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LESSONS FROM THE INTERNATIONAL COMPARISON OF CONTAMINATED LAND POLICIES WITH RISK GOVERNANCE IN JAPAN, THE NETHERLANDS, AND THE UK

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ABSTRACT: After the Great East Japan Earthquake and Fukushima Daiichi nuclear disaster, decontamination has been undertaken primarily to remediate residential areas. Therefore, it is necessary to consider risk governance in decontamination process. This paper aims to examine contaminated land policies by comparing Japan, the Netherlands, and the UK by literature reviews from the aspects of risk governance towards sustainable decontamination process. The results clarified that policies in Japan is disintegrated and sectionalised by separate acts. Contrastingly, integrated contaminated land regimes are practiced in the Netherlands and the UK on contaminated risks from current land uses. In terms of risk governance in contaminated land policies, although the Netherlands has a limited application, Japan and the UK have a certain degree of community participation in recent policies. Thus, recent contaminated land policy frameworks are adapting to promote risk governance in decontamination process by introducing statutory requirements. However, there is a limitation to ensure risk governance by statutory actions and more support to voluntary actions is needed.

Keywords: Contaminated Land, Brownfields, International Comparison of Policies, Risk Governance

1. INTRODUCTION

Four years had passed from the Great East Japan Earthquake and Fukushima Daiichi nuclear disaster. At present, decontamination is in process with the Act on Special Measures concerning the Handling of Environment Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District –Off the Pacific Ocean Earthquake that Occurred on March 11, 2011(After that, Act on Special Measures concerning the Handling of Environment Pollution by Radioactive Materials; 2011) released from the Fukushima Daiichi nuclear power plant which is caused by the Great East Japan Earthquake. However, contamination is widely spread into vast areas and it is not possible to decontaminate to its original condition in a short time [1].

Moreover, in the decontamination process, communication and community participation is a key aspect in the case of remediation sites to be located nearby residential areas. Additionally, in the case of severe contamination, it may take longer period for remediation, therefore, communication and community participation needs to be integrated in long term remediation. Hence, decontamination process in Fukushima applies to the above situation with primarily targeted to remediate residential areas, thus, risk governance is necessary.

The definition of risk governance is a 'collective decisions' through an interactive decision making process, which includes 'the totality of actors, rules, conventions, processes, and mechanisms' with its relevance in its collection, analysis, communication, and management decisions, due to 'the nature of the risk requires the collaboration of, and co-ordination between, a range of different stakeholders' [2], [3]. It is a dynamic continuous process with understanding gradually and adjusting to manage carefully of 'complexity, scientific uncertainty, and/or socio-political ambiguity' which needs to be 'flexible', 'interactive and inclusionary' [4]. It also aims to consider 'institutional agreements (the regulatory and legal framework that determines the relationship, roles and responsibilities of the actors and co-ordination mechanisms)' and 'political culture', to overcome differences in risk perception [2].

1.1 The Public Concerns of Risk Governance in Fukushima City, Japan

On the other hand, according to the report on consciousness of citizens for radioactivity by postal questionnaire survey to a random selection of people who are living in Fukushima city and living elsewhere to escape from the city in May, 2014, there was a tendency to have more concerns

on anxiety on health risks from radiation, i.e., families than themselves [5]. From the opinions of citizens on what should be prioritized in actions in the future by local authorities, prefecture, and central government had highlighted the highest concerns on the disclosure of accurate information at 68.8 per cent, and the health management of citizens at 64.6 per cent to follow [5]. Another investigation on perceptions of Japanese parents by online survey at four groups of Tohoku, Kanto, and Kansai regions and Fukushima prefecture in March, 2012 summarized that reasons for feelings of anxiety to be mainly from distrust of the outlook and actions by the central government, and secondly from 'uncertainty about scientific data disseminated in the past about low dose radiation' as well as 'invisible risks' , i.e., spots with high dose of radiation or food produced without monitoring from radiation [6]. Furthermore, improvement of the quality of information and disclosing information completely was strongly requested for information providers [6].

Above situations may illustrate the public concern on communication and community participation, therefore, it is necessary to consider risk governance in decontamination process. Until present, international comparison of contaminated land policies have been explored from environmental and spatial planning perspectives, i.e., US and Europe [7], North America and Europe [8], the UK and China [9], and England and Japan [10], however, discussions on incorporating social aspects of community participation is rather limited. Thus, this paper aims to examine contaminated land policies by literature reviews from the aspects of risk governance towards sustainable decontamination process by comparing Japan with separate set of acts, the Netherlands with the risk assessment system, and the UK with the planning system.

2. THE SIGNIFICANCE OF RISK GOVERNANCE IN DECONTAMINATION PROCESS

Environmental risk communication is recognized its importance by legislator, environmental groups and citizens that extra effort is needed to change plans in order 'to provide citizens with more meaningful input' [7], i.e., participation of the community in the early stages of the process [7], [11]-[13]. Moreover, communication should be undertaken continuously in the whole process of activities [13]. It is also suggested that 'meaningful community engagement' takes a highly influential part of actions for the public health in a case of contaminated land [11]. Therefore, the impact of effective communication on stakeholders needs to be considered, since it is 'critical to the successful delivery of remediation projects' [14]. From the above, communication and community participation can be said to be one of the most important issues for sustainable decontamination process.

The framework of risk governance comprises of four phases; 'pre-estimation', 'interdisciplinary risk estimation', 'risk characterization', and 'risk evaluation and risk management'; pre-estimation stage is a screening of actions and problems which are related to risks; interdisciplinary risk estimation is to undertake both scientifically based risk assessment and concern assessment to include socio-economic issues; risk characterization is an element based on evidence, while risk evaluation is an element based on the value to make decisions on the 'tolerability and /or acceptability of a risk'; and risk management is to re-examine 'all relevant data and information generated in the previous steps' to decide adequate actions in consideration of 'societal acceptability and tolerability' [4]. In risk governance, stakeholder and public involvement has been stated as a core feature [3], [4], and constant companions to all phases [2], [4] for transparent process, supervision by the public, and understandings among each other about the risks and their governance [2] should be ensured.

In the decontamination process, both the direct toxicological impacts and indirect affects to health, i.e., stress and anxiety, should be considered for residents living on or near in case of higher risks of contamination [11], [12]. Public concerns on contaminated land and its risks are identified as a scientific issue of 'health of self and family', as well as a range of socio-economic issues, 'property values', 'amenity', 'liability', 'level of confidence in government's ability to protect', and 'damage to environment' [15]. It is also discussed further that the indirect affects to residents in ways of physiological, economic and psychological, in 'a less certain and less transient way than observed pollution incidents' [14]. Furthermore, it has been reported that 'more open and proactive style of risk communication and consultation' had led to less dissatisfaction in the community on brownfield land with contamination [16]. For radioactive contaminated land, 'a systematic consideration of ethical and social issues' is going to make a selection of countermeasures 'more transparent and less controversial for society' and assist in sustainable restoration and long-term management [17]. Therefore, social and economic factors need to be discussed not only to examine the decontamination approaches from the aspects of its technological effectiveness [1]. To ensure the long-term sustainability, public acceptance and social sustainability need to be undertaken in the decontamination process [18].

Table 1 Comparison of contaminated land policies

Level of contamination	Japan	the Netherlands	the UK
Severely contaminated	Agricultural Land Soil Pollution Prevention Law(1970) [19] Law Concerning Special Measures against Dioxins(1999) [20] Act on Special Measures concerning the Handling of Environment Pollution by Radioactive Materials (2011) [21]	Soil Protection Act (1987) with Risk assessment [23], [24]	Special Site [25]-[27]; Part IIA to include radioactively contaminated land (2006) [26], [27]
Contaminated	Soil Contamination Countermeasures Act(2002) [22]	Soil Protection Act (1987) [23], [24]	Part IIA (2000) in Environmental Protection Act (1990) and Environment Act (1995) [25]

3. CONTAMINATED LAND POLICIES IN JAPAN, THE NETHERLANDS AND THE UK

Japan has similarities with the Netherlands and the UK that central governments are having a majority of role in setting and enforcing contaminated land policies [8], i.e., severely contaminated sites are dealt by the central governments or governmental organizations of Environment Agency as such in the UK. However, contaminated land regime in Japan had developed differently. In Japan, contaminated land regime is dealt by separate acts for specific land uses and substances which are introduced after the severe contaminated land cases, i.e., acts for agricultural lands, dioxins, and radioactive materials (Table 1). For example, for agricultural land, Agricultural Land Soil Pollution Prevention Law (1970) was introduced to deal with the 'Itai-Itai disease' in the Jinzu River Basin area in 1968 to cause soil pollution on agricultural land by chronic cadmium [19], and for dioxins, Law Concerning Special Measures against Dioxins (1999) has been introduced to deal with dioxins which is emitted from waste incinerators which became to cause pollution problems in recent years [28]. Thus, it can be said to be disintegrated and sectionalized from Soil Contamination Countermeasures Act (2002) that covers contaminated land in general.

Although EU has a number of directives to bridge the gaps between environmental laws among member states, individual member states are having a key role in policy-making [8]. The Netherlands is one of the countries to introduce contaminated land policies in early periods in 1983 with Interim Soil Remediation Act, owing to its dense population and being as an industrial country [24]. In case of severe contamination, it is dealt by Soil Protection Act (1987) with risk assessment supported by web based decision making support systems 'to combine scientific aspects of risk assessment with policy choices' [23], [24].

In the UK, contaminated land regime came into force in 2000 by part IIA of the Environmental Protection Act (1990) and the Environment Act (1995) in a case of causing or having a potential to cause significant harm, or causing or likely to cause pollution of controlled waters [25]-[27].

For severe contamination, Part IIA has been extended to include Special Site which Environment Agency to be responsible for the remediation [25], [27] under the conditions stated in circular 01/2006[26], as well as radioactively contaminated land in 2006 [26], [27]. Contamination risks from its current use is dealt by the above system, by contrast, such risks for proposed use is controlled by Town and Country Planning Act (1990) [25]-[27]. Contamination is a 'material consideration' which requires planning authorities to consider them through development planning and development control [25], [26], i.e., remediation can be the condition before granting planning permission by the local authorities for new proposed land uses. Therefore, the UK approach is regarding contamination under the condition of 'only in relation to particular sites and particular end-uses' [29].

Japan developed separate acts concerning each environmental issue, contrastingly, the Netherlands and the UK has an integrated contaminated land regime to extending and enhancing the current acts to deal with soil contamination by Soil Protection Act (1987), and Part IIA of Environmental Protection Act (1990) and Environment Act (1995) to include severely contaminated sites (Table 1) [23]-[27]. Furthermore, the Netherlands has a national inventory of contaminated sites based on the risk of 'health and the environment or potential impact on key resources' including groundwater [8], while Japan and the UK have not been establishing the equivalent inventories. However, the UK had developed contaminated land policies from the aspects of 'recycling brownfields sites' due to pressures on efficient land uses, rather than focusing on the public health and environmental quality which can be seen in other countries [30]. For instance, concerning risks of contamination from proposed land uses, the UK has a separate

system by Town and Country Planning Act (1990) [29], [30], [31] to bring 'operational tensions' by the differences of each system professionally and technically [30].

4. COMPARISON OF RISK GOVERNANCE IN CONTAMINATED LAND POLICIES

4.1 Steps and Opportunities of Risk Governance

There are a number of steps and opportunities which enables better communication and participation as followings; disclosure of the information; consultations with residents associations and interest groups; community participation to consultative, decision making meetings; and correspondences during the decontamination process [32]. First and foremost, disclosure of the information is necessary for citizens to have a chance/opportunity to participate in the process, because it is considered as a highly important factor in risk communication [5], [6]. It does not directly engage with 'affected parties or the wider public', and becomes 'a critical first step' in case of a need of communication with complexity [13]. Then, consultations and participations of residents and interest groups are important for improving communication between stakeholders and to activate participation in decision making process [32]. It is a direct involvement with stakeholders, and by ensuring to listen and take into account of their opinions from these opportunities, it can be a help to smooth the process [13]. Moreover, the reflective involvement enables to 'pursue the purpose of finding a consensus on the extra margin of safety that potential victims would be willing to tolerate and potential beneficiaries of the risk would be willing to invest in order to avoid potentially critical and catastrophic consequences' [4]. During the decontamination process, involvement of all stakeholders needs to be considered in order to provide access to advice at most [14], which also enables 'to build confidence and trust between all parties' by working together to maintain consistency and approachability [12]. In risk governance, mutual actions between actors from scientists, public and private sectors, and citizens are undertaken in accordance with 'public participation, stakeholder involvement and governance structures' horizontally and vertically [2]. Furthermore, correspondences for residents during the process should also be considered in terms of the health and safety and after the process to meet with the local needs [32]. In addition, correspondences after the decontamination process may be also necessary since some of them require management on sites or have limitations on land uses due to the remediation methods [32], particularly for the long term cases i.e. in Fukushima.

4.2 Statutory Requirements of Contaminated Land Policies with Risk Governance

In Japan, Agricultural Land Soil Pollution Prevention Law (1970) and Law Concerning Special Measures against Dioxins (1999) both have not been defined in terms of the aspects of communication and community participation, therefore, it is not mandatory to include such action in the decontamination process [19], [20]. However, there is some advancement in contaminated land policies on this issue in recent years. For example, Soil Contamination Countermeasures Act (2002) states that the public are available to browse the registry of designated areas [22]. Furthermore, Act on Special Measures concerning the Handling of Environment Pollution by Radioactive Materials (2011) includes several steps as follows; disclosure of the information which is available to browse the registry of sites under management for soil removal of areas in action for decontamination; consultations with residents associations and interest groups to create opportunities to deliver opinions from land owners; and admitted parties (stakeholder but was not included by the previous system/law, i.e., residents) by the governor (leader/chairman of the state/county council) are able to participate if necessary [21].

In the Netherlands, Soil Protection Act (1987) states various entitled parties should be communicated before making decisions in case of seriously contaminated cases [33].

In the UK, disclosure of the information is statutory that local authority should make additions to public register of contaminated land which is available to browse by the public [26].

It is also stated that consultations with residents associations and interest groups and correspondences during the decontamination process to be statutory [26]. Therefore, local authority has to arrange and plan procedures of remediation strategies by communicating, and catering for the information of parties involved including owners, occupiers of land, and other relevant interested parties; as well as information and complaints from the public, businesses and voluntary organizations [26].

4.3 Comparison and Applicability of Contaminated Land Policies with Risk Governance

From the comparison of contaminated land

policies among the three countries regarding on risk governance, it became clear that aspects of risk communication are rather limited in the Netherlands. However, recent policies in Japan and the UK are shifting to include some perspectives of community participation by incorporating disclosure of the information for the public to access the registry of contaminated sites and consultations of stakeholders. In addition, there are advancements to include community participation to consultative, decision making meetings in Japan, and correspondences during the decontamination process in the UK. However, in practice, application of policies has a limitation that became evident from a case in Fukushima to have a problem of disclosure of accurate information.

According to the framework of risk governance comprising of the four main phases from pre-estimation to management has been proposed [4];, however, contaminated land policies have stated none of the actions dedicated to risk governance in the statutory process. This may be due to the fact that contaminated land policies are based on scientific data and information, and lacking to incorporate socio-economic aspects in the process. However, communication has been partially stated as a part of statutory actions, which is undertaken throughout the process in parallel to the four phases. Thus, there is a limitation to ensure risk governance by statutory actions, and many set of actions needs to be dealt by voluntary. This may be because the concept of risk governance is a continuous set of inclusive and consolidative actions, while contaminated land policies are scientifically based and has a tendency to follow administrative procedures and not to be interactive. Therefore, to fill the gap, guidelines have been provided to demonstrate best practices as a way of recommendation to support voluntary actions, i.e., SNIFFER [13], [15]. In addition, promoting further integration between the four phases of risk governance and communication may also lead to enhancement of actions on risk governance in contaminated land policies.

5. CONCLUSION

In this paper, it had examined contaminated land policies in Japan, the Netherlands, and the UK from the aspects of risk governance towards sustainable decontamination process to incorporate social aspects. From the comparison, Japan had developed contaminated land regime in a way of disintegrated and sectionalized, owing to separate sets of acts had been introduced to cover each specific and severely contaminated land cases. By contrast, the Netherlands and the UK has an integrated contaminated land regime by extending and enhancing the current acts to cover both severely contaminated and contaminated sites on contamination risks from current land uses. Although the above regime of the Netherlands covers both current and future proposed land uses, the UK has a separate system for future proposed land uses by town and country planning system.

Thus, the differences of contaminated land policies in the three countries may be illustrating the differences of having measures of generic numerical values of environmental quality which requires a set of soil values to have disintegrated and sectionalized in Japan, whereas the idea of risk assessment/management can be applied to various cases to allow the enhancement and integration of the current system. In order to consider the integration in contaminated land policies in Japan, it may be necessary to examine the current system which has a limitation to extend or enhance. However, risk assessment/management also require to set clear goals and to be measurable for achieving the effectiveness [34], therefore, clarification of goals may be one of the key issue for smooth implementation of contaminated land policies and sustainable decontamination process.

In terms of the comparison of risk governance in contaminated land policies, the Netherlands has a system with limited application, while the aspects of community participation has been incorporated to some extent in recent policies in the UK and Japan, i.e., disclosure of the information for the public to browse the registry of contaminated sites and consultations of stakeholders. Furthermore, community participation to consultative and decision making meeting in Japan as well as correspondences during the decontamination process in the UK should be also considered as good practices.

Therefore, recent contaminated land policy frameworks are adapting to promote risk governance in decontamination process by introducing statutory requirements. However, there is a limitation to ensure risk governance by statutory actions, and many set of actions needs to be dealt by voluntary. This may be because of the concept of risk governance is a continuous set of inclusive and consolidative actions, while contaminated land policies have a tendency to follow administrative procedures and not to be interactive. Thus, to fill the gap, guidelines have been provided to demonstrate best practices as a way of recommendation to support voluntary actions.

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