster

Figure 4 shows the environmental items which Japanese EIA should take into account under the EIA Act. From a view point of this institutional framework, there are no items directly corresponding to

landslide disaster prevention. However, according to a technical review report issued by MOE (Ministry of Environment), landslide disaster could be considered as one component of *ground environment* namely *change in land stability* (MOE, 2002). And the report said that it should be taken into account if the development includes deforestation, land formation and underground quarry, or if there are high interest of local residents and past disaster history. However, the report also mentions EIA seldom takes into account *change in land stability* in practice.

Wind farm developments in the context of landslide disaster prevention

Wind farm developments are significant project type in terms of landslide disaster prevention for the following reasons. First, under the situation after the nuclear accident, accelerating developments are expected in near future. According to a MOE survey, wind energy has the highest potential of any of renewable energy and the installation potential only for onshore wind farm is estimated over 280 GW (MOE, 2011). On the other hand, in current status, total installation capacity is only 2.5 GW. Second reason is related to the project site characteristics. As mentioned above, flat land is comparatively limited in Japan, therefore mainly shorelines or along ridges of mountains are selected as the project sites due to good wind conditions. In case of mountainous area, the development includes large area of deforestation and land formation. Third is due to high interest of local residents. In recent years, turbine size and installation capacity are getting bigger due to the profitability. This trend has been giving rise to various environmental conflicts in Japan and one of the main issues of concerns by local resident is landslide disaster.

Context of a case study “Minenohara wind farm project”

This presentation looks at Minenohara wind farm project as a typical case study that landslide disaster was one of dominant issues of concerns by local residents. The project site was located in Suzaka city, Nagano prefecture shown in figure 5. In this case, EIA was conducted under the EIA ordinance of Nagano prefecture from 2006. However, the project was aborted by strong local opposition at 2009. The main issues of concerns were spoiled scenery of the national park, impact on the Golden Eagle and landslide disaster. Especially the concerns of landslide disaster was caused by a past disaster history on 1981 which occurred from near the project site and this disaster killed 10 local people.

Figure 6 shows land-use zonings under the relevant laws for landslide disaster prevention and environment conservation. The protection forest designated under the Forest Act (east and northwest area of the site) and the special zone under the Natural Parks Act (south area of the site) are located around the project site and the site itself is located in the ordinal zone under the Natural Parks Act. On the other hand, there is no land use zoning area under the relevant 3 laws for landslide disaster prevention despite the past disaster history. In actually, the past disaster on 1981 occurred just next to the site (shown in figure 7) and the mudslide went along with the arrow and attacked downstream communities. According to the disaster analysis report issued by NIED (National Research Institute for Earth Science and Disaster Prevention) on 1982, land changes caused by a development of golf course on 1970’s had changed in a condition of water

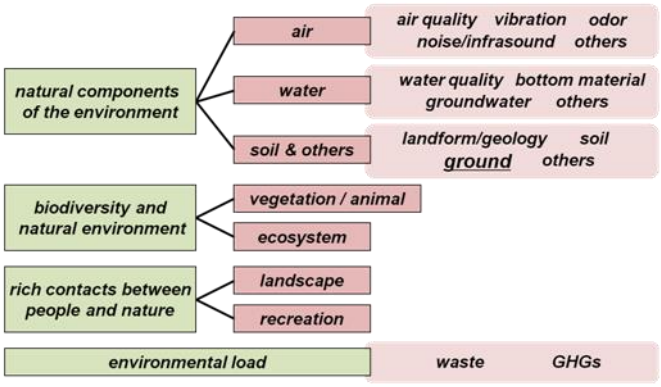

Figure 4: Environmental items under the EIA Act

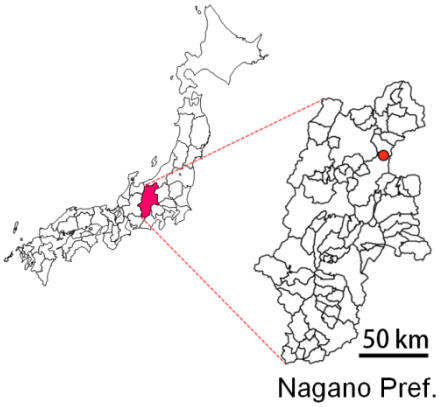

Figure 5: Project site location

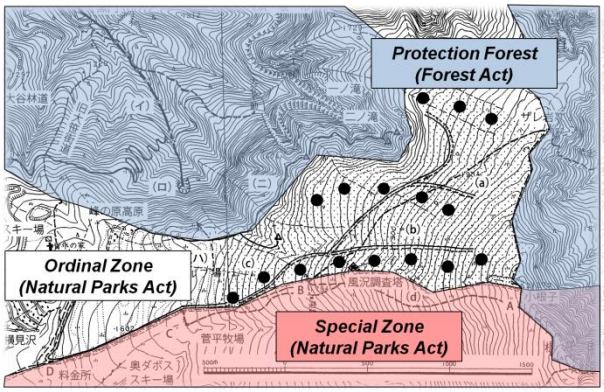

Figure 6: Project site (land use zoning)
Source: Yamaguchi (2008)

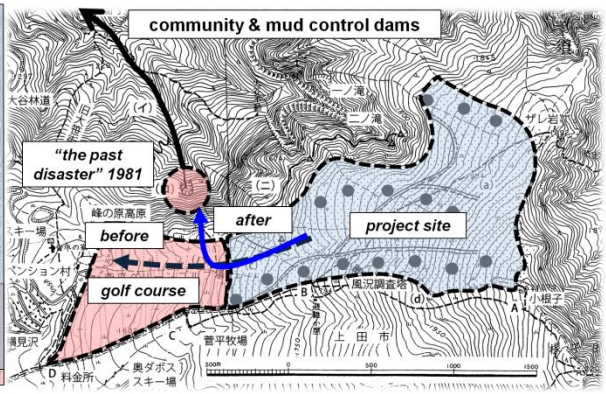

Figure 7: Project site (past disaster history)
Source: Yamaguchi (2008)

catchment around the area (shown in figure 7), and it encouraged the disaster occurrence (NIED 1982). In light of above information, it was obvious that the wind farm development would impact increased risk of landslide disaster. And this indicated that land-use zoning under the existing relevant laws could not be effective countermeasure for disaster prevention in this case.

EIA scoping of a case study "Minenohara wind farm project"

As mentioned above, this project was aborted by strong local opposition during the planning phase, in consequence, EIS (Environmental Impact Statement) was not prepared by the proponent and only scoping document was issued on 2006. Therefore, this presentation looks at the scoping documents and public comments to the document.

According to the scoping document, *noise, radio disturbance, animal, vegetation, landscape* and *recreation* were selected by the proponent as the environmental items which would be taken into account in the EIS. However, in the first place, the document didn't mention the past disaster history and *ground environment* was not on a list of candidate items. On the other hand, *landform/geology* was on the list but it was not selected as the items. The reason was that *landform/geology* was not intended to investigate risk of landslide disaster (this was intended to survey scientific significant landform and geology). Instead, the proponent proposed that risk of landslide disaster would be investigated separately from EIA.

In reaction to disclosure of the scoping document, a large number of public comments concerning

about risk of landslide disaster were submitted by local residents and environmental protection groups. Their main statements could be divided into the following two points. First, the proponent should survey the past disaster history closely and predict change in an amount of rain runoff on the project site which would encourage the disaster occurrence to investigate risk of landslide disaster. Second, risk investigation of landslide disaster should be integrated into the EIA. In response to these comments, the proponent decided to add *water quality* to investigate change in an amount of rain runoff on the project site and *landform/geology* especially focusing on risk of landslide disaster. In light of this case study, it could be said that EIA could take into account risk of landslide disaster by extending *landform/geology* and *water quality* even if *ground environment* was out of the scoping in the first place. On the other hand, this case shows anew that proponents tend to neglect to take into account risk of landslide disaster in EIA even in such the typical case study.

Discussion of challenges to integrate landslide disaster prevention in Japanese EIA

One of the reasons why proponents tend to neglect the issue in EIA is due to the ordinance of the competent ministry which is the basic guideline for which environment items should be taken into account by the specific project type. In case of wind farm developments, the ordinance has only narrow scope, therefore *ground environment* is excluded from the list of scoping at the first place. This means even the national government neglect to integrate landslide disaster prevention in EIA (probably other project types as well) or there is a lack of knowledge about the need and possibility of EIA in terms of prevention tool for landslide disaster. Both challenges would be caused by the bureaucratic sectionalism in the competent government ministries for between EIA (i.e. MOE) and disaster prevention (i.e. MLIT). Another reason is due to a lack of experience to assess risk of landslide disaster in EIA. However, NIED have already surveyed 186 dominant disasters which had occurred since 1586. Therefore those experiences should be integrated in the methodology of EIA. For this, the cooperation among multiple ministries and institutions is essential.

Conclusion

This presentation focused on a relationship between EIA and landslide disaster in wind farm developments and discussed the need and feasibility to integrate landslide disaster prevention in Japanese EIA by looking at a specific case study.

By summing up the result of a case study, the need was shown that landslide disaster could be a dominant issue of concern by local residents on EIA process and land-use zoning designated under the existing relevant laws for landslide disaster prevention could not be an effective countermeasure depending on circumstances around a project site. In point of the feasibility, EIA could take into account the risk of landslide disaster by extending existing environmental items such as *landform/geology* and *water quality* even if *ground environment* which was intended as an environmental item to investigate the disaster risk as was out of the scoping. On the other hand, proponents would tend to neglect to take into account the disaster risk in EIA due to the narrow scope of the ordinance of the competent ministry and a lack of

experience to assess the disaster risk.

References

Cabinet Office (2008) “White Paper on Disaster Prevention FY 2008” (in Japanese)

MLIT (2013) “Case Studies of Landslide Disaster Occurrence in recent years” http://www.mlit.go.jp/river/sabo/jirei.html (Cited 31/01/2013) (in Japanese)

MOE (2002) “EIA Technical Review Commission Report in the field of Air, Water and Environmental Load, Chapter 3” (in Japanese)

MOE (2011) “Renewable Energy Introduction Potential Survey FY 2010” (Available English summary)

NIED (1982) “Analysis Report of Suzaka Landslide Disaster in Nagano Prefecture Caused by the Typhoon No.15 on August, 1981” (in Japanese)

Yamaguchi, F. (2008) “Nekodake Wind Farm Project and the Local Residents”, Monthly Geography, Vol. 53-3, pp. 57-71. (in Japanese)

Japan-UK joint workshop
@Chiba University of Commerce
30/11/2012

EA and Landslide Disaster in Wind Farm Development in Japan

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Outline 2

Discuss about the need and feasibility to integrate landslide disaster prevention in Japanese EA by a specific case study

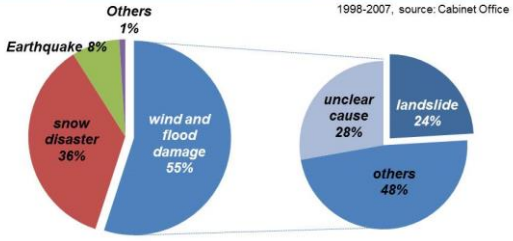
1. *Japanese EA and landslide disaster*
2. *Why wind farm development?*
3. *A case study and discussion*
4. *Conclusion*

1. Japanese EA and landslide disaster

Landslide disaster in Japan (1) 4

Classification of disaster victims (dead & missing) for a decade

1998-2007, source: Cabinet Office



Landslide is one of dominant disasters in Japan

Many typhoon & rainy season front

Landslide disaster in Japan (2) 5

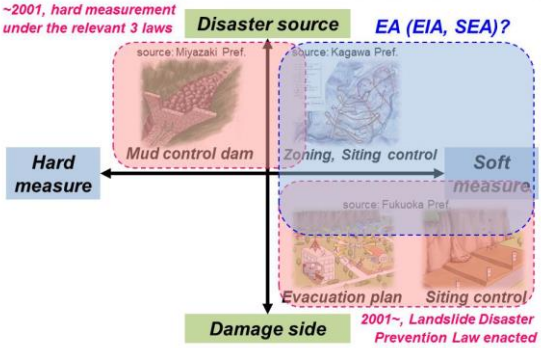
Annual number of landslide disaster & victim source: MLIT

Average of 1200 landslides and 31 victims per year

- *In recent years, number of abnormal heavy rain has been increased.*
  - *Aug. 2011 "the Typhoon No.12"* *208 landslides, 94 victims*
  - *Sep. 2011 "the Typhoon No.15"* *198 landslides, 19 victims*

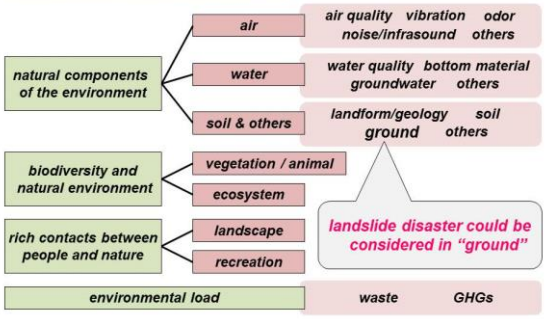
Countermeasure to landslide disaster 6

~2001, hard measurement under the relevant 3 laws



Japanese EA and landslide disaster (1) 7

Environmental items in the EIA Act



Landslide disaster and Japanese EA (2) 8

Technical Review Report (2002)

"ground"

- land subsidence
- change in thermal environment of ground
- physicochemical change (e.g. poisonous gas)
- **change in land stability (e.g. landslide disaster)**

"**change in land stability**" should be considered in projects such as…

- development: deforestation, land formation, underground quarry
- site & community: interest of local residents, past disaster history

In practice, EA seldom takes into account "change in land stability"

- **land subsidence**
  - change in thermal environment of ground
  - physicochemical change (e.g. poisonous gas)
  - change in land stability (e.g. landslide disaster)

Presentation Aim 9

[current and future]

× the risk would become higher by an increased abnormal heavy rain

○ The amended EIA act could make EA more effective measure

Discuss about the need and feasibility to integrate landslide disaster prevention in Japanese EA by a specific case study

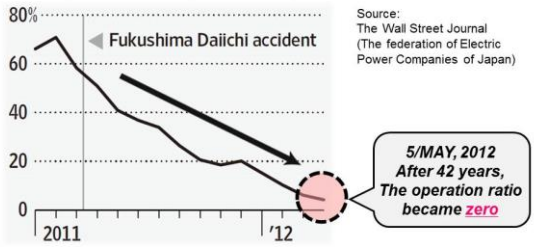
+

This presentation will focus on "wind farm development"

2. Why wind farm development?

Why wind farm development? (1) 11

The operation ratio of Japan's nuclear plant



Source:
The Wall Street Journal
(The federation of Electric Power Companies of Japan)

Reassessment of Japanese energy policy was inevitable

- ***Promotion of renewable energy have become crucial issue***

Why wind farm development? (2) 12

(1) Highest development potential
- *over 280GW (onshore)* (MOE, 2011)
- *current status: 2.5 GW (6.5 GW)*

accelerating development is expected

(2) Project site characteristics
- *shoreline or* ***along ridge line of Mt.***
  - *flat land 25% (70%)*

development with deforestation & land formation

(3) Large number of conflicts
- *conflicts occurred in 38% of wind farm with above 20MW windfarm*
- *noise, infrasound, bird collisions, spoiled scenery,* ***Landslide disaster***

high interest of local residents

Why wind farm development? (3) 13

Source: Kobe Newspaper 21/DEC, 2011

Sep.2011, "the Typhoon No.15"
Landslide occurred from a project site of wind farm in Hyogo Pref.

Why wind farm development? (2) 14

(1) Highest development potential
- *over 280GW (onshore)* (MOE, 2011)
- *current status: 2.5 GW (6.5 GW)*

accelerating development is expected

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- *shoreline or* ***along ridge line of Mt.***
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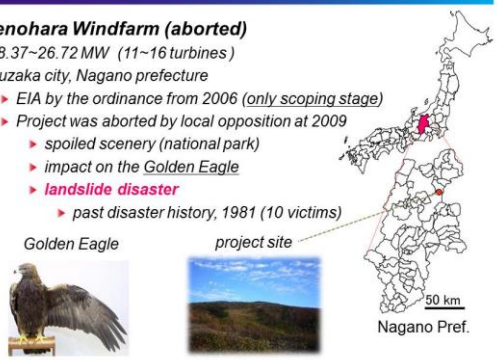
- *conflicts occurred in 38% of wind farm with above 20MW windfarm*
- *noise, infrasound, bird collisions, spoiled scenery,* ***Landslide disaster***

high interest of local residents

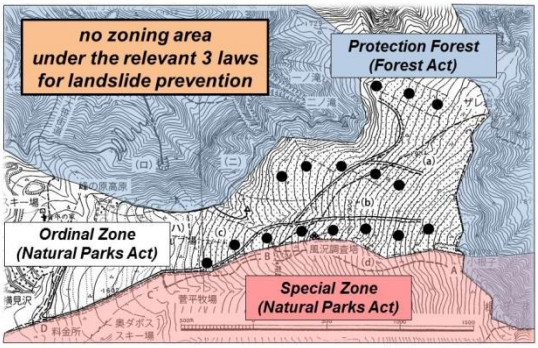
3. A case study and discussion

Context 16

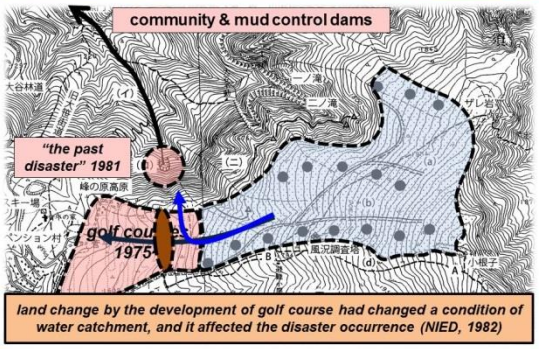
Minenohara Windfarm (aborted)
- *18.37~26.72 MW (11~16 turbines)*
- *Suzaka city, Nagano prefecture*
  - *EIA by the ordinance from 2006 (only scoping stage)*
  - *Project was aborted by local opposition at 2009*
    - *spoiled scenery (national park)*
    - *impact on the Golden Eagle*
    - ***landslide disaster***
      - *past disaster history, 1981 (10 victims)*



Project Site (land-use zoning) 17



Project Site (past disaster history) 18



EIA Scoping (before) 19

item	scope	reason
noise	○	
radio disturbance	○	
animal	○	
vegetation	○	
landscape	○	
recreation	○	
landform/geology	×	• scientific significant landform and geology does not exist in the project site • however, muddy runoff and landslide by such as rainfall would be investigated separately

- *in the first place, **"grand" was not selected** to the list of scoping*
  - *muddy runoff & landslide will be investigated **separately***
- *the document didn't mention **the past disaster history***

EIA scoping (after) 20

Public opinions to the scoping documents

- concern about landslide disaster occurrence
  - integrate the investigation into EIA process
  - survey the past disaster history closely
  - predict the amount of rain runoff and evaluate the risk

landform/geology (landslide), water quality were added to the environment items

EIA could take into account the risk of landslide disaster by extending "landform/geology" and "water quality"

Discussion and challenges (1) 21

Wind farm development (the Ordinance of the Competent Ministry)

- *natural components of the environment*
  - *air* — *air quality vibration odor noise/infrasound others*
  - *water* — *water quality bottom material groundwater others*
  - *soil & others* — *landform/geology soil ground others*
- *biodiversity and natural environment*
  - *vegetation / animal*
  - *ecosystem*
- *rich contacts between people and nature*
  - *landscape*
  - *recreation*
- *environmental load* — *waste GHGs*

shadow flicker

"grand" is excluded, therefore basically not considered

Discussion and challenges (2) 22

*In the first place, **lack of knowledge to assess the disaster risk ?***

NIED have surveyed 186 dominant disasters from 1586

- ***Lack of knowledge to assess the disaster risk by EA***
  - difference of the governing ministry
    - Japanese EA → Ministry of Environment
    - Landslide → Ministry of Land, Infrastructure, Transport and Tourism
  - methodology is different from *"existing environment items"*
    - long timescale
    - irreversibility
    - integrated (e.g. landform + ground + rain runoff)

4. Conclusion

Conclusion 24

by the case study of wind farm development

(A)zoning by the relevant 3 laws for landslide disaster prevention is not always sufficient

(B) landslide disaster could be a dominant issue of concern during a EIA process

(1) the need integrating landslide disaster prevention in Japanese EA especially on wind farm development is high
- *accelerating development*
- *project characteristics (deforestation & land formation)*
- *high interest of local residents*

(2) under the existing framework, EA could take into account the risk of landslide disaster by extending the environment items
(e.g. landform/geology, ground, water environment.)
- *even integrating the existing knowledge in EA would be effective*

3.4 Disaster Management and Environmental Assessment tools

Integration of Risk Management and EIA

Takehiko Murayama

Professor, Tokyo Institute of Technology

Abstract

Great East Japan Earthquake and subsequent a severe accident of Fukushima Daiichi nuclear power plants challenged us about various issues. Through our extremely rare experiences, we are expected to conduct interdisciplinary activities to improve risk management for low probability and high consequence (LPHC) disasters. From these points of views, the following aspects would be covered; re-examination of definition of risks, decision-making system or governance for risk management among various stakeholders, some challenging approaches on better management for 'beyond assumption' events, and coordination with EIA.

リスク管理と環境アセスメントの統合に向けて

村山武彦

東京工業大学

（和訳）

東日本大震災と、それに続く、深刻な福島第一原子力発電所事故は、我々に多くの課題をもたらした。我々の非常に稀な経験を通じて、LPHC 型（Low-Probability/High-Consequence）災害の危機管理改善に向けた学際的活動の実施が、我々に期待されている。これらの視点から、リスクの定義の再検討、様々な利害関係者の間のリスク管理に向けた意思決定制度あるいはガバナンス、「想定外」のイベントのより良い管理についての、いくつかの難しいアプローチ、EIA との調整といった側面について述べる。

Integration of Risk Management and EIA

Takehiko Murayama
Professor, Tokyo Institute of Technology

1. Background and purpose

Great East Japan Earthquake and subsequent a severe accident of Fukushima Daiichi nuclear power plants challenged us about various issues. Through our extremely rare experiences, we are expected to conduct interdisciplinary activities to improve risk management for low probability and high consequence (LPHC) disasters. From these points of views, the following aspects would be covered; characteristics of disaster prevention measures, difficulty of damage estimation with assumption and scenario, importance of resilience assessment with indicators.

2. Difference of the processes between EIA and risk management

Compared with EIA, risk management relatively more depends on several assumptions and scenario-setting. That would lead we have to estimate potential damages with substantial uncertainty. In fact, national and local governments do not use the word “prediction”, but “estimation” for earthquake risk. This point would be one of the most important points to show the difference between the two approaches.

In particular, risk management for natural disaster in Japan usually would be conducted against potential damages based on several assumptions. In comparison to other disasters, it would be more difficult to predict the place and time earthquake and tsunami occurred. That is one of the most critical points to disturb our effective management.

3. Case of Damage estimation by earthquake and tsunami in Miyagi Prefecture

One of typical damage estimation for earthquake and tsunami would be a case of Miyagi Prefecture, which is located in Northern part of Main land of Japan, and one of severely damaged areas by Great East Japan Earthquake. Unlike other regions in Japan, this prefecture is suffered from large-scale earthquake regularly. Roughly speaking, large-scale quakes would occur every 30 years.

Based on the information of previous earthquakes, Miyagi prefectural government published potential damage by future earthquake. For this purpose, they made the following assumptions. For plate type earthquake, they assumed 2 locations of quake source (one for Tsunami), and quake scale would be about magnitude 7.6 to 7.8. For another type whic (Source: Damage estimation by Miyagi Prefecture in 2004) ılt as a location of quake source, and magnitude 7.1 as a damage scale. In addition, they assumed the following two scenarios for season, time, and weather conditions;

- Noon in summer, 0 pm on weekday, clear, 75% in humidity, wind: 4.5 m/s from south-southeast

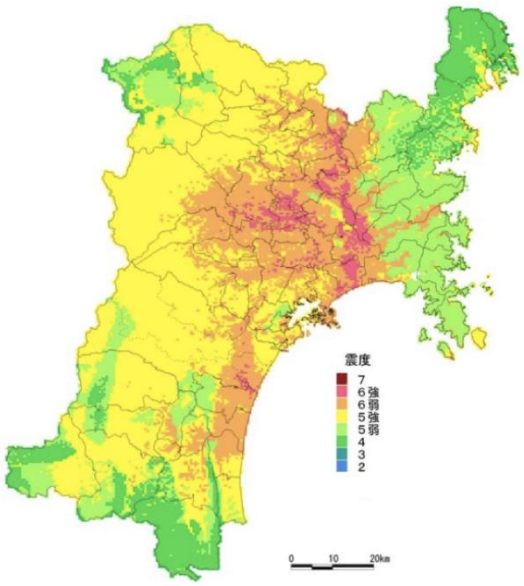


Fig 1 Estimated scale of vibration in Miyagi

Fig 2 Estimated height of tsunami

(Source: Damage estimation by Miyagi Prefecture in 2004)

- Evening in winter, 6 pm on weekday, clear, 60% in humidity, wind: 6.0 m/s from west-northwest

Figure 1 and 2 show estimated scale of vibration and height if tsunami respectively. These estimations were made in 2004, and people in this region could access the related information and conduct some management against potential damage by earthquake and tsunami. However, Great East Japan Earthquake overwhelmed those estimations in scale, and almost all efforts of people against the disaster unfortunately were in vain. Experts of earthquake said that the quake may occur one in a thousand and quite difficult to estimate.

4. Importance of resilience assessment

Previous risk management emphasized to prevent from potential damages against natural disasters. While this approach would be effective disasters for which we could predict future damages. However, we also have to manage another types of disasters for which we have a lot of difficulties to predict. Under these situations, we should more emphasize on preparedness of regional robustness after disaster. With indicators for regional resilience, we would assess regional robustness as well as the impact of disasters. These indicators may include; carrying capacity, cleaning ability as environmental aspect, diversity of economic activities, balance of inter and intra activities as economic aspect , and strength in unity of community, balance of age groups, and collaboration of other regions as social aspect.

Japan-UK WS
1 Dec, 2012
Chiba U of Commerce

Integration of Impact Assessment and Risk Management

Takehiko Murayama, PhD
Tokyo Institute of Technology

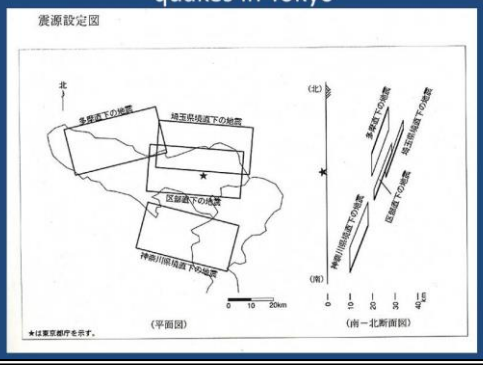
Background and Purpose

- Background
  - Individually implementation of EIA and RM in Japan
  - Personal experiences in both fields
- Purpose
  - Characteristics of disaster prevention measures
    - Difficulty of damage estimation (with assumption and Scenario)
    - Lack of consideration on sequence of events after disaster
  - Possible role of IA for disaster management
    - Clarification of sequence of events in Scoping stage
    - Evaluation of resilience (with indicators)
    - Information disclosure and stakeholders involvement (on assumption, scenario and management)

Process of EIA and RM

EIA	RM (for natural disaster)
Screening	Risk identification
Scoping	Assumption & Scenario setting
Estimation & Evaluation	Damage estimation
Mitigation	Planning for damage prevention

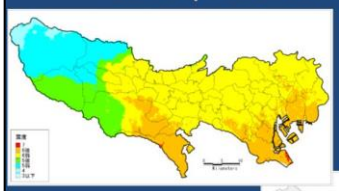
4 estimated locations of centers of quakes in Tokyo



Case of Damage Estimation by Quake in Tokyo

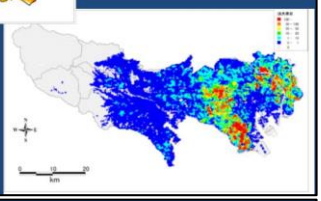
- Assumption
  - Plate type
    - Location of quake source: Sagami Trouf in Pacific Ocean
    - Scale: about magnitude 7.9 (the same as Kanto Great Earth in 1923)
  - Another types which are located directly above quake source
    - Location of quake source: Core, Suburb, Others (Kanagawa, Saitama)
    - Scale: magnitude 7.2
    - Depth of quake source: 20 to 30 km
- Scenario
  - Season and time: 6 pm on weekday in winter
  - Wind speed: 6 m/s

Example of damage map



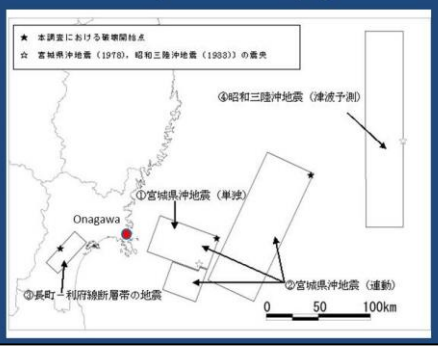
Distribution of vibration

Distribution of houses burnt after quake



Location of Miyagi Pref.

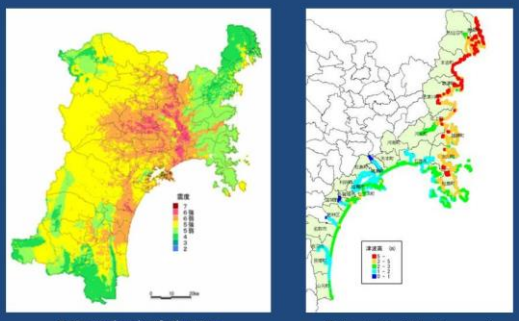
3 estimated locations of centers of quakes in Miyagi



Case of Damage Estimation by Quake in Miyagi

- Assumption
  - Plate type
    - 2 Locations of quake source (one for Tsunami)
    - Scale: about magnitude 7.6 to 7.8
  - Another type which are located directly above quake source
    - Location of quake source: a fault
    - Scale: Magnitude 7.1
- Scenarios
  - Noon in Summer
    - 0 pm on weekday , Clear, 75% in humidity
    - Wind: 4.5 m/s from south-southeast
  - Evening in Winter
    - 6 pm on weekday, Clear, 60% in humidity
    - Wind: 6.0 m/s from west-northwest

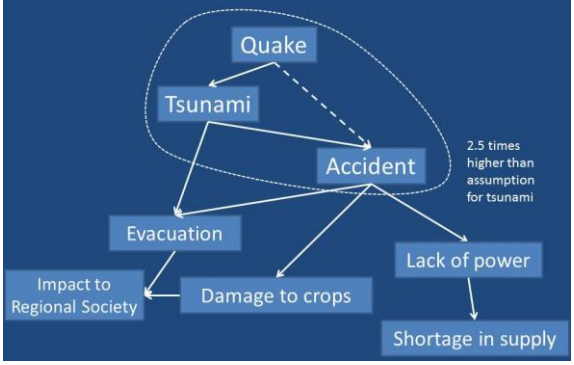
Example of damage estimation in 2004



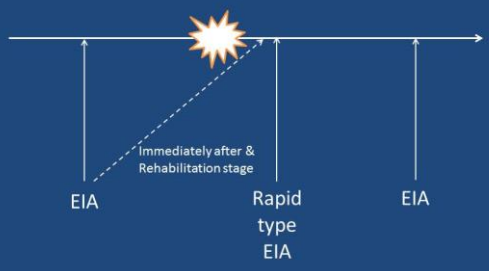
Estimated scale of vibration

Estimated height of tsunami

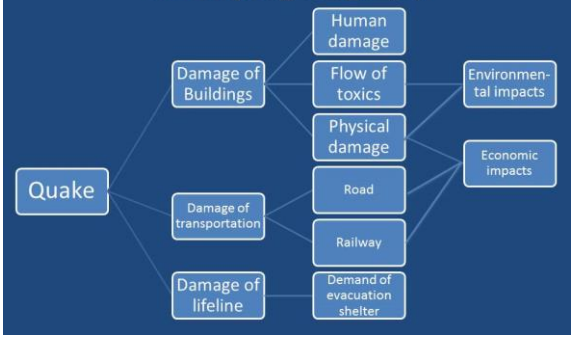
Sequence of events in Fukushima accident



Possible Roles of EIA



Consideration of event sequences in Scoping stage (1)



Consideration of event sequences in Scoping stage (1)

		Damage of Buildings		Damage of lifelines			Damage of transportation		...
		Office and House	Factory	Electricity	Water	Gas	Road	Railway	
Environ-mental aspect	Air		○						
	Water		○						
	Waste	○	○						
Econo-mic aspect	Distribu-tion	○					○	○	
	Regional economy		○	○	○	○			
Social aspect	Household	○		○	○	○	○	○	
	Communit y								

Evaluation of Resilience (with indicators)

- Preparedness of Regional robustness after disaster
- Resilience indicators may include
  - Environmental aspect
    - Carrying capacity
    - Cleaning ability
  - Economic aspect
    - Diversity of economic activities
    - Balance of inter and intra activities
  - Social aspect
    - Strength in unity of community
    - Balance of age groups
    - Collaboration of other regions

Information disclosure and stakeholders involvement

- Necessity of information disclosure
  - Consensus-making on justification of assumptions and scenarios
  - Application of precautionary principle
    - Implementation of feasible measures under scientific uncertainty
    - Burden of proof on validation of applied measures
- Stakeholder involvement
  - Application of local knowledge
    - Lessons in tsunami disaster in Tohoku region (Stone monuments and locations of shrines)
  - Balance among self, community and public relief in both prevention and post-disaster stage

EIA, SEA and the UK Civil Contingencies Act

Ross Marshall

Head of National Environmental Assessment Service, Environment Agency

Abstract

An important aim of the UK Civil Contingencies Act 2004 was to strengthen institutional emergency planning, civil resilience and multi-agency responses to disaster events. In this context, what strategic role or tactical contribution the practice of EIA and SEA, and its practitioners can play before, during and after an emergency is an important question. This presentation will look at the way in which the Act is asking different groups (including EIA and SEA practitioners) to co-operate. Using the Lincolnshire coast line as a case study, implications will be elaborated on and explained.

（和訳）

環境アセスメント、戦略アセスと、英国緊急事態法

ロス・マーシャル

英国環境庁

英国の 2004 年民間緊急事態法の重要な目的は、制度的な緊急計画立案、民間の回復力、そして災害への複数の機関による対応を強化することであった。この関連において、EIA と SEA の実施およびその実施者が、緊急事態の前、最中、そして後に、どのような戦略的役割を演じることができるか、あるいは如何なる戦術的な貢献を行えるのか、というのが、重要な疑問である。本プレゼンテーションは、同法が、どのように（EIA と SEA の実施者を含む)様々なグループに協力を求めているのかを検討する。事例研究としてリンコリンシャー海岸線を用いて、影響について、詳しく述べ、説明する。

Environment Agency

Environment Agency

EIA, SEA and the Civil Contingencies Act 2004

Dr Ross Marshall
Head, National Environmental Assessment Service
Environment Agency

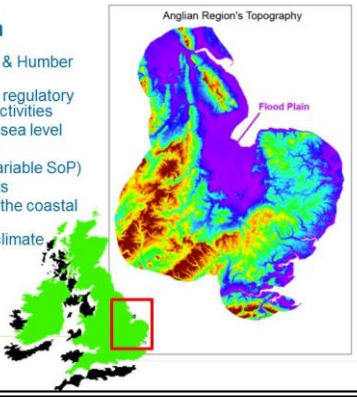
Japan-UK Joint Workshop
Policy Integration between IA and Disaster Management
Chiba University of Commerce, 30 Nov – 3rd Dec, 2012, Ichikawa, Japan

AIMS

- Brief introduction to the Civil Contingencies Act 2004
- How the Act has stimulated Multi-Agency emergency preparedness, response and co-operation
- An outline of how SEA and EIA procedures, and practitioners are fulfilling Strategic & Tactical Roles within the EA and regional Emergency management frameworks
- Background scenario - The Environment Agency's Anglian Region - Northern Area (Humberside, Lincolnshire & Northamptonshire)

Anglian Region

- Contains the Thames & Humber estuaries
- EA's largest region re regulatory and flood protection activities
- Fifth of Region below sea level
- 470km of open coast
- 11,85km sea walls (variable SoP)
- ¼ of all Agency Assets
- 133,000 properties in the coastal floodplain
- Habitats sensitive to climate change



Risks

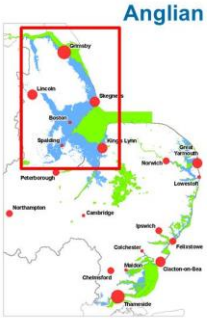
Highest Risks
Flooding
Pandemic Flu

High Risk
Chemical release
Fire & Explosion (at a refinery)
Low temps/Heavy snow

Medium Risk
Aviation/Transport incident
Storm/Gales
Fuel protests
Telecommunications loss

Low risk
Maritime incident
Building collapse
Large scale public protests
Public events and mass gatherings
Volcanic ash disruption

Anglian Coastal Flood Risk



Properties in the floodplain (where greater than 1000).

Coastal Floodplain (blue)

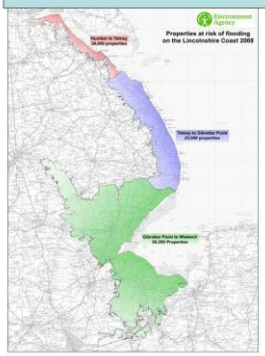
European designated habitats (green)

Lincolnshire & The Wash Coastline

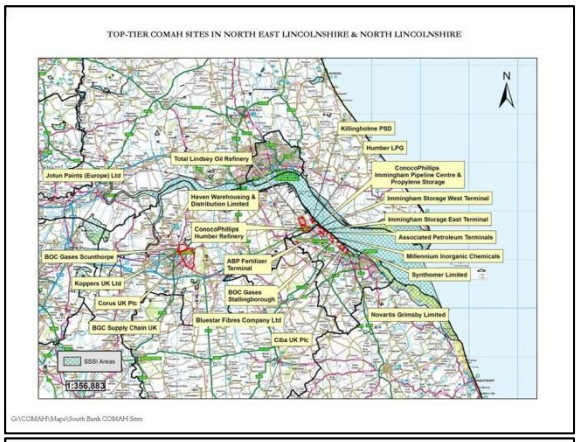
The area flooded from the sea in 1953 causing 41 fatalities

- 9 major breaches in defences
- Over 100 smaller breaches
- Floodwater penetrated 9km inland

FLOOD RISKS NOW



- 75,000 houses
- 200,000 people
- 6,000 businesses
- 40,000 caravans
- 200,000 hectares of
- agricultural land
- >£10bn of infrastructure



Major Agricultural production & processing centre

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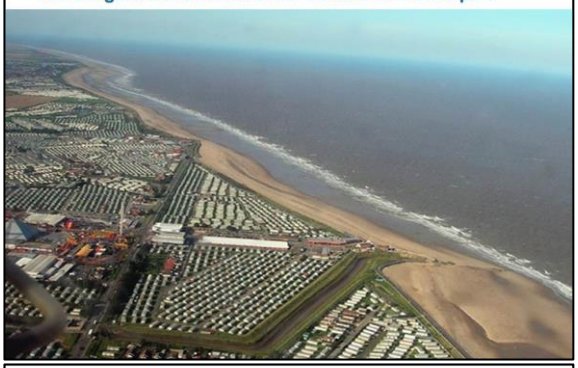
The Largest Concentration of Caravans in Europe !

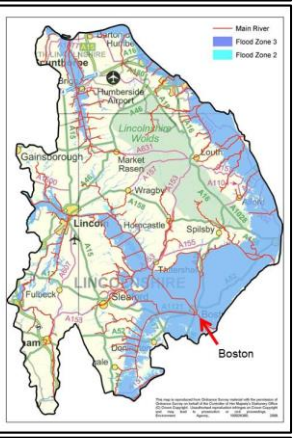


Anglia's Northern Region has a variety of risks that in the event of a disaster would affect the Environment Agency & its emergency response partners

Main industrial environment risks are from the COMAH sites within the region especially on the South Humber Bank

Main natural environmental risks are from fluvial and coastal flooding

A concentration of individual and cumulative risks



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Civil Contingencies Act 2004

- Brief history - 1980's decade of disaster
  - Several disasters varying in nature - flood, fuel, fire, strike, mass fatalities, foot and mouth, disease (flu, SARS)
- post incident investigations, court impression:
  - Breakdown in communications
  - Silo working - little liaison between agencies
  - Loss of public confidence

At the very worst time of thier lives, the very least we can do, is our best

Marchioness public inquiry

Environment Agency

Civil Contingencies Act 2004 - Background

- The Act (and accompanying non-legislative measures) delivers a single framework for civil protection in the UK
- Capable of meeting twenty-first century challenges.
- The Act is separated into two substantive parts:

- Part 1: Local arrangements for civil protection
  - Duty to co-operate on designated bodies
  - Duty to ensure that Business Continuity run alongside Response
  - Duty to prepare Recovery plans
- Part 2 of The Act updates the 1920 Emergency Powers Act
  - It allows for the making of temporary special legislation (emergency regulations) to help deal with the most serious of emergencies or exceptional circumstances
  - subject to a robust set of safeguards.

Environment Agency

- **Part 1** establishes the roles and responsibilities for Agencies involved in emergency preparation and response at a local level.
- The Act divides local responders into two categories, imposing a different set of duties on each.
  - **Category 1 responders** - Organisations at the centre of the response in most emergencies
    - Local (and neighbouring authorities)
    - Emergency services - police forces, fire and rescue authorities, ambulance services
    - Government agencies – The Environment Agency, Marine & Coastguard Authority
    - National Health Service and Health bodies - Primary Care Trusts, Acute Care (Hospitals)
    - Category 1 responders are subject to the full set of civil protection duties.
  - **Category 2** responders (e.g. Health and Safety Executive, Transport and Utility companies).
    - "Co-operating bodies" less likely to be involved in the heart of planning work but heavily involved in incidents affecting their sector.
    - Lesser set of duties - co-operating and sharing relevant information with other Category 1 and 2 responders.
  - Category 1 and 2 organisations are required to come together to form **Local Resilience Forums** to help co-ordination and co-operation between responders at the local level.

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Role of the environment agency as a Category 1 Body

At incidents involving flooding/storm surge our role is to

- Support the joint response providing representatives to the Emergency Control points
- Issue flood warnings
- Maintain and operate assets vital to flood defence
- Monitor water levels and flows, assess risk and advise the emergency services and local authorities
- Check flood defences, monitor and clear blockages to rivers, streams, culverts, etc.
- Repair breaches in dams and flood defences
- To support other responding agencies with materials, equipment and manpower as far as our resources and duties permit

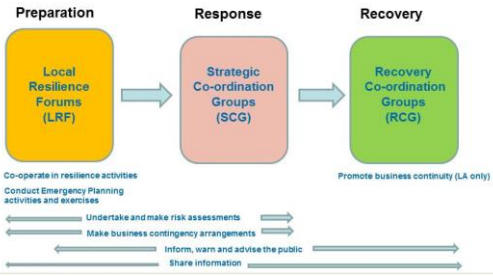
At incidents involving actual or potential environmental damage our role is to

- Provide co-ordination and management of the environmental response to the incident
- To assess the risk of the incident to the people, environment and property
- Prevent or minimise impacts on human health, the environment and property
- Investigate, gather information and evidence for possible enforcement or legal action
- Ensure that the owner/operator/polluter takes responsibility for the appropriate remedial actions in an approved, professional and competent manner, recovering incident response costs and investigation at every opportunity
- Where no source or responsible party is identified to take remedial action
- Notify, warn and advise relevant stakeholders
- Work effectively with external parties e.g. The emergency services

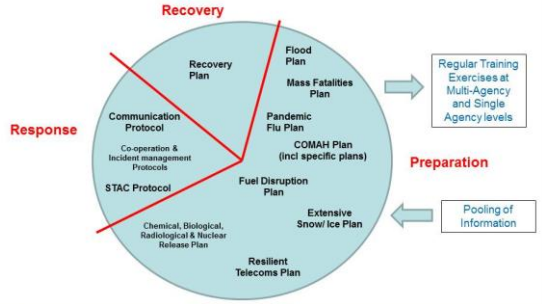
How the Act is facilitating multi-Agency response and co-operation

- A Duty of Co-operation on Category 1 bodies to:
  - Undertake and make risk assessments
  - Make business contingency arrangements
  - Conduct Emergency Planning activities and exercises
  - Inform, warn and advise the public
  - Co-operate in resilience activities
  - Share information
  - Promote business continuity (Local Authorities only)
- The primary vehicles for these are the Local Resilience Forums
  - Lincolnshire LRF, Humberside LRF and Northamptonshire LRF

What does this look like in Practice



Impact Assessment – Emergency Procedures Manual



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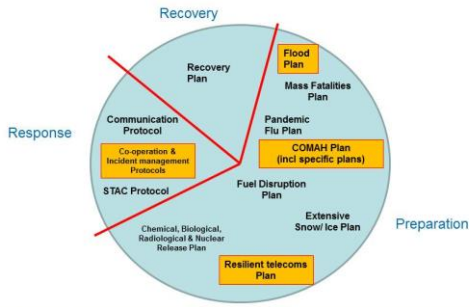


Co-operation & Incident Management Protocols

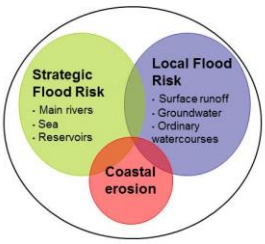
- **Impact assessment - Several identified as necessary for consideration during Incidents**
- **Threat assessment** - on-going hazards: potential for escalation; the availability of responders; and the effectiveness of response effort
- **Health and welfare** - including casualties and fatalities; the availability of Medical Care; Public Health Concerns; availability of Care facilities; and on-going health monitoring requirements
- **Natural environment** - including water courses and the marine environment; Air Quality; Contamination & Ground Deposition; and wildlife
- **Social environment** (including Community impact assessment) - including public anxiety & psychological impacts; community tensions; provision of education; social disruption; non-profit organisations and community groups; Security & public order
- **Built environment** - including Housing; transportation & highways; infrastructure & utilities; business & industrial facilities; Culturally significant structures and sites
- **Economic environment** - including Supply and distribution; Agriculture & Forestry; Tourism; Small businesses; Workforce and local tax base
- **Cumulative impacts and principle recovery considerations**

Co-operation & Incident Management Protocols

- Impact assessment - Several identified as necessary for consideration during Recovery
- Impact of the emergency on community
- Nature and extent of continued humanitarian assistance and health
- Community safety
- Provision of temporary Social infrastructure (education, welfare, transport, utilities)
- Environmental issues (pollution, decontamination, waste, protection of critical resources and natural habitats)
- Economic and business recovery

Flood Plans

- Existing SEA Regulatory provision for:
  - National Flood Plan
  - River Basin Management Plans
  - Flood & Coastal Risk Management Plans
  - Shoreline Management Plans
  - Flood Appraisal Strategies
- Data from these plans helps structure and support the information base contained within an LRF Flood Plan



Strategic Overview

COMAH (Control of Major Accident Hazards Regulations 1999) Plans

- The plans seek to reduce the consequences of a major accident at a COMAH site through effective on-site emergency planning and response arrangements and, where necessary, dovetailing between these and off-site emergency arrangements (both COMAH, and LRF plans)
- Many of the existing sites were constructed prior to the introduction of the EU (and UK) EIA Regulations.
- New production plants & structures may only have an EIA that is structure specific and not cover the whole site
- Suspicion that many EIA deficient in emergency response scenarios

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Resilient Telecoms Plan

- The SEA Directive applies to a wide range of public plans and programmes (e.g. on land use, transport, energy, waste, agriculture, etc.).
- An SEA is mandatory for plans/programmes which are:
  - are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste/ water management, **telecommunications**, tourism, town & country planning or land use and which set the framework for future development consent of projects listed in the EIA Directive.
- LRF Plans seem to focus on the adequacy of emergency service equipment and the use of 3rd sector resources.
- No apparent focus on the protection of sensitive network structures

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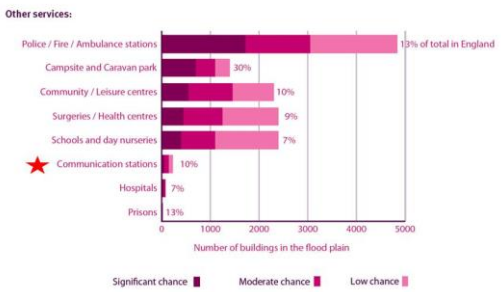
Telecommunication Services at Risk of Flooding



Environment Agency

The Role of the EIA & SEA Practitioner

- **NEAS**
- 76 staff (2 teams, 14 staff in Anglian region)
- Preparation and management of all Agency statutory obligated SEA & EIA
  - Typically 30 EIA p.a.; 10 SEA
  - Lead on key Agency interfaces
- Emergency & Incident Roles as
  - Gold Commander
    - + Gold Liaison Support Officer
    - STAC
  - Silver (Tactical Response Room)
    - Data Loggist
    - Call Handlers
  - Bronze – Flood Monitoring officers (depth gauge reading)
  - Recovery phase (recording flood level extent)

Environment Agency

Scientific and Technical Advisory Cell (STAC)

- Provides a co-ordinated scientific and technical advice to support the response and advise the SCG

Duties

- Provides a common source of technical advice to SCG (pools information) and provides a common view on the merits of different courses of action
- Monitors and corrals the responding scientific and technical community to deliver the SCG's objectives
- Provide a common brief to the technical lead from each agency represented on the STAC
- Liaise with national specialist advisors and their agencies to ensure consistent advice locally and nationally
- **Potential Co-ordination Role for Experienced SEA & EIA Practitioners**

Environment Agency

Summary

- Future presents many challenges – 'known unknowns & unknown unknowns'
- The UK needed the Civil Contingencies Act to fill Emergency Response gaps and to create a more joined up approach
- Significant steps since then have been made in co-ordinating Multi-Agency response and inter-Agency relationships
- The LRFs have made significant progress in determining levels of local risk and how to mount a robust response to Emergencies
  - Impact Assessment has helped LRF's understand the risk and what it will take to manage it , but SEA & EIA have to date only acted as peripheral tools & data sources.
  - SEA & EIA are primarily statutory tools to counter the adverse effects of site specific development or spatial planning.
  - More can be made of EIA/SEA tools and techniques and their practitioners
  - Can EIA and SEA techniques adapt fast enough to 'real time' emergencies
  - In the Emergency Plan preparation phase there is a role for SEA & EIA to promote holistic, Innovative and sustainable solutions considering natural resilience
- The skill sets and experience of IA practitioners are valuable and directly applicable to Emergency Management, notably
  - Big picture thinking
  - Cross-disciplinary management
  - Communication, Writing skills and Report summary
  - Adaptive mitigation management
  - Cumulative assessment across natural, social and technical spheres

Environment Agency

QUESTIONS?

Thank You

Environment Agency

Exemption Clause in Japanese EIA Law in Disaster：Looking into the Functions

Atsuko Masano
Freelance Journalist

Abstract

TEPCO's Fukushima Daiichi Nuclear Power Plant disaster triggered by Great East Japan Earthquake on March 11, 2011 revealed the fact that exemption clause in the Japanese EIA Law was cut out neither for risk management nor post disaster management. Article 52-1 needs to be removed for assessing radioactive effects. Application of Article 52-2 and 52-3 needs careful review for future cases and preparations through lessons learned this time.

災害時における日本のアセス法の除外規定、その機能の検証

まさのあつこ
ジャーナリスト

（和訳）

2011 年 3 月 11 日の東日本大震災によって発生した TEPCO の福島第一原子力発電所事故は、日本の EIA 法の適用除外規定がリスク管理にもポスト災害管理にも適していないという事実を明らかにした。第 52 条 1 は、放射能の影響の評価のために、削除されるべきである。第 52 条 2 と第 52 条 3 の適用は、今回の教訓を通じた今後の事例と準備に向け、慎重な見直しが必要である。

Exemption Clause in Japanese EIA Law in Disaster：Looking into the Functions

Atsuko Masano
Freelance Journalist

Introduction

Japanese Environmental Impact Assessment Law (JEIA) is applied to specified large scale projects such as roads, dams, railroads, airports, power plants, waste disposal sites, land filling and reclamation, developments of housing, industry, commodity distribution areas, ports and so on. Among the projects, there are 3 categories to be exempted from assessment procedures. Unfortunate TEPCO's Fukushima Daiichi Nuclear Power Plant disaster, triggered by Great East Japan Earthquake on March 11, 2011, gave us opportunities to look in the function of theses exemption clauses.

Radioactive Substances (Clause 52-1)

Clause 52-1 says, "The provisions of this Law shall not apply to air pollution, water pollution (including deterioration of water conditions other than water quality and soil at the bottom), or soil pollution caused by radioactive substances." It means JEIA is applicable to only nuclear power plants among the all kinds of nuclear use facilities but when nuclear power plants were assessed, radioactive substances were not considered as impact. Therefore there was no available information for the public at the planning stage nor at the time of emergency like Fukushima. There was no coordination or integration between environmental assessment and disaster management as preventive methods.

Beside at the time of Fukushima Accident, Japanese government withheld information on radioactive contamination data called "*SPEEDI*", System for Prediction of Environmental Emergency Dose Information". Without being informed which direction radioactive substances goes some people ended up evacuating towards more contaminated areas than the place where they started evacuation.

This is caused by sectionalism between the Basic Environmental Law and the Atomic Energy Basic Law and to resolve the issue it is said that reform bill will be submitted to the Ordinary Diet in 2013. There are several other things to be done. One is reopen the EIA procedures including radioactive impact assessment with the worst scenario of the accident. Another is to include other nuclear facilities such other nuclear fuel factories and nuclear waste disposal site to avoid any form of damage on human health and biodiversity by radioactive substances.

Natural-Disaster Stricken Areas (Clause 52-2)

The project to restore an area stricken by natural calamities is exempted from EIA procedures according to Clause 52-2. However after the Fukushima Daiichi Nuclear Power Plant Accident, this clause was applied to introduce new thermal plants in existing sites of TEPCO outside the natural calamities stricken areas such as Chiba and Kanagawa Prefectures. Table 1 shows TEPCO could start operating totally 2.8 million kW operating thermal Power Plants to replace some part of Fukushima Daiichi

generating capacity. Their reasoning is that "the project to restore an area stricken by natural calamities" can be interpreted as restoring "function" lost in natural calamity. Therefore restoring function of TECPO's Fukushima Daiichi Nuclear Power by thermal plants in different places than natural disaster stricken area was exempted. However question remains. It is certainly true that natural disaster triggered the disaster. However there were warning against lack of precaution against natural disaster which TEPCO took no countermeasures. Is it morally right if TEPCO's thermal plants were exempted from EIA procedure to restore to compensate the function of Fukushima Daiichi No.1~No.6 whose total power generating capacities is 4.7 million kW. Before questioning it, let us think what else could be done.

Table 2 shows renewable energy generating power capacities before and after FIT, feed-in tariff system went into force in July 2012. It has been strong opposition against introducing this system resulting in limited dependency on renewable energy. However Fukushima accident became a wakeup call and started. After three month by the end of Oct. 2012, the capacities increased by 1.15 million kW and is expected to increase at least up to 2.5 million kW, which is almost equivalent to what TEPCO gained in 5 months through exemption of EIA.

Table 1: EIA Exempt Thermal Power Plants of TEPCO

Press Release	Place	Power (million kW)	Starting
15-Apr-11	Anegasaki	0.006	Apr-2011
15-Apr-11	Sodegaura	0.11	Jul-2011
15-Apr-11	Chiba	1	Aug-Dec-2011
21-Apr-11	Ooi	0.21	Jul-2011
22-Apr-11	Kawasaki	0.13	Aug-2011
6-May-11	Yokosuka	0.33	Jun-2011
16-May-11	Hitachinaka	0.25	Jul-2011
29-Jul-11	Kashima	0.8	Jul-2012
Total Generating Capacity		**2.836**	

Unit :million kW Source: TEPCO

Table 2: FIT(Feed-in Tariff) commenced in July 2012 (As of the end of Oct. 2012)

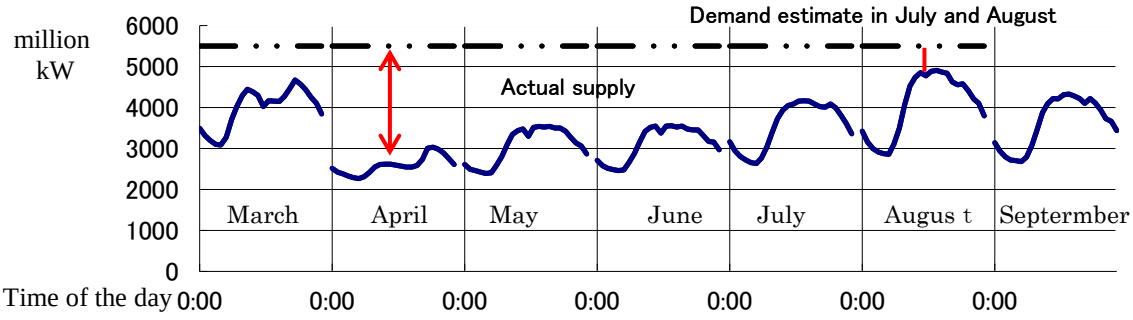
	Before FIT in FY2011	Apr-Oct FY2012 Operating Capacity	Total Estimate by the end of FY 2012	Authorized Capacity by the end of Oct. 2012
Solar （house)	4	0.88	1.5	0.586
Solar （non-house）	0.8	0.24	0.5	1.627
Wind	2.5	0.014	0.38	0.336
Water （over 1000 ）	9.35	0.001	0.02	0
Water(less than 1000 ）	0.2	0.002	0.01	0.002
Biomass	2.1	0.012	0.09	0.006
Geothermal	0.5	0	0	0
Total	19.5	**1.155**	2.5	**2.557**

Unit :million kW Source: Agency for Natural Resources and Energy released on December 16, 2012

And Figure 1 describes 50 million kW demand estimate for July and August electricity consumption, while actual supply on the 1oth day of each month before and after 2011, March 11. It shows due to the consumers effort to cut down their electricity consumption, actual demand was far less than

TEPCO anticipated for summer.

Figure1: Power Supply Every 10th day of March to September, 2011



Source: TEPCO

Japanese Self Defense Force and US Base (Clause 52-3)

Clause 52-3 was newly added in 2011. The clause exempts the projects from provisions of Chapter II, which requires early stage of project EIA, if they concerns with national interests and under other circumstances at the time of occurrence of disaster that are designated according to its urgency by government ordinance.

Due to its rather unclear meaning, during the Diet session for this amendment on April 13th, 2010 at the Environment Committee, House of councilors, Shuichi Kato, the Councilor, asked about interpretation of "other circumstances". Junichi Shiraishi, Environmental Policy Bureau Chief, Department of Environment responded, "For example, occasion when massive amount of waste such as debris at the occurrence of great earthquake is included." Councilor Kato again asked a further question on April 20th, 2010 at the Committee, "Is it only at the time of calamity?" Toshiyuki Inoue, Vice-Minister of Land, Infrastructure and Transport responded, "We anticipate disaster, however there could be cases when we need essential public facilities managed by government for necessary development with surrounding towns" and did not mention further. However, disclosed public record requested through Information Disclosure Law revealed the fact that during inter-ministries procedures of preparing the bill, Ministry of Defense had questioned Ministry of Environment on MOD's anticipation that "giving information on defense facilities to local governments and a nation triggers various opposition movements and causes further more hindrance" and requested defense facilities of both Japan and US be exempted from SEA. And the fact was appeared on media coverage.

Ironically, a year later it was massive Tsunami debris and radioactive debris that the Japanese government faced. However, the government has not prepared its ordinance to exempt neither Japanese Self Defense Force and US Base from SEA from procedures nor massive disaster debris for Clause 52-3.

Table 3 shows the status quo of disaster and Tsunami debris disposal in disaster- hit-prefectures. It became clear, in spite of lack of government ordinance for debris disposal, it is out of scope of JEIA from the first place. And the government decided combustible debris shall be partly transported to and incinerated in other non-disaster-stricken areas of Japan with voluntary spirits of local governments for subsidies by the Ministry of Environment and the rest to be disposed in each disaster stricken prefecture.

However both procedures are lack of public consensus and local governments are facing fierce opposition from the local citizens who fear health and environmental impact by supposedly condensed radioactive substances through incineration. While government's slow decision making and citizens' opposition were taking place, it is now beginning to be said that those debris was overestimated and there were not so much debris. So much fluidity is likely to remain.

Table 3 Status Quo of 3.11 Debris Disposal

Prefecture	Total Waste Estimate	Disaster Debris			Tsunami Debris		
		Estimate	Disposed		Estimate	Disposed	
	mil. tons	mil. tons	mil. tons	%	mil. tons	mil. tons	%
Iwate	5.3	4.0	0.93	24	1.3	0.003	0
Miyagi	187.3	120.0	3.65	30	6.7	0.86	13
Fukushima	3.6	2.1	0.35	17	1.5	0.02	1
Total	275.8	180.2	4.94	27	9.6	0.88	9

Source: DOE, "Status Quo of Disaster Waste Disposal and Policy for Reaching the Target", October 19, 2012

Observation and Conclusion

There must be presumption that there could be times when exemption from time consuming EIA or SEA work well for society. However, looking into function of theses exemption played at the time of Fukushima Daiichi Accident, there are no concrete fact that it worked favorably to the public. On the contrary, it did harm to the public and created confusion and distrust to the government. To conclude based on above observation, here are some recommendations our government should take into count;

1. Finish the sectionalism of nuclear substances and delete Clause 52-1.
2. Start integrate EIA and disaster management especially impact by nuclear substances.
3. Designate all the nuclear related facilities so as to be assessed by EIA. It is crucial as preventive principle that the wide range of residence and businesses surrounding both nuclear power plants and other related facility have information on range of harmful impact at the time of emergency.
4. Remember what people could do to save energy at the time of emergency and there was no hurry to use Clause 52-2 to give exemption to thermal power plants to compensate power companies negligence.
5. Delete Clause 52-3 because disclosed public record and interpretation made during the Diet session are different. And the latter is different from the reality we faced. (Disaster debris disposal is out of scope of EIA and taking different decision making process). It is obvious that these three-way difference stems from the inter-ministry consensus on Japanese Self Defense Force and US Military bases, which is not made clear to the public by the government. Unaccountable clause should not remain in any law.
6. Take public consensus in formal decision making process to avoid confusion and gain trustworthy and fair decision It is essential to have consensus when nuclear substances, whose half life is life time long or generations lives time long, to be disposed for environmental justice.

Exemption Clause in Japanese EIA Law in Disaster : Looking into the Functions

災害時における日本のアセス法の適用除外、その機能の検証

Japan-UK Joint Workshop,
Policy Integration between Environmental Assessment and Disaster Management
Chiba University of Commerce, 2012.Dec.1
Atsuko Masano, Freelance Journalist
email atsukom@mrj.biglobe.ne.jp

Outline

TEPCO's Fukushima Daiichi Nuclear Power Plant disaster triggered by Great East Japan Earthquake on March 11, 2011 revealed the fact that

- exemption clause in the Japanese EIA Law was cut out neither for risk management nor post disaster management.
- Clause 52-1 needs to be deleted for assessing radioactive impacts.
- Application of clauses 52-2 and 52-3 needs careful review through lessons learned this time.

Precondition: What is Not exempted?

JEIA is applied to only large scale projects; roads, logging roads, dams, railroads, airports, power plants, waste disposal sites, land filling and reclamation, developments of housing, industry, commodity distribution areas, ports.

Only specified and limited projects

Exemption Clause

Clause 52-1
radioactive substances.

Clause 52-2
to restore an area stricken by natural calamities

Clause 52-3 Newly added before 3.11. 2011
concerned with national interests and under other circumstances at the time of occurrence of **disaster** that are **designated** according to its urgency by **government ordinance**

Exemption Clause 52-1

The provisions of this Law shall not apply to air pollution, water pollution (including deterioration of water conditions other than water quality and soil at the bottom), or soil pollution caused by **radioactive substances**.

meaning JEIA applies to
-Nuclear Power Plants, but NOT RADIATION
-No Other Nuclear Facilities

Clause 52-1 Resulting In

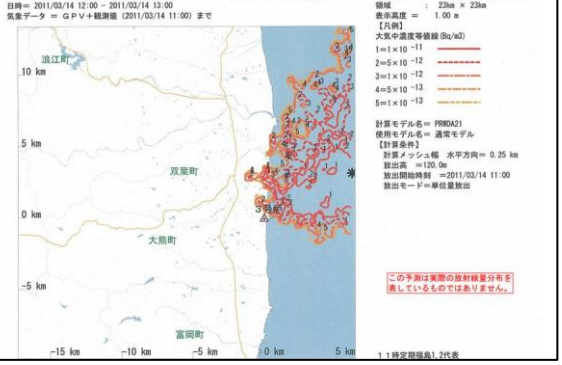
No surveying, predicting, and assessing on radioactive contamination in case of emergency
No precaution (though t/w iodine preparation)
No risk management
No efficient evacuation
No coordination with other preventive methods

System for Prediction of Environmental Emergency Dose Information

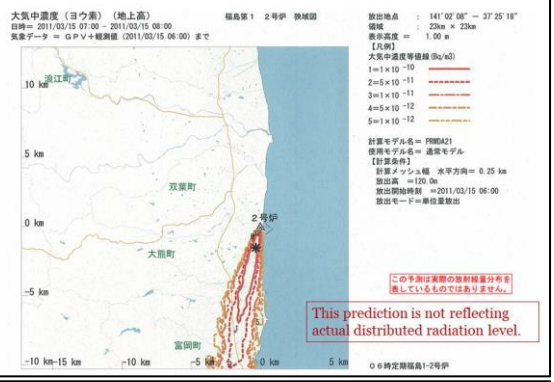
- Japanese government concealed *SPEEDI* data from people,
- resulting in people evacuating towards highly contaminated areas without being informed

Mar.12th 15:36 Fukushima No.1 Explosion

Mar.14th 11:01 Fukushima No.3 Explosion



Mar.15 6:14, 620 Fukushima No.4 and No.2 Explosion



This prediction is not reflecting actual distributed radiation level.

Lessons on Clause 52-1

1. Needs to be deleted.
   Sectionalism is going to be resolved starting from the Basic Environmental Law & the Atomic Energy Basic Law.
   Reform bills will be submitted to the Diet next year.
2. Radioactive Impact Assessment should come with Contingency plan.
3. Other nuclear facilities need to be covered by EIA.
4. Reopen the EIA procedures of all nuclear power plants and facilities.

To avoid, minimize and compensate damage on human health and biodiversity by radioactive substances.

What Happened? 52-2

The provisions of Chapters II through VII of this Law shall not apply to the following:

(a) **a project** to restore an area stricken by natural calamities, as stipulated in Article 87 of the **Basic Law for Disaster Relief** (Law No. 223 of 1961);
(b) **projects** referred to in Article 88, Paragraph 2 of that same Law;
(c) **a project** incorporated into an urban plan pursuant to Article 84, Paragraph 1 of the **Building Standards Law** (Law No. 201 of 1950);
(d) **a project**, as referred to in that same Paragraph 1, that is subject to the provisions of that same Article 84; or
(e) **a project**, as stipulated in Article 5, Paragraph 1, Item 3 of **the Law concerning Special Measures for Recovery of Urban Areas Stricken by Disasters** (Law No. 14 of 1992), to be implemented in a disaster-stricken urban area designated for accelerated recovery under Article 5, Paragraph 1 of that same Law.

EIA Exempt Thermal Power Plants of TEPCO

Press Release	Place	Power (million kW)	Starting
15-Apr-11	Anegasaki	0.006	Apr-2011
15-Apr-11	Sodegaura	0.11	Jul-2011
15-Apr-11	Chiba	1	Aug-Dec-2011
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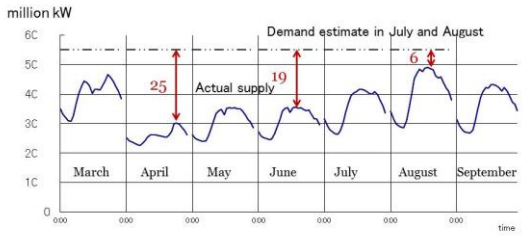
16-May-11	Hitachinaka	0.25	Jul-2011
29-Jul-11	Kashima	0.8	Jul-2012
Total		2.836	

The exempted were supposed to be projects to restore an area stricken by natural calamities
Is it OK to build new plants in different areas, not disaster-stricken-areas?
A kind of the Shock Doctrine?
Fukushima Daiichi No.1~No.6 total 4.7 million kW

Gap between TEPCO's Power Demand Estimate and Actual Supply -Every 10th day of March to September, 2011



Source: TEPCO's Press Release "Demand Estimate This Summer" and TEPCO's actual supply data in 2011

Implemented Power Generating Facilities by Renewable Energy in FY 2012/ As of the end of Oct. 2012

Wake Up Call

FIT(Feed-in Tariff) commenced in July 2012

Unit :million kW

	Before FIT in FY2011	Apr-Oct FY2012 Operating Capacity	Total Estimate by the end of FY 2012	Authorized Capacity by the end of Oct. 2012
☑ Solar (house)	4.00	0.880	1.50	0.586
☑ Solar (non-house)	0.80	0.240	0.50	1.627
☑ Wind	2.50	0.014	0.38	0.336
☑ Water (over 1000)	9.35	0.001	0.02	0
☑ Water (less than 1000)	0.20	0.002	0.01	0.002
☑ Biomass	2.10	0.012	0.09	0.006
☑ Geothermal	0.50	0	0	0
Total	19.5	1.155	2.5	2.557

Source: Agency for Natural Resources and Energy released on December 16, 2012

Lessons on Clause 52-2

1. Gov. should look for consistency with policies such as energy shift and climate change even in facing a disaster.
2. Gov. should remember what people could do and the fact businesses are oriented towards sustainable energy.
3. There was a thin line between TEPCO's disaster management and Shock Doctrine.

Exemption Clause 52-3

Newly added in 2010

The provisions of Chapter II of this Law shall not apply to projects that are greatly concerned with national interests and under other circumstances at the time of occurrence of **disaster** that are **designated** according to its urgency by **government ordinance**.

Government ordinance---not prescribed yet as of Nov.29 2012

Why?

Exemption Clause 52-3 ---Explanation to the Diet

Councilor Shuichi Kato: How do you interpret?

Junichi Shiraishi, Environmental Policy Bureau Chief, Department of Environment: .....
for example, massive amount of waste such as debris at the occurrence of great earthquake....

Apr. 13, 2010 Environment Committee, House of Councilors

Exemption Clause 52-3 ---Explanation to the Diet

Councilor Shuichi Kato: It says "concerned with national interests and at the time of occurrence of disaster". Is it only at the time of calamity?

Toshiyuki Inoue, Vice-Minister of Land, Infrastructure and Transport: We anticipate disaster, however there could be **cases** when we need **essential public facilities** managed by government for necessary development with surrounding towns

Apr. 20, 2010 Environment Committee, House of Councilors

EIA/SEA Reform Bill: Ministry of Defense Requested US Base be exempted --May 14, 2010

Truth is

Disclosed public record through Freedom of Information Act Request showed that during inter-ministries procedures of writing the bill, MOD questioned MOE on MOD's anticipation that "giving information on defense facilities to local governments and a nation triggers various opposition movements and causes further more hindrance" and requested defense facilities of both Japan and US be exempted from SEA.

Because the secret is out.

Dose EIA Exemption function?

Status Quo of 3.11 Debris Disposal

Prefecture	Total Waste Estimate	Disaster Debris			Tsunami Debris		
		Estimate	Disposed		Estimate	Disposed	
	mil. tons	mil. tons	mil. tons	%	mil. tons	mil. tons	%
Iwate	5.3	4.0	0.93	24	1.3	0.003	0
Miyagi	18.7	12.0	3.65	30	6.7	0.86	13
Fukushima	3.6	2.1	0.35	17	1.5	0.02	1
Total	27.6	18.0	4.94	27	9.6	0.88	9

Source: DOE, "Status Quo of Disaster Waste Disposal and Policy for Reaching the Target", October 19, 2012

EIA Exemption is not the answer.

The fact shows it is Not EIA that HIDERS waste disposal.

Confusion | Lack of Trust | Concerns for Future Generation

Lessons on Clause 52-3

1. Honesty Is the Best Policy
Truth comes out in the end,
although truth can be hidden in many ways.

2. People Care
Building waste disposal sites and restoring long last town development can not and should not be built without public consensus. SEA could function as common procedures in the middle of confusion.

3. Ignorance & Indifference Cause Human Disaster

Observation

- Exemption Clause 52-1 is going to be deleted.
- The fact tells us 52-2 and 52-3 did not and will not function in favor of both people and projects.
- Exemption clause showed how the government do not trust its people and vice versa.
- It is not EIA/SEA that hinders proceeding projects or placing facilities but it is hiding and distrust.

Conclusion

- All the exemption clauses could and should be deleted.
- Even at the time of disaster and for contingency plans people and government need information and public participation for wiser decisions.

Thank you!

Embedding evolutionary resilience in impact assessment: a post-normal strategy for disaster risk management?

Alan Bond
University of East Anglia

Abstract

This paper brings together a number of disparate areas in an attempt to find an improved mechanism for disaster risk management: Impact Assessment (IA); post-normal science; and evolutionary resilience. In brief, the justification for considering this mélange of techniques and theories is that together they offer a better strategy for disaster risk management. IA has been developed on the basis of rational decision making whereby better information leads to better decisions. Inherent in this 'positivist' theory of decision making are the assumptions that: a) decision makers behave rationally; and b) impact assessments practice 'normal' science whereby our system understanding is sufficient to associate cause and effect. This article argues that neither of these cases is true, and that IA therefore needs to embed post-normal science thinking to accommodate the uncertainty associated with the outcomes of decisions. Evolutionary resilience is proposed as the basis for achieving this by altering the goals of IA such that they become the ability of the system to change and adapt to the new circumstances (including post-disaster), rather than attempting to preserve the status quo.

（和訳）

インパクト・アセスメントへの進化的レジリエンスの融合：災害リスク管理のポスト・ノーマル戦略となるか

アラン・ボンド
イースト・アングリア大学

本論文は、災害リスク管理の改良されたメカニズムを模索する目的で、多くの異なる分野を集める。すなわち : 影響アセスメント (IA); ポスト・ノーマルサイエンス、そして進化的レジリエンスである。つまり、技術と理論は、一体となってより良い災害リスク管理戦略を提供するのであり、その意味で、この取り合わせを検討することは正当である。IA は、より良い情報がより良い決定を導くという合理的な意思決定に基づいて、策定されてきた。この「実証主義」意思決定論に内在するのは、a）意思決定者は合理的に振舞う;b)我々の制度理解は原因と結果を関連付けるに十分であるとする「ノーマル」サイエンスを、影響 アセスメントは実践する、という仮定である。本稿は、このどちらも真実ではないこと、従って IA は、決定の結果に伴う不確実性に応じるためにポスト-ノーマルサイエンスの考えを織り込むことが必要であることを、主張する。現状維持を図るのではなく、（ポスト災害を含む）新しい状況を変え、また（ポスト災害を含む）新しい状況これに適応するための制度の力となるように、IA の目標を変更して、ポスト-ノーマルサイエンスの考えの織り込みを実現する、そのための土台として、進化的レジリエンスが提案されているのである。

Embedding evolutionary resilience in impact assessment: a post-normal strategy for disaster risk management?

Dr Alan Bond
School of Environmental Sciences
University of East Anglia
Norwich Research Park
Norwich, NR4 7TJ, UK

Abstract

This paper brings together a number of disparate areas in an attempt to find an improved mechanism for disaster risk management: Impact Assessment (IA); post-normal science; and evolutionary resilience. In brief, the justification for considering this mélange of techniques and theories is that together they offer a better strategy for disaster risk management. IA has been developed on the basis of rational decision making whereby better information leads to better decisions. Inherent in this 'positivist' theory of decision making are the assumptions that: a) decision makers behave rationally; and b) impact assessments practice 'normal' science whereby our system understanding is sufficient to associate cause and effect. This article argues that neither of these cases is true, and that IA therefore needs to embed post-normal science thinking to accommodate the uncertainty associated with the outcomes of decisions. Evolutionary resilience is proposed as the basis for achieving this by altering the goals of IA such that they become the ability of the system to change and adapt to the new circumstances (including post-disaster), rather than attempting to preserve the status quo.

Introduction

Klinke and Renn (2002, p.1071) define risk as "the possibility that human actions or events lead to consequences that harm aspects of things that human beings value". Taking the same definition, on the assumption that events can be natural disasters (like Tsunamis), the definition makes it very clear that risk is both an analytic and normative concept. The normative nature of the concept is well recognised if not always welcomed (Anex and Focht, 2002), and has led to proposals for more analytic-deliberative forms of risk governance (Chilvers, 2007). So it is clear that risk is a complex concept and, in the context of potential disasters, this can lead to difficulties in determining appropriate strategies. In this context of *ex ante* consideration of disaster risk, the terminology 'disaster risk management' is used in this paper in preference to 'disaster risk reduction', which is a term which has its roots in the United Nations' declaration of the 1990s as the 'International Decade for Natural Disaster Reduction (IDNDR) with an objective to reduce fatalities, damage to property and socio-economic consequences caused by extreme natural events (Possekel, 1999). The objective of the IDNDR programme is not contested by the author, but the assumption that risk should be reduced is normative, and one that sits uneasily with the lack of certainty associated with risk predictions.

It is generally accepted that disasters are characterised by uncertainty and complexity (European Parliament and the Council of the European Union, 2011)(and in some cases, chaos (for example, Agrawala *et al.*, 2012)). Klinke and Renn (2002) summarise three strategies for managing risks:

1. Risk based approaches
2. Precautionary based approaches
3. Discursive approaches

In considering the three in turn, they develop an 'escalator' of risk management (see Figure 1).

			Risk Tradeoff Analysis and Deliberation Necessary
		Risk Balancing Necessary	Risk Balancing Necessary
	Scientific Risk Assessment Necessary	Risk Assessment Necessary	Risk Assessment Necessary
Routine Operation	**Types of conflict:** cognitive	**Types of conflict:** cognitive evaluative	**Types of conflict:** cognitive evaluative normative
Actors: Agency Staff	**Actors:** Agency Staff External Experts	**Actors:** Agency Staff External Experts Stakeholders such as Industry, Directly Affected Groups	**Actors:** Agency Staff External Experts Stakeholders such as Industry, Directly Affected Groups Representatives of the Public(s)
Discourse: Internal	**Discourse:** cognitive	**Discourse:** reflective	**Discourse:** participatory
Simple	Complex	Uncertain	Ambiguous

Figure 1 The risk management escalator (based on Klinke and Renn, 2002, p.1090)

As an example, the kind of risk assessment conducted by the insurance industry (see European Parliament and the Council of the European Union, 2011 for an example) might be considered to represent a complex problem. That is, whilst some uncertainty in acknowledged, the fact that probabilities of natural events can be calculated means that a mechanistic approach can be taken which satisfies the needs of a single stakeholder (insurance companies). Such an approach has its place, but the individuals affected by a disaster are likely to hold very different views on the outcomes and their implications. This introduces ambiguity into the risk management approach given that complex and uncertain events are considered to have very different meanings amongst different stakeholder groups. In Klinke and Renn's view this leads to a need for risk balancing, although this paper will go on to look at other approaches for dealing with these 'ambiguous' risks.

Given this framing of risk-based strategies for risk management, it is useful to consider the ability of *ex ante* tools to act as a vehicle for conducting such deliberation. There is a recognised risk assessment field (Carpenter, 1995; Petts, 1999) for which the focus is, understandably, risk to humans. At the same time, the risks extend to the wider environment, and the recent move towards ecosystem services assessment acknowledges that humans depend on the services ecosystems offer, and so these services are critical even if indirectly so. The suggestion is, therefore, that risk assessment might usefully be integrated with environmental impact assessment, a recognised ex ante decision-making tool. Indeed, there has been considerable interest in combining risk assessment and environmental impact assessment in the past (see, for example, Arquiaga *et al.*, 1992; Canter, 1993). In this paper, the generic term 'impact assessment' is used to refer to such ex ante decision-making tools, without specifically constraining the focus. There follows a brief review of what we know about the theoretical roots of impact assessment by way of examining its relevance to ambiguous risks.

Impact assessment has been developed on the basis of rational decision making whereby better information leads to better decisions. Inherent in this 'positivist' theory of decision making are the assumptions that: a) decision makers behave rationally; and b) impact assessments practice 'normal' science whereby our system understanding is sufficient to associate cause and effect (i.e. ambiguity is limited). Ravetz (1999) states the assumptions rather more plainly as assuming that science is both value-free and certain. Taking the first of these assumptions, the evidence that objective information is transferred via EIA into policy is somewhat limited (Cashmore *et al.*, 2004; Cashmore *et al.*, 2009; Elling, 2009; Van Buuren and Nooteboom, 2009; Eales and Sheate, 2011). More and more authors argue that decision-making is not rational and that EIA, for example, has considerably more roles than simply information provision (see, for example, Lawrence, 2000; Leknes, 2001; Bond, 2003; Bekker *et al.*, 2004; Cashmore, 2004; Owens *et al.*, 2004). Bartlett and Kurian (1999) detail six separate models explaining the role of EIA in decision-making, in which the information processing (rational) model is just one end of the spectrum of influence; other models include the symbolic politics model, the political economy model, the organisational politics model, the pluralist politics model and the institutionalist model. Research to-date has focussed on the information

processing model, perhaps because it is relatively easy to measure influence, but the evidence suggests that the influence of EIA on decision-making using this model is very limited (see, for example, Wood and Jones, 1997). Richardson (2005) argues that political processes cannot be separated from rational policy and that environmental assessment needs to be able to operate in the context of power, and to be able to incorporate ethics and morality and accommodate the values of stakeholders. Within the context of public participation, he has previously shown that suitably motivated stakeholders can pursue a 'parallel public participation' strategy which will marginalise the EIA and, ultimately, damage its credibility (Richardson *et al.*, 1998).

Taking the second assumption, a number of studies have demonstrated that impact predictions are poor at incorporating uncertainty (see, for example, Bennett *et al.*, 2001) as existing understanding of systems is insufficiently clear to account for all the potential variation. This lack of complete system understanding manifests itself in large numbers of qualitative and unauditable predictions in impact assessment, or predictions which are inaccurate (Dipper *et al.*, 1998). In one example, a Gaussian plume model was compared against tracer data in two urban settings in the USA and found to both over- and under-predict concentrations at different receptors (Hanna and Baja, 2009). There is also evidence that complex prediction leads to a focus on smaller areas of certainty, ignoring no less important issues, but ones which cannot be predicted with any certainty, or organisations might make simplifying assumptions that set inappropriately restricted boundaries around the issues to be investigated (Turner, 1976). Further, Turner (1976) points to analysis which places the outcomes of man-made accidents at roughly 2 human errors per accident (based on a sample of 405), but between 36 and 61 human errors per disaster (based on a sample of 3), the implication being that disasters only come about through an accumulation of errors that are difficult to foresee.

As such, there is cause for concern for both assumptions, with little evidence that impact assessments are used rationally in decision-making, and only limited evidence that science is certain. Furthermore, in the context of disasters, uncertainty is guaranteed. This means that the positivist theory of impact assessment is not fit for purpose in any case, and certainly not for disaster risk management purposes. Instead what is required is a process which can apply 'post-normal' science to reflect both uncertainty and differing values. It is almost two decades since Funtowicz and Ravetz wrote a number of articles arguing for the application of post-normal science to situations where either uncertainty, or decision stakes (or both) are high (see, for example, Funtowicz and Ravetz, 1993; Funtowicz and Ravetz, 1994a; Funtowicz and Ravetz, 1994b; Funtowicz and Ravetz, 1994c). The fundamental argument being that quantifying hazards is an inadequate approach for dealing with complexity because people will react to hazards, and the realisation of hazards (in this case – a disaster) in different ways. The argument for recourse to post-normal science is grounded in an assumption that uncertainty is likely to be epistemological (because our understanding of natural systems is so incomplete that any models we develop are inadequate representations where the uncertainties are based on ignorance) or ethical in nature (Funtowicz and Ravetz, 1994b, p.1884). The

concept of post-normal science was explained by Ravetz (1999) as being based on the concept of both science being post-normal where 'normal' is conceived as being straightforward scientific problem-solving, and of policy-making being based on a straightforward ('normal') transfer of objective scientific knowledge into policy. For the former 'normal' science cannot be applied to global or uncertain problems as cause and effect are not clear; for the latter, the inadequacies of this model have been highlighted by the GM debate whereby epistemological differences characterise the debate and policy is not dictated by science.

The arguments made thus far point strongly to the need to change impact assessment practice and move from an assumption of normal science to one of post-normal science. The challenge, then, is to re-design impact assessment in line with post-normal science and, whilst it is possible there are a number of ways this could be achieved, this paper sets out to examine the relevance of resilience as means of embedding post-normal science into impact assessment processes, particularly in the context of disaster risk management. One of the reasons for investigating resilience in this context is because of its emphasis on "*uncertainty and surprise*" (Folke, 2006, p.253).

Interest in resilience as a concept has dramatically increased in recent years with Davoudi *et al.* (2012) citing a 400% increase in annual references to resilience in the decade starting in 1997 in the Social Science Index. They further introduce a categorisation of types of resilience, ranging from engineering resilience, which is defined as "*the ability of a system to return to an equilibrium or steady-state after a disturbance*" (Davoudi *et al.*, 2012, p.300) where the emphasis is on the time it takes a system to return to where it was (which might be defined as returning to 'normal'), through to ecological resilience, which is defined as "*the magnitude of the disturbance that can be absorbed before the system changes its structure*" (Davoudi *et al.*, 2012, p.300 drawing on the work of Holling) where the emphasis is on the ability to persist and adapt. Drawing on these definitions, Davoudi *et al.* (2012) refer to the discourse of bounce-back-ability which refers to the tendency of Governments to emphasise the goal of returning to the state prior to the disaster, which implicitly assumes it is worth returning to, and that it is sensible to return to.

In diagrammatic terms, these concepts can be illustrated by figure 2, taken from Scheffer *et al.* (2001, p.593). Within any of the 'valleys' illustrated in this diagram, engineering resilience would focus on the length of time taken to return to the previous state (where the ball starts off from) whereas ecological resilience focuses on how far you can push the ball before it no longer returns to its former position. These concepts both align with the current model of impact assessment practiced widely which is baseline-led. That is to say that it takes the existing situation as being the preferred endpoint and examines the implications of change to this existing situation, proposing mitigation measures to perpetuate it. As Hacking and Guthrie put it: "*[T]he established approach to impact assessment is baseline-led, whereby the conditions that are likely to prevail in the absence of a proposed initiative are used as the 'benchmarks' for determining the significance of impacts*".

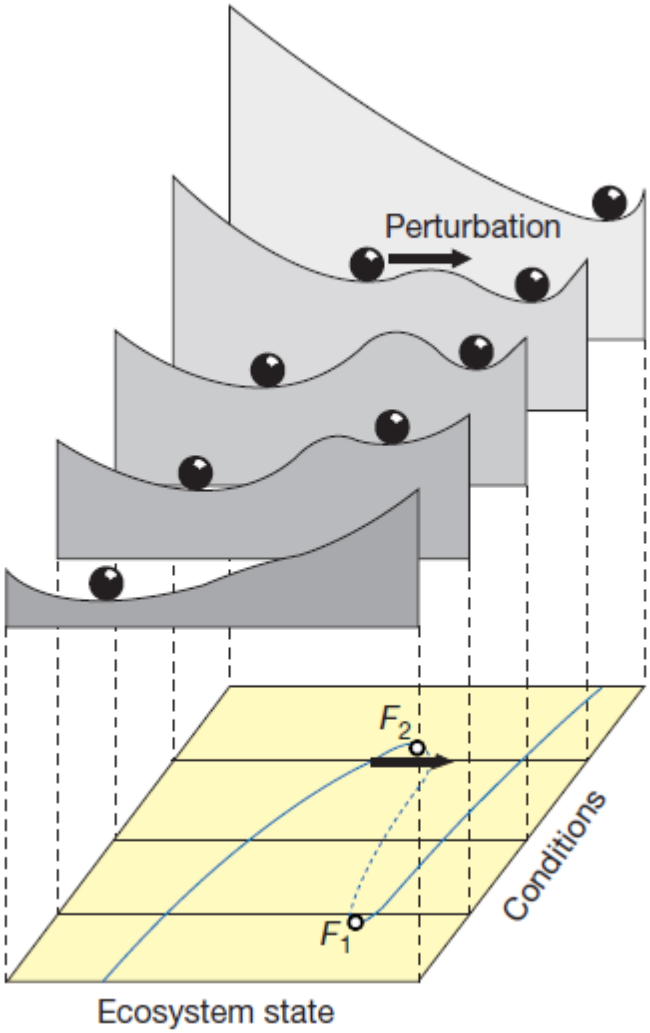


Figure 2 Different states of ecosystem resilience (Source: Scheffer *et al.*, 2001, p.593)

However, figure 2 illustrates that some ecosystem states have more than one equilibrium position, with an alternative position only being achieved if a tipping point is passed. "*The term 'tipping point' commonly refers to a critical threshold at which a tiny perturbation can qualitatively alter the state or development of a system*" (Lenton *et al.*, 2008, p.1786). In figure 2 these alternative states are represented by the new position the ball occupies once it has been pushed over the tipping point into the adjacent valley (ecosystem state). In the context of disasters, we might assume that socio-ecological tipping points are likely to be breached, but that, given inherent uncertainty, our knowledge of where these tipping points lie is poor. Davoudie *et al.* (2012, p.302) thus offered up the concept of evolutionary resilience, which they indicate "*challenges the whole idea of equilibrium and advocates that the very nature of systems may change over time with or without an external disturbance*". They go on to stress the paradigm shift in thinking that this concept represents, whereby the past system behaviour is no longer a useful indication of the future system behaviour and that the socio-ecological system can suddenly change and never return to its future state. Evolutionary resilience draws heavily on the work of Holling (for example, 1973), and in particular the

concept of panarchy (Holling and Gunderson, 2002) based on the adaptive cycle which Slootweg and Jones (2011) have already identified as having the potential to improve Strategic Environmental Assessment. The adaptive cycle is illustrated in figure 3.

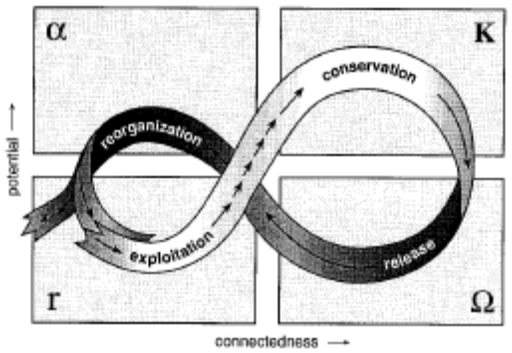


Figure 3: The adaptive cycle (Source: Holling, 2001, p.394)

The adaptive cycle suggests that for any ecological system, a period of growth (involving exploitation of resources) is followed by more stability and an emphasis on conservation of the resources locked up in the system. After a tipping point is passed, the system collapses, releasing resources. This phase then leads to reorganisation and a new adaptive cycle – although the new cycle may represent an entirely different ecological system. Panarchy is represented by a series of adaptive cycles operating at different geographical and temporal scales, although the cycles are connected and therefore have implications for each other. Whilst originally developed for ecological systems, the concept of resilience is now applied to socio-ecological systems, and so overlaps with the domain of impact assessment.

To summarise, natural disasters are inherently uncertain, or in risk management terms, ambiguous. Even anthropogenically-caused disasters are complex, with little understanding of the cumulative errors that might lead to different outcomes, given the large number of errors involved. Post-normal science is more appropriate for analysing these risks as the basis for management strategies as indicated in the risk management escalator (figure 1). In order to develop strategies in a timely fashion, *ex ante* assessment is required which embeds post-normal science. Evolutionary resilience seems to provide a potentially useful concept as it acknowledges that severe perturbation of systems can change them indefinitely, which is counter to the normal way Governments operate which makes the normative assumption that the current state of the socio-ecological environment experienced by people is the one worth preserving. What resilience offers us is a "*structured way of looking at complexity, uncertainty and interrelatedness of systems and processes*" (Slootweg and Jones, 2011, p.263) such that, rather than seeking to prevent change, we should seek to accept and accommodate it. Such a change in philosophy can already be detected in climate change assessment where increasing focus is placed on adaptation rather than mitigation. A move towards managed retreat from coastal defences might provide an example.

The next question is what impact assessment will look like if it is to embed evolutionary resilience? Here it is clear that consideration of climate change impacts, and also cumulative impacts, call into question a focus on maintaining the existing baseline and implementing mitigation measures. In the former case, Agrawala *et al.* (2012) argue for an increasing focus on adaptation in EIA to manage climate risks; it is not possible to prevent climate change given the anthropogenic pollutants already emitted, and so the focus is shifting further towards adaptation. For cumulative impacts, Canter and Atkinson (2010) focus on adaptive management to increase system resilience; it is clear that addressing individual projects is inadequate in protecting the baseline and, again, some adaptation to inevitable change is warranted. What we can draw from these studies is that we should not attempt to prevent the unpreventable (for example climate change), and that the continual accumulation of development will require systematic reviews of the ability of the system to recover from shocks (disasters). What needs to change is that society needs to start accepting the inevitably of change, and also that unforeseen disasters will occur. Acknowledging this can better prepare for the aftermath although, as Davoudi *et al.* (2012, p.305) point out, "*the adaptive cycle seems overly deterministic, not allowing for human intervention to break cycles through their ingenuity, technology and foresight. Ecologists recognise this limitation and have, hence, suggested that in the social context adaptive cycles and their outcomes should be considered as tendencies rather than inevitabilities*". So EIA should retain its traditional role of predicting what can be predicted and mitigating where possible, as long as the ambiguity and uncertainty is acknowledged and managed through an increasing focus on adaptation.

References

Agrawala, S, A M Kramer, G Prudent-Richard, M Sainsbury and V Schreitter (2012), "Incorporating climate change impacts and adaptation in environmental impact assessments: Opportunities and challenges", *Climate and Development*, 4(1), pages 26-39.

Anex, R P and W Focht (2002), "Public participation in Life Cycle Assessment and Risk Assessment: A Shared Need", *Risk Analysis*, 22(5), pages 861-877.

Arquiaga, M C, L W Canter and D I Nelson (1992), "Risk Assessment Principles in Environmental Impact Studies", *The Environmental Professional*, 14, pages 204-219.

Bartlett, R V and P A Kurian (1999), "The Theory of Environmental Impact Assessment: Implicit models of policy making", *Policy & Politics*, 27(4), pages 415-433.

Bekker, M P M, K Putters and T E D van der Grinten (2004), "Exploring the relation between evidence and decision-making: a political-administrative approach to health impact assessment", *Environmental Impact Assessment Review*, 24(2), pages 139-149.

Bennett, D H, M Scheringer, T E McKone and K Hungerbühler (2001), "Predicting long-range transport: A systematic evaluation of two multimedia transport models", *Environmental Science and Technology*, 35(6), pages 1181-1189.

Bond, A J (2003), "Let's not be rational about this: response to Benson", *Impact Assessment and Project Appraisal*, 21(4), pages 266-268.

Canter, L and S F Atkinson (2010), "Adaptive management with integrated decision making: An emerging tool for cumulative effects management", *Impact Assessment and Project Appraisal*, 28(4), pages 287-297.

Canter, L W (1993), "Pragmatic Suggestions for Incorporating Risk Assessment Principles in EIA Studies", *The Environmental Professional*, 15, pages 125-138.

Carpenter, R A (1995), "Risk Assessment", *Impact Assessment*, 13(2), pages 153-187.

Cashmore, M (2004), "The Role of Science in Environmental Impact Assessment: Process and Procedure versus Purpose in the Development of Theory", *Environmental Impact Assessment Review*, 24(4), pages 403-426.

Cashmore, M, A Bond and B Sadler (2009), "Introduction: The effectiveness of impact assessment instruments", *Impact Assessment and Project Appraisal*, 27(2), pages 91-93.

Cashmore, M, R Gwilliam, R Morgan, D Cobb and A Bond (2004), "The interminable issue of effectiveness: substantive purposes, outcomes and research challenges in the advancement of environmental impact assessment theory", *Impact Assessment and Project Appraisal*, 22(4), pages 295-310.

Chilvers, J (2007), "Towards Analytic-deliberative Forms of Risk Governance in the UK? Reflecting on Learning in Radioactive Waste", *Journal of Risk Research*, 10(2), pages 197 - 222.

Davoudi, S, K Shaw, L J Haider, A E Quinlan, G D Peterson, C Wilkinson, H Fünfgeld, D McEvoy, L Porter and S Davoudi (2012), "Resilience: A Bridging Concept or a Dead End? "Reframing" Resilience: Challenges for Planning Theory and Practice Interacting Traps: Resilience Assessment of a Pasture Management System in Northern Afghanistan Urban Resilience: What Does it Mean in Planning Practice? Resilience as a Useful Concept for Climate Change Adaptation? The Politics of Resilience for Planning: A Cautionary Note", *Planning Theory & Practice*, 13(2), pages 299-333.

Dipper, B, C Jones and C Wood (1998), "Monitoring and Post-auditing in Environmental Impact Assessment: A Review", *Journal of Environmental Planning and Management*, 41(6), pages 731-747.

Eales, R P and W R Sheate (2011), "Effectiveness of policy level environmental and sustainability assessment: Challenges and lessons from recent practice", *Journal of Environmental Assessment Policy and Management*, 13(1), pages 39-65.

Elling, B (2009), "Rationality and effectiveness: does EIA/SEA treat them as synonyms?", *Impact Assessment and Project Appraisal*, 27(2), pages 121-131.

European Parliament and the Council of the European Union (2011), "Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification)", *Official Journal of the European Communities*, 55(L26), pages 26/1-26/21.

Folke, C (2006), "Resilience: The emergence of a perspective for social-ecological systems analyses", *Global Environmental Change*, 16(3), pages 253-267.

Funtowicz, S and J R Ravetz (1994a), "Emergent complex systems", *Futures*, 26(6), pages 568-582.

Funtowicz, S O and J R Ravetz (1993), "Science for the post-normal age", *Futures*, 25(7), pages 739-755.

Funtowicz, S O and J R Ravetz (1994b), "Uncertainty, complexity and post-normal science", *Environmental Toxicology and Chemistry*, 13(12), pages 1881-1885.

Funtowicz, S O and J R Ravetz (1994c), "The worth of a songbird: Ecological economics as a post-normal science", *Ecological Economics*, 10(3), pages 197-207.

Hanna, S and E Baja (2009), "A simple urban dispersion model tested with tracer data from Oklahoma City and Manhattan", *Atmospheric Environment*, 43(4), pages 778-786.

Holling, C S (1973), "Resilience and stability of ecological systems", *Annual Review of Ecology and Systematics*, pages 1-23.

Holling, C S (2001), "Understanding the complexity of economic, ecological, and social systems", *Ecosystems*, 4(5), pages 390-405.

Holling, C S and L H Gunderson (2002), "Resilience and adaptive cycles", in L H Gunderson and C S Holling (editors), *Panarchy: Understanding transformations in human and natural systems* (Island Press, Washington) pages 25-62.

Klinke, A and O Renn (2002), "A new approach to risk evaluation and management: Risk-based, precaution-based, and discourse-based strategies", *Risk Analysis*, 22(6), pages 1071-1094.

Lawrence, D P (2000), "Planning theories and environmental impact assessment", *Environmental Impact Assessment Review*, 20, pages 607-625.

Leknes, E (2001), "The roles of EIA in the decision-making process", *Environmental Impact Assessment Review*, 21(4), pages 309-334.

Lenton, T M, H Held, E Kriegler, J W Hall, W Lucht, S Rahmstorf and H J Schellnhuber (2008), "Tipping elements in the Earth's climate system", *Proceedings of the National Academy of Sciences of the United States of America*, 105(6), pages 1786-1793.

Owens, S, T Rayner and O Bina (2004), "New agendas for appraisal: reflections on theory, practice, and research", *Environment and Planning A*, 36(11), pages 1943-1959.

Petts, J (1999), "Environmental Impact Assessment versus other Environmental Management Tools", in J Petts (editor) *Handbook of Environmental Impact Assessment - Vol.1 Environmental Impact Assessment: Process, Methods and Potential* (Blackwell Science, Oxford) pages 33-59.

Possekel, A K (1999), *Living with the unexpected: linking disaster recovery to sustainable development in Montserrat* (Springer, Berlin).

Ravetz, J R (1999), "Editorial", *Futures*, 31(7), pages 647-653.

Richardson, T (2005), "Environmental assessment and planning theory: four short stories about power, multiple rationality, and ethics", *Environmental Impact Assessment Review*, 25(4), pages 341-365.

Richardson, T, J Dusik and P Jindrova (1998), "Parallel public participation: an answer to inertia in decision-making", *Environmental Impact Assessment Review*, 18(3), pages 201-216.

Scheffer, M, S Carpenter, J A Foley, C Folke and B Walker (2001), "Catastrophic shifts in ecosystems", *Nature*, 413(6856), pages 591-596.

Slootweg, R and M Jones (2011), "Resilience thinking improves SEA: A discussion paper", *Impact Assessment and Project Appraisal*, 29(4), pages 263-276.

Turner, B A (1976), "The Organizational and Interorganizational Development of Disasters", *Administrative Science Quarterly*, 21, pages 378-397.

Van Buuren, A and S G Nooteboom (2009), "Evaluating strategic environmental assessment in The Netherlands: content, process and procedure as indissoluble criteria for effectiveness", *Impact Assessment and Project Appraisal*, 27(2), pages 145-154.

Wood, C and C E Jones (1997), "The Effect of Environmental Assessment on UK Local Planning Authority Decisions", *Urban Studies*, 34(8), pages 1237-1257.

Embedding evolutionary resilience in impact assessment: a post-normal strategy for disaster risk management?

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Why post-normal?

- Assumes decision-makers behave rationally
- Assumes 'normal' science predominates whereby system understanding connects cause and effect

Rational decision-making?

- Different models (Bartlett & Kurian 1999)
  - information processing (rational)
  - symbolic politics
  - political economy
  - organisational politics
  - the pluralist politics
  - institutionalist

System understanding?

- Poor at dealing with uncertainty
- Focus on areas of certainty
- Oversimplistic assumptions
- Disasters comprise complex series of errors

Post-normal science

- Funtowicz and Ravetz argued the application of post-normal science where either uncertainty, or decision stakes (or both) are high
- quantifying hazards is inadequate because
  - people will react to hazards, and the realisation of hazards (in this case – a disaster) in different ways

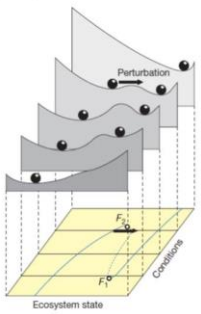
Risk management strategies (source: Klinke and Renn, 2002)

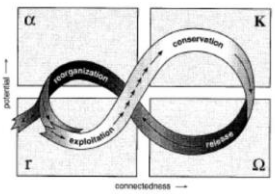
			Risk Tradeoff Analysis and Deliberation Necessary
		Risk Balancing Necessary	Risk Balancing Necessary
	Scientific Risk Assessment Necessary	Risk Assessment Necessary	Risk Assessment Necessary
Routine Operation	Types of conflict: cognitive	Types of conflict: cognitive evaluative	Types of conflict: cognitive evaluative normative
Actors: Agency Staff	Actors: Agency Staff External Experts	Actors: Agency Staff External Experts Stakeholders such as Industry, Directly Affected Groups	Actors: Agency Staff External Experts Stakeholders such as Industry, Directly Affected Groups Representatives of the Public(s)
Discourse: Internal	Discourse: cognitive	Discourse: reflective	Discourse: participatory
Simple	Complex	Uncertain	Ambiguous

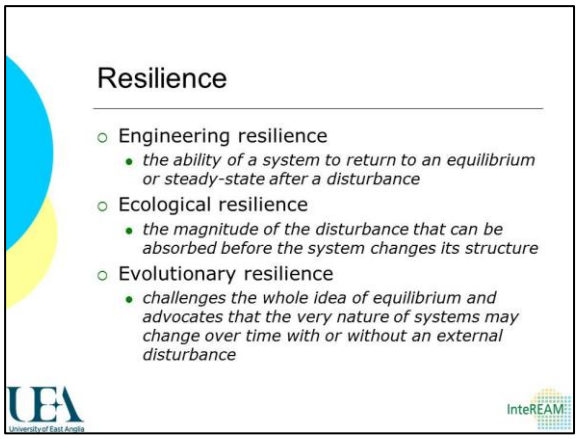
EIA/SEA and post-normal science?

- Disaster management deals with ambiguity
- Post-normal science is appropriate
- How do we embed post-normal science in impact assessment?

Resilience






Resilience
Engineering resilience
the ability of a system to return to an equilibrium or steady-state after a disturbance
Ecological resilience
the magnitude of the disturbance that can be absorbed before the system changes its structure
Evolutionary resilience
challenges the whole idea of equilibrium and advocates that the very nature of systems may change over time with or without an external disturbance
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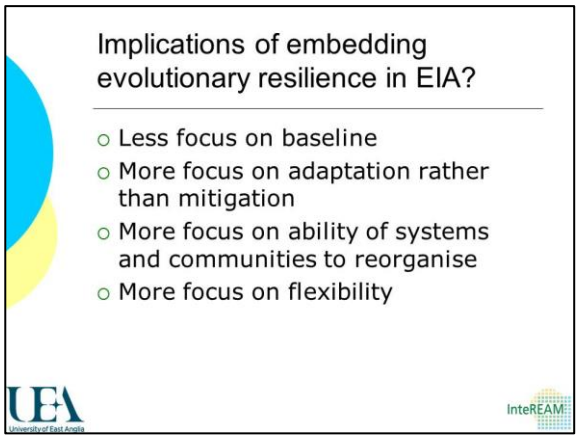
Implications of embedding evolutionary resilience in EIA?
Less focus on baseline
More focus on adaptation rather than mitigation
More focus on ability of systems and communities to reorganise
More focus on flexibility
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InteREAM

Japanese EIA system and its practice relevant to disaster management

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Abstract

There is a strong link between environmental damage and disasters. EIA is applied to human activities with potentially significant adverse environmental impacts. It implies that EIA can be a key tool to identify, evaluate and respond to serious environmental issues caused by disasters. Although Japanese EIA has yet to be well-designed in terms of disaster management, some disaster-related issues have been considered in EIA. This presentation will introduce such practices and institutional frameworks in Japanese EIA system.

日本における環境アセスメントと災害管理の政策統合の制度と実態

錦澤滋雄

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（和訳）

環境破壊と災害は、強く結びついている。EIA は、環境に大きな悪影響を及ぼす恐れのある人間の活動に適用される。災害によって生じる深刻な環境問題を特定し、評価し、それに対応するための重要なツールに EIA がなり得ることを、これは示唆しているのである。日本の EIA は、災害管理の点で未だ適切に策定されていないが、EIA において一部の災害関連課題が検討されてきた。本プレゼンテーションは、日本の EIA 制度におけるそのような実践と制度的枠組みを紹介する。

Japanese EIA system and its practice relevant to disaster management

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1. Introduction

There is a strong link between environmental damage and disasters. Environmental Impact Assessment (EIA) is applied to human activities with potentially significant environmental impacts. It implies that EIA can be a key tool to identify, evaluate and prevent serious disasters. Disaster management, however, has yet to be well-considered in Japanese EIA system, some relation would be observed especially in local EIA ordinances. In this study, practices and institutional frameworks of some examples are introduced.

2. Institutional settings and practices of EIA relevant to disaster management

2-1. Disaster related survey

Regarding disaster related survey, two types of surveys are carried out; one is material-based survey, the other one is field-based survey.

Material based surveys are divided into two types: one is regulation survey. Taking a forestland development for example, “Forest Reserve”, ”Control of Soil Erosion” and “Landslide Prevention” are major related regulations which are commonly examined in the scoping process. The other material-based survey is non-regulated materials such as active fault maps, past seismic records, past flood records and so forth. These materials can be utilized for identification both of the disaster risk and prevention measures.

Regarding field surveys, core sample surveys and landslide surveys are conducted for collecting basic information of landslide risk identification.

2-2. Disaster related environmental components

Table 1 shows a typical matrix using in the scoping process in Japan. As far as conducting survey randomly (not systematic) of EISs which were undertaken under EIA act or ordinances, it was clarified that disaster related EIAs were mainly found in the “Topology and geology”, and some were in “Hydrometeorology”. For instance, landslide risks were assessed in the Topology and geology, and flood risks are assessed in the Hydrometeorology. Those characteristics were shown both of the EIA act and local ordinances.

Also, some EIA ordinances are more considering disaster risks than the EIA act. For instance, Yokohama City and Kawasaki City prescribe “safety” as an evaluation item of environmental component. It includes disaster related matters such as fire disaster, explosion, flood disaster and so forth.

In addition, the EIA ordinance of Yokohama City has a provision relating to secondary disasters caused by natural disaster. Actually, following items are prescribed; landslide, fire disaster, chemical contamination leak caused by earthquakes. In general, as EIA ordinances in many local governments don’t consider secondary disasters, it’s a unique prescription. In reality, however, it is rarely focused as

evaluation items since environmental components are partially selected according to characteristics of projects.

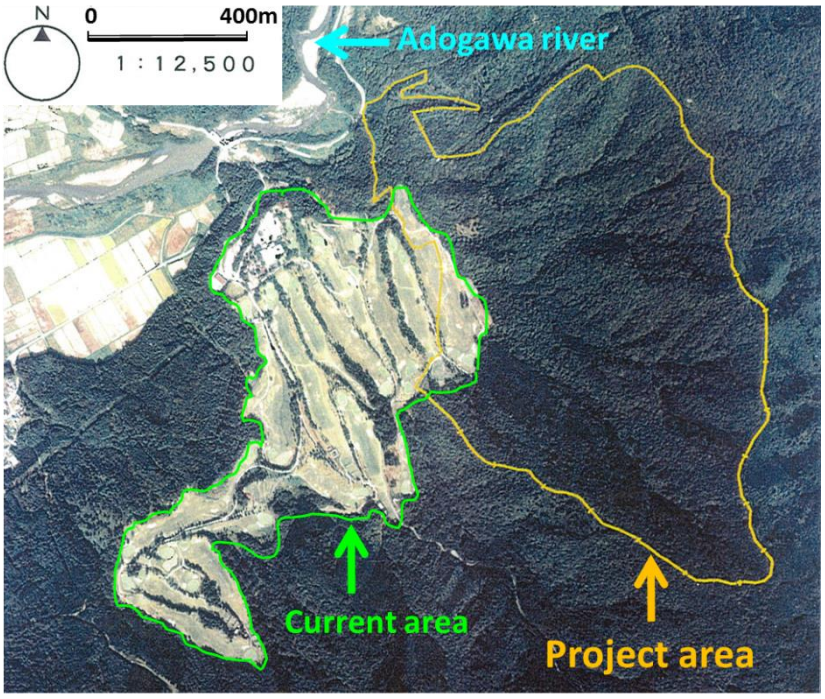
Table 1. Disaster related environmental components

Environmental component			Project action					
			Construction			Operation		
			Land transformation	Building construction	Construction vehicles	Existence of facility	Operation of facility	Relevant vehicles
Ⅰ. Physical and Chemical characteristics								
	Atmospheric environment	Air quality						
		Noise						
		Vibration						
		Odor						
		Other						
	Water environment	***Hydrometeorology***	X				X	
		Water quality						
		Sediment quality						
		Groudwater/Aquifer						
	Soil and other environments	***Topography/Geology***	X				X	
		Ground base						
		Soil						
Ⅱ. Biological conditions								
	Flora							
	Fauna							
	Ecosystem							
Ⅲ. Social and Cultural factors								
	Scenery							
	Recreation							
	Waste							
	GHGs, etc							
	Cultural assets							
	Safety	***Fire/explosion etc***					X	

3. Case study of EIA relevant to disaster management

In this paper, a golf course expansion project is introduced as an example which was proposed in Shiga prefecture. As the site of the project was covered with forestland and residential areas were located in the downstream sections from the site, disaster risks of landslide due to the project should be considered.

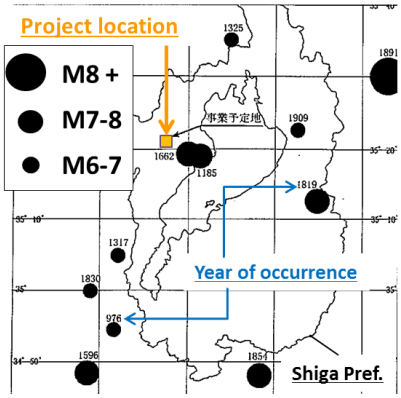
In this case, seismic hazard was evaluated on the basis of past seismic records and active fault surveys. Regarding seismic records, old records were described. According to this survey, the oldest seismic event occurred in the year 976 which was during the Heian period in Japan (see Figure 2, 3). Also, locations of epicenter and levels of magnitude are indicated on the map. Thus, a wide range of records is sometimes collected spatially and temporally to identify seismic risks.



Project overview

- Golf course expansion
- Site Location:
  Shiga Prefecture, Japan
- 1995 Scoping document
  1998 DEIS, FEIS
- 71.2ha (Forestland)

Figure 1. Site of EIA case in Shiga Prefecture,
Golf Course Expansion Project



被災年月日西暦（和暦）	震源地	ﾏｸﾞﾆﾁｭｰﾄﾞ	備考：県下の被害等，()内は全体の被害
976(貞元元年) 7月22日	34.9N, 135.8E	Mus≧6.7	(死者50以上、家屋倒壊多数)
1185(文治元年) 8月13日	35.0N, 135.8E	M≒7.4	琵琶湖水減少(家屋倒壊・死者多数)
1325(正中２年)12月 5日	35.6N, 136.1N	M=6.5±¼	琵琶湖北部山崩れ、竹生島の一部崩壊
1586(天正13年)11月29日	36.0N, 136.9E	Mus= 7.8	長浜市街火災(飛騨:帰雲城埋没)
1596(慶長元年) 9月 5日	34.7N, 135.6E	Mus= 7.0	栗太郡栗東で死者14(京都・畿内)
1662(寛文２年) 6月16日	35.2N, 136.0E	Mus= 7¼	
1707(宝永４年)10月28日	33.2N, 13?		

Year of Occurrence
Location of epicenter
Magnitude
Extent of Damage

Figure 2. Past Seismic Survey

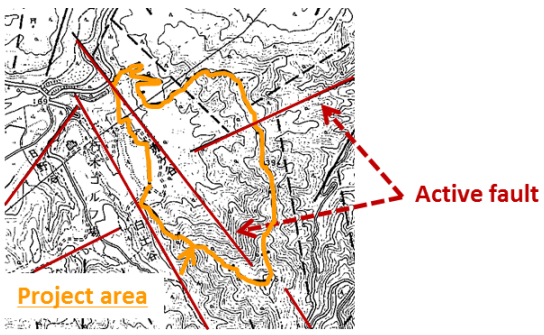


Figure 3. Active Fault Survey

Table 2 shows a landslide evaluation. In this case, landslide risks had been evaluated by a quantitative approach from three categories of environmental components; Topography, Geology/Groundwater and Landslide occurrence situation. Each category was subdivided into more specific components such as gradient, form of slope etc.

The magnitude of the impact on each environmental component was assessed on the basis of surveys, and the evaluation score was decided according to the criteria. For instance, as the gradient was classified as 15～8 degrees, the evaluation score given was 12. Then, the sum of evaluation scores was calculated. In this case, the sum was 77. And finally, landslide risk was classified into three categories according to criteria. As a result, it was concluded that this case had a large landslide risk.

Figure 4 is a map of disaster prevention plan. A regulating reservoir for flood control was proposed as a mitigation measure in the EIA process. The capacity was determined by the prediction of changing hydrological regime. In addition, specific construction methods to prevent soil erosion were planned. These countermeasures were typically addressed to prevent disasters in forestland development.

Table 2. Land Slide Risk Evaluation

Evaluation score

Environmental component		criteria		criteria		criteria		criteria	
Topography	gradient	25°＜	6	25～15°	8	15～8°	⑫	8°＞	3
	form	侵食	12	集水	⑥	複合	4	散水	3
Geology, Groundwater	geology	断層破砕帯	6	流れ盤	⑤	受け盤	3	水平・無層理	2
	stratum	古琵琶湖層群	⑥	丹波帯	5	丹波帯	3		
	lithofacies	砂礫・粘土 火山灰層	⑩	粘板岩 頁岩等	8	砂岩・チャート	6	砂礫層	2
	aeretion	強風化	6	風化	⑤	新鮮	3		
	groundwater	常時湧水	⑥	雨期湧水	6	降雨時湧水	5	地下水位低い	3
Landslide occurrence situation	landslide	70%＜	12	70～40%	9	40～10%	⑥	10%＞	3
	stability	移動中	8	やや不安定	⑦	不明	6	安定している	3
	landslide around site	斜面上位	6	斜面下位	⑤	斜面側方	4	なし	2
	damage	ﾌﾞﾛｯｸ中有	12	ﾌﾞﾛｯｸ下位	⑨	ﾌﾞﾛｯｸ上位	6	なし	3

Sum = 77

The sum of evaluation scores

Category	The sum of evaluation scores	Evaluation of landslide risk
Ⅰ	More than 70	Large
Ⅱ	57-70	Medium
Ⅲ	Less than 57	Small

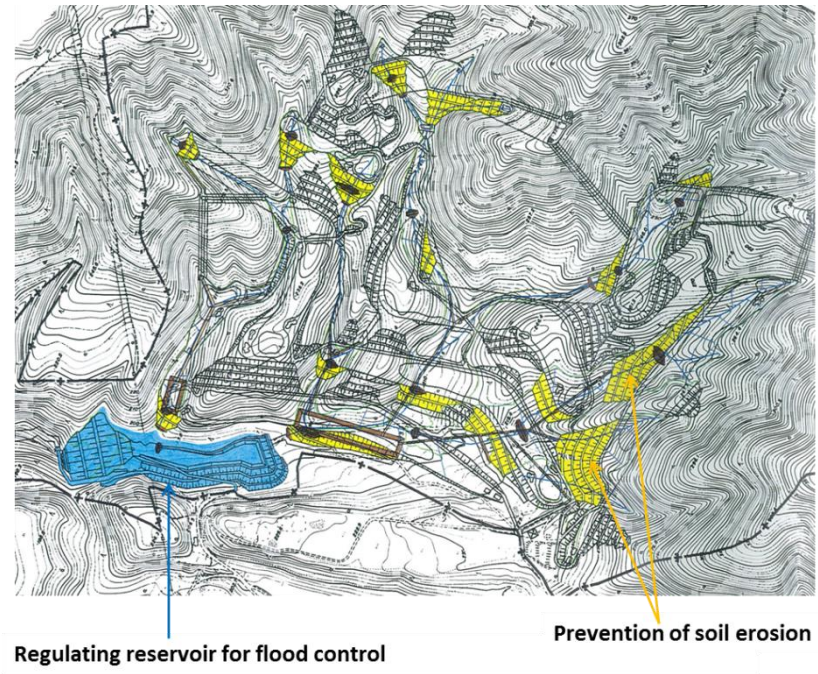


Figure 4. Mitigation measures for disaster management

4. Conclusion

Firstly, disaster related EIAs have been carried out primarily in forestland developments such as commercial facility constructions, road constructions and so forth, because these types of projects sometimes lead to serious disaster. Second, some EIA ordinances prescribe "safety" as an environmental component, but actually, it hasn't been very often focused as a key issue.

In general, EIAs don't consider disaster-related impacts which can affect the proposed project itself, particularly in impacts caused by seismic activity. For example, EIA which is conducted in urban developments don't consider potential impacts of a ground liquefaction accompanying earthquakes. This point has still remained as future study to be cleared.

Japanese EIA System and its Practice Relevant to Disaster Management

UK-Japan joint workshop on Policy Integration between Environmental Assessment and Disaster Management
Nov 30-Dec 3, 2012, Chiba, Japan

Shigeo Nishikizawa
Associate Professor, Ph.D.
Tokyo Institute of Technology

Overview of Relevance between EIA and Disaster Management(DM) in Japan

Disaster-related EIAs (survey, prediction, etc) have been carried out primarily in forestland developments

Some EIA ordinances prescribe *Safety* as an environmental component, less focused as a key issue

EIAs don't consider disaster-related impacts which can affect the proposed project itself
e.g. liquefaction in urban developments

Although disaster risks might be considered in the planning phase, such information is not in EISs.

Disaster related survey in forestland development

Regulation survey for DM
- Forest Reserve, Control of Soil Erosion, Landslide Prevention, Fire Defense, etc

Other material-based survey
- Active fault, Past seismic records, Past flood records, etc
- Wide range of records are collected spatially and temporally

Field survey
- Boring (core sample) survey, Landslide survey

Disaster related environmental components

Environmental component		Project action: Construction – Land transformation	Construction – Building construction	Construction – Construction vehicles	Operation – Existence of facility	Operation – Operation of facility	Operation – Relevant vehicles
Ⅰ. Physical and Chemical characteristics							
Atmospheric environment	Air quality						
	Noise						
	Vibration						
	Odor						
	Other						
Water environment	Hydrometeorology						
	Water quality						
	Sediment quality						
	Groudwater/Aquifer						
Soil and other environments	Topography/Geology						
	Ground base						
	Soil						
Ⅱ. Biological conditions							
Flora							
Fauna							
Ecosystem							
Ⅲ. Social and Cultural factors							
Scenery							
Recreation							
Waste							
GHGs, etc							
Cultural assets							
Safety	Fire/explosion etc						

Most of disaster related items are in the Topography and Geology, some are in Hydrometeorology

Some EIA ordinances prescribe "Safety" as an evaluation item.
e.g. Yokohama city, Kawasaki city

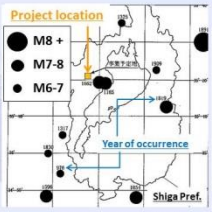
: Disaster related items

4

Case example: Golf Course Expansion

Project overview
- Golf course expansion
- Site Location: Shiga Prefecture, Japan
- 1995 Scoping document 1998 DEIS, FEIS
- 71.2ha (Forestland)

Disaster related EIA: Past seismic survey



Seismic Record Survey

表3－2－2 震災誌に被害を及ぼした主な地震

被災年月日(西暦)(和暦)	震源地	マグニチュード	備考:記下の被害等、○内は全体の被害
976(貞元元年) 7月22日	34.9N, 135.8E	M_{KA}≧6.7	(死者50以上、家屋倒壊多数)
1185(文治元年) 8月13日	35.0N, 135.8E	M=7.4	琵琶湖水減少(家屋倒壊・死者多数)
1325(正中2年)12月 5日	35.6N, 136.1E	M=6.5±1/4	琵琶湖北部山崩れ、竹生島の一部崩壊
1586(天正13年)11月29日	36.0N, 136.9E	M_{JMA}= 7.8	岳振市街火災(飛騨:帰雲城埋没)
1596(慶長元年) 9月 5日	34.7N, 135.6E	M_{JMA}= 7.0	東太都東東で死者14(京都・鴨内)
1662(寛文2年) 6月16日	35.2N, 136.0E	M_{JMA}= 7 1/4	
1707(宝永4年)10月28日	33.2N, 135.7E		

Year of Occurrence
Location of epicenter
Magnitude
Extent of Damage

Active Fault Survey

Disaster related EIA: Landslide evaluation

Evaluation score

Environmental component		criteria		criteria		criteria		criteria	
Topography	gradient	25°＜	6	25～15°	8	15～8°	⑫	8°＞	3
	form	侵食	12	集水	⑥	複合	4	散水	3
Geology, Groundwater	geology	断層破砕帯	6	流れ盤	⑤	受け盤	3	水平・無層理	2
	stratum	古琵琶湖層群	⑤	丹波帯	5	丹波帯	3		
	lithofacies	砂礫・粘土 火山灰層	⑩	結晶片岩 頁岩等	8	砂岩・チャート	6	砂礫層	2
	aeretion	強風化	6	風化	⑤	新鮮	3		
	groundwater	常時湧水	⑤	雨期湧水	6	降雨時湧水	5	地下水位低い	3
Landslide occurrence situation	landslide	70%＜	12	70～40%	9	40～10%	⑥	10%＞	3
	stability	移動中	8	やや不安定	⑦	不明	6	安定している	3
	landslide around site	斜面上位	6	斜面下位	⑤	斜面側方	4	なし	2
	damage	ブロック中有	12	ブロック下位	⑨	ブロック上位	6	なし	3

Sum = 77

The sum of evaluation scores

Category	The sum of evaluation scores	Evaluation of landslide risk
Ⅰ	More than 70	Large
Ⅱ	57-70	Medium
Ⅲ	Less than 57	Small

Mitigation measures for disaster management

Regulating reservoir for flood control

Prevention of soil erosion

Significance of integration between EA & DM

- Seismic impact on urban areas is less focused in EIA despite its huge risks
- A major earthquake will hit Tokyo area in the near future
- EA and DM should be more integrated to reduce hazards

What is the strength of integration?

(Hanshin-Awaji Earthquake , 1995)

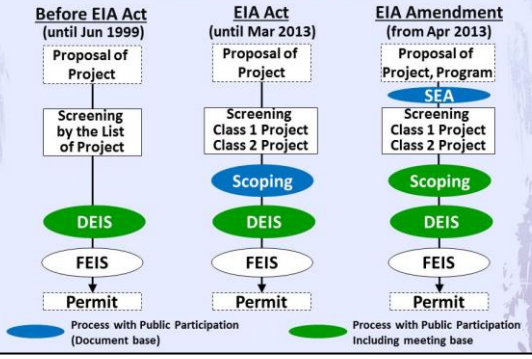
Role of the integration (1)

- If disaster assessments are conducted in the EIA, undisclosed information can be revealed/made available as open source through the process.
- Some experts have warned that a future major earthquake will likely give rise to a serious fire disaster due to liquefaction at petrochemical complexes in Tokyo Bay.
- Hamada(2012)* pointed out that this issue has been difficult to address due to insufficient information disclosure.

Fire disaster of a petrochemical complex in Tokyo Bay caused by East Japan Great earthquake , 2011

* Hamada, Masanori, "Shut down of Tokyo Bay due to liquefaction?" *Tokyo Shinbun News*, Feb 23, 2012

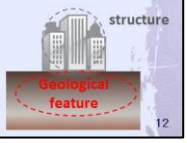
Changes of Public Participation opportunities under EIA Act in Japan



Role of the integration (2)

- EIA could identify disaster risk with accuracy by means of valuable data collected through EIA
- Some experts have warned that a long-period earthquake ground motion will seriously affect high rise buildings in Tokyo
- Not only a structural aspect of buildings but also a geological feature are key factors of this issue
- The EIA ordinance of Tokyo was amended in 2002: Exclusive threshold was changed to 180m+ buildings from 100m+ in specific areas.

High rise buildings in Shinjuku area were swaying more than 10 minutes on Mar 11, 2011



12

Implications of the absence of EA requirements for civil emergency plans

Steve Swain

Environment Agency

Abstract

Plans and programmes that only serve civil emergencies are exempt from undergoing Strategic Environmental Assessment (SEA). Since climate change is expected to result in more frequent climactic emergencies, the use of emergency plans is expected to increase. This, in conjunction with the findings of the investigation in to the Buncefield Oil Storage and Transfer Depot explosion and subsequent emergency response, which resulted in significant environmental pollution, has prompted this study of the possible environmental impacts of such plans and whether the SEA exemption results in negative environmental effects being missed or not mitigated for. Emergency plans use a range of techniques, some structural, others not, to minimise the impacts of hazards, some of which have the potential to have negative impacts on the environment. Relatively few of the plans assessed would be subject to the exemption, most not satisfying the other criteria. Those that do could potentially result in surface and groundwater pollution, waste dispersal, ecological, cultural or historical impacts, energy and carbon resource use and drainage impacts. The ability of SEA to mitigate potential effects is limited by restrictions on consultation and the flexibility required to react to emergency events but non-statutory scoping consultations, if possible, could provide benefits. Emergency management uses other mechanisms to protect the environment, such as the requirement for emergency plans to consider environmental impacts, the required involvement of environmental bodies in the decision-making process and the ability to pass emergency regulations to protect the environment.

（和訳）

民事緊急時計画に対する環境アセスメント適用規定の不在について

スティーブ・スウェイン

英国環境庁

民事緊急事態のみを対象とする計画とプログラムは、戦略的環境アセスメント (SEA)の適用除外である。気候変動によって気候関連の緊急事態の頻度が高まると予想されることから、緊急計画の活用も増えることが予想される。このこと、また、深刻な環境汚染を引き起こしたバンスフィールド油槽所の爆発火災とその後の緊急対応の調査結果が、本研究の引き金であり、そのような計画のもたらし得る環境影響と、SEA 適用除外によって環境への悪影響が見逃されているあるいは緩和されていないかどうかを、検討した。危険の影響を最小限に抑えるために、緊急計画は、構造的なものもそうでないものも含め、広範な技術を活用するが、中には環境に悪影響を及ぼす恐れがあるものもある。評価された計画のうち、比較的少数が適用除外になるが、大半は、他の基準を満たしていない。満たすものも、地表汚染と地下水汚染、廃棄物の飛散、生態学的、文化的あるいは歴史的な影響、エネルギーと炭素資源の使用、排水汚染をもたらす恐れがある。緊急事態の対応に必要な諮問と融通性が限定されているため、潜在的な影響を緩和する SEA の能力は限られているが、制定法で認められていないスコーピング諮問が、可能であれば、利益をもたらし得る。緊急事態管理は、環境保護に向けて、環境影響の考慮という緊急計画の要件、意思決定プロセスへの環境団体の強制関与、環境保護のための有事規制制定能力など他のメカニズムを活用する。

Environmental impacts of civil emergency plans and of their exemption from SEA

Steve Swain and Riki Therivel

Abstract

Various measures to mitigate for disasters are included within emergency plans, some of which could potentially have impacts on the environment. One method of limiting or mitigating for these effects could be through SEA but such plans are exempt from SEA. Emergency plans were assessed to see if they satisfy SEA criteria and would be exempt. Most did not satisfy the criteria but those that did contained mitigation measures that could potentially affect the marine environment, surface and ground water quality, localised habitat, historical or cultural features and have resource use and wider carbon and energy use implications. These factors are likely to be considered via the involvement of environmental authorities in the plan-making process and emergency response but possible benefits from the incorporation of elements of SEA could be beneficial for site-specific plans subject to further study involving engagement with environmental regulators.

The main aims of this study were to assess the possible environmental impacts used in emergency responses as dictated by emergency plans and to identify which types of plan would be likely to be exempt from SEA, therefore giving an indication of the possible environmental impacts of the exemption. This initial work has highlighted that the implementation of emergency plans is as important as the plans themselves in terms of providing scope for the protection of the environment. Possible benefits of environmental assessment are considered prior to recommendations for further study to determine their usefulness in practice. Firstly, a view of the types of emergency plan is provided.

Types of Emergency Plan

Emergency plans are required by the legislation shown in the table below.

Legislation	**Producer of Plan**	**Plan Type**
Civil Contingencies Act 2004	Local, regional, national authorities	Area-wide EP
	Category 1 Responders	Business Continuity Plan
Control of Major Accident Hazards (COMAH) Regulations 1999	Local authorities	'Off-site' EP
	Site operators	'On-site' EP
Radiation Emergency Preparedness Public information (REPPIR) Regulations 2001	Local authorities	'Off-site' EP
	Site operators and companies transporting radioactive substances	'On-site' EP
Pipeline Safety Regulations (PSR) 1996	Local authorities through which pipelines pass	'Off-site' EP

EP = Emergency Plan, BCP = Business Continuity Plan

Table 1: Types of emergency plans, their producers and legislative background

Other legislation also requires the production of emergency plans but these are not covered in this study. They include the Genetically Modified Organisms (Contained Use) Regulations 2000, Ionising Radiation Regulations 1999, Safety of Sports Grounds Act 1975 and the Fire Safety and Safety of Places of Sport Act 1987, the Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations 1998 and Flood and Water Management Act 2010.

These plans contain elements that are common to all, such as specifying the roles and responsibilities of the people and organisations involved before, during and after the emergency, highlighting the triggers for various actions to be initiated, including marking of different phases of the response/recovery and references to other relevant plans. They all are all also affected by controls on the public accessibility of specific information due to security and/or commercial confidentiality considerations. However, variations exist in the degree to which they are single or multiple authority focussed, they target single or multiple hazards, they are general or only consider one element of the operational response and whether they are specific to the response or recovery phase.

There are also large variations in the information included within them, depending on the legislation requiring them and the resultant purpose of the plan. For example, plans produced for specific known sites, like those required by COMAH and REPPIR, contain detailed analyses of possible hazards and similarly detailed mitigation measures to combat them. Whereas plans produced by authorities in accordance with CCA tend to be less detailed to provide flexibility for responders given the lesser certainty surrounding the exact locations of the hazards involved.

All of these plans should connect to each other in an emergency planning framework, which includes business continuity plans, and which is regularly tested and reviewed. The mitigation measures contained within them and possible environmental impacts are covered in the following section.

Emergency Mitigation Measures and their Environmental and Health Impacts

Emergency plans include the following categories of measures to mitigate for the various emergency scenarios:

- Managing the behaviour of professionals and the public during emergencies, for instance through guidance on congregation, evacuation, quarantine and animal culls, with full consideration paid to human rights issues;
- Providing guidance for emergency responders on tangible (structural and non-structural) elements of the response phase, including on organisational logistics, providing temporary shelters and waste transfer measures; and
- Helping the various elements of the recovery phase, for instance by restoring housing following a flood, liaising with affected communities and debriefing to learn lessons for future events.

The following possible environmental impacts of these mitigation measures include hypothetical scenarios and actual impacts that have occurred but does not include measures that are not outlined in emergency plans, like those that are implemented under emergency powers or duties, like flood defence works. Over 40 emergency plans were studied to conduct this assessment.

Population and human health: Civil emergency plans minimise impacts on populations and human health through the physical treatment of people during an event, including the provision of shelter, healthcare, food, and if necessary measures to help the bereaved. Negative environmental impacts could arise through the siting of temporary structures, like rest centres, humanitarian assistance centres, demountable facilities large enough to house 600 fatalities and sites for the temporary storage of medical waste in environmentally sensitive areas. The likelihood of temporary centres having impacts on the environment is reduced by the wide geographical spread, and therefore use, of existing schools, community halls, council buildings (MSDC 2011, ECC 2007) and developed areas close to hospitals (DoH 2003).

Material assets: Infrastructure provided in response to a civil emergency could include the repair, replacement, and/or temporary provision of:

- Waste management facilities or processing areas: Large quantities of waste could result, either from the event, like an oil spill, or by the response, through the use of fire fighting water and foam (COMAH 2011, IMPEL 2011) and the culling of animals after foot-and-mouth or rabies infections.
- Temporary bunded sites might be needed to store waste until it can be dealt with (SCC 2008), for example, two sites were set up after the flooding in Carlisle in 2005 (Carlisle CC 2005). These could lie within environmentally sensitive areas, as occurred in the response to the Sea Empress oil spill in 1996 (Colcomb et al 1997)
- Accommodation centres would be needed to house and provide logistical support to volunteers involved in the clean up of shoreline oil pollution.
- Health care facilities and emergency mortuaries: See the previous section on population and human health.
- Dams, bunds and riverbed barriers: These can be pollution prevention measures that can halt the flow of pollution in to groundwater or surface water receptors, as undertaken to reduce the spread of contaminants following the failure of a containment bund at Kolontar in Hungary in 2010 (IMPEL 2011). However, this could mean the pollution affects other areas, which could also be environmentally sensitive.
- Recovery infrastructure: Given that almost any structure or community could be affected by one or more of the events listed in the National Risk Register and that recovery includes rebuilding and regeneration, it is reasonable to consider that almost all infrastructure could be needed to be replaced or upgraded as part of the recovery from a certain event. This includes transport, energy and communications infrastructure, housing, educational facilities and commercial and industrial buildings. Other elements of the national infrastructure would support affected areas until recovery has restored local capacity for these services. For example, gas storage capacity has increased to compensate for a disruption in supply, both for domestic and industrial electricity generation (POST 2004). However, these developments are not specified in pre-existing recovery plans. Instead, they set the platform to enable decisions to be made.

Air and climatic factors: Impacts from civil emergency plans on air quality, like those that involve pyres for culled cattle, are unlikely to be significant. However, the use of in-situ burning to remove oil from the sea would be more significant, depending on the size of the oil release, a technique recently reviewed and accepted by the UK Oil Spill Prevention and Response Advisory Group (OSPRAG 2011). Large-scale transport, for instance of waste materials or for the construction of replacement infrastructure, would also

increase carbon dioxide and local air pollution emissions. Releases from industrial sites can cause atmospheric pollution. For example, a loss of containment occurred at Heilbronn in Germany in 2010, when an accidental build up of a cloud of hydrochloric acid within a chemical plant building was released into the atmosphere when the building ventilation was turned on (IMPEL 2011). However, the release of gaseous pollutants in to the atmosphere is advised against if they would be harmful to people or the environment. Instead, the suppression of any explosion or construction of plant strong enough to withstand the pressures is advised to prevent the uncontrolled loss of containment.

Soil and water: Civil emergency plans generally aim to minimise contamination of soil and water through spills or accidents. For instance, some plans to tackle marine oil spills involve the use of booms and absorbents to recover oil from the water, when the weather allows. Absorbents have been seen to have potentially negative effects on marine corals (Gupta 2010), although they are not necessarily more toxic than the oil they are dispersing (Fuller 2004) and any negative effects would have to be balanced against the improvement caused by oil not reaching the shoreline. Plans for industrial accidents could lead to the construction of bunds, dams or riverbed barriers to contain pollution from accidents, as mentioned in the material assets section previously, or indeed from the foam or fire-fighting water used to combat them. The fire fighting foam and water can have negative environmental impacts if not contained, as occurred at Buncefield (COMAH 2011) and following fires at the Universal Freight Warehouse in Yorkshire in 1982 (HSE 2012), at Allied Colloids Ltd in Bradford in 1992 (HSE 2012) and at a wood recycling plant in Saint-Cyprien in France in 2008 (IMPEL 2011). Recovered oil, pollution absorbent and affected sand and soil must be treated as hazardous waste. This must go to a licensed waste facility, although it can initially be stored on a bunded or contained paved area. If available waste facilities are overwhelmed, temporary sites would be needed. The initial storage area, transport and temporary sites all have the potential to pollute nearby soils, surface water and groundwater, if the sites are not contained and vehicles not adequately cleaned.

Biodiversity, fauna, flora: These could be affected by several types of civil emergency plans, for instance those that involve temporary site emergency centres , pyres for culled animals or waste storage sites in sensitive areas. Water diversion could affect riverine biodiversity. Coasts and estuaries host a large number of environmentally sensitive areas like Special Protection Areas and Ramsar sites. In the case of an oil spill or shipping accident, emergency facilities, like accommodation centres, or equipment may need to be provided on these sites, or waste and materials may need to be moved through them. The use of heavy vehicles and aggressive clean up procedures could also damage the existing habitats (NCC 2009). However, the possible environmental impacts of any mitigation measures would need to be weighed up against the effects of not using them. For example, dispersants, as covered in the previous section, are often used in oil spills to avoid the oil reaching sensitive locations.

Cultural heritage and landscape: Effects on cultural heritage sites or landscapes would only really occur if sensitive areas were affected by temporary structures. Churches could be impacted as they are community-focussed buildings that could be used in times of need to provide temporary shelter, although most settlements are likely to also have schools or community halls nearby. Otherwise, the only effects that the emergency mitigation measures could have would tend to result from the construction of emergency infrastructure, like dams, pits and bunds that would need to be undertaken without the archaeological assessment usually required for planning permission. Therefore, the development could either unwittingly

impact on an unknown heritage site or would need to occur before the normal mitigation measures to preserve the site or artefacts have occurred or before they have been documented.

The possible worse-case scenarios described above are generally likely to be far less significant or undesirable than the overall effects of the emergencies they are designed to mitigate for.

Emergency Plans and the SEA Selection Criteria and Exemption

The SEA Directive (2001/42/EC) exempts plans and programmes "the sole purpose of which is to serve national defence and civil emergency" from undergoing SEA. A similar exemption exists for projects solely serving civil emergency within the Environmental Impact Assessment (EIA) Directive (85/337/EEC as amended).

This exemption does not include plans for the proactive reduction of risks, for example through the construction of infrastructure, like the Thames Barrier, to avoid flooding in London from tidal surges. The European Commission's guidance on SEA is clear that only reactive plans should be thought of as serving civil emergency.

The plans investigated previously for their possible environmental impacts, were assessed to see if they would be subject to the SEA Directive's exemption. Diagram 1 shows the decision-making required to determine whether a plan would have been subject to SEA were it not for the exemption.

The only plans considered to meet the SEA criteria and thus be exempt were those plans produced by local authorities that tackle oil spill emergencies as required through CCA, 'off-site' industrial and pipeline emergencies as required through COMAH and PSR, respectively, and CCA generic recovery plans.

The potential environmental impacts of the mitigation measures in the exempt plans include;

- The potential pollution of the marine environment through the use of dispersants;
- Ecological impacts from the use of heavy vehicles to transport oil-spill waste and from the possible siting of waste storage and transfer centres close to what could be sensitive environmental areas;
- The pollution of surface water and groundwater through the use of fire fighting water and foam, should containment be unsuccessful;
- Localised habitat and potentially historical or cultural damage due to the construction of bunds, dams or riverbed barriers and possible effects of altered flows on sensitive local areas;
- Resource implications of the replacement and regeneration of affected areas and communities in the recovery process, including energy and carbon costs; and
- Ecological damage as a result of having to re-site affected infrastructure to non-brownfield sites.

These impacts would only be equivalent to the effects of the exemption if it could be established both that SEA would stop them from occurring and that no other legislation or mechanisms exist that would stop them from occurring, for example via the involvement of environmental organisations with statutory duties in the emergency response process. To benefit the environmental performance of emergency responses environmental assessment would need to either improve the plans or the ways they are implemented. As

mentioned earlier the degree of information included in different types of plans varies. The less detailed non-site-specific plans do not have such a definitive impact on the emergency response, instead providing flexibility and scope for real-time decision-making. With this in mind, possible benefits of environmental assessment are discussed below.

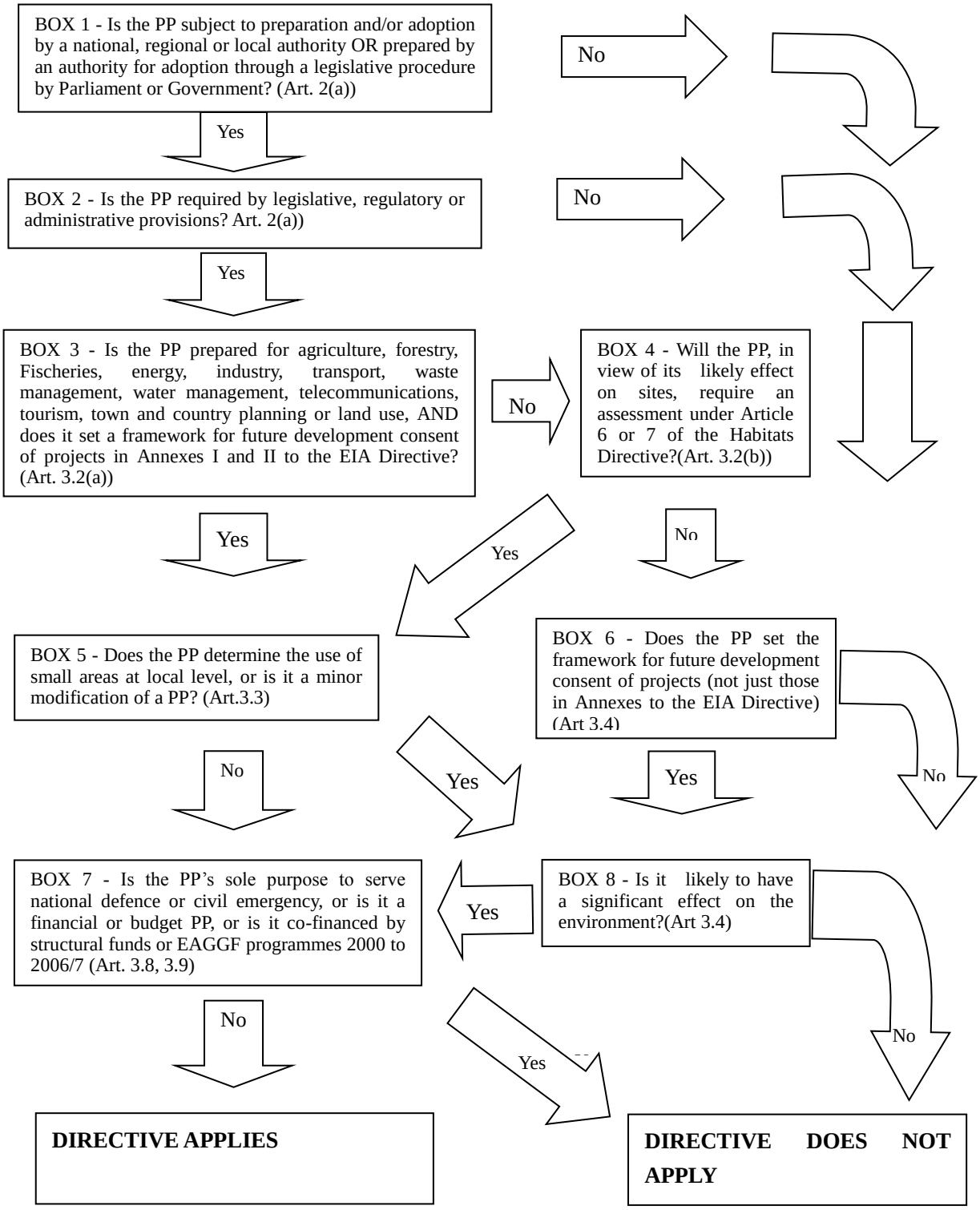


Diagram 1 – Application of the SEA Directive to plans and programmes (Therivel personal communication)

Possible benefits of environmental assessment prior to an emergency occurring

The use of environmental assessment procedures during emergency plan production to benefit the environmental performance of emergency responses would be more applicable to site-specific than non-site-specific hazard plans because hazards and resultant mitigation measures and any subsequent environmental impacts can be assessed more thoroughly and they define, more closely, the likely emergency response.

Site-specific hazards are already strictly regulated through COMAH, REPPIR and PSR, requiring detailed information on hazard characteristics to inform the use of preventative measures to make the risks as low as reasonably practicable (ALARP). COMAH Regulations require that risks to the environment are considered and COMAH sites are jointly regulated by the Competent Authority consisting of the Environment Agency and the Scottish Environment Protection Agency (SEPA). Changes in primary legislation would be needed before the REPPIR and PSR emergency plans would need to consider environmental impacts.

Off-site plans are required to dovetail with CCA plans for the area concerned, which will consider the environmental impact, largely through the involvement of the same local authority emergency planners who would have been informed of environmental sensitivities during the plan creation process by the Environment Agency or SEPA and through real-time contact with them as Category One responders during any emergency response and recovery. The same environmental data would also be accessible to the emergency planner through the local authority town planning department that will have received the data from the Environment Agency or SEPA as statutory consultees in the Town Planning process.

Two possible advantages of incorporating environmental assessment into the production of emergency plans seem to be the formalisation of the need for the environment to be considered and certain aspects of the procedures required. From initial contact had with officers regulating these sites, it is likely that no formalisation would be needed for COMAH sites and improvement upon the mitigation measures in the emergency plans is not likely to be gained from the provision of alternatives, because of the necessity to keep risks ALARP and use of risk hierarchies. Any improvements through increased public consultation could well be outweighed by the current reasons for restrictions on information, namely: security, commercial confidentiality and personal privacy.

Further study is suggested into the processes of site-specific emergency plan creation and further liaison with practitioners about the potential efficacy of these benefits.

Possible benefits of environmental assessment during an emergency

Any benefits, during an emergency, would only result if a concise form of environmental assessment could be developed that would not significantly slow down the emergency response. The environmental consequences of plan implementation should already be included in the real-time decision making via the statutory involvement of the Environment Agency or SEPA as Category One responders under the CCA. Well defined roles for Environment Agency staff for different types of emergencies exist that enable information on the environmental sensitivities of areas affected or surrounding emergency sites to be

provided and technical expertise pertinent to various hazard types, like those associated with regulated industrial sites, to be included. The effectiveness of this mechanism is dependent on the Environment Agency's and SEPA's own business continuity plans but regular exercises help to embed behaviour and thinking and highlight potential areas to work on.

Conclusions

Emergency plans contain various mitigation measures, of which some could have environmental impacts, but all are exempt from SEA. While the majority of plans do not meet the SEA criteria anyway, some do but are exempt from SEA. Their possible impacts could affect the marine environment, surface and ground water quality, localised habitat, historical or cultural features and have resource use and wider carbon and energy use implications, in the absence of other environmental protection mechanisms. However, there are other mechanisms, especially the involvement of environmental authorities in the plan creation and implementation processes. Further study is advised to assess the possible benefits to site-specific emergency management of aspects of SEA, within the plan production stage, namely: the formalisation of environmental impacts in a report, the setting of environmental objectives and performance criteria, the requirement for alternatives to be considered and for text demonstrating how feedback from consultees has been incorporated, or not, and the identification of future monitoring indicators to help post-emergency review. A real-time form of environmental assessment would be needed to be applied during the implementation of CCA plans, to potentially improve their environmental impact.

References

Carlisle CC 2005 – Carlisle City Council – Report to Executive, Ref TC01/05.

Colcomb et al 1997 – Shoreline cleanup and waste disposal issues during the Sea Empress incident, 1997 International Oil Spill Conference.
http://www.iosc.org/papers_posters/02005.pdf

COMAH 2011 – Buncefield: Why did it happen?
http://www.hse.gov.uk/comah/buncefield/buncefield-report.pdf

DoH 2003 – Guidelines for smallpox response and management in the post-eradication era (smallpox plan), Appendix 5 Specifications for Smallpox Care Centres.
http://webarchive.nationalarchives.gov.uk/20110907164128/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4071515.pdf

ECC 2007 – Essex County Council – Bradwell Off Site Emergency Plan (June 2007)
http://www.essex.gov.uk/Your-Council/Local-Government-Essex/Documents/Your_Safety_Bradwell_doc.pdf

Fuller 2004 - Fuller C., Bonner J., Page C., Ernest A., McDonald T., McDonald S. (2004) Comparative toxicity of oil, dispersant, and oil plus dispersant to several marine species, Environ.

Toxicol. Chem., 2004 Dec;23(12):2941-9.

Gupta 2010 – Gupta S. Oil spill dispersant could damage coral populations, NewScientist, 3 August 2010.
www.newscientist.com/article/dn19260-oil-spill-dispersant-could-damage-coral-populations.html

HSE 2012 – Fire at Universal Freight warehouse, Yorkshire. 13th February 1982 – Accident Summary.
http://www.hse.gov.uk/comah/sragtech/caseuniversal82.htm

HSE 2012 – The Fire at Allied Colloids Limited, Low Moor; Bradford, 21st July 1992 – Accident Summary.
http://www.hse.gov.uk/comah/sragtech/casealliedcol92.htm

IMPEL 2011 – Lessons learnt from industrial accidents.
http://impel.eu/wp-content/uploads/2012/03/brochure_gb_impel2011.pdf

MSDC 2011 – Mid Sussex District Council Emergency Plan.
http://www.midsussex.gov.uk/media/MSDC_MIPBTEdit2011.pdf

NCC 2009 – Norfolk Coastal Pollution Emergency Response Plan 2009
http://www.norfolkprepared.gov.uk/consumption/groups/public/documents/article/ncc102578.pdf

OSPRAG 2011 – Oil Spill Prevention and Response Advisory Group: Strengthening UK Prevention and Response Final Report 2011
http://www.oilandgasuk.co.uk/cmsfiles/modules/publications/pdfs/EN022.pdf

POST 2004 – http://www.parliament.uk/documents/post/postpn230.pdf

SCC 2008 – Southampton City Council – Oil and Chemical Pollution Plan.
http://www.southampton.gov.uk/Images/Oilchem%20Pollution%20Plan%20Version%201.1%20Julyunrestricted_tcm46-210535.pdf

Environment Agency

Emergency Plans (UK)

Steve Swain
Major Projects Officer – Sustainable Places

1 December 2012

Environment Agency

"plan or programme the sole purpose of which is to serve national defence or civil emergency"

Topics

- Legislative need for Emergency Plans
- Isle of Grain LNG Terminal
- Contents of Emergency Plans
- Consideration of the Environment
- Mitigation Measures & Possible Environmental Impacts
- Non-SEA Mechanisms

Legislative need for Emergency Plans

Civil Contingencies Act 2004
Category 1 Responders – Business Continuity Plans
Local, Regional, National Emergency Plans

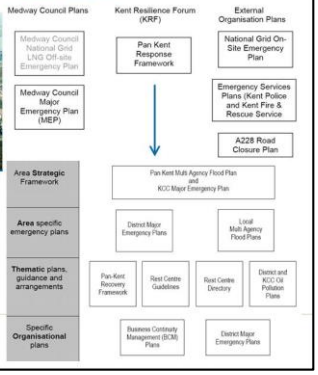
Control Of Major Accident Hazards Regulations 1999
Tier One Operators – On-Site Emergency Plans
Local Authority – Off-Site Emergency Plans

Radiation (Emergency Preparedness & Public Information) Regulations 2001
Operators / Transporters – On-Site Emergency Plans
Local Authority – Off-Site Emergency Plans

Pipeline Safety Regulations 1996
Local Authority – Off-Site Emergency Plans

Others....

Isle of Grain LNG Terminal



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Contents of Emergency Plans

ALL
Related and Interdependent Plans
Roles and Responsibilities
Communications with Public & Inter-Agency
Trigger Levels for Actions / Phases
Mitigation Measures
Review Process / Debriefing
Exercises / Training
Security / Commercial Confidentiality

CCA 2004 (Area-Wide)
Extendibility (Local>regional>National)

COMAH / REPPIR / PSR (Site-Specific)
Detailed Hazards
Detailed Mitigation Measures

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Consideration of the Environment

Civil Contingencies Act 2004
"Maintain plans for the purpose of ensuring, so far as is reasonably practicable, that if an emergency occurs the person or body is able to continue to perform his or its functions,

Maintain plans for the purpose of ensuring that if an emergency occurs or is likely to occur the person or body is able to perform his or its function so far as necessary or desirable for the purpose of -
(I) Preventing the emergency,
(II) Reducing, controlling or mitigating its effects, or
(III) Taking other action in connection with it,"

"an event or situation which threatens serious damage to the environment of a place in the United Kingdom"

Control of Major Accident Hazards Regulations 1999
"1 containing and controlling incidents so as to minimise the effects, and to limit damage to persons, the environment and property,
2 implementing the measures necessary to protect persons and the environment from the effects of major accidents;
3 communicating the necessary information to the public and to the emergency services and authorities concerned in the area;
4 providing for the restoration and clean-up of the environment following a major accident."

Radiation (Emergency Preparedness & Public Information) Regulations 2001
"..designed to secure, so far as is reasonably practicable, the restriction of exposure to ionising radiation and the health and safety of persons who may be affected by such reasonably foreseeable emergencies as are identified in the assessment"

Pipeline Safety Regulations 1996
"prepare an adequate plan detailing how an emergency relating to a possible major accident in its area will be dealt with."
""major accident" means death or serious injury involving a dangerous fluid"

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Mitigation Measures & Possible Environmental Impacts


Response
Behavioural


Response
Tangible


Recovery

Environment Agency

Non-SEA Mechanisms

> Involvement of EA / SEPA – Off-site / Area-wide

Category 1 Responder;
Sit on Resilience Forums – input into plan creation,
Involved in emergency response - lead on flood risk,
participate for pollution control

> Indirect / Direct consideration in legislation

COMAH environmental remit
COMAH, REPPIR, PSR reduce probability of emergencies occurring

Environment Agency

Thank you for listening

Environment Agency

Reconstruction and Mass Relocation Initiatives by the Resident Association -Sakihama District , Ofunato City- (Source: NPO Iwate Community Support Center)

Kenichi Tanaka

Senior Advisor (Environmental Impact Assessment), Japan International Cooperation Agency

Abstract

The huge tsunami reached the Sakihama District at 15:15 in March 11, 2011. Approximately 50 households were washed away and 10 people were killed or went missing. The Sakihama Reconstruction Council was established to facilitate the speedy reconstruction in June 29, 2011. The council has 22 members including resident association representatives, disaster victims, the former mayor, Iwate University staff and NPO staff. As cultural properties requiring the investigation were found during exploratory excavation at the candidate site in April 2012. Once the archaeological study is complete, detailed design for the relocation site will be implemented and construction will be commenced.

大船渡市崎浜地区における住民公益会による復興･高台移転の合意形成主導 （いわて地域づくり支援センター）

田中研一

（独）国際協力機構

（和訳）

巨大津波は、2011 年 3 月 11 日 15 時 15 分、崎浜地区に到達した。約 50 世帯が流され、10 人が死亡あるいは行方不明となった。迅速な再建を促進するために、2011 年 6 月 29 日、崎浜再建協議会 が設けられた。協議会 は、住民団体代表、被災者、元市長、岩手大学職員と NPO 職員を含む、メンバー22 人で構成されている。2012 年 4 月、候補地での試掘中に調査を要する文化財が発見されたため、考古学的調査が完了し次第、移住先が詳細に設計され建設が開始される予定である。

JICA's Environmental and Social Consideration on Public Involvement "Reconstruction and Mass Relocation Initiatives by the Resident Association -Sakihama, Ofunato City- (Source: NPO Iwate Community Support Center)"

Kenichi TANAKA

Senior Advisor (Environmental Impact Assessment), Japan International Cooperation Agency (JICA)

1. JICA's environmental and social considerations

The implementation of a development study by the Japan International Cooperation Agency (JICA) is based on a request for technical cooperation from a developing country and the ensuing examination for project approval by related organizations. When approval for a project is granted, a preliminary study is conducted first, followed by a full-scale study by a consultant team. In the full-scale study stage, both a Master Plan Study (M/P) and a Feasibility Study (F/S) may be conducted, or a Feasibility Study may be implemented directly without implementing a Master Plan Study. In large-scale infrastructure and some other projects, a social and environmental consideration study may be conducted before the preliminary study from the viewpoint of ensuring appropriate consideration of environmental and social impacts. In formulating a Master Plan, if the recipient country conducts an Initial Environmental Examination (IEE), JICA usually helps the country to implement the IEE, and may dispatch a full-scale study team to provide assistance from the planning stage to ensure that the Project Executing Organization will implement the IEE properly. As for Feasibility Studies, JICA basically provides technical assistance for environmental assessments to be conducted by Project Proponents.

After its 1990 introduction of guidelines for environmental considerations for dam projects, JICA developed and used thematic guidelines in 20 sectors, including those of mining and manufacturing, social development (e.g., roads, ports/harbors and airports), and agriculture, forestry and Fischeries. In recent years, however, the importance of social considerations, in particular, has been increasingly recognized for development studies on large-scale infrastructure and some other projects, requiring a shift in focus to environmental and social considerations, not solely environmental considerations. The following section, entitled "Circumstances of the revision of the JICA Guidelines for Environmental and Social Considerations," outlines the review of the shift in focus and gives details of the guidelines' revision.

2. Circumstances of the revision of the JICA Guidelines for Environmental and Social Considerations

The new JICA Guidelines for Environmental and Social Considerations have been implemented and applied to technical cooperation projects since April 1, 2004. The Committee for Revising the JICA Guidelines for Environmental and Social Considerations, established in December 2002 and comprising specialists representing academia, NGOs, the private sector and related ministries of the Japanese government, met 19 times up to September 2003. The Committee meetings, featuring lively discussions, were open to the public, and allowed members and non-members alike to express their views in order to

ensure transparency of the proceedings. All the minutes of the meetings are available on JICA's website. To strengthen environmental considerations, the Committee analyzed problems of JICA's past development studies and examined surveys on the current status of environmental considerations conducted by other international lending agencies and aid organizations. Accordingly, the Committee made recommendations on the Basic Principles. Subsequently, the October 2008 merger between JICA and the Overseas Economic Cooperation Operations wing of the Japan Bank for International Cooperation (JBIC) led to the integration of two sets of respective guidelines for environmental and social considerations after open discussions by a committee tasked with merging the guidelines. The new JICA Guidelines for Environmental and Social Considerations, integrated on April 1, 2010, have been applied to all JICA's support projects, including Preparatory Surveys.

We have several training courses regarding environmental impact assessment every year. JICA training course on Public Participation, Consensus Building and Resettlement in Public Works Project for Asian Countries was held in September 2012. In this training course, I visited to sakihama disaster area by Tsunami in Iwate prefecture with 11 participants (Cambodia, Indonesia, Nepal, Laos, Sri Lanka, East -Timor and Pakistan.) Stakeholders meeting is important issue for JICA's Environmental and Social Consideration Guideline. Therefore we had discussed on voluntary resettlement to the heights with devastated Fischermen group by Tsunami.

Photo No.1
Sakihama disaster area by Tsunami

Photo No.2
Participants at the Sakihama temporary housing

The huge tsunami reached the Sakihama District at 15:15 in March 11, 2011. Approximately 50 households were washed away and 10 people were killed or went missing. The Sakihama Reconstruction Council was established to facilitate the speedy reconstruction in June 29, 2011. The council has 22 members including resident association representatives, disaster victims, the former mayor, Iwate University staff and NPO staff. As cultural properties requiring the investigation were found during exploratory excavation at the candidate site in April 2012. Once the archaeological study is complete, detailed design for the relocation site will be implemented and construction will be commenced.

Photo No.3
Ofunato city-Devastated building by Tsunami

Photo No.4
Discussion with sufferer at the temporary housing

3. Overview of the Sakihama District

Overview of Sakihama Koekikai

A residents' association encompassing all households

13 board members including: Chair, vice-chair, 8 directors, 3 auditors

General accounting budget of 5.6 million yen (2010)

Roles and Business of Sakihama Koekikai

Maintenance and improvement of owned and managed forest land , New installation and maintenance of security lighting: Implementation of public welfare work, Promotion and support for social education activities, Promotion of traffic safety measures, Representation at municipal affairs workshops, lobbying for improvement of the regional environment, etc. Promotion of social welfare services, Organization of various training programs, round-table discussions and lectures, Maintenance of deer control netting and clearing of underbrush in and around Shiraiso Park, Promotion of fire prevention activities in the district, Implementation of improvement projects for fishing villages, Other

4. Situation in the Sakihama District

March 11, 2011, The earthquake occurred at 14:46. The tsunami reached the area at approximately 15:15.Approximately 50 households were affected. 10 people died or went missing.

Current Conditions:

Disaster victims are living in emergency temporary housing and rental apartments (Minashi Temporary Housing) in the district. Sakihama Elementary School is being used as emergency temporary housing. Numerous student apartments related to the university in Sakihama have been made available to disaster victims, allowing them to stay in the district.

Residents in emergency temporary housing: 23 families (approx. 80 people)

Residents in rental apartments (Minashi Temporary Housing): 20 families (approx. 40 people)

5. Background of the Reconstruction Council Discussions

Discussion Background :June 29, 2011 Inaugural meeting: Worked to identify problems in the district. July 29, 2001 Second meeting: Attendees included a professor from Iwate University and representatives of Iwate Community Support Center (Iwasen). October 31, 2011 Third meeting: More attendees were added for a workshop-style session to pinpoint problems and challenges.

December 2, 2011 Fourth meeting: Attendees agreed on domicile reconstruction and village relocation as top priorities. (December 3, 2011: A field visit to a candidate area for relocation was implemented.)

January 1, 2012: Fifth meeting: The results of the field visit were reported, the candidate site was studied and the height of seawalls was discussed. (January 22: The first Disaster Victims' Liaison Conference was held.) February 22, 2012 Sixth meeting: The candidate site was reviewed and problems were focused on. (March 24 – 26, 2012: A field visit to study the reconstruction status in the area affected by the Mid-Niigata Prefecture Earthquake of 2004 was attended by 16 representatives.) April 27, 2012 Seventh meeting: The results of the Niigata field visit were reported and a project team was established.

June 7, 2012 Eighth meeting: The city proposed a candidate site for relocation. (June 14: An information session was held for people interested in relocating.) (June 27, 2012: A Disaster Victims' Liaison Conference secretariat meeting was held.) July 22, 2012 Ninth meeting: A progress report was made on the mass relocation project and discussions were conducted on a housing reconstruction consultation service.

6. Major Developments

Inaugural Reconstruction Council meeting 6/29/2011

An agreement was made to develop plans for handling problems with (1) urban infrastructure (e.g., how to deal with flooded areas) and (2) local infrastructure (e.g., how to improve infrastructure for daily life) as basic issues to be addressed.

Second Reconstruction Council meeting 7/29/2011

An Iwate University professor reported on activities of the central and prefectural governments concerning the reconstruction of the Sakihama District. The council agreed to add new members including disaster victims as of the next meeting, to go ahead with activities such as mass relocation, and to make proposals to and collaborate with the government on various matters.

Third Reconstruction Council meeting 10/31/2011

The council held a workshop-style meeting to identify issues and challenges concerning the reconstruction of Sakihama. Various matters were discussed, including (1) domicile reconstruction(relocation), (2) local community maintenance, (3) support services for disaster victims, (4)utilization of the vacant lot where Sakihama Elementary School used to stand, (5) utilization of the flooded area, (6) improvement of living environments, (7) collection and consolidation of information on victims' recollections of the disaster and related records, (8) population issues, and (9)promotion of local industry and job creation.

Fourth Reconstruction Council meeting 12/2/2011

The meeting carried over from the previous session, with discussions concerning issues and challenges and methods/responsibility for their resolution. Domicile reconstruction and village relocation were confirmed

as top priorities.

Candidate relocation site inspection 12/3/2011.

A potential candidate site for relocation in the Sakihama District was visited.

Fifth Reconstruction Council meeting 1/18/2012.

The height of sea walls, the potential of the candidate site for relocation and related issues were discussed.

First Disaster Victims' Liaison Conference 1/22/2012

As preparatory activities for mass relocation progressed and support measures at national and prefectural levels began to be worked out, the provision of information to disaster victims took on increased importance.

The Disaster Victims' Liaison Conference was consequently established as a body to support the sharing of information and discussions on temporary housing and rental accommodation.

Field visit to the area of the Mid-Niigata Prefecture Earthquake of 3/24– 26/2004

A team of 16 people representing the Reconstruction Council, the Disaster Victims' Liaison Conference and Iwate University visited a reconstructed area hit by the Mid-Niigata Prefecture Earthquake of 2004 to study public housing and examples of mass relocation.

Photo No.5
Proposed mass relocation site

Photo No.6
Explanation of proposed mass relocation site

Exchange of opinions with Ofunato City Hall 4/13/2012

It was reported that the Reconstruction Council was making progress with the selection of a candidate relocation site, and the necessary steps in moving forward with the reconstruction project were confirmed.

The agreement of landowners and leaseholders in the community should be obtained. Opinions were exchanged on compulsory purchase prices for properties in the affected area and the price of the mass relocation site. The mass relocation project schedule was confirmed.

Views were exchanged on public housing for disaster victims (including a request to consider a variety of housing types, such as terraced houses, in the Sakihama District).

Eighth Reconstruction Council meeting 6/7/2012

A city official reportedV the results of candidate mass relocation site selection.

City presentation on the candidate mass relocation site 6/14/2012

A city official gave a presentation on the candidate mass relocation site for disaster victims.

Commencement of consultation sessions on domicile reconstruction – late July 2012

The Disaster Victims' Liaison Conference proposed the need to provide consultation services for people requiring assistance with domicile reconstruction. Individual consultation service interviews began.

JICA's Environmental and Social Consideration on Public Involvement

Reconstruction and Mass Relocation Initiatives by the Resident Association (Source: NPO Iwate Community Support Center)

December 1 , 2012

TANAKA Kenichi

JICA Senior Adviser on Environmental Impact Assessment

1

Composition of JICA's Environmental and Social Consideration

Source : JICA's Environmental and Social Consideration Guideline

Introduction
I. Basic matters
II. Process of Environmental and Social Considerations
III. Procedures of Environmental and Social Considerations

Appendix 1 Environmental and Social Considerations Requirements to be fulfilled by the recipient government.

Appendix 2 Screening Format.

2

I. Basic Items

Purpose

To ensure the appropriate implementation of support, and confirmation for JICA's environmental and social Consideration.

Define the duties and procedures of environmental and social Consideration performed by JICA.

Encourage proper implementation by the recipient country by showing JICA's environmental and social Consideration requirements.

3

Basic Items for Environmental and Social Consideration

1. Covers wide range of environmental and social influences.
2. Addresses the environmental and social consideration from an early stage (Introduce the concept of Strategic Environment Assessment).
3. Carry out follow-up activities after the termination of a cooperation project.
4. Maintain accountability and transparency when conducting a cooperation activities.
5. Seek participation by the stakeholders.
6. Disclose Information.
7. Strengthen the organization and implementation ability of JICA.

4

Responsibility of JICA

- Environmental and social considerations should be initiated by the recipient government.
- JICA provides assistance and confirms that the recipient government is carrying out the environmental and social considerations, in accordance with guidelines.

- Prepares report of environmental and social consideration study in collaboration with a host country, and provides proper technical support
- Conducts monitoring an implementation stage of a technical cooperation project
- Conducts follow-up activity after a cooperation project terminates
- Ensuring wide range of environment and social considerations from an early stage
- Keeps accountability and transparency
- Make experts to respect related clauses of the guideline

5

Measures Taken during an Emergency

- During restoration and rehabilitation after a natural disaster or conflict, some guideline procedures may be skipped after an inquiry with the advisory committee.
- Submit a report of the inquiry with the advisory committee.

6

II. Process of Environmental and Social Considerations

- Information Disclosure
- In principle, the recipient government discloses information.
- Roles of JICA
- Assist the recipient government in disclosure through the cooperation project.
- JICA itself discloses important information about environmental and social considerations in the main stages of the cooperation project in the appropriate manner.
- Method of Information Disclosure
- Viewing of the JICA website, public reading at the JICA Library or local office.

7

Items of Environmental and Social Considerations

- **Impact on human health and safety as well as the natural environment including any trans-boundary or global impact on the atmosphere, water, soil, waste material, accidents, water usage, ecosystems and biodiversity, and social impacts as shown below**

- Migration of a population or involuntary resettlement
- Local economy such as employment and livelihood
- Utilization of land and local resources
- Social institutions such as the social infrastructure and local decision-making institutions
- Social infrastructures and services
- Poverty level and indigenous peoples
- Equality of benefits and losses and in the development process
- Gender
- Children's rights
- Cultural heritage
- Local conflict of interests
- Infectious diseases such as HIV/AIDS

8

Inquiry to Advisory committee

Establishes a standing advisory committee

- Receive advice for support and confirmation regarding environmental and social considerations.
- Comprised of outside specialists with the necessary knowledge.

9

Categorization

Category	Definition
A	Projects to have significant adverse impact on the environmental and social
B	Project with potential adverse impact on the environmental and social is less adverse than Category A
C	Project to have minimal or little adverse impact on the environmental and social

The projects classified in Category A require an especially cautious environmental and social consideration

10

Laws and Standards referred to by JICA

- Laws and standards relating to the environment and local communities regulated by recipient government.
- Good Practice of Japan, international and national organizations, and developed countries.
- Respect for the conditions of governance.

11

Concerns about the Social Environment and Human Rights

- Fully take social and institutional conditions of the recipient country and the actual situation of the project location into account when providing assistance and confirming environmental and social considerations.
- Respect internationally established human rights standards such as the International Convention on Human Rights when implementing cooperation projects.

12

Monitoring

- Confirm the monitoring results of the recipient government
- When the environmental and social considerations are not fully implemented, encourage the recipient government to take the appropriate actions through a transparent and accountable process
- When the implementing body does not have sufficient monitoring capability, JICA provides cooperation relating to monitoring, including human resources development

13

Follow-up（Common to Each Scheme）

- JICA conducts a follow-up activity to confirm that the EIA process that has been incorporated as a result of the environmental and social considerations study is being implemented
- Confirm the condition of the EIA process by the implementing body (development study, preparatory study for grant aid cooperation)
- Confirm that the results and recommendations of the environmental and social considerations study are incorporated into a resettlement action plan and mitigation measures, and disclose the results
- When an unexpected effect occurs, a field study is conducted in order to fully understand the problem when necessary

14

Appendix 1 Requirements to be Fulfilled by the the Recipient Government

- Consideration of an alternative plan and relief plan
- A Quantitative Evaluation
- Preparation of an EIA Report
- Establishment of third party panel
- Scoping of the effects
- Social Acceptance
- Involuntary migration of residents
- Indigenous peoples
- Monitoring

15

Appendix 2 **Screening Format**

- Name of Proposed Project:
- Project Executing Organization, Project Proponent or Investment Company:
- Name, Address, Organization, and Contact Point of a Responsible Officer:
- Name:
- Address:
- Organization:
- Tel:
- Fax:
- E-Mail:
- Date:
- Signature:

16

Check Items

Please write "to be advised " when the details of a project are yet to be determined.

Question 1: Address of project site

Question 2: Scale and contents of the project (approximate area, facilities area, production, electricity generated, etc.)

2-1. Project profile (scale and contents)

2-2. How was the necessity of the project confirmed?
Is the project consistent with the higher program/policy?
☐YES: Please describe the higher program/policy.
( )
☐NO

17

2-3. Did the proponent consider alternatives before this request?
☐YES: Please describe outline of the alternatives
( )
☐NO

2-4. Did the proponent implement meetings with the related stakeholders before this request?
☐Implemented ☐Not implemented
If implemented, please mark the following stakeholders.
☐Administrative body
☐Local residents
☐NGO
☐Others( )

18

Question 3:
Is the project a new one or an ongoing one? In the case of an ongoing project, have you received strong complaints or other comments from local residents?
☐New ☐Ongoing (with complaints) ☐Ongoing (without complaints)
☐Other

Question 4:
Is an Environmental Impact Assessment (EIA), including an Initial Environmental Examination (IEE) Is, required for the project according to a law or guidelines of a host country? If yes, is EIA implemented or planned? If necessary, please fill in the reason why EIA is required.
☐Necessity (☐Implemented ☐Ongoing/planning)
(Reason why EIA is required:)
☐Not necessary
☐Other (please explain)

19

Question 5:
In the case that steps were taken for an EIA, was the EIA approved by the relevant laws of the host country? If yes, please note the date of approval and the competent authority.
☐Approved without a supplementary condition☐Approved with a supplementary condition☐Under appraisal(Date of approval: Competent authority:)
☐Under implementation
☐Appraisal process not yet started
☐Other ( )

Question 6:
If the project requires a certificate regarding the environment and society other than an EIA, please indicate the title of said certificate. Was it approved?
☐Already certified
Title of the certificate: ( )
☐Requires a certificate but not yet approved
☐Not required
☐Other

20

Question 7:

Are any of the following areas present either inside or surrounding the project site?
☐Yes ☐No
If yes, please mark the corresponding items.
☐National parks, protection areas designated by the government (coastline, wetlands, reserved area for ethnic or indigenous people, cultural heritage)
☐Primeval forests, tropical natural forests
☐Ecologically important habitats (coral reefs, mangrove wetlands, tidal flats, etc.)
☐Habitats of endangered species for which protection is required under local laws and/or international treaties
☐Areas that run the risk of a large scale increase in soil salinity or soil erosion
☐Remarkable desertification areas
☐Areas with special values from an archaeological, historical, and/or cultural points of view
☐Habitats of minorities, indigenous people, or nomadic people with a traditional lifestyle, or areas with special social value

21

Question 8:

Does the project include any of the following items?
☐Yes ☐No
If yes, please mark the appropriate items.
☐Involuntary resettlement (scale: households persons)
☐Groundwater pumping (scale: m3/year)
☐Land reclamation, land development, and/or land-clearing (scale: hectors)
☐Logging (scale: hectors)

22

Question 9:
Please mark related environmental and social impacts, and describe their outlines.

☐Air pollution
☐Water pollution
☐Soil pollution
☐Waste
☐Noise and vibrations
☐Ground subsidence
☐Offensive odors
☐Geographical features
☐Bottom sediment
☐Biota and ecosystems
☐Water usage
☐Accidents
☐Global warming
☐Involuntary resettlement
☐Local economies, such as employment, livelihood, etc.
☐Land use and utilization of local resources
☐Social institutions such as social infrastructure and local decision-making institutions
☐Existing social infrastructures and services
☐Poor, indigenous, or ethnic people
☐Misdistribution of benefits and damages
☐Local conflicts of interest
☐Gender
☐Children's rights
☐Cultural heritage
☐Infectious diseases such as HIV/AIDS
☐Other ( )
Outline of related impact:

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Question 10:
In the case of a loan project such as a two-step loan or a sector loan, can sub-projects be specified at the present time?
☐Yes ☐No

Question 11:
Regarding information disclosure and meetings with stakeholders, if JICA's environmental and social considerations are required, does the proponent agree to information disclosure and meetings with stakeholders through these guidelines?
☐Yes ☐No

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MINUTES OF MEETING
ON
SCOPE OF WORK
FOR
THE STUDY
ON
THE CONSTRUCTION OF THE SECOND MEKONG BRIDGE
IN
THE KINGDOM OF CAMBODIA
AGREED UPON BETWEEN
THE ROYAL GOVERNMENT OF CAMBODIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

25

M／M （1）

1. Study Title
   Both sides agreed to use "the Study on the Construction of the Second Mekong Bridge".
2. Study Area
   Both sides agreed that the study area shall be the proposed Neak Loeung Bridge Site and associated regions. However, the socio-economic impact of bridge construction on neighboring countries will also be studied.
3. Steering Committee
   Both sides agreed that the Steering Committee would be set up to conduct the Study efficiently under the initiative of MPWT. The committee will be comprised of the following ministries and organizations mainly, and the other ministries and organizations could be included if MPWT recognizes the necessity.

26

M／M （2）

4. The Concept of Environmental and Social Considerations Based on JICA's New Guidelines
   The Team explained the background and the present situation related to the revision of JICA's environmental and social consideration guidelines. These revisions were based on the recommendations of a Special Committee created for the purpose and which met 19 times from December 2002 to September 2003 before coming up with the final form.

   The Team emphasized on the proponent's responsibility in conducting the environmental and social considerations, information disclosure, participation of stakeholders from the early stage of the study and that the new basic approaches shall be accordingly applied to the Study.
   The Royal Government of Cambodia agreed in principle to these responsibilities as cited above.

27

M／M （3）

5. Responsibility of MPWT for IEE and EIA
   Both sides agreed that MPWT shall be responsible for IEE and EIA, and Necessary activities for IEE and EIA shall be implemented as cooperative work between MPWT and JICA.

6. Roles of MPWT and JICA Concerning Environmental and Social Considerations
   Both sides agreed that environmental and social considerations including collection of necessary data for consultations with stakeholders shall be carried out by MPWT, being the proponent of the Project. On the other hand, JICA shall provide MPWT with technical support to resolve environmental and social consideration issues.

7. Preparation for Initial Environmental Examinations (IEE)
   The Royal Government of Cambodia agreed that they shall make the preparations for contribution such as necessary budget as counterpart fund, organization and so forth for the conduct of the IEE, including public consultation, and other related activities after the sign of this Minutes of Meeting, and that the preparations should be finished prior to the commencement of the Study.

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M／M （4）

8. Agreement among Communities and Stakeholders
   The Royal Government of Cambodia agreed that they shall confirm agreement among the communities and the stakeholders upon the results of selecting from the alternatives before proceeding to the next steps of the Study at each environmental and social consideration stage.

9. Information Disclosure
   Both sides agreed that indispensable information disclosure shall be implemented by MPWT and JICA. The Team explained that information disclosure is necessary as this shall confirm the alternatives with the participation of the stakeholders early on in the conduct of the Study.
   The Team also emphasized that JICA will make the Study reports open to the public throughout the Study.

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JICA External Advisory Committee for ESC

Case I

SYNOPSIS

The Study of the Improvement / Construction of the International Airport in the Republic of Guatemala
Study Period: From June 2003 to February 2006
Counterpart: UNEPRA, MCIV

INTRODUCTION

Outline of the Study

Improvement planning of the existing La Aurora Airport & Santa Elena Airport, and Site selection study for a new airport from May 2003 to March 2004;
Pre-feasibility study on the 4 selected sites from June 2004 to December 2004; and Feasibility Study on the final site from April 2005 to February 2006.

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Objectives of the Study

To prepare improvement plan of the existing La Aurora Airport and Santa Elena Airport;
To conduct site selection study for the new international airport to serve the capital city in Guatemala;
To conduct a feasibility study at the selected site;
To consider the environmental and social consideration into the study, including stakeholder meetings;
To make recommendation on suitable implementation scheme of the new international airport

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Study Area
- La Aurora Airport in Guatemala City and Santa Elena Airport in Peten, and Area within 2-hours travel time from Guatemala City (150 km x 150 km in square)

Relevant Organizations
- MCIV: Ministry of Communications, Infrastructures, and Housing;
- UNEPRA: Unidad Ejecutora del Proyecto del Nuevo Aeropuerto Internacional, that is an ad hoc organization organized in MCIV as the counterpart for this study;
- DGAC: General Direction of Civil Aviation under MCIV

Study Area
- La Aurora Airport in Guatemala City and Santa Elena Airport in Peten, and
- Area within 2-hours travel time from Guatemala City (150 km x 150 km in square)

Relevant Organizations
- MCIV: Ministry of Communications, Infrastructures, and Housing;
- UNEPRA: Unidad Ejecutora del Proyecto del Nuevo Aeropuerto Internacional, that is an ad hoc organization organized in MCIV as the counterpart for this study;
- DGAC: General Direction of Civil Aviation under MCIV

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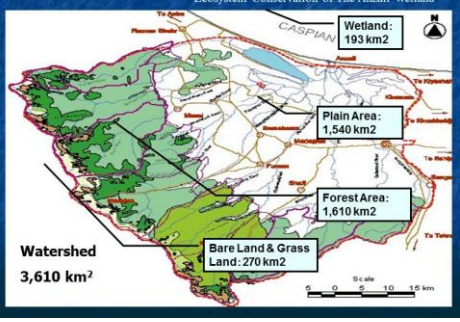
CASE II Public Participation and Environmental Education

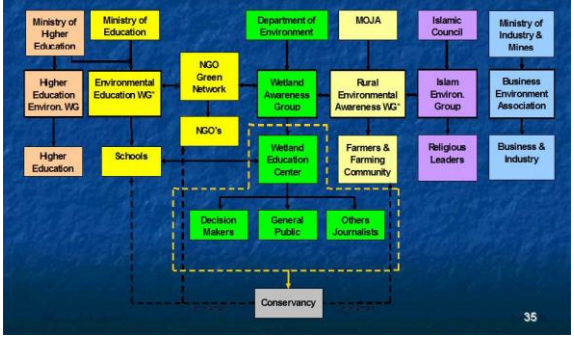
2-1. Anzali Wetland, IRAN

Source: Development Study 2004 The Study on Integrated Management for Ecosystem Conservation of The Anzali Wetland



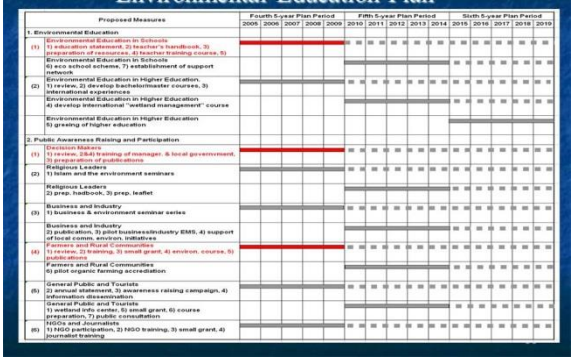
34

2-2. Anzali Wetland Environmental Education Plan



35

2-3. Anzali Wetland Environmental Education Plan



2-4. Anzali Wetland, IRAN Environmental Education High School and College Students

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2-5. Anzali Wetland Wetland Education Program

38

3−1. Source: JICA Development Study 2004 The Study of Management on Sanitation Environment in the Coast of Quintana Roo State in Mexico (Waste Management)

39

3−2. Environmental Education Landfill site in Chetumal, Mexico

40

3－3. Environmental Education
Solid Waste
Landfill site in Chetumal, Mexico

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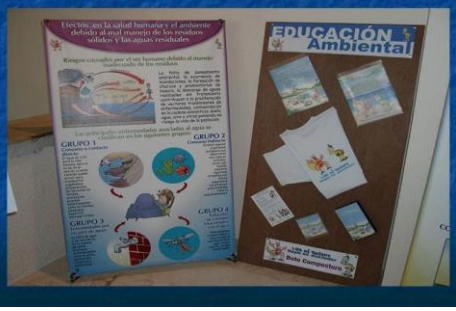
3－4. Environmental Education
Waste Management in Mexico
(Brochure, Video, DVD)



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4－1. Training: JICA Prospective experts,
JICA Staff and staff of
the related Ministries on Environmental
and Social Considerations

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4－2. Training : JICA Prospective Experts on
Environmental and Social Considerations
in Zambia (1)

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4－3. Training : JICA Prospective Experts on
Environmental and Social Considerations
in Zambia (2)

45

4－4. Training : JICA Counter parts on
Environmental and Social Considerations
in Japan (1)
South Pacific Countries

46

4－5. Training : JICA Counter parts on
Environmental Management
in Japan (2)
Mesopotamian Wetland , IRAQ

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END

Japan Interntional Cooperation Agency (JICA)
Nibancho Center Building
5-25, Nibancho, Chiyoda-ku, Tokyo 102-8012, Japan

JICA Institute for International Cooperation (IFIC)
10-5 Honmura-cho, Ichigaya,
Shinjuku-ku, Tokyo 162-8433, Japan

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Furthering environmental assessment through continuing assessment into management as an aid to integrating disaster risk reduction measures into development

Bridget Durning
Oxford Brookes University

Abstract

Environmental impacts of developments are currently identified and mitigated from two distinct perspectives:' before' and 'after' implementation with environmental impact assessment (EIA) and environmental management systems and processes (EMS) being the main instruments on the respective sides. Increasingly the 'after' process it also developing a more strategic rather than purely operational focus and linking into other operational and strategic process including corporate social responsibility, and pollution prevention and control. Whilst there are many factors which can be seen to inhibit a connection the two 'sides' of impact identification and mitigation, there are examples were the two are successfully connected and therefore rather than a 'before' and 'after' there is instead the continuous management of impact. This presentation will look at some of the barriers to integration between EIA and operational processes and look at case studies were there has been successful integration.

（和訳）

開発事業へ災害管理を統合することに向けたマネジメント局面への環境アセスメントの継続的適用

ブリジット・ダーニング
オックスフォード・ブルックス大学

現在、環境影響アセスメント (EIA)の実施の「前」と「後」、そして、環境管理の制度とプロセス (EMS)がそれぞれの面における主な手段である、という 2 つの異なる視点から、開発の環境への影響が特定され緩和されている。「後」プロセスも、次第に、単なる運用的というよりむしろより戦略的な焦点を策定しつつあり、企業の社会的責任、汚染防止や汚染管理などの他の運用戦略的プロセスとリンクしつつある。影響の特定と緩和の２つの「面」の接続を抑制すると見られる多くの要因が存在するが、この 2 つがうまく接続され、従って「前」と「後」というよりも継続的な影響管理が存在する例がある。本プレゼンテーションは、EIA と運用プロセスの統合の障壁をいくつか検討し、うまく統合が行われた事例研究を検討する。

Environmental assessment and disaster event: JSPS/ESRC 'collaborative seminar', Tokyo, Japan, 30 Nov – 2 Dec 2012

'Furthering environmental assessment through continuing assessment into management as an aid to integrating disaster risk reduction measures into development'

Dr Bridget Durning, Oxford Brookes University

Abstract:

Environmental impacts of developments are currently identified and mitigated from two distinct perspectives:' before' and 'after' implementation with environmental impact assessment (EIA) and environmental management systems and processes (EMS) being the main instruments on the respective sides. Increasingly the 'after' process is developing a more strategic rather than purely operational focus and linking into other strategic process (such as pollution prevention and control). Whilst there are many factors which inhibit a connection between the two 'sides' of impact identification and mitigation, there are examples where the two are successfully connected and where there is therefore a continuous management of impact. This presentation will consider why the continuation of the impact management process is important for disaster risk reduction and preparedness in urban environments. It will also consider some of the barriers integration and look briefly at two key factors for successful integration.

1. Introduction

'Humanity seems to be drawn towards an urban model of living…critical in this respect are the rapidly growing numbers of people who live in urban slums and squatter settlements with limited access to basic services and political capital but who often are highly exposed to risk in all its forms from crime and violence to economic exploitation and environmental hazard' (Pelling, 2012 p145).

This quote encapsulates the risks associated with an expanding global population: modeled to rise from 6.9 billion in mid-2011 to 9.3 billion in 2050 and 10.1 billion by 2100 (United Nations, 2011), with largest expansions in Africa and Asia. However, 'environmental hazards' (which are variable in nature and origin) can be encountered in all parts of the developed and developing world (Table 1).

Table 1 – Major Categories of Environmental Hazard (adapted from Table 1.2 in Smith and Petley, 2009)

Major categories of environmental hazard	
Natural hazards (extreme geophysical and biological events)	Geologic e.g. earthquakes, landslides Atmospheric e.g. tropical cyclones Hydrologic e.g. floods, drought Biologic e.g. wildfires
Technological hazards (major accidents)	Transport e.g. air accidents Industrial failures e.g. explosions and fires Unsafe public buildings e.g. structural collapse Hazardous materials e.g. storage, transport
Context hazards (global environmental change)	International air pollution Environmental degradation e.g. deforestation Land pressures e.g. intensive urbanization Super hazards e.g. catastrophic earth changes

Disaster risk can be defined as the existence of a hazard (i.e. 'a potential threat to humans and their welfare' (Smith, 2001)), multiplied by vulnerability i.e. 'people's susceptibility to loss, injury or death' or 'susceptibility to harm' (Wisner et al, 2012). It can be considered that the extent to which a community can be exposed to a hazard (e.g. by having little or no coping strategies in place), increases their vulnerability and the potential for disaster to occur.

Disaster risk reduction can be achieved through risk mitigation e.g. by preventative action and building social resilience (i.e. the antithesis of vulnerability). In considering how 'disaster risk reduction' as a concept can benefit the communities who populate the urban areas, Pelling (2012) hypothecates that it can act as a 'champion' for ensuring that there is an integrated or holistic approach to policy making and a centrality of procedure, which can lead to 'distributional justice in governance and decision-making' (p.147). However, Pelling considers that some risk reduction measures are deficient by not including consideration of 'non-human entities': 'too often the ecological and carbon footprints of risk reduction or reconstruction activities are given only superficial attention' (p.147). Consideration of inter-generational impact is also often missing and he suggests these omissions could be countered (and environmental risk minimized) by having 'open and inclusive urban management' (p.147). To achieve this requires the co-ordination of a number of elements of urban governance including development planning, development regulation, risk reduction and emergency management, and particularly the inclusion of community participation: 'where disaster risk reduction works best, urban dwellers and their civil society organizations are involved' (p.151).

Many of these aspects are addressed through the Environmental Impact Assessment process, but it is

interesting to note that Pelling does not identify it as one of the urban governance processes that can assist in reducing the omissions in disaster risk reduction. This lack of recognition of the benefits of EIA in urban governance may explain why EIA is not more widely used in disaster risk reduction. However, others such as Benson (2007) and DEGWA (2008, pvii) do identify the benefits of integrating disaster risk reduction in environmental assessments for new development projects. Benson (2007) identifies five factors for 'critical success' in incorporating disaster risk reduction into environmental assessment:

- Sufficient information
- Early assessment
- Adequate monitoring
- Awareness of the benefits of assessing disaster risk as part of the environmental assessment process
- Supportive environmental policy

The last of these (policy) may be considered as key: 'environmental policies and related safeguard compliance policies should require satisfactory analysis and related management of disaster risk as part of the environmental assessment process. They should also require environmental assessment of post-disaster relief and recovery interventions' (Benson op cit p.7).

2. Disaster risk and environmental assessment and management

One viewpoint in considering how to mitigate 'disaster risk' is to postulate whether it should also be considered from a 'disaster preparedness' viewpoint, for, as Smith (2001) notes: 'although many risks are potentially avoidable, global environmental change and uncertainty about future hazardous events, together with the central role played by human failings in all disasters make the total elimination of hazard an unrealistic task' (p. 340). Should, therefore, an aim be to consider how tools can be used to 'be prepared' as well as reducing risk? One approach might be to adopt the 'precautionary principle' at all times as a way of achieving disaster risk reduction in urban governance. However, many authors have noted that use of the precautionary principle is not straightforward and comes with the risk of misapplication, potentially leading to a 'paralysis in decision making' (Sustein, 2005 cited in Bacon, 2012 p.164). Balint et al (2011) also observe 'the relative strength of precautionary arguments tends to rise with the perceived severity of possible future harms' (p. 67). They cite the scientific uncertainty of the scale of anthropogenic influences on climate change and the severity of the adverse effects of climate change as an example of this: those opposing the imposition of regulation call for more research to reduce the uncertainties whilst those following the precautionary principle call for regulation stating that the likely adverse effect are serious enough to justify regulation despite uncertainties.

The effective approach offered here is to use adaptive environmental assessment and management

processes. Some early work on environmental assessment advocated this: Holling (1978) observed that 'unless big disasters can be completely eliminated (which we take to be impossible) there remains the problem of designing our institutions and artifacts to cope with their occurrence' (p.138) and argued that the need to be adaptive is demonstrated when failure or disaster occurs: 'there exists a serious trade-off between designs aimed at preventing failure and designs that respond and survive' (p138). Lawrence (2003) suggested that environmental impact assessment needs to be an adaptive process in 'turbulent and complex situations where risk, uncertainty and health predominate and where the EIA needs to take into account knowledge limits and uncertainty-related concerns' (cited in Glasson et al, 2012, p.85). Balint et al (2011) also promote adaptive management for managing 'wicked' environmental problems (i.e. those for which there is no obvious solution) although couch that the process needs to be iterative, analytical and participatory, as well as adaptive.

Much of the key literature on the need to incorporate disaster risk reduction and disaster preparedness into environmental assessment processes appears to be based on, or is influenced by, input from organizations that work with major financial institutions and funders of development e.g. Benson (2007) draws on examples from the African Development Bank and Caribbean Development Bank. The practice of these institutions is likely to be influenced by the need for risk reduction in their financial investments rather than solely for the achievement of sustainable low disaster risk urban development. However, their guidance on practice is useful for envisaging how risk consideration and reduction could be incorporated into other areas of environmental assessment and management practice, including that where environmental assessment practice is mandatory or discretionary.

Some major financial institutions explicitly see risk reduction as a significant part of their way of working e.g. World Bank (2011) state that they 'routinely' require risk assessments 'for projects involving handling, storage, or disposal of hazardous materials and waste, the construction of dams, or major construction works in locations vulnerable to seismic activity or other potentially damaging natural events.' Their guidance states these assessments can be either part of environmental assessment documentation or as a standalone documents. However, echoing a point made by Benson (2007) on the inconsistent use of terminology within the 'disaster' community of practice, World Bank guidance also refers to the need for 'hazard' assessments, although these 'hazards' are specifically related to materials i.e.: 'The Bank requires a hazard assessment for projects involving certain inflammable, explosive, reactive, and toxic materials when they are present at a site in quantities above a specified threshold level' (World Bank, op cit).

Demonstrating how environmental assessment can be adaptive and continue from assessment into management, the large financial institutions also include the requirements for monitoring and auditing and the use of management plans and systems to monitor and manage impacts during the operational phase of development and beyond. Others, such as DEGWA (2008) and UNISDR (2004), also refer to the use of environmental management plans and operational systems to continue the preparedness of risk from

assessment into operational management e.g. through the use of environmental management systems (EMS): 'a well-maintained inventory of chemicals and hazardous substances used by local industries, and their proper labeling, will ensure that, during a disaster event, the risks that such materials pose to communities living nearby can be mitigated by proper isolation, handling and segregation' (DEGWA, 2008 p.26). It is therefore advocated that in seeking to incorporate disaster risk reduction and preparedness into any urban development, there should be the assumption that the assessment process will link through into the construction and operational processes. The need for this 'continuation' and ongoing of process has been advocated over many years e.g. as Holling stated in 1978:

> 'if assessment continues into the future, then prediction loses its status as a goal and assessment merges into environmental management. Prediction and traditional 'environmental impact assessment' suppose that there is a 'before and after' whereas environmental management in an ongoing process (p.133)

Many authors have considered how the ongoing process could actually occur, both in theory and in practice. The following section briefly describes the differences in practice between the EIA process and EMS and some of the key challenges in making the linkage between the two. The final section looks at what emerges from the literature as some of the key factors for successful integration and considers how these could aid with disaster risk reduction in urban development.

3. EIA practice and EMS practice

EIA is a mature process used in most parts of the globe to aid decision making (ensuring that the decision is better formed) and the formulation of development actions (by anticipating environmental challenges at an early stage in the process design) and to act as an instrument for sustainable development (though the avoidance of environmental damage) (Glasson et al 2012). These outcomes tend to be associated with legislated EIA process, but as referred to previously, EIA is also a process used out-with of legislative requirements for risk management by major financial institutions. Where the process is used as a way of managing financial risk, the management commonly extends beyond the initial assessment into management of impact during construction (through the use of systems such as environmental management plans) and into operational management (through use of e.g. environmental management systems, resettlement plans, auditing and monitoring).

Environmental impacts of developments are currently identified and mitigated from two distinct perspectives:' before' and 'after' implementation with environmental impact assessment (EIA) and environmental management systems and processes (EMS) being the main instruments on the respective sides. Table 2 lists often perceived barriers to linking EIA and EMS (based on the EIA being a legislated process and EMS a voluntary process using standards such as ISO14001).

Table 2 - Perceived Barriers to Linking EIA and EMS (adapted from Table 1.2 in Durning et al, 2012)

Type of barrier	Example
Legal and policy framework	Different consenting regimes for planning and environmental protection (pollution control)
	Potential overlap in requirements leading to inefficiencies
	Voluntary basis of EMS providing little incentive for uptake
Process/technical issues	Complexities of site ownership and occupation
	Time lag between EIA being carried and detailed design of project
	EMS orientated towards day to day activities, environmental implications of new development not considered
	Limited number of practitioners specializing in both tools
Practitioner issues	Different personnel undertaking EIA and EMS for any given project
	Public debate around new developments centered on whether or not to grant consent, not on mitigation
	Companies consider EMS to be outside the normal scope of operational activities
Proponent and stakeholder attitudes	EIA viewed by proponents as a bureaucratic step rather than a useful process to aid the delivery of the project
	Reluctance of proponent to put resources into operational management before outcome of the application is known

4. Examples of Key Factors in Aiding Integration

The barriers listed in Table 2 were identified from literature published prior to 2007. There is a small body of published examples of successful integration (e.g. Barnes and Lemon, 1999 and Marshall, 2002 which are some early examples – see also case study chapters within Perdicoulis et al 2012 for more recent examples) and also a larger body of theoretical work on models of integration (e.g. Eccleston 1998 who was one of the earliest writers on this topic). One of the key factors is that the information and actions proposed within the ex ante stage are carried through to the ex-post stage. Many involve the use of environmental management plans during the construction phase. Often these follow a systematic process, although they are not 'environmental management systems' in the sense of (e.g.) following ISO14001 guidelines; Marshall (2004) termed them 'EMS-lite' which seems apposite. The most successful examples of integration through to and with EMS sensu stricto occur where there is a linkage between the

different 'stages'. There are a number of potentially different key aspects to this linkage – two are very briefly explored below:

4.1 Communication, information and knowledge

Sanchez (2012) describes EIA as a 'knowledge-intensive' activity, with a number of different actors generating data, compiling information and using and creating knowledge (including consultants, proponents, decision making authorities). He proposes that achieving a transition from project planning through to management needs a mix of managerial tools (such as EIA and EMS - but he suggests the tools to be used are not limited to just these) but also identifies the need for human 'capacity development' e.g. through information sharing and knowledge generation within and between the different actors.

This human element is a key factor, as is the need 'feedback loops' - whether these are internally within the development or from one development to another. The importance of 'feedback loops' from environmental management to planning conditions and associated requirements is also identified by Becker (2012) in an example from the renewable energy section. Others have also identified the importance of information sharing and 'knowledge-brokers' to the impact assessment process e.g. Bond et al (2010) emphasis the importance of regular information exchange (in relation to successful implementation of EIA in a multidisciplinary team) whilst Sheate and Partidário (2010) identify the importance of 'knowledge-brokers' as key to ensuring relevant information is shared or transferred from its source to appropriate place.

4.2 Knowledge of the two processes

Raissiyan and Pope (2012) on reflecting on two case studies from the oil and gas industry identify one of the key success factors for having the connection is that the practitioners at both ends of the spectrum (environmental assessment and management) need to be conversant with 'each other's terminology and techniques, as well as the language of hazard identification and risk assessment' (p.125) – although as has already been noted, there is inconsistent use of terminology within the 'disaster' community of practice in general. Research carried out by McGuigan (2012) who interviewed a small number of practitioners again from both ends of the spectrum on their experience of working on construction phase of projects, also shows that few environmental assessment practitioners have any training or experience of environmental management systems and vice versa. This links back to the need for human capacity development identified by Sanchez (2012).

5. Conclusions

Adaptive management, comprising assessment and management which is a continuous process could in theory allow for disaster preparedness be incorporated into urban development by ensuring that risk mitigation measures or disaster preparedness identified during the assessment process are incorporated into management practices. Environmental impact assessment is not identified by the urban governance community as a key tool for disaster risk reduction, yet is used as a tool in financial risk reduction. The need information sharing and knowledge brokerage is seen as key but also having practitioners that are conversant in a joint language of assessment and management.

6. References

Bacon, C.M (2012) 'Disaster risk and sustainable development' in Wisner, B, Gaillard, J.C. and Kelman, I (eds) The Routledge Handbook of Hazards and Disaster Risk Reduction. Routledge: London and New York

Balint, P J, Stewart, R E, Desai, A and Walters L C (2011) 'Wicked Environmental Problems: managing uncertainty and conflict'. Island Press: Washington, Covelo and London

Barnes J and Lemon D (1999) 'Life-of-project environmental management strategy: case study of the Confederation Bridge project, Canada'. Journal of Environmental Assessment Policy and Management 1 (4) 429-439

Becker F (2012) 'EIA-EMS link from the renewables sector'. *In* Perdicoulis, A, Durning, B and Palframan L (eds) 'Furthering Environmental Impact Assessment: towards a seamless connection between EIA and EMS'. Edward Elgar: Cheltenham UK and Northampton MA USA

Benson C (2007) 'Tools for mainstreaming disaster risk reduction: Environmental Assessment – guidance note 7'. Provention Consortium

Bond A, J, Viegas, C.V. Coelho, C. C, dS. R., Selig, P M (2010) 'Informal knowledge processes: the underpinning for sustainability outcome in EIA?' Journal of Cleaner Production 18 6-13

Durning, B, Palframan, L and Perdicoulis A (2012) 'Chapter 1 - Introduction' *in* Perdicoulis, A, Durning, B and Palframan L (eds) 'Furthering Environmental Impact Assessment: towards a seamless connection between EIA and EMS'. Edward Elgar: Cheltenham UK and Northampton MA USA

Eccleston C (1998) 'Strategy for integrating NEPA with EMS and ISO14001'. Environmental Quality Management 7(3) 9-17

Glasson, J Therivel, R and Chadwick A (2012) 'Introduction to Environmental Impact Assessment (4th Ed)'. Routledge: London and New York

Marshall, R. (2002) 'Professional practice: developing environmental management systems to deliver mitigation and protect EIA process during follow-up'. Impact Assessment and Project Appraisal 20 (4) 286-292

Marshall, R (2004) 'Can industry benefit from participation in EIA follow-up – the Scottish Power

experience'. *In* Morrison-Saunders, A and Arts J (eds) 'Assessing impact: handbook of EIA and SEA follow-up' London:Earthscan

McGuigan, K. C. (2012) 'An investigation into the realistic link between environmental impact assessments and environmental management systems within the construction industry'. MSc Dissertation, University of Strathclyde.

Pelling, M (2012) 'Hazards, risk and urbanisation' in Wisner, B, Gaillard, J.C. and Kelman, I (eds) The Routledge Handbook of Hazards and Disaster Risk Reduction. Routledge: London and New York

Sanchez, L E (2012) 'Information and knowledge management'. *In* Perdicoulis, A, Durning, B and Palframan L (eds) 'Furthering Environmental Impact Assessment: towards a seamless connection between EIA and EMS'. Edward Elgar: Cheltenham UK and Northampton MA USA

Sheate, W. R. and Partidario, M R (2010) 'Strategic approaches and assessment techniques – potential for knowledge brokerage towards sustainability'. Environmental Impact Assessment Review 30 278-288

Smith K (2001) 'Environmental hazards: assessing risk and reducing disaster' (3rd ed). Routledge: London and New York

Smith K and Petley D N (2009) 'Environmental hazards: assessing risk and reducing disaster' (5th ed). Routledge: London and New York

Sunstein C (2005) 'Laws of fear: beyond the precautionary principle'. Cambridge University Press: Cambridge

United Nations (2011) 'World Population Prospects: The 2010 Revision'. United Nations Department of Economic and Social Affairs, Population Division. New York.

Wisner, B, Gaillard, J.C. and Kelman, I (2012) 'Framing disaster' in Wisner, B, Gaillard, J.C. and Kelman, I (eds) 'The Routledge Handbook of Hazards and Disaster Risk Reduction. Routledge: London and New York

World Bank (2011) ' OP4.01 Environmental Assessment, Annex A – definitions'. Available at http://web.worldbank.org

Furthering environmental assessment through continuing assessment into management as an aid to integrating disaster risk reduction measures into development

Bridget Durning,
Oxford Brookes University

Japan-UK Joint Workshop:
'Policy Integration between Environmental Assessment and Disaster Management'
Chiba University of Commerce, Ichikawa, Japan
30 November – 3 December, 2012

My presentation – 2 key points:

1. EIA – a role in urban governance as part of disaster risk reduction and preparedness? Why is this not recognised more?
2. Taking EIA 'further' - explicit integration with environmental management to strengthen the tool. Two key factors to aid integration

1. EIA role in urban governance?

Expanding population – 10.1 billion by 2010 (Africa and Asia)

Environmental hazards – varied and everywhere! (adapted from Smith and Petley 2009)

Major categories of environmental hazard	
Natural hazards (extreme geophysical and biological events)	• Geologic e.g. earthquakes, landslides • Atmospheric e.g. tropical cyclones • Hydrologic e.g. floods, drought • Biologic e.g. wildfires
Technological hazards (major accidents)	• Transport e.g. air accidents • Industrial failures e.g. explosions and fires • Unsafe public buildings e.g. structural collapse • Hazardous materials e.g. storage, transport
Context hazards (global environmental change)	• International air pollution • Environmental degradation e.g. deforestation • Land pressures e.g. intensive urbanization • Super hazards e.g. catastrophic earth changes

- Disaster risk reduction:
  - preventative action and building social resilience
  - integrated or holistic approach to policy making and a centrality of procedure: 'distributional justice in governance and decision-making'
- But: 'too often the ecological and carbon footprints of risk reduction or reconstruction activities are given only superficial attention'
- Consideration of inter-generational impact is also often missing

Omissions countered by having 'open and inclusive urban management'

But…requires the co-ordination of a number of elements of urban governance including:

- development planning,
- development regulation,
- risk reduction and emergency management,
- and particularly the inclusion of community participation:
- 'where disaster risk reduction works best, urban dwellers and their civil society organizations are involved'

EIA the answer?

Yes! – can address these – but not recognised as a tool in urban development literature (?something to explore further?)

It is a tool for risk reduction in financial investments – e.g. World Bank:

'routinely' require risk assessments 'for projects involving handling, storage, or disposal of hazardous materials and waste, the construction of dams, or major construction works in locations vulnerable to seismic activity or other potentially damaging natural events.'

2. Taking EIA further….

'although many risks are potentially avoidable, global environmental change and uncertainty about future hazardous events, together with the central role played by human failings in all disasters make the total elimination of hazard an unrealistic task'

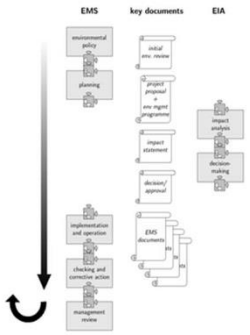
?adopt the precautionary principle at all times to avoid risk?

Or Adaptive assessment – integrating with management:

Needed in 'turbulent and complex situations where risk, uncertainty and health predominate and where the EIA needs to take into account knowledge limits and uncertainty-related concerns'

'if assessment continues into the future, then prediction loses its status as a goal and assessment merges into environmental management. Prediction and traditional 'environmental impact assessment' suppose that there is a 'before and after' whereas environmental management in an ongoing process

One way in theory…



Key points to integration

- Actions are carried through from assessment into management – not perceived as separate processes.
- During a disaster situation – information to inform management system may come from different sources (e.g. emergency assessment during disaster event, emergency/disaster risk plans).
- Communication, information and knowledge exchange is key
- Human capacity development – information sharing – feedback loops
- Knowledge-brokers to share information
- Familiarity with the 'language' of the different processes – two separate groups of practitioners?
- Integrated environmental and natural resource management system

Example – dealing with disaster debris…

Disasters that effect property can generate a lot of waste (or 'debris') e.g. construction material, damaged/destroyed buildings, sediment, 'green' (e.g. trees), 'white goods' (e.g. washing machines), vehicles etc etc

Hurricane Katrina (New Orleans, USA, 2005) generated 55 million cubic yards of debris.

Dealt with by re-use of existing land'fill' sites (actually land'raising')

- an assessment of their current condition carried out to assess suitability
- an assessment of the impact of using the sites (e.g. lorry movements, impact on nearby levees of landraising) and alternative sites (ie partial EIA!)
- requirement for groundwater and slope stability monitoring to mitigate potential impacts
- sites authorised for certain wastes only

Latter points could be built into management system for site – reducing environmental impact and reducing risk

4. Academic output of the seminar 2 – Workshop: The potential role of EA in disaster management

An intensive three hour workshop took place after the presentation sessions to further discuss the possibility of integrating EA and disaster management. In this chapter, the discussion outputs are compiled and summarized for the sake of record keeping.

Summary of the Workshop 'The potential role of EA in disaster management'

Tom Gore, Ryo Tajima, Thomas B Fischer, Sachihiko Harashina

1. Aim

To develop new insights and highlight opportunities for progressing work in the integration of Disaster Management and Environmental Assessment in research and practice

2. Method

2.1 Framework of Discussion

EA is a tool to help making decisions that leads to sustainable development. Therefore, it is helpful to clarify the aspects of decision making in DRR for the discussion of how EA could be integrated with DRR. Collins (2009) identified two phases of DRR, namely Prevention and Response. The former includes preparedness, early warning, mitigation, and the latter relief, recovery, and rehabilitation. As there are different levels of decision making at each of these phases, the potential aspects of integrating EA with DRR could be considered as shown in Table 1.

Table 1 Key aspects of integrating EA with DRR

	Disaster prevention	Disaster response
Policy / Plan	- Consideration of environmental/social risks in disaster preparedness planning (by applying SEA)	
	- Consideration of environmental/social risks in recovery / rehabilitation planning (by applying SEA)	
Project	- Consideration of disaster risks of projects in normal development context (by considering disaster risks in EIA)	- Consideration of environmental/social in post disaster recovery projects (by applying rapid EIA)

Based on the table 1, the integration of DRR and EA was discussed under the following headings;

1. Accelerated EA procedures applied post disaster
2. Applying/integrating EA methods into pre-disaster planning activities
3. Integrating disaster risk (DRR) considerations into the current EIA process

2.2 Discussion format

The participants were divided into four groups, under which a SWOC (Strengths, Weaknesses, Opportunities, and Challenges) analysis was undertaken for each of the discussion topics. The results from each group were shared after each topic had been discussed. As the contextual difference between the two countries is significant, groups were organized in accordance with the participant's expertise and nationality.

The groups and program is shown in Table 2 and 3.

Table 2 Workshop participants

Group	Members
Group 1	Ross Marshall, Nebil Achour, Andrew Buchanan, Sam Hayes
Group 2	Thomas Fischer, Alan Bond, Bridget Durning, Steve Swain, Tom Gore
Group 3	Sahihiko Harashina, Takehiko Murayama, Kenichi Tanaka, Shigeo Nishikizawa, Yuki Shibata, Ryo Tajima
Group 4	Tomohiro Tasaki, Atsuko Masano, Keita Azechi, Takuya Sugimoto, Seiichi Suzuki

Table 3 Timetable of the workshop

Introduction	EA and Disaster Management in Literatures (Ryo Tajima) Framework and format of discussion (Tom Gore)	20 min.
GD 1	Topic 1: Accelerated EA procedures applied post disaster	30 min.
Plenary 1	Presentation and Q&A of the outputs from GD 1	40 min.
Short break		10 min.
GD 2&3	Topic 2: Applying/integrating EA methods into pre-disaster planning activities Topic 3: Integrating disaster risk reduction (DRR) considerations into the current EIA process	50 min.
Plenary 2	Presentation and Q&A of the outputs from GD 2&3	30 min.
Wrap up		5 min.

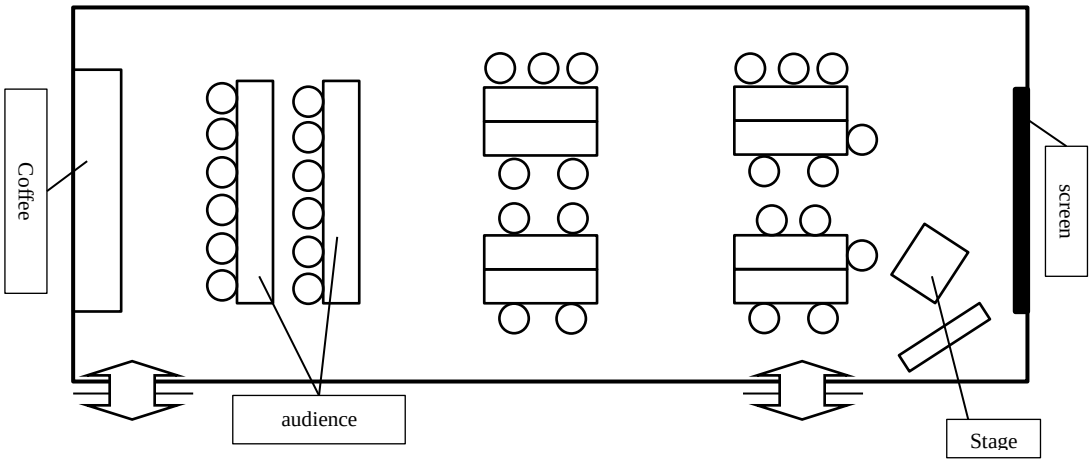


Fig.1 Outline of the meeting room

Fig.2 Photos of the workshop

3. Results

The results of the discussion (the SWOC table) and comments from Q&A sessions are compiled in this chapter.

3.1 Accelerated EA procedures applied post disaster

・Strengths/opportunities

UK	JP
✓ The thought process could be more open and disciplined to accelerate the identification process ✓ 80:20 rule applies – focus on the significant issues ✓ Consider non-standard situations ✓ Environmental protection ✓ Information will be collected ✓ Facilitates rapid decisions when they are needed ✓ Opportunity through exercises which can also consider recovery and rapid EIA ✓ Clear lines of responsibility needed for the rapid EIA and a framework to guide the practice ✓ Scoping is key	✓ Exemption clause and review committee is already in place (in Japan) ✓ Lack of information ✓ Scoping could be skipped for projects where the methods have been established, as this would accelerate the process ✓ As less people would probably have strong opposition towards recovery projects in post disaster period, it may be efficient to undertake 'perfunctory' EA (?) ✓ In the Japanese context, the scoping could be skipped because the scope of assessment is pre-determined to some extent by regulations

・Weaknesses/challenges

UK	JP
✓ Potential impacts will be missed; short-termism to support public demand for regeneration ✓ 80:20 rule applies - "the 20% could be significant" ✓ The wrong decisions could be made ✓ Depends on the country context ✓ Depends on the type of disaster ✓ Lack of access to data ✓ Exercises also needed to clarify the needs for the context	✓ Lack of clear definition of what is "emergency" ✓ Need to define the type of project (incl. place) to be exempted, and how ✓ No expert from the DRR community involved in the expert committee ✓ Depending upon the actual nature of disaster, it might be problematic to skip scoping considering that conditions for land use etc. may change from normal development context (and therefore the

	pre-determined scope of evaluation would no longer be applicable) ✓ Skipping the scoping process will not save much time. Reducing the survey period is more effective ✓ Dissemination of information takes time ✓ Skipping the scoping process could have adverse impact on consensus building. (from experience in waste disposal facility) ✓ Depend on project type

・Other comments

- Scoping is still essential better scoping identifies the issues. (UK)
- Need to define different types of post-disaster activity, for example, rapid EIA for temporary housing but less rapid EIA for long-term housing solutions as need to fully engage community – need a screening list to focus on right level of EIA. (UK)
- When it is necessary to rely on experts opinion in considering exemptions, it is important to record who said what, so as to be able to undertake ex-post facto evaluation. (JP)

  → in the UK, record is kept when high level decisions are made in time of emergency

  → the following is provided in the new JICA's guidelines for environmental and social considerations;

  - **JICA GL on Environmental and Social Consideration - Sec. 1.8 Measures Taken in an Emergency**

    In an emergency—which means a case that must be dealt with immediately, such as restoration after natural disasters or post-conflict restoration—when it is clear that there is no time to follow the procedures of environmental and social considerations mentioned in the guidelines, JICA reports at an early stage to the Advisory Committee for Environmental and Social Considerations on categorization, judgment of emergency, and procedures to follow, and discloses a result. JICA asks advice from the Advisory Committee when it is necessary.
- 'rapid environmental assessment' and 'rapid decision making' should be differentiated (JP)
- As a rule of thumb, time and effort are important factors for EA to have impact on decision making. The necessity of REIA in general is understandable, how effective it is in practice is still questionable. One paper argues that the level of satisfaction among residents with their relocation after the quake and tsunami disaster is significantly linked to the involvement of these residents in the development of the relocation plan. In these circumstances, making a decision based on REIA may not be appropriate. (UK)
- Continuous training is necessary to perform REIA adaptive to different contexts. (UK)
- In time of emergency there is no time to thoroughly collect and analyze the data and it is therefore necessary to rely on expert judgment. In the UK, REIA was performed in organizing an emergency response to 'ghost ships' (a fleet of 5 abandoned US naval vessels suspected of being stuffed with

asbestos and other hazardous substances) . As was the case in that event, REIA needs to assist the relevant authorities in charge of dealing with the incident in judging what measures should in fact be taken. (*'it must move decision making forward') (UK)*

3.2 Applying/integrating EA methods into pre-disaster planning activities

・Strengths/opportunities

UK	Japan
✓ You can identify scenarios that allows prioritisation in event of disaster by having the baseline data to hand ✓ Can identify the potential impacts of disasters and generate recovery plans ✓ The opportunity exists to take the plan for post disaster further than present ✓ Precedent set by generic SEA so could be used even if location of certain events not known ✓ Workshop between EA experts and emergency planners on the details of recovery plans and implementation and opportunities for EA inclusion	✓ Be able to justify post-disaster decision making in disaster situation using the prepared EA (including siting of evacuation sites, etc.) ✓ Development of post-disaster capacity/capability ✓ Learning aspect of EA helps post-disaster behavior ✓ Giving chance & information to public to consider disaster ✓ Response to disaster would become smooth (i.e. clear lines of responsibility)

・Weaknesses/challenges

UK	Japan
✓ EIA is not a good mechanism for getting back to a steady state ✓ Priorities during a disaster are not the same as those perceived when considered in a pre-disaster context ✓ Pre-disaster planning only goes so far ✓ Lack of detail could inhibit effectiveness ✓ Uncertainty - Hazard, difficulty in predicting hazard risks inhibits ability to make informed decisions about response impacts. ✓ Uncertainty - Effects, uncertainty regarding the environmental changes brought on by	✓ Hard to scope out scenarios ✓ Full of uncertainty ✓ Lack of expertise (no day-to-day experience in scenario analysis) ✓ Institutional rigidity ✓ Uncertainly of scenario ✓ Difficult to select scenario ✓ Definition of environment becomes so narrow (in Japan). Disaster risks should also be considered by other frameworks.

the disaster agent e.g. the earthquake ✓ If recovery is largely dependent on existing spatial plans then is there merit in repeating the SEA process that they will have been through? ✓ On the other hand re-EA-ing these plans could make sure changes that occur due to the hazard are considered. ✓ EIAs expires if action not taken (relevant to possible pre-selection of site locations for possible emergency response measures)	

・Other comments

- Apply pre-disaster planning through a structure such as the Local Resilience Forum
- If EIA is going to be used in a pre-disaster setting to identify the post disaster scenario then the practitioners need to be aware of the significant issues during a disaster – (road closures)
- Should be based on scenario analysis (wide variety of scenario) to tackle uncertainty
- With regard to siting of facilities, application of EA will be advantageous in that the consideration of environmental effects can begin in advance.
- There are 3 types of disaster risks: risks caused by natural disasters, such as those that led to the accident at the nuclear power stations; health risks after disasters; and risks associated with relocation to temporary shelters (JP)

3.3 Integrating disaster risk reduction (DRR) considerations into the current EIA process

・Strengths/opportunities

UK	Japan
✓ Questions would be asked relating to the development that are not currently being asked. ✓ More information would be available at an early stage ✓ Scoping phase could be better utilised by statutory consultees and identify the projects where risks exist ✓ EIA could raise issue of development increasing risks and therefore inform decision making (eg deforestation and	✓ Disaster risks are considered in different systems ✓ Need to cover disaster risks not covered by regulations regarding DRR ✓ Could select projects to consider DRR through SEA ✓ Collection of related information ✓ Integration of fragmented information ✓ Giving a chance to increase public awareness for & motivation for risk management to the DRR

landslide). EIA could also result in decreased ✓ Existing tool so a good mechanism to use to reduce risks ✓ Way forward to include emergency planners into consultation process ✓ In absence of other mechanisms can make sure risk reduction is included ✓ Recommendation that community risk register consulted and informs the SA objectives against which plans are assessed	✓ Avoid critical human disaster (e.g. the Fukushima nuclear plant wouldn't have been sited at the current location if EA had been undertaken appropriately)

・Weaknesses/challenges

UK	Japan
✓ The detail is not necessarily available ✓ Difficulty in predicting disaster could undermine decisions made based on disaster models ✓ Other tools may already exist (eg Flood Risk Assessment)	✓ Disaster risks are considered under separate system, not referred in EA. (e.g. landslide risk is considered under the system of Ministry of Land, Infrastructure, Transport , and Tourism) ✓ Sectionalism ✓ Especially problematic for the public sector (strong political will to enhance certain types of development) ✓ Significant disaster risks could not be avoided as requirement to consider 'no action' alternative does not exist in Japan ✓ As public participation is poor in Japan, public interest might be ignored. ✓ Lack of human resource (public, government) ✓ Communication method about the disaster risk (comprehensive manner)

・Other comments

- Scoping, scoping, scoping… (UK)
- Transparency in procedures, and capacity building through distribution of information to the general public are important (JP)
- Encouraging people in other sectors, such as those in urban planning, to give consideration to disaster

risks is an important role of EA (UK)

4. Summary of issues

Based on the outputs from group discussions and Q&A session, here, the issues upon integrating EA and DRR are summarized

4.1 Accelerated EA procedures applied post disaster

First of all, the advantages of accelerated EA applied post disaster were acknowledged by the participants, including: the ability to facilitate faster decision making; and the ability to shed light on environmental preservation even in time of emergency. However, it was also pointed out that since the necessity to perform EA rapidly, and the extent of how rapid it should be, needs to be judged, in respect of nature of the disaster and the intervention.. The Japanese group referred to the EA guidelines of the new JICA and suggested that a this judgment could be made by specialized agencies such as an experts committee, emphasizing that, in so doing, a record of how a decision has been made should be kept to increase transparency. This suggestion is consistent with the following comment made on the strength of undertaking rapid EA; 'information will be collected'. On the other hand, the UK group suggested that a screening list could be prepared in order to determine how rapidly an assessment needs to be performed. In sum, the necessity to make a judgment on the need and the role of a rapid EA according to each emergency circumstance was recognized, and for this, recommendations were made to set up organizations and/or frameworks that facilitate this judgment.

In terms of methodology, the UK groups specifically emphasized the importance of scoping. This was seen as being a particularly important in circumstances when time is believed to be scarce, as it can focus the assessment on the most critical issues. A Japanese group, on the contrary, suggested that scoping could be skipped. It is believed that the suggestion from the Japanese group is linked to the notion that, in the Japanese context, scoping remains a mere formality in the assessment in normal development context. Nevertheless, some Japanese researchers argue that omission of scoping can have negative consequences in respect of consensus building. It can therefore be concluded that, in principle, it was commonly acknowledged that scoping is important for accelerated EAs in time of emergency. Concern was expressed that environmental surveys may interfere with the rapid assessment; this can also be avoided by narrowing the focus through scoping.

It was also pointed out that, in time of emergency, the risk of overlooking serious environmental impacts and making a wrong decision exists. In light of preparedness, comments were made that assessment exercises would be effective and that it would be important to set up a framework so that the quality of the assessment shall not be dependent on skills of the person who carries it out.

4.2 Applying/integrating EA methods into pre-disaster planning activities

The advantages of applying EA to contingency/emergency planning and to post-disaster recovery planning in normal development context when conditions are generally more favorable to EA practice were acknowledged, since it would facilitate consideration of highly sustainable post-disaster measures and could be used to justify post-disaster decision making. Moreover, EA process could facilitate learning (of disaster risks and risk reduction measures) of the officers in municipal governments and local residents. As regards recovery planning, it was pointed out that instead of having EA directly applied to recovery plans, it may be possible to get similar effects could be indirectly gained by ensuring that recovery plans are consistent with land use plans, to which SEA (or SA in the context of the UK) has already been applied. As seen above, although the general strength of carrying out EA pre-disaster were pointed out (rather than applying EAs post-disaster), there seemed to be less discussion on whether applying EA to preparedness planning or in-advance recovery planning per se (instead of not doing so) .

Both groups emphasized that the key consideration in setting up effective methodology for EA of this type would be 'uncertainty' (types and sizes of disasters, environmental changes due to disasters, etc.). Scenario analysis could be an option, but issues still remain as no specific methodology has been established in respect of how to set the scope of a scenario to what extent. From a different perspective, recommendation to utilize Generic EIA (and tiering) was made by a UK group. The fact that EAs can expire after a period of inaction under some regulatory regimes was also raised. This could be an important issue when applying EA in the planning of actions that may only actually be implemented years later.

4.3 Integrating disaster risk (DRR) considerations into the current EIA process

It was acknowledged that one great advantage of integrating DRR into the current EIA process would be the ability to take into account such disaster risks which are not considered within other mechanisms/tools/frameworks. Other strengths acknowledged include; EIA should be effective (relatively speaking) in facilitating consideration of DRR in decision making since it is an established decision aiding tool; public involvement, consultation (to DRR experts), and information disclosure carried out as a part of EA process could raise public awareness on disaster risks and enhance learning. As EA itself offers a variety of advantages, by 'piggy-backing' DRR on it, consideration of disaster risks in decision making and also in the whole society is expected to be enhanced.

However, 'uncertainty' still remains to be an issue here as well. The difficulty to predict the occurrence of a disaster was pointed out as a challenge for EA in this context. Issues of Japanese EA practice in general were pointed out as challenges for effective DRR through EA. These include; the assessment outcome has limited impact on decision making due to sectionalism; serious disaster risks cannot be fully avoided as 'no action' alternative is not considered; and poor public participation. Further, just as it could encourage a consideration of disaster risks not currently covered under other mechanisms/tools, it will also be important to avoid overlap with existing tools and mechanisms that already consider disaster risk (e.g.

flood risk assessment in the UK) and the duplication of effort. As seen above, it is considered that re-evaluation of existing tools currently in use in each country (both EA and tools regarding DRR) is desirable when disaster risks are to be actually considered through EA.

Box 1 Issues of integrating DRR and EA identified though the workshop

1. Accelerated EA procedures applied post disaster
   - ✓ Although accelerated EA procedure is important post-disaster, how rapid it should be needs to be judged first of all→ 'who' and 'how' is an important consideration
   - ✓ Scoping will be particularly important in this context
   - ✓ Possible pre-disaster preparation: assessment exercise to facilitate the development of a suitable approach, setting up a framework that guides the practice of rapid EA
2. Applying/integrating EA methods into pre-disaster planning activities
   - ✓ Advantages of undertaking EA pre-disaster is understood from general disaster reduction perspective, but the advantages of undertaking EA for pre-disaster planning activity per se need to be further discussed
   - ✓ Need to establish scenario analysis methodology for EA
   - ✓ Tiering can be utilized, paying attention to the 'expiry date' of assessment
3. Integrating disaster risk (DRR) considerations into the current EIA process
   - ✓ There could be great advantages in 'piggy backing' DRR on an established tool, i.e. EA
   - ✓ Identifying whether disaster risk considerations are relevant to an assessment will be an important task in the scoping phase
   - ✓ Necessary to deal with 'uncertainty'
   - ✓ Review of the existing impact assessment / DRR tools is suggested, particularly to avoid overlaps in coverage and to ensure efficiency

Workshop

The potential role of EA in Disaster management

The aim of the workshop

- To develop new insights and highlight opportunities for progressing work in the integration of Disaster Management and Environmental Assessment in research and practice

What we want to see…

SWOCs considered from
- Japan / UK perspective
- research / practice perspective

Strength (idea) /opportunities (progressing the idea)	Weaknesses/challenges

Ryo Tajima

INTRODUCTION

- EA AND DISASTER MANAGEMENT IN LITERATURES -

Purpose

- To give a broad overview of what and to what extent the link of disaster management and EA has been discussed in the EA community

Definition of the key terms

- What is a disaster?
  - *A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources. Though often caused by nature, disasters can have human origins* (IFRC)
    - (vulnerability + hazard)/capacity = disaster
  - *A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.* (UNISDR)
    - Disasters are often described as a result of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences.(UNISDR)

Source:
- IFRC (http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/)
- UNISDR (http://www.unisdr.org/we/inform/terminology)

Disaster management cycle (an example)

Collins (2009), p.27

Decision making in different disaster phases

	Pre disaster	Post disaster
Strategic level	✓ Emergency planning ✓ Rehabilitation planning	✓ Response planning ✓ Recovery planning
Project level	✓ Consideration of disaster risks in development	✓ EA adapted to post disaster environment

Method

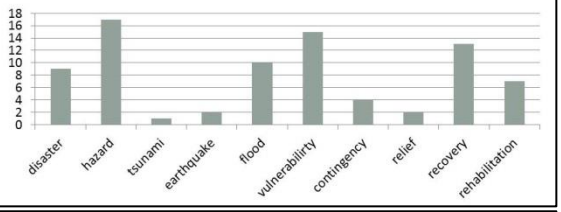
(1) Search for research articles with the following criteria, and screen out the unrelated articles (eg. "resource recovery")
- Keywords: "disaster", "hazard", "Tsunami", "Earthquake", "Flood", "vulnerability", "contingency", "relief", "recovery", "rehabilitation"
- Search field: title, abstract, keyword [or]
- Journal: EIA Review (Science direct), IAPA (Taylor & Francis), and JEAPM (World Scientific)

(2) Group the articles based on a quick review of the abstracts



Result in brief

- 66 hits in total
- 15 were identified as "disaster management related" articles
  - Of which, 11 were published after 2000
  - Approx. 1 article in 2 years



Identified Papers (cont'd)

1. Dhira Phantumvanit, Widhanya Nandhabiwat (1989) The Nam Choan controversy: An EIA in practice, EIAR ,9 (2), 135-147
2. Kerr W.A., Boutin B.D., Kwaczek A.S., Mooney S. (1992) Nuclear accidents, impact assessment, and disaster administration: post-chernobyl insights for agriculture in Canada, EIAR, 12 (4), 387-400
3. Hillary S. Egna (1995) Psychological distress as a factor in environmental impact assessment: Some methods and ideas for quantifying this intangible intangible, EIAR, 15 (2), 115-137
4. David Dery (1997) Coping with "latent time bombs" in public policy, EIAR, 17 (6), 413-425
5. Mirady Sebastiani, Elena Mart??n, Daniella Adrianza, Carlos Mendez, Mariana Villaro, Yaneira Saud (2001) Linking impact assessment to an environmental management system. Case study: a downstream upgrading petroleum plant in Venezuela, EIAR, 21 (2), 137-168
6. Adrianto L, Matsuda Y (2002) Developing economic vulnerability indices of environmental disasters in small island regions, EIAR, 22 (4), 393-414
7. Paolo Luria, Peter A. Aspinall (2005) Evaluating a multi-criteria model for hazard assessment in urban design. The Porto Marghera case study, EIAR, 23 (5), 625-653

Identified Papers

8. Wei Y., Fan Y., Lu C., Tsai H. (2004) The assessment of vulnerability to natural disasters in China by using the DEA method, EIAR, 24 (4), 427-439
9. Kumagai Y., Edwards J., Carroll M. S. (2006) Why are natural disasters not "natural" for victims?, EIAR, 26 (1), 106-119
10. Mulvihill P.R., Ali S.H. (2007) Disaster incubation, cumulative impacts and the urban/ex-urban/rural dynamic, EIAR, 27 (4), 343-358
11. Geneletti D. (2008) Impact assessment of proposed ski areas: A GIS approach integrating biological, physical and landscape indicators, EIAR, 28 (2), 116-130
12. Jeremy G. Carter, Iain White, Juliet Richards (2009) Sustainability appraisal and flood risk management, EIAR, 29 (1), 7-14
13. Harry Spaling PhD, Bryan Vroom (2007) Environmental assessment after the 2004 tsunami: a case study, lessons and prospects, IAPA, 25 (1), 43-52
14. Charles Kelly (2002) Assessing environmental impacts during natural disaster: the development of a Rapid Environmental Assessment Methodology, JEAPM, 4 (4), 475-492
15. Fabienne Lord, Seth Tuler, Thomas Webler, Kirstin Dow (2012) Unnecessarily neglected in planning: Illustration of a practical approach to identify human dimension impacts of marine oil spills, JEAPM, 14 (2)

Categorizing

- EA (or other impact assessment tools) for disaster management
  - Kelly (2002) : Rapid Environmental Impact Assessment
  - Spalding (2007): Community EA

- consideration of hazard risks in EA
  - Phantumvanit and Nandhabiwat (1989): Earthquake
  - Kerr et al. (1992): Phycological distress in the context of technological disaster
  - Sebastiani et al. (2001): Industrial plants (petroleum and gas)
  - Geneletti (2008): consideration of geomorphologic hazards in EA (landslides, avalanche), based on a hazard map
  - Jeremy et al. (2009): SA for flood risk management

- Some on methods
  - Adrianto and Matsuda (2002): Gross island product
  - Luria and Aspinall (2003)Major industrial hazard assessment (based on Quantitative risk analysis and AHP)
  - Wei et al. (2004): vulnerability assessment (based on DEA)
  - Mulvihill and Ali (2007): Disaster Incubation Analysis
  - Lord et al. (2012) causal pathways by which impacts emerge and the vulnerabilities of social entities to different impacts

- Others
  - Response to disaster (in general)
    - Dery (1997): government response to sudden/non-sudden disasters
    - Kumagai et al. (2006): peoples attitude towards government authorities on disaster events
  - Ex post evaluation of the economic impact of a disaster
    - Kerr et al. (1992)
- Other common study topics (not necessarily in the context of "disaster management")
  - "health hazard" and HIA
  - Methodology of the measurement of "(environmental) Vulnerability"

disaster risk consideration in development by EA	assessment adapted to post disaster environment (both recovery plans and projects)	EA in pre-disaster planning (emergency response, recover planning)
- **Practice / Case studies** Phantumvanit and Nandhabiwat (1989), Kerr et al. (1992), Sebastiani et al. (2001), Geneletti (2008), Jeremy et al. (2009) - **Methodology** Adrianto and Matsuda (2002), Luria and Aspinall (2003), Wei et al. (2004), Mulvihill and Ali (2007), Lord et al. (2012)	- **Concept and case studies** Kelly (2002), Spalding (2007)	

Conclusion

- 15 disaster management related articles found in the three main international EA journals
- Some studies on methodology of disaster consideration tools
- A few studies and practices exist for Post Disaster EA tools (mainly REA)
- Research gaps in the field of EA in pre-disaster planning (emergency response, recover planning)

Tom Gore

GROUP DISCUSSION

EA for Post-disaster activities : Question 1

- Following disasters, applying normal EA procedures can be problematic!
- What are the strengths/opportunities and weaknesses/challenges of **accelerated EA procedures ?**

Strength (idea) /opportunities (progressing the idea)	Weaknesses (idea) /challenges (progressing the idea)
● Help environmental consideration within limited timescale (S) ● …	● Lack of Political will (C) ● …

EA for Post-disaster activities: Question 2

- Following disasters, applying normal EA procedures can be problematic!
- What are the strengths/opportunities and weaknesses/challenges of **applying them to pre-disaster planning activities?**

Strength (idea) /opportunities (progressing the idea)	Weaknesses (idea) /challenges (progressing the idea)
● Allows to conduct EA outside pressure in post-disaster phase (S) ● …	● Uncertainty (C) ● …

EA for disaster management in pre-disaster phase: Question 3

- What are the strengths/opportunities and weaknesses/challenges of **integrating DRR considerations into procedures ?**
- Expanding the EIA process to explicitly consider the DRR considerations of a project that damages wetlands that act as a buffer, or deforests a slope prone to land sliding

Strength (idea) /opportunities (progressing the idea)	Weaknesses (idea) /challenges (progressing the idea)
● Already established tool (S) ● …	● Lack of Political will (C) ● …

Format

- Program
  - Group discussion on Q1 (20 min.)
  - Collective discussion (20 min.)… repeated for Q2 and Q3
  - Wrap up discussion
- Groups
  - JP1: Sachi, Atsuko, Keita, Tomohiro
  - JP2: Takehiko, Kenichi, Shigeo, Yuki, Ryo
  - EN1: Thomas, Steve, Bridget, Alan, Tom
  - EN2: Ross, Andrew, Nebil, Sam

5. Academic output of the Seminar 5 - Site Visit: Post-disaster town planning after the unprecedented earthquake and tsunami in Miyagi, Japan

A site visit to a disaster stricken area took place after the first two days to further enhance the discussions and ideas. In this chapter, a summary report of the visit is presented, in which information on the reconstruction / recovery activities undertaken in the visited stricken areas are included.

Summary report of the Site Visit:

Post-disaster town planning after the unprecedented earthquake and tsunami in Miyagi, Japan

Keita Azechi

Tokyo Institute of Technology

Brief overview of site visit

Site visit to areas suffered from the unprecedented Tsunami caused by the Great East Japan Earthquake of 11th March 2011 was held on 2-3 December just after the workshop. Places of the visit were Onagawa town and Iwanuma city which were located on the coast of Miyagi prefecture (Figure 1). Participants in the site visit were eight people from Japanese side and all members (nine people) of UK side.

Onagawa town is a small town on the east coast of Miyagi prefecture. In the tsunami, the town suffered appalling damage and loss of life. According to the town report, over 800 of the 10,000 population were dead or missing and whole of the main part of Onagawa town was destroyed by the tsunami which reached 24 m (78 feet) high (Table 1).

Iwanuma city is located in central part of Miyagi prefecture, 17.6 km south of Sendai city (prefectural capital city). And Iwanuma has a long straight coastline from north to south, therefore the area which was affected by the Tsunami was much larger than Onagawa town and huge area of agricultural field were heavily damaged by the sea salt.

Figure 1: Location of Onagawa town and Iwanuma city

Table 1: Damage situation of Onagawa town and Iwanuma city

	Onagawa town	Iwanuma city
Population before the earthquake (1/12/2010)	10,051	44,187
└ Ratio over 65 age	33.50%	20.00%
Dead (31/12/2011)	803	149
Missing (31/12/2011)	34	1
Current population (31/1/2013)	7,984	43,763
Area (ha)	6,579	6,071
├ Totally destroyed area (ha)	223.1	982.1
├ Partially destroyed area (ha)	17	411.1
└ Number of house washed away	4,274	1,220

Site visit to Onagawa town (2nd December)

In Onagawa town, we made a site visit of the disaster situation in such as the mountain area and the harbor area by beginning at Onagawa Regional Medical Centre which located in the center of the town. After that, we moved to temporary building of Onagawa town hall and conduct an interview for two hours with Mr. Toshiaki Yaginuma at Section of Reconstruction, Onagawa town, about the day of the disaster and reconstruction of Onagawa town. Specific content of the interview is as follows.

1) The day of the disaster

Onagawa town observed an earthquake with the seismic intensity 6 on the day, and immediately announced a predicted arrival time and height of the tsunami (at that time, the prediction height was only **6m**) over the community wireless system for disaster prevention and TV that was equipped each household in the town. However a blackout occurred immediately after the first announcement, therefore Onagawa town could not transmit that the predicted height had changed to much higher.

The actual height of the tsunami was **14.8m** and it took 30 minutes from the occurrence to reach Onagawa town. Onagawa Regional Medical Centre we visited is one of the highest places in the center of the town (i.e. **16m**), therefore a lot of local residents evacuated to the centre by using their cars. However, the tsunami of 14.8m had been increasing own height by going up rias coast (deeply-indented coastline) which is the regionally specific geography, and finally the tsunami had swept away the cars and ground floor of the center.

Onagawa town had carried out evacuation drills for tsunami from the usual, but the scale of the tsunami on the day far exceeded crisis awareness of the local residents, therefore even the people who evacuated to higher place such as the medical centre were victimized by the tsunami.

2) Reconstruction of Onagawa town

For recovery from the severe damage caused by the tsunami, Onagawa town established a planning committee for reconstruction plan and they drew up the Onagawa Reconstruction Plan on September 2011. However, at start of the implementation of the reconstruction plan, there was variety of problems.

The first problem was consensus problem between the local government and local residents. For example, a relocation of residential area to elevated land for a damage mitigation measure against future tsunami disaster would worsen a Fischery condition by taking Fischermen from the harbor area. This was severe problems especially for Onagawa town whose main industry was Fischery. And another example was that some local residents concerned about a collapse of their traditional culture which have been protected for long time by developing new community to centralize remote small communities whose population had been decreasing due to the aging and disaster.

The second was financial problem. Without any additional support from national and prefectural governments, Onagawa town had to cover approximately 100 ~ 150 billion yen for the reconstruction, on the other hand however, the year budget was only around 6 billion yen. This was a common problem for any of local governments around the disaster-hit areas. And nine months later after the disaster, finally national government decided to cover all cost of reconstruction of any of local governments around the disaster areas.

The third was processing problem of huge amount of debris generated by the tsunami. As same as the financial problem, if Onagawa town tried to process the debris only by their facilities, it would take around 100 years. Therefore, national government decided to implement nationwide broad-based treatment,

Picture 1: Briefing on the reconstruction plan of Onagawa town by Mr. Yaginuma

Picture 2: Interview with Mr. Yaginuma at temporally building of Onagawa town hall

Picture 3: Disaster situation of the center of Onagawa town

Picture 4: View from the high land (ASL 16m) of Onagawa Regional Medical Centre

however most of local governments showed negative attitudes to participate in the processing, because the local governments and especially the local residents concerned about possibility that the debris were contaminated by radioactive material spread by the Fukushima Dai-ichi nuclear power accidents caused by the tsunami.

As mentioned above, though Onagawa town had variety of programs, the reconstruction of Onagawa town is moving forward with many dialogues between local government and local residents by holding briefing sessions many times in order to solve the problems.

Picture 5: Land use of the reconstruction plan (orange and yellow show residential area)

Picture 6: Map of distribution of the remote small communities (shown as circles)

Site visit to Iwanuma city (3rd December)

In Iwanuma city, we made a site visit at some points very close to coastline. Though we observed the disaster situation mainly from the bus in Onagawa town, we walked on and observe large flat area which the tsunami covered completely and large number of house were washed away in Iwanuma. And on the way to the points, we saw some works to remove sea salt provided by the tsunami from agricultural fields. As just described, tsunami disaster could cause not only physical destruction such as houses and factories but also chemical damage mainly caused by the sea salt. And in case of Iwanuma city, the latter damage was severe problem as well as the physical destruction.

Though most buildings and trees on the points were washed away widely, we could see one remained house. And we could imagine how powerful the tsunami was by watching the damage situation that the first floor was washed away almost completely and there was only the frame. And we saw restoration works of embankment destroyed by the tsunami were carried out by the Ministry of Land, Infrastructure, Transport and Tourism.

Picture 7: Disaster debris generated by building collapse (Onagawa)

Picture 8: Temporary collection site for huge amount of disaster debris (Onagawa)

Picture 9: Observation of damage situation in Iwanuma city

Picture 10: Work to remove sea salt form agricultural fields by using crane machine

Picture 11: Remained house whose ground floor was washed away by the tsunami

Picture 12: Fallen gravestones cause by the tsunami

Appendix

- Appendix 1: Final program

- Appendix 2: Minutes of the Q&A at the presentation sessions

Japan-UK joint workshop on

Policy Integration between Environmental Assessment and Disaster Management

Chiba University of Commerce | 30 Nov.- 3 Dec. 2012 | Ichikawa, Japan

Final Program

Table Of Contents

Dear colleagues from UK,

We Japanese colleagues in impact assessment heartily welcome you. We had very sad experience in March 11, 2011 by the attack of the huge earthquake. Japanese society was damaged not only by the earthquake but also by the Fukushima Dai-ichi Nuclear Power Accident. Earthquake is a natural disaster and the nuclear accident supposed to be caused by mostly human errors such as mistake of the site location, ill design of the facility, and mismanagement of its operation. By having the tragedy, we learnt again that human beings have to be more cautious against disasters especially in the age of vast application of science and technology. For precautionary approach of human actions, IA should have quite important role, sometimes it is critical. The colleagues of IA studies and practices collected here in Tokyo will have intensive discussions based on rich information exchange crossing over wide scope of the field. In this event, participants would have not only presentations and discussions but also experience of visiting sites attacked by the earthquake and a nuclear plant there. Though in only a few days, the participants from UK and Japan must have an opportunity to consider how IA would be contributable to disaster management. And the result of our activity should be sent to the world afterword.

Sachihiko Harashina
Professor, Chiba University of Commerce
Professor Emeritus, Tokyo Institute of Technology
Past president of IAIA

Dear participants,

Welcome to our Japan-UK workshop on Environmental Assessment and Disaster events. It's a great pleasure seeing you all here in Tokyo! We have been able to gather a good range of internationally renowned speakers and the next few days promise to be hugely interesting. Can I stress that we hope that as many of you as possible will be able to provide us with your written contributions after the event so that we'll be able to publish a book on this crucially important and emerging topic. Personally, I hope that you will find the presentations over the next couple of days inspiring. And I'm looking forward to a fascinating technical visit to Miyagi Prefecture.
I am very grateful to our Japanese hosts, in particular Professor Harashina and Dr Ryo Tajima, for the excellent organization of this event. A particular big thank you is also due to Tom Gore and Ryo, who (probably during one of their pub crawls in Liverpool last year, when Ryo did his post-doc there) had the idea to this event. Enjoy!

Thomas B Fischer
Professor, University of Liverpool

Schedule

Day 1 (Fri, 30 Nov.)

9:00 ~ 9:30	Registration
9:30 ~ 10:00	Opening plenary, Photograph
10:00 ~ 10:40	Keynote Speech
10:40 ~ 11:00	Short Break
11:00 ~ 12:00	Session 1: Disaster Management for sustainability in the UK/Japan (1)
12:00 ~ 13:30	Lunch Break
13:30 ~ 14:30	Session 2: Disaster Management for sustainability in the UK/Japan (2)
14:30 ~ 14:50	Short Break
14:50 ~ 16:30	Session 3: Youth Session
16:30 ~ 17:00	Wrap up meeting
18:00 ~	Reception (Sky Tree View Restaurant & Bar “REN”)

Day 2 (Sat, 1 Dec.)

9:00 ~ 10:30	Session 4: Disaster Management and Environmental Assessment tools (1)
10:30 ~ 10:50	Short Break
10:50 ~ 12:30	Session 5: Disaster Management and Environmental Assessment tools (2)*
	*Joint session with the Association for Policy Informatics
12:30 ~ 14:00	Lunch Break
14:00 ~ 17:00	Workshop: The potential role of EA in Disaster Management
17:00 ~ 17:15	Closing Plenary

Day 3~4 (Sun, 2 Dec. ~ Mon, 3 Dec.)

Site Visit: Stricken area in Miyagi (see p.12 for details)

Keynote Speech

Sachihiko Harashina

Professor, Chiba University of Commerce

Professor Emeritus, Tokyo Institute of Technology

"Environmental Assessment is Manners in a Sustainable Society - Lessons on Environmental Assessment from Fukushima Nuclear Power Plant Accident"

Fukushima nuclear power accident gave us tremendous lessons to impact assessment. Though, it was impossible to apply EIA to the plant as it had been built in 1960s, after operation, there had been many opportunities of taking measures against great earthquakes and tsunami on the occasions of repairs or periodical test. If Japanese IA system includes a concise IA system, it could be done. Japanese EIA Law was amended in 2011, but no concise IA system was introduced, which should be manners in a sustainable society. The Annual number of environmental assessment on national level in Japan is only about 20, which is quite small compared to 30,000 to 50,000 under NEPA in the US. This is because Japanese systems have no concise IA like EA under NEPA. By the amendment of the Japanese EIA Law, there are some improvements, but the basic concept of environmental assessment was not changed. Why this was happened? There is a long history of struggles between pro development and pro environment in Japan. But we have to learn from the tragedy of Fukushima.

Thomas B Fischer

Professor, University of Liverpool

"On the ability of environmental assessment to support better planning and management"

Environmental assessment (EA, including both, SEA and EIA) has been attacked by some particularly vocal critics for having no more than a negligible impact on policy, plan, programme and project making processes and for being largely ineffective. In this context, reference is frequently made to some particular poor case studies. In this paper, and based on the empirical evidence provided by various studies, I will argue that overall these claims are spurious and that in many countries and systems EA is able to contribute significantly to thousands of sustainable and better decisions. In fact, when compared with other decision support tools, including for example cost-benefit analysis, the instrument is proving to be remarkably robust.

Presentations

[15 min. presentation followed by 5 min. Q & A]

-------- Day 1 (Fri, 30 Nov.) --------

Session 1 (11:00~12:00): Disaster Management for sustainability in the UK/Japan (1)

Chair: Takehiko Murayama

Masahiro Osako

National Institute for Environmental Studies

"Current status and future challenges of disaster waste management in Great East Japan Earthquake'"

Firstly, the main issues and countermeasures regarding the disaster waste management in Great East Japan Earthquake including the radioactively contaminated waste management will be presented, which will be followed by the discussion of the remaining future challenges. Finally the prepared conditions necessary for robust waste management system in the emergency of the disaster will be proposed.

Andrew Buchanan

Chairman, IChemE Environment Special Interest Group

"COMAH Safety Report – Environmental assessment tool aimed at preventing major accidents to the environment'"

The Seveso Directive is the main piece of EU legislation that deals specifically with the control of on-shore major accident hazards involving dangerous substances. It is implemented in Great Britain through the Control of Major Accident Hazards (COMAH) Regulations.

This paper will describe the requirements of a COMAH Safety Report specifically focussing on the guidance and methodology that should be applied when identifying potential impacts to the environment, identifying appropriate prevention/mitigation measures and developing appropriate emergency response procedures including assessing the capacity and infrastructure that is required to apply the procedures identified. The paper will summarise examples of submitted COMAH Safety Reports and discuss the UK's Competent Authority's (The Health and Safety Executive) response to these submissions.

Taiyoung Yi

Researcher, National Research Institute for Earth Science and Disaster Prevention (NIED)

"Post-earthquake town reconstruction applying 'e-Community Platform'"

In the stricken area of the Great East Japan Earthquake, the post-earthquake town reconstruction is carried out with promotion of the reconstruction work based on the reconstruction plan for livelihood rehabilitation and region reconstruction. For the sustainable post-earthquake town, in addition to an existing situation, it is necessary to take into consideration local inhabitant's value standard to long-term changes of social conditions. This study introduces the example which local inhabitants utilized "e-Community Platform", and suggests the reconstruction in consideration of the trade-off relation between the value standard and the receptiveness of risk.

Session 2 (13:30~14:30): Disaster Management for sustainability in the UK/Japan (2)

Chair:Ross Marshall

Kayoko Yamamoto

Associate Professor, University of Electro-Communications Tokyo

"Information Infrastructure for Recovery and Reconstruction after the Great East Japan Earthquake"

This study considers the extent of the damage caused by the Great East Japan Earthquake and makes proposals for recovery and reconstruction of the areas affected by this disaster as well as for a reduction of the impact of natural disasters that may occur in the future with GIS as an information infrastructure. Due to the fact that social media that used ICT was useful in the days directly after the disaster, it can be said that it is necessary to investigate the provision of an information infrastructure that uses ICT to reduce the impact of disasters.

Nebil Achour, Efthimia Pantzartzis, Federica Pascale and Andrew D F Price

Loughborough University

"Opportunities associated with the integration of environmental and resilience appraisal tools"

Recent research outcomes suggest that the number of natural hazards, both environmental and geo-physical, will increase due to the effect of global warming. Researchers have been investigating various approaches to reduce environmental degradation and to improve the physical resilience to natural hazards. However, most of these approaches are fragmented and when combined with cultural barriers it often results into a less efficient assessment tools. The aim of this study to explore environmental impact and resilience assessment tools with the view to develop a more integrated approach able to assess efficiently both the impact and the resilience.

Tomohiro Tasaki[*] and Misuzu Asari[**]

[*]*National Institute for Environmental Studies*

[**]*Assistant professor, Environment Preservation Research Center, Kyoto University*

"Activities and guidelines of the Japan Society of Material Cycles and Waste Management (JSMCWM) for disaster waste management after the Eastern Japan Disaster"

Shortly after the massive March 11th earthquake and tsunami in eastern Japan, an academic Task Team for Disaster Waste Management and Reconstruction was established by members of the Japan Society of Material Cycles and Waste Management (JSMCWM). All the members voluntarily worked on conveying information from/to disaster area and gathering information into a guidelines entitled, Strategies for Separation and Treatment of Disaster Waste. As an original member of the task team, I will explain how situations the team faced were and how the team reacted to the disaster as well as the outline of the guidelines.

Session 3 (14:50~16:30): Youth Session

Chair: Alan Bond, Shigeo Nishikizawa

Takuya Sugimoto

Lecturer, Chiba University of Commerce

"Tiering system on the amended EIA regulation of Yokohama city"

In Yokohama city, EIA system was introduced in 1980, developed a regulation in 1998, and amended in 2010. SEA-type system, which was named project-consultation system, was introduced as internal system of the local government in 1995. The SEA-type system was abolished and integrated in EIA system when EIA regulation was revised. New EIA system inherited some know-how from former system. This presentation is included in results of interview with the administrative officer involved with EIA division about tiering system to conduct reasonable environmental consideration in early step of project planning..

Samuel Hayes

PhD Candidate, University of Manchester, School of Environment and Development

"Consideration of Flood Risk in UK SEA and SA"

Reflections are presented on the consideration of flood risk in Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) from four case studies of assessment in UK spatial planning. Data highlight several areas of assessment practice as potentially influential on the

consideration of flood risk in strategic level assessment. Discussion is of key themes identified through document analysis of environmental reports and semi-structured interviews with those involved in each assessment case study. Examples from case studies are given to highlight how each of these themes can influence how flood risk is dealt with in SA and SEA. Themes include; how flood risk is included in assessment frameworks, the use of flood risk data, consultation on flooding, potentially conflicting objectives, how flood risk is included in plan policies, and commitment to plan policies.

Yuki Shibata

Assistant Professor, University of Shiga Prefecture

"Institutionalization and operation of Special-EIA for recovery from the Great East Japan Earthquake"

Recovery Special Zone Act, established nine months after the Great East Japan Earthquake, has excluded the Special Reconstruction Project for the earthquake reconstruction from the application of the EIA Law. However, the Act established Special-EIA for the Special Reconstruction Projects. The Special-EIA is marked by the simplification of the assessment process and the environmental investigation. At the same time, the Special-EIA is also marked by the application of the ex-post environmental monitoring survey and follow-up measures. Now, this Special-EIA is expected to accelerate the environmental consideration in the rapid recovery construction and has been conducted in three earthquake hit prefectures and partially seven prefectures. In this paper, we present the overview of the Special-EIA system and the current situation of the operation.

Tom Gore and Thomas B Fischer

University of Liverpool

"Identifying the factors that support and hinder EIA following disaster events"

In recognition of the close relationship between environmental degradation and the occurrence of disaster events, the importance of fully integrating environmental assessment techniques into activities in the aftermath of disasters has now been widely emphasised. Yet, despite the apparent desirability of such action in helping prevent disaster recurrence, questions regarding the feasibility of this in practice have also been raised. Post-disaster environments generally differ substantially from the normal 'developmental' context in which such techniques are usually applied which may in fact make such applications problematic. Using a case study of the situation in Aceh Province, Indonesia, following the impact of two tsunamigenic earthquakes in 2004 and 2005, this paper reports on a study that was undertaken to investigate more specifically the factors which can both impede and support the practice of one EA methodology, environmental impact assessment, following such events in a developing country context.

Keita Azechi

Doctoral Student, Tokyo Institute of Technology

"EIA and Landslide Disaster in Wind Farm Development in Japan"

In Japan, the momentum to shift to renewable energy was enhanced by the Fukushima Dai-ichi Nuclear Accident on March 11, 2011. Wind energy should be one of the important options of Japanese renewable energy policy as in other countries. However, wind farm developments in mountain area produce an increased risk of landslide disaster and it becomes issues of concern of local residents. This presentation focuses a relationship between EIA and landslide disaster in the development and discusses the challenges in current situation and future by specific case studies.

-------- Day 2 (Sat, 1 Dec.) --------

Session 4 (9:00~10:30): Disaster Management and Environmental Assessment tools (1)

Chair: Thomas B Fischer

Takehiko Murayama

Professor, Tokyo Institute of Technology

"Integration of Risk Management and EIA"

Great East Japan Earthquake and subsequent a severe accident of Fukushima Daiichi nuclear power plants challenged us about various issues. Through our extremely rare experiences, we are expected to conduct interdisciplinary activities to improve risk management for low probability and high consequence (LPHC) disasters. From these points of views, the following aspects would be covered; re-examination of definition of risks, decision-making system or governance for risk management among various stakeholders, some challenging approaches on better management for 'beyond assumption' events, and coordination with EIA.

Ross Marshall

Head of National Environmental Assessment Service, Environment Agency

"EIA, SEA and the UK Civil Contingencies Act"

An important aim of the UK Civil Contingencies Act 2004 was to strengthen institutional emergency planning, civil resilience and multi-agency responses to disaster events. In this context, what strategic role or tactical contribution the practice of EIA and SEA, and its practitioners can play before, during and after an emergency is an important question. This presentation will look at the way in which the Act is asking different groups (including EIA and SEA practitioners) to co-operate. Using the Lincolnshire coast line as a case study, implications will be elaborated on and explained.

Atsuko Masano

Freelance Journalist

"Exemption Clause in Japanese EIA Law in Disaster：Looking into the Functions"

TEPCO's Fukushima Daiichi Nuclear Power Plant disaster triggered by Great East Japan Earthquake on March 11, 2011 revealed the fact that exemption clause in the Japanese EIA Law was cut out neither for risk management nor post disaster management. Article 52-1 needs to be removed for assessing radioactive effects. Application of Article 52-2 and 52-3 needs careful review for future cases and preparations through lessons learned this time.

Alan Bond

University of East Anglia

"Embedding evolutionary resilience in impact assessment: a post-normal strategy for disaster risk management?"

This paper brings together a number of disparate areas in an attempt to find an improved mechanism for disaster risk management: Impact Assessment (IA); post-normal science; and evolutionary resilience. In brief, the justification for considering this mélange of techniques and theories is that together they offer a better strategy for disaster risk management. IA has been developed on the basis of rational decision making whereby better information leads to better decisions. Inherent in this 'positivist' theory of decision making are the assumptions that: a) decision makers behave rationally;

and b) impact assessments practice 'normal' science whereby our system understanding is sufficient to associate cause and effect. This article argues that neither of these cases is true, and that IA therefore needs to embed post-normal science thinking to accommodate the uncertainty associated with the outcomes of decisions. Evolutionary resilience is proposed as the basis for achieving this by altering the goals of IA such that they become the ability of the system to change and adapt to the new circumstances (including post-disaster), rather than attempting to preserve the status quo.

Session 5 (10:50~12:30): Disaster Management and Environmental Assessment tools (2)

Chair: Yuki Shibata

Shigeo Nishikizawa

Associate Professor, Tokyo Institute of Technology

"Japanese EIA system and its practice relevant to disaster management"

There is a strong link between environmental damage and disasters. EIA is applied to human activities with potentially significant adverse environmental impacts. It implies that EIA can be a key tool to identify, evaluate and respond to serious environmental issues caused by disasters. Although Japanese EIA has yet to be well-designed in terms of disaster management, some disaster-related issues have been considered in EIA. This presentation will introduce such practices and institutional frameworks in Japanese EIA system.

Steve Swain

Environment Agency

"Implications of the absence of EA requirements for civil emergency plans"

Plans and programmes that only serve civil emergencies are exempt from undergoing Strategic Environmental Assessment (SEA). Since climate change is expected to result in more frequent climactic emergencies, the use of emergency plans is expected to increase. This, in conjunction with the findings of the investigation in to the Buncefield Oil Storage and Transfer Depot explosion and subsequent emergency response, which resulted in significant environmental pollution, has prompted this study of the possible environmental impacts of such plans and whether the SEA exemption results in negative environmental effects being missed or not mitigated for. Emergency plans use a range of techniques, some structural, others not, to minimise the impacts of hazards, some of which have the potential to have negative impacts on the environment. Relatively few of the plans assessed would be subject to the exemption, most not satisfying the other criteria. Those that do could potentially result in surface and groundwater pollution, waste dispersal, ecological, cultural or historical impacts, energy and carbon resource use and drainage impacts. The ability of SEA to mitigate potential effects is limited by restrictions on consultation and the flexibility required to react to emergency events but non-statutory scoping consultations, if possible, could provide benefits. Emergency management uses other mechanisms to protect the environment, such as the requirement for emergency plans to consider environmental impacts, the required involvement of environmental bodies in the decision-making process and the ability to pass emergency regulations to protect the environment.

Kenichi Tanaka

Senior Advisor (Environmental Impact Assessment), Japan International Cooperation Agency

"Reconstruction and Mass Relocation Initiatives by the Resident Association -Sakihama District , Ofunato City- (Source: NPO Iwate Community Support Center)"

The huge tsunami reached the Sakihama District at 15:15 in March 11, 2011. Approximately 50 households were washed away and 10 people were killed or went missing. The Sakihama Reconstruction Council was established to facilitate the speedy reconstruction in June 29, 2011. The council has 22 members including resident association representatives, disaster victims, the former mayor, Iwate University staff and NPO staff. As cultural properties requiring the investigation were found during exploratory excavation at the candidate site in April 2012. Once the archaeological study is complete, detailed design for the relocation site will be implemented and construction will be commenced.

Bridget Durning

Oxford Brookes University

"Furthering environmental assessment through continuing assessment into management as an aid to integrating disaster risk reduction measures into development"

Environmental impacts of developments are currently identified and mitigated from two distinct perspectives:' before' and 'after' implementation with environmental impact assessment (EIA) and environmental management systems and processes (EMS) being the main instruments on the respective sides. Increasingly the 'after' process it also developing a more strategic rather than purely operational focus and linking into other operational and strategic process including corporate social responsibility, and pollution prevention and control. Whilst there are many factors which can be seen to inhibit a connection the two 'sides' of impact identification and mitigation, there are examples were the two are successfully connected and therefore rather than a 'before' and 'after' there is instead the continuous management of impact. This presentation will look at some of the barriers to integration between EIA and operational processes and look at case studies were there has been successful integration.

Workshop

The potential role of EA in Disaster Management

Chair: Tom Gore, Ryo Tajima

- Introduction (20 min.)

  Ryo Tajima[*], Tom Gore[**]

  [*]National Institute for Environmental Studies, [**]University of Liverpool
- Discussion 1: "What role can/should EA play in different disaster phases?" (60min.)
- Break (20min.)
- Discussion 2: "Alternative ways to EA - what other instruments/tools could we use for effective disaster management?" (60 min.)
- Plenary (20 min.)

Site Visit

Post-disaster town planning after the unprecedented earthquake and tsunami in Miyagi, Japan

- **General Information about Onagawa town, Miyagi**

Onagawa town is a small town on the coast of Miyagi prefecture, north-east Japan. In the tsunami of 11th March 2011, the town suffered appalling damage and loss of life. Latest estimates are that 1300 of the 10,000 population are dead or missing. The whole of the main part of Onagawa town was destroyed by a wave that reached 24m (78 feet) high.

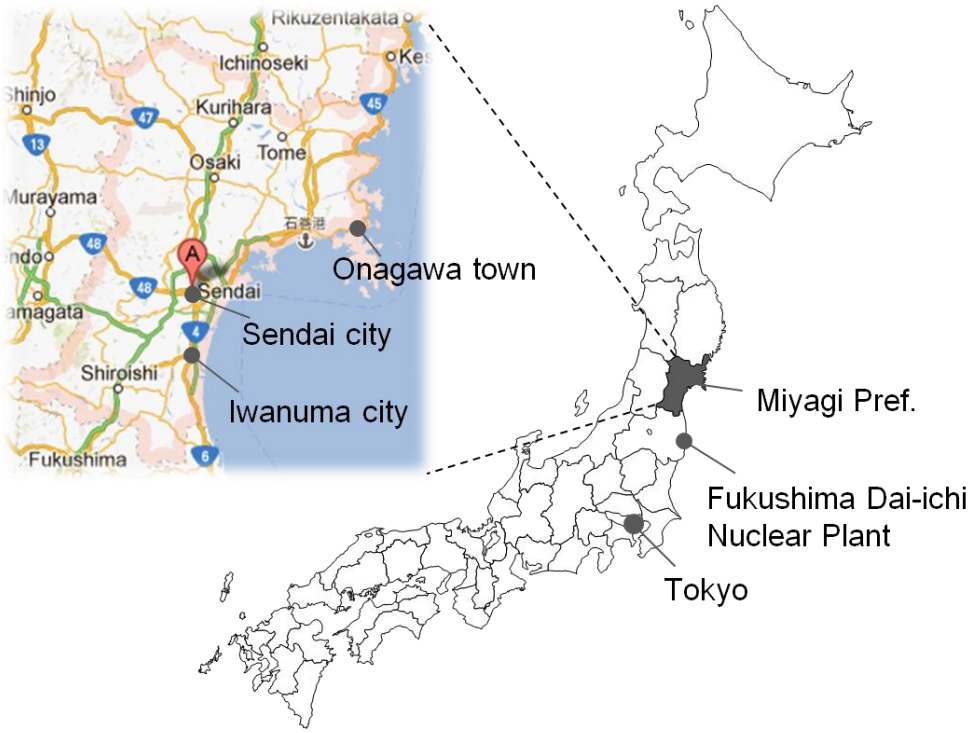
Date	Time	Event	Note
2 Dec. (Sun.)	7:20	Meet at the Tobu Hotel Levant Tokyo Hotel (lobby)	
	7:30	Depart the hotel for Miyagi Pref.	7 hour (including break and lunch time)
	14:30	Arrive at Onagawa town - Observation on the Tsunami affected area - Q&A session on the reconstruction plan	Main Host: Mr. Toshiaki Yaginuma, Section of Reconstruction, Onagawa town
	17:30	Depart Onagawa-cho for Sendai	1.5 hour
	19:00	Arrive at the hotel in Sendai	
	19:30	Dine out	TBD
3 Dec. (Mon.)	8:30	Depart the hotel for Iwanuma city	
	9:00	Arrive at coast line near Iwanuma - Observation on the Tsunami affected area from the bus	Iwanuma city, Miyagi Prefecture
	10:00	Depart Iwanuma city for Narita	6 hour (including break and lunch time)
	16:00	Arrive at Narita Airport	21:55 flight to UK
	16:30	Depart Narita Airport for Tokyo	1 hour
	17:30	Arrive at Tokyo station	

- **Accommodation**

Hotel Metropolitan Sendai

1-1-1, Chuo, Aoba-ku, Sendai 980-8477
TEL: +81-(0)22-268-2525
URL: http://www.s-metro.stbl.co.jp/english/
Breakfast: from 6:30
Internet: available in the guest room

- **Map**



Venue

Chiba University of Commerce (CUC)

1-3-1 Konodai, Ichikawa-shi, Chiba, 272-8512

Conference room, 3rd floor, Main Building

Access

A) Approx. 20-minute walk from JR Sobu Line Ichikawa Station (15 minutes from Kinshicho Station)

B) Or you can take a bus (for Matsudo or Matsudo-shako) from No.1 Keisei Bus Stop in front of JR Sobu Line Ichikawa Station and get off at Wayo-joshidai-mae bus stop. CUC is about 3 minutes from the bus stop.

Hotel information

TOBU hotel Levant Tokyo

1-2-2 Kinshi, Sumida ward, Tokyo, 130-0013

TEL:03-5611-5511

FAX:03-5611-5500

Access

Approx. 3-minute walk from JR Sobu Line Kinshicho Station (North Exit)

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“The Tree of Hope”, *Ippon-matsu*,

is the only pine tree that survived the tsunami out of the 70000, which had saved people’s lives as a seawall since the Edo era. It has given hope to people as a symbol of fortitude towrds recovery.

Appendix 2: Minutes of the Q&A at the presentation sessions

＜Session 1＞

・Masahiro Osako

- Fischer
  - Q) About processing facilities (i.e. incineration facilities for the debris), are you building new facilities or not? The existing ones are not enough?
  - A) Partly we use the existing facilities. But the capacity was too short to deal with huge amount of the debris, so we had to build new facilities.
- Harashina
  - Q) Do the present facilities have enough capacity?
  - A) Yes, they do. The constructions were done quickly and perfectly.
- Gore
  - Q) How were the temporally storages for debris selected? And how were the environmental considerations taken into account the siting?
  - A) We had huge area washed away by the Tsunami, and there were no houses and buildings. So, it is easy to select the site.
  - A) But in case of Iwate prefecture, the area was limited. So the siting was difficult.
- Swain
  - Q) About the before-hand preparation of such a big recovery operation, were there any plans or exercises that you think went well? What are the lessons to be learned and incorporated in the plan for future?
  - A) First, we didn't have know-how to deal with such a huge amount of the debris. But through this experience, we have to reflect this experience to future instruction of waste management.

・Andrew Buchanan

- Swain
  - Q) Do you think the information of safety report could be used and incorporated into environment impact assessment?
  - A) Environment Impact Assessment is the first stage which is the planning stage for approval, and the next stage is the safety report. The safety report is a requirement for operation, and the EIA is a requirement for planning. Environment Impact Assessment provides the information which is taken into the scenario definition, but there is no reason to suggest that the technical component of the safety report cannot be filtered back into Environmental Impact Assessment but I think that the detailed information needed for the safety report doesn't yet exist in the other stage.
- Harashina
  - Q) Safety is one of the components of EIA, what do you think?
- Marshall
  - Q) COMAH (Control of major accident hazards) is about safety. Harm to people was the driver for establishing the legislation to protect people. Since 2002, when the legislation was first applied, the environment was included. But in the 2010-11 revision, a special session on the environment was developed. It's still evolving. The safety report methodology

for predicting and preventing human harm has evolved. But the evolution of assessing the environmental impact and quantifying that impact is still ongoing today. It's a safety-led process, but the environmental element was always there and is now becoming more prominent.

・Tai-young Yi

- Fischer
  - Q) About "land use adjustment project", what exactly is that? Is that a project something like supporting reconstruction for long term?
  - A) This is a plan for future made after the earthquake. And this project will take around 10 years. Each consensus is not so quickly. Now is just beginning stage.
  - Q) What are the different colors in the diagram?
  - A) The yellow is residence area, the red is commercial area and the green is residency prohibited area. As I mentioned, it will takes long time, but local residents cannot wait for these time and the situation have become very complex.
- Buchanan
  - Q) Who is funding to develop the software package?
  - A) NIED is.
- Bond
  - Q) Whether is this e-community platform just proposing to be used or being used?
  - A) Already using.
  - Q) Do you have any data of number of access to the platform?
  - A) I cannot say the answer. But only small portion of total area can be used this platform.
- Fischer
  - Q) The platform has already used a strategy for future development by designating by colors, and should be developed for the purposes. How quickly did you come up? And who came up with the decision, authority or municipality? Because this decision was quite significant decision.
  - A) Decision was made by the municipality and NIED is assisting them in terms of information aspect.

＜Session 2＞

・Kayoko Yamamoto

- Bond
  - Q) I was curious that you mentioned the negative impact resulting from SNS (e.g. twitter and facebook). Could you give me more detail of it?
  - A) I will send more date about cooperative study we are conducting now by e-mail.

・Nebil Achour

- Tasaki
  - Q) In the third from last slide, you mentioned that CASBEE takes into account resilience. How does CASBEE take into

account resilience in this methodology?

- A) There are so many criteria in resilience itself, but here we have classified. We have location, flexibility and structure of many functions. These three main elements develop SAP (Subjective Assessment of workplace Productivity). There are a lot of equation and information in there. The approach that been found of CASBEE and other tool follows that way. CASBEE is kind like more detail and lot of mathematics and calculation behind. And in others, more comparable kind of information (e.g. low, middle and high) is given. What in Japan do opposite way have quite numbers, then those numbers will lead to decide which one is high and which one is low and so on.

◆ Marshall

- Q) I have keep seeing the references to resilience of unsustainability. Surely is resilience important component of sustainability?
- A) Yes. Then the way resilience always been seen different perceptions in different part and different people. For example in UK, our view of resilience is resilience of people and resilience of management system and process that we have. On the other hand in Japan, you found it is more about infrastructure or physical issue. Perhaps that is one perception you can see. But world resilience itself, it exists in report. And there are other thing, disaster management and disaster prevention. And perhaps these could be shown as difference perception in different place and different people as well.

・Tomohiro Tasaki

◆ Bond

- Q) I'm interested in asbestos just because it important to handle. How to deal with asbestos? How to detect and how hard is it?
- A) As you said, it's difficult to identify which contains asbestos in especially practical situation. So sometime we neglect existence of asbestos. It's very tough point to deal with appropriate in the real situation.
- A) In case of only earthquake, you might be able to indentify. But in this case of the tsunami, it becomes so difficult.

◆ Swain

- Q) About regulation, was there flexibility of waste management regulation for such a very extremely incident?
- A) Not so flexible I think. For example, to create temporal incineration plant, we need appropriate environmental assessment and like that and it takes time. So Ministry of the Environment decided to reduce the process a couple months after the disaster. But before that, it took time.

＜Session 3＞

・Takuya Sugimoto

◆ Fischer

- Q) We heard in this morning that there are 20 EIAs every year at national level in Japan. But you said that in Yokohama alone, the experience is 60 EIAs. Is that just national EIA or also like prefectural or municipal EIA? And since when?
- A) From 1980 to 2012.

◆ Harashina

- Q) In your wrap up, you said "not only project level but also to something like plan."

- A) Yes. But this doesn't have "consultation." The committee gives just comment to the plan (consultation is more influential than comment).

◆ Swain

- Q) Is there any plan to monitor an effect of the change (i.e. amendment)? And what impact would be changed?
- A) Not done yet. The amendment was done just last year.

・Samuel Hayes

◆ Harashina

- Q) In your conclusions, you said that inclusion of flood risk within assessment objectives is variable. Did you see some tendency of the variation?
- A) I focus on 4 cases in my Ph.D based on, so these are quite detail. And these are only the most recent plan, so in terms of how they were previously and how they were doing, I don't know. But in my impression, some of the variation is quite typical in other studies ancestors said.

◆ Fischer

- Q) One thing I'm interested in is that you looked at SEA in England and Scotland, and you said there are various factors that are difficult to isolate from flood risk. But what I was wondering is that flood plains very often become very attractive for developers, and you could argue that an SA could be used to push towards actually developing a flood plain. Have you seen any evidence of that, when you were looking at the cases?
- A) Not specifically, yet. My cases weren't selected with the issue of flood risk in mind. So if you wanted to look at that, you might choose difference cases. Because in the English cases, the Black Country, which does have issues of flood risk, is already heavily urbanized. So their position was very much a case of trying to regenerate areas that have already been developed. So the traditional idea of a green flood plain is not really in their area. But you do get the feeling that things are weighed against economics and other aspects. Although they aren't formally included in SEA in Scotland, they're part of the discussion. In the Scottish case I spoke about, they excluded one area because the SEA said flooding was an issue, but decided to continue to develop in the core area because it was "economically viable to protect it." So there are definitely elements bleeding into the discussion.

◆ Tajima

- Q) In terms of managing flood risks, did you see any use of the flood risk assessment or strategic flood risk assessment in the SA? And was it influential? Which was used, SA or the flood risk assessment?
- A) Depending on the order in which they're done, there are references, such as "there will be further information provided by the strategic flood risk assessment." So the SA or SEA will refer to the flood risk assessment as a place where more detail can be found. So there is some crossover.

◆ Murayama

- Q) Flood risk is difficult to estimate (i.e. how to calculate probability and damage scale). So in this case, were some technical information provided?
- A) Yes. Environment Agency provided the flood risk data which produced information.

・*Tom Gore*

- Tajima
  - Q) You said the time requirement for scoping was reduced. What kind of scoping activity was undertaken?
  - A) The way the Indonesian system works is the proponent prepares a scoping document that is evaluated by a technical team of experts. Then again, the scoping document, along with the recommendation of the technical team, goes to the review commission, who then appraises it and decides whether or not to accept it. What they did, in actuality, was they got the head of the technical team to work with the proponent, so instead of the "to and fro" approach, they worked everything out in advance
- Harashina
  - Q) In your 3rd recommendation, you write "such agreements don't necessarily reduce the quality of the EIA". Do you have evidence to support that?
  - A) No, it's more of a hunch, because many people have said that by accelerate the EIA process, we'd automatically have to reduce the quality by reducing the time for analysis or the depth for field studies. I was just making the point that if we first focus on things that can have their time requirements reduced without necessarily impacting quality, such as administration, we can reduce the overall time requirement for EIA without having too much of an impact on overall quality. No evidence, though, it's just an idea.

・*Keita Azechi*

- Gore
  - Q) Am I correct in understanding that landslide hazard was taken into account because of public demand in the case study? Did I understand that correctly? The public believed that because of the history of the location that it was important to consider the landslide hazard in the EIA. Is that what happened?
  - A) It's actually difficult to answer this question because there was public demand but, in practice, usually the EIAs don't consider the landslide hazard.
  - A) I'd like to say one thing more about this. As I told him this morning, the scope of impact assessment is very narrow. The reason why is we have a very secular(?) system in Japan. So the environment, the concept, is very narrow. It does not include such radioactive substances for this kind of safety concern. They're different. So this ministry (MLIT) is in charge of this kind of thing. They like to do this by themselves. But not in the impact study. So that is the basic problem. But, as you say, the public, they are very aware of this. So this kind of concern should be included in the scope of the environmental impact. So he insisted on including it.
  - Q) I recognize here, actually, something that you find very often; that fragmentation of responsibility leads to ignoring certain things. But within the environmental assessment process, would MLIT not be one of the bodies to be consulted? So wouldn't they automatically bring their expertise into the process?
  - A) I think that usually MLIT doesn't engage in the EIA process.
  - A) That's on the national level. But each local government studies differently. And they have a more comprehensive approach for impact studies. So some advanced municipalities, they have this kind of system, including safety. In this case, this city includes safety in their environmental studies. So it's different from the national level.

・*Yuki Shibata*

- Buchanan
  - Q) The previous speaker highlighted that landslides are significant national disasters in Japan. I was wondering if you'd like to comment on the relocation from coastal areas into more hilly areas and how that knowledge has been impacted in the selection of areas for the new locations. Has concern about landslides been incorporated into the decision making process?
  - A) The primary purpose in relocation to mountainous areas is to avoid the tsunami disaster but you are correct that such locations have some risk of landslides.
  - Sachihiko Harashina) In this case, landslides happened in emergency areas, not close to the plans. So the areas close to the sea and mountainous areas aren't so dangerous. In the mountain areas, there are many such places. So they are checked by MLIT which has the basic data on which parts are dangerous. So based on that data, different locations can be chosen. So it's not a big problem. But in the case of wind turbines, these are constructed in the mountain areas, so this is a problem.
- Achour
  - Q) Along with the landslides, there is also rock fall as well, here in Japan. Does the ministry do a risk assessment for all these types of disasters, or is it just, basically focused on landslides or otherwise?
  - A) These aren't checked in the impact studies, but in a different system. MLIT does this. But not connected to the impact studies. But the people, they are aware of the comprehensive issues, so it's not good for them to have it separated. But MLIT says that they have responsibility.
- Fischer
  - Q) The special EIA for recovery, is that something that is based on the current EIA law, or is that a new act for disasters?
  - A) Yes, that is a special act. So it's only applicable to a very slim target.
  - Q) The amended EIA procedure, it removes the scoping process altogether? There's no scoping process shown in the slide.
  - A) It's skipped.
  - Q) So who decides what to focus the EIA on?
  - A) The proponent.
  - Q) Without input from other…?
  - A) In my opinion, it's very bad.
- Gore
  - Q) I think so, too. In actuality, they still did the scoping process, but they reduced the time it took. It usually took 5 months. What they did is they sped it up by integrating government finance technical experts into the proponent's team to speed the scoping process up. So it's still conducted (arguably to a better standard) but scoping is important because you aim the EIA at important aspects. You can argue it's even more important to do it in a post-disaster context. Removing it altogether seems like a dodgy move.
  - Sachihiko Harashina) I conducted impact studies and processes, and it only took 3 to 4 months. The scoping process was most important. And we allocated more time for the scoping process. To persuade them, we conducted this one 2 years ago. That's what he was referring to. But the national government considered this to perhaps be much better. But I don't think so. This was before the EI Act in Japan and the first guideline. This is the kind of system we had. But we changed.
  - Q) So, that is the original system?

- A) This a very limited system, only for emergencies.
- Q) I was struck by it as well, since it looks like it has the potential to make the process take even longer, since you're not excluding things that aren't important.

＜Session 4＞

・Takehiko Murayama

- Buchanan
  - Q) Has somebody conducted a comparison of the actual with the 2011 and the first estimation 2004 by looking at the differences?
  - A) Yes. For example, Miyagi prefecture government are remixing and trying to make clear the accuracy of first estimation. But, it is still going under consideration.
  - Q) It is interesting to see the environmental statistic.
- Harashina
  - That day, the height of tsunami might be much lower compared with the actual, one than less than half.
  - A) Generally speaking, yes.
- Fischer
  - Q) My first question is almost same as what Buchanan asked. My second question which is related to the first one is that in 2004 there was any implication in terms of preparing to meet for possible disaster?
  - A) It is very good point. Such kind of the estimation prevention plan is not perfectly but effective to reduce some damage. However, local people is too difficult to understand, and in general, local people want to live near seaside because for their Fischery activity or something others. This is very difficult point, but we have to discuss about such kind of risk and future goal. We have several options after the disaster. One is a still living near seaside or moving to the mountain area. But, it is very difficult to solve.
  - Sachihiko) I think it's a problem of perception of the people. And in these cases, people would like to think the risk much lower the level. There was this kind of tendency. If we could find the way to show more realistic one. So after the disaster, they could know that, however before the disaster, they could not understand. That was a big change. We had experience same kind of the earthquake more than 1,000 years ago in 19 centuries. But, it's once in 1,000 years, so people could not understand. So, but now, we have this experience, it should be changed.

・Ross Marshall

- Harashina
  - Q) Why did they establish such the Contingency Act 2004? What is the background?
  - A) Lots of disasters that were badly managed.
- Buchanan
  - Q) This is more comment than question. I focused on same thing yesterday but I never covered this point, the next phase of the survey (phase 3). One of the key changes is going to be an executive summary type of section to make the public aware. In the EIA stage, there's not enough done in the more detailed scenario risk and publication of that. Obviously the stages at

which these assessments have to happen are varied, but there's going to be more information in the public domain about what the risks are. That's going to be brought in across Europe.

- A) We achieved very rapid EIA on the ship's disposal options. One of my staff, Kevin worked with the internal agency team on the disposal options, their environmental implications and what needed to be communicated out to the team. We've done such "special EIAs" on several missions as a rapid response.EIA looking at alternatives and options, how you communicate with the public and what they're likely to be concerned about.

・ *Atsuko Masano*

- Achour
  - Q) What was highlighted earlier on this morning and yesterday, for example, what we have in the UK, we have our critical infrastructure. The first thing we say, we say that earthquakes and seismic activities, we don't have them in the UK. So they're out of the risk, and then we say that flood plain areas would not stop us from building our infrastructure. So what I'm trying to say is that authorities, and governments and politicians generally speaking, they are not bothered at all about the people or they're only bothered about whether they'll vote for them.
- Bond
  - Q) It's possibly, it's a fair comment that the idea isn't just one of one place, that while the evidence is there to suggest that certain different decisions should be made in terms of development and infrastructure, those decisions are still not being made, so while we might think we have the systems in place, it's still not just unique to one place; all over the world we still have these problems.
  - A) May I comment on both of them. Today's presentations were so interesting to me. Because, Prof. Murayama's presentation showed how much information they have about simulation about tsunami but it doesn't really connect to the contingency plan and maybe they don't have any evacuation drilling about tsunami even though they have some simulation. On the other hand, Mr. Marshall showed us the Contingency Act and I was wondering as I was listening to you if there was any evacuation drill something but you show some. So I think it's very important to connect these two, actual simulation and contingency plan for evacuation to just save our life. In Japan, I think we have very brilliant technology to do simulation but then it doesn't really help people's life.
- Gore
  - Q) When TEPO lost the nuclear power plant in Fukushima, they wanted to rebuild the capacity by developing new power station. Is that right?
  - A) They have already built new thermal plant without EIA.
  - Q) Was anything done without any alternative.
  - A) Yes. TEPCO said they provided a lot of information to local government and local residents, but not whole full set of EIA procedure.
  - Q) But were there some sort of EIA?
  - A) Not much.
  - Harashina) Yes, this is the basic problem in Japan. As I told you yesterday, it takes two or three years, so it's very long time and also very expensive, so they would like to exempt. But in this case, I'd like to say you that they should take concise type of EIA including scoping process, and should be finished three or four months, very short and they can check

environmental impact. But in this case, they didn't do this. They only provide information but not good participation, so skipping over this kind of process. So this is big problem.

- A) If you slide number 12, these are all the power plant we want to build. As you see Anegasaki one, they released 15 Apr. 11 and within this month they started operating. It was so quick. The press releases were that these were exempt. And their excuse was that they were just replacement because they already have the site.
- Harashina) In this case, even if we conduct EIA process, it might not be big problems. So they could pass. But in this case, we could apply more concise one. So from my experience, maybe it would be applicable. But even though they don't want to conduct the EIA processes. Because Japanese systems only focus on such a huge project target. So it takes long time, two or three years. And more than one million dollars expense so they don't want to. For the other alternative way, so we should have more concise one like EA under NEPA.

◆ Fischer

- Comment) In the EIA directive in Europe, there is clause that in certain situations, the activities can be exempted from the rule. The member states considered doing some sort of assessment over that moving defined. But I guessed such probably is good thing to do the release to be defined just to avoid situations where the project is just simply exempted without having on any alternatives even the shorten produce.

・ *Alan Bond*

◆ Harashina

- Q) You presented the new concept is less focus on baseline. But for this, I think we need kind of special criteria to evaluate. How is current situation and hot to make this kind of criteria?
- A) It's a good question about sustainability appraisal approach where using in England. There were objects which come up with and become criteria against policies and plans, and future actions. Now, there is smart research and practice pointing out factors of those objectives to get best development by involving with communities who live near specific plan. And wide range of stakeholders not only consultants and environmental agency. So, I mean lots of knowledge about how to go forward.
- Q) That might be not create kind of criteria but also making consensus in the society, community consensus building.
- A) Yes, It's easy to say let's develop the consensus, everyone agree doesn't work. So they have discussion intend to enhance legitimacy to the final conclusion for the final criteria. What we found also in practicing Sustainability Appraisal is that there is tendency to involve members of public and stakeholders to develop the criteria and then move away go behind close the door to do assessment based on criteria not involved public.

◆ Buchanan

- Q) Is there going to be a major piece of legislation in the near future that will take that report's approach, or we still going to continue with the grandfathered-in sort of way that we always do?
- A) I wish there was. I mean, I think we might (?) when the sustainability craze had first arrived, an actual step forward. But if you actually look at the way environmental impact assessment, and strategic environmental assessment developed, the structure is constrained much more by the courts than anything else. And the courts look at what the legislation says, and that's where a baseline-led report approach has started to dominate. So it's kind of saying, this is what we have to do, we're not doing it, and that approach visualizes (in sustainability-terms) where you want to be, which is a difficult concept to take

forward, and it's certainly difficult in terms of the courts to work out if you're doing something appropriate, and it's fallen out of favor.

- Marshall
  - Q) I agree with the concepts. I still think you should remember that one of the primary tenants why you do this is so that the decision-maker understands the consequences of his decision as we move from the baseline to a new state. That was the primary policy driver of the EIA. So as ever we try to protect the baseline, but as EIA practitioners, we're always conscious that we're moving into a new baseline, or a future baseline. As long as people accept what they're going to get.
  - A) I agree with you. I think the only argument I'm making in terms of the baseline is that we've got to stop this kind of blinkered approach to protect a particular species. As moving forward, if we have habitat what we think it is protected, I think there is nothing wrong with impact assessments trying to protect a habitat. What it shouldn't do is try to protect a habitat in its existing form. That doesn't accept that evolution takes place.

Session 5

Shigeo Nishikizawa

- Fischer
  - Q) You mentioned the disaster prevention plan. Is that something that is a statutory requirement or is that done voluntarily? To what extent are those prepared currently? You mentioned that at one point in your presentation, or maybe you were referring to the disaster-related survey, I don't know.
  - A) It is not an obligated item, so it's done on a voluntary basis. But, in the case of forest land development, disaster prevention, particularly in the landslide or flood risk, basically was selected and their impact was predicted.
  - Sachihiko Harashina) As I told you yesterday, at the national level, each ministry is very sectional, so they are vertically separated. So, they could not intervene in the EIA process of this kind of disaster management. These cases are all from the local ordinances, the prefecture level or minister level. In these cases, local governments that are much closer to the people have this kind of approach. But it's hasn't been done yet at the national level. Therefore, as Dr. Masano said, we have this kind of problem at the national level.
  - A) One of the major differences between the national level and ordinance is that at the national level there is no EIA review committee. On the other hand, EIA ordinances have the EIA reviewing process. So, even if the proponents don't select the evaluation item of prevention risk, in most of the cases reviewers can do so.
- Nakagami
  - Q) EA and the disaster management are related to many stakeholders, and we should consider which stakeholder is the most important for each specific project. In your case study, who is it?
  - A) In this case, the most important stakeholders are the inhabitants, the administrative bodies, and maybe Fischermen.

Steve Swain (40:00~)

- Harashina
  - Q) Thank you very much. You are not an expert in such radiation, but you have this restricting system and radiation emergency preparation. So, can you talk more about this?

- A) The requirement for an emergency plan is not automatic. There has to be the presence of fissile material, radioactive nuclide at the site that ought to be transported, and then there has to be a very detailed assessment of risks and then, following that, there is a decision about whether there should be an emergency plan. This is as far as I got for my case study. The risks are assessed by the authority, which is the Health and Safety Executive.

◆ Nakagami

- Q) And another discussion point is Non-SEA mechanisms. It's a very new discussion point in the last slide. Even the SEA is a very new field regarding environmental impact assessment, and you mentioned Non-SEA mechanisms, we need more discussion.
- A) I should have clarified and explained more. I was looking at specifically the SEA regulations and the exemption. There are environmental assessments going on as part of these processes. Strictly speaking, they aren't called environmental assessments, but they are strategic environmental assessments and nothing new.
- Q) Prof. Harashina is an expert in SEA. May I ask you for some comments?
- Harashina) SEA is perhaps not very wide in scope and the definition might be a little limited. So maybe this kind of approach is a kind of alternative to the SEA approach.
- A) I think they are mechanisms of environmental assessment. I was probably too focused on the SEA directive and the exemption, so if they are not, strictly, falling within that realm because they are exempt, I thought of them as non-SEA, but they are forming the same task.

◆ Bond

- Q) I've always thought that the directives, with their exemptions in emergencies, had in mind a situation where there was an emergency and you rapidly put a plan together because it didn't exist. Because you needed to save life, that was the priority. But with things like the civil contingency, that's clearly not the way things happened. Is there really any reason why we can't conduct an environment assessment in an emergency plan?
- A) I did have to think about the practicalities of how you could incorporate EA into emergency plans, and I thought there were probably three different sorts of plans, really, in terms of how you could affect them:
- A) There's the civil contingency response plan, where you'd need a real-time equivalent of an environmental assessment, which actually does exist. So because they're only a framework, really, for getting people together to decide upon the response, all the decisions that affect the environment are done in real-time, so there's real-time environmental assessment.
- A) I think the recovery might be a little different. Potentially there are ways which you could prepare beforehand to have certain options available, maybe, or there's a shorter, concise environmental assessment that you could undertake which you could fit in to the timescale of the recovery. It sounds like that's something that's sensible.
- A) And the site-specific emergency plans, but they're mitigation measures, what they achieve is they already look at the hazards, and they try to reduce risks in proportion to make loads reasonably practical. In a way, the problem's already been taken care of there through regulations.
- Comment) One of the things we need to be aware of, when we discuss SEA and EIA, especially in the European context of using emergency plans, is that there' s a very clear distinction between EIA and SEA as a regulatory tool. An EIA, an SEA is just a decision-making kit. If we took the statute treatment for EIA emergency plans, we'd suddenly run into process and administration issues such as a four-week consultation period, 8 weeks for the decision-making body to respond, public consultation, advertising in the newspapers, so I think even little elements, they just stop being a functioning tool, so to

speak.

Kenichi Tanaka

- Marshall
  - Q) Could you explain further about the composition of the advisory committee? Is this a standing committee within your organization, or is it a committee that is pulled together for a special occasion?
  - A) The advisory committee I mentioned is a special committee, a 3rd party. We cannot select the members directly. And for the selection, Prof. Harashina is a member of the selection, if we didn't have such a system, maybe JICA, we could appoint the people who want to collaborate with JICA's project, but in the current system, we can get seated. The opposition party, also.
  - Harashina) It's a standing committee. They have very many EISs, around 300 or 400. But only 20 domestic cases. So if we could introduce this system domestically, we could have more. Then we could become connected to disaster management as in your cases.
  - A) And all discussion is open to the public by website. All of the minutes of the discussion of the advisory committee.

Bridget Durning

- Harashina
  - I think the connection between the environmental management system and the process is a very good concept but as you know in Japan it's almost impossible. But if EIA are made more prevalent in society, this approach might be possible.
  - I think you can have smaller versions of the environmental system, what they increasing use now as an environmental management plan is what has been called "EMS-light". It's a smaller version, for taking into small towns with time restraints.
- Marshall
  - Q) What are the risks with respect to acting in haste through ill-advised actions if we speed up the EIA? We learned a lot of lessons in the UK from foot and mouth where the army came in and acted in haste. It led to a lot of ground water issues, a lot of risk management that we've had to tidy up.
  - A) The paper goes into this in more detail, but you need feedback loops for sharing practices and things that start to go wrong. If you have that integrated system, you have to start with the organization at the point, it starts at the management side, whether it's the civil defense side, the civil contingency side. You'd have to have that body as the one that then said the rapid EIA would have to follow this plan, and you'd have to have those systems in place to make sure that things didn't happen without some sort of governance you can control. It isn't something you could do unless the system and procedures fully exist. You'd have to look at how it would actually fit in with what already exists.
  - Q) In the case of Louisiana who decided for the army to handle the landfills?
  - A) That's a national legislative process. Any disaster, it's the army that takes over. But it was the Louisiana authority that authorized the re-opening of the landfill site and who controls what goes into the landfill site. They obviously follow waste management practices in terms of the need to screen waste. It's only authorized to take certain types and amounts of waste. I think the process with that is the Louisiana local authority authorized the use landfill site, but it's the army who provides the process for managing the waste. But they still looked at the condition of the landfill site to make sure it could

take additional waste and what impact ground movements would have on the site. The alternative sites were decided to have greater environmental impacts. So, various aspects of the EIA process were still looked at. The Louisiana state authorities attached various conditions to approving the landfill. The army didn't just come in.

- Q) So the process is based on a regular statutory one? But it was very fast?
- A) Yes.

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