Public Debate
and
Better Environmental Decision Making

by

SHU ZHU

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School of Environmental Sciences
University of East Anglia
University Plain
Norwich
NR4 7TJ

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Abstract

The public debate is a good public participation method in making environmental decisions, especially decisions on the scientific issues which are difficult to be understood by the lay public but widely influence the public’s daily life as GM issues.

In this article it studies the public’s acceptance of the GM food, how GM label functions in public’s GM food consuming manner, as they are the main GM issues discussed in the public debate.

Then it follows up with the studying of criteria of good public debate and criteria of good environmental decision, base on the case of 2003 UK GM Nation? Public Debate and Dietz’s study in environmental decision.

Finally, it compares the two sets of criteria to see how to make public debate lead to better environmental decision and how to modify the public debate method to improve the quality and effectiveness of environmental decisions.
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Chapter 1: Introduction and objectives

1.1 Introduction

Everyone is making environmental decision in his daily life, whether he realizes that or not. For instance, when someone decides to buy natural food instead of Genetic Modification (GM) food, he is making an environmental decision. Actually, for many years, in most of people’s comprehensions of environmental decision making, it refers to environmental decisions made by governments or local authorities. Decision makers as governments or local authorities decide, and then announce the public. If the public have query on the decision, the government will have to pay a lot of time and money to make explanations to the public, but this can hardly change governments’ decisions even if they have potential adverse environmental impacts on the public.

With the emergence of environment problems and accidents as global warming, Chernobyl nuclear power station accident in 1986 in Ukraine and the crisis of “mad cow” in 1997 in USA, people lose their trust in the effectiveness and safety of the decisions made by the governments and scientists. There are also other factors which will force the decision makers to make the decision making processes more democratic. For instance, the factors can be the public’s realization of the complexity and uncertainty inherent in environmental issues; the importance of protecting the physical environment which often ignored by governments for economic benefits or political motivations; the public’s pursuit of democracy; assurance of the successful implementation of environmental decisions. (Holmes & Scoones, 2000)

To make better environmental decisions, decision makers increasingly consider the engagement of public stakeholders in the decision making process in many countries. There are various public participation methods introduced in decision making process, which show difference levels of public engagement. The lower level is that people can enhance their understandings of the issues which are relevant to the decisions which will be made. The higher one is that public views can be taken into considerations to greater extent by methods as consultation exercises, questionnaires, focus groups meetings, telephone interviews and so on. The even higher level is gathering the selected representatives together for days to do some exercises. In this process,
participants will be provided with a degree of decision-making authority, which can make their efforts do great influences on the final decisions. (Rowe & Frewer, 2000) There are some public participation methods as expert consultations, public hearing, consensus conferences, citizens’ panel (IPPR, 1999), public debate (Pidgeon et al, 2003) deliberative mapping (Burgess& Chilvers, 2006) and so on. The public participation methods are improved from just communication to decisions made by the public. “The lowest level involves top-down communication and a one-way flow of information, while the highest level is characterized by dialogue and two-way information exchange”. (Rowe & Frewer, 2000)

The public debate is a widely used public participation method in making environmental decision on scientific issues, which are not very familiar by the public but will widely influence the public’s daily life, as GM food and radioactive waste. How to make the public debate do contribution to better environmental decisions? The study of that problem will help to upload the public participation on a higher step of Arnstein’s (1969) ladder of citizen participation.

Both the public participants and governments hope to find a participation method that can lead to better environmental decision. They hope it can be good decision for all participants, not only better decision for the public and citizens, but also for the government and scientists. But it’s just a pretty wish according to existing experiences. We are on the road to a perfect public participation mechanism which can be got from the success and failure of the existing methods.

1.2 Objectives

The overall goal of this study is to examine how the public debate method can improve the public’s participation in making environmental decisions, especially on GM issues.

It mainly focuses on the following questions in the chapter of literature review:

- What about the public’s acceptance of GM food and attitudes to the GM label on GM products?
- What are the roles of the public and the scientists in the GM public debate meeting and the whole decision making process?
It mainly focuses on the following questions in the chapter of methodology:

- What are the criteria of good implementation of public debate as public participation method?
- What are the criteria of good environmental decision?
- How can the public debate method lead to better environmental decision?
- How can we modify the public debate method to improve the quality and effectiveness of environmental decisions?
Chapter 2: Literature Review

Genetic Modification (GM) food is not a widely spread thing in UK as in US and China yet, but it cause the UK public’s concerns about it. (Burton et al, 2001) The concerns range from GM food’s influences in human health, safety to influences in environment as biodiversity problems. The public’s concerns make it necessary to prove that their voices will be heard in decision making process of GM issue. The wide public participation in decision making can help the decisions in getting wider acceptance in the public. This will reduce the explaining and revising expenditure, and increase the public’s trust in decision makers. The public debate is one of the most globally used public participation methods in GM decision making cases (US, French, Italy, UK). (Heller, 2002)

To make a good decision on GM issue, both the wide range and variety of the public’s views and the scientists’ views are important. But in the public debate meeting, it mainly focus on the public’s attitudes to GM food as GM labeling, GM consuming manners, government’s responsibility on human safety and liberty, without the directions and recommendations from the scientist. But the scientists’ views will be consulted on other ways separated from the public debate meeting.

2.1 GM issues

2.1.1 Identification

Genetic Modification (GM) is a new technique to transfer “genetic material from the cells of one organism to another, whether they are related or unrelated.” (McHughen, 2000) Globally, there are four main GM crops being grown commercially as soybean, maize, cotton and oilseed rape. They are not directly provided in the UK supermarkets, but will be used as ingredients contained in the products in UK market. There are different views of GM food among the public in UK, accepting or rejecting it. To widen the public’s acceptance of the decisions on GM food and gather more information of the public’s attitude to the GM food, it’s better to engage more public participants in decision making process. The public debate is a new and widely used public participation method in GM food decision making process. In this article, it will study the case of
2003 UK GM nation? Public debate, which is the most famous implementation of the public debate in decision making process.

### 2.1.2 The public attitude to the GM food

In 1973, the gene was firstly transferred between plants. Between 1995 and 1998, 16 new GM crops were introduced into the USA farmers for agricultural and commercial use, after around 25 years’ research. (Wolf et al, 2004) The development of GM technique from laboratory research to the commercial use is too quickly, as the potential health risk and long term impacts on the environment and human beings are not sure yet. It leads to weak trust and low acceptance of GM food in the public.

Different experiences of food safety in different nations will lead to different degrees of acceptance of GM food. Compare with American’s widely acceptance of GM food (Ballenger et al, 2000), the consumers in EU show adverse attitudes to GM food as they consider GM food as health hazards. (Wolf et al, 2004) The reason for the different attitudes may be that USA has good experiences of handling food safety problems as BSE (mad cow) which increase American’s trust in the government’s attention and ability in proving food safety, while EU have less experiences as that.(Morgan, 1998)

It’s a popular trend to produce more GM products which are accepted by somebody while are rejected by others. For those who support GM food, they think GM food help to control pest disaster without high usage of pesticides, improve the quality of food as better taste and more nutrition. (Wolf et al, 2004) For those who reject GM food, they are mainly worried about GM food safety. As Bonny’s (2004) research on the public’s attitude on the GM food shows, an average of 76% of the interviewees think the GM food has health risk.

### 2.1.3 The GM labelling

To mitigate the conflicts between people supporting and rejecting the GM food, it should develop the GM label on the products which can help the public to make choice between the GM products and non-GM products. (Huffman et al, 2004) Helping the public to distinguish GM food from Non-GM food is also the greatest function of GM labelling. Caswell (1998) concluded that there are three kinds of GM labelling: mandatory labelling, voluntary labelling and bans on all
labelling. “Most of the categories of the products to different GM labelling are made after benefit-cost analysis.” (Caswell, 2000)

For those who have the adverse attitude on GM food, they will reject food contains GM ingredients or be influenced by GM techniques. To gain trust from consumers, some supermarkets ban GM ingredients in the products of their members’ private label. For instance, Iceland- a UK frozen food supermarket announced that “it had removed all GM ingredients form its private label products” in 1998. And in the products provided in Sainsbury, another UK retail chain, all GM products should have mandatory labels if they contain more than 1% GM ingredients. (Parcell, 2004)

The labelling policies are becoming stricter, and the monitoring and tracing of GM food are more required by the public at the same time. (Huffman, 2004) Huffman’s conclusion of the study in Australia and New Zealand about the costs in complying with the labelling policy shows that “the costs of the labelling law would mean an increase in consumer prices from 0.5% to 15%” and “the firms who comply with the GM labelling policy will reduce their profits.” (Huffman, 2004)

But GM label can’t resolve all the food safety problems caused by GM food. Although GM labels on the GM products can be factually informative, it may be useless for the reasons as ambiguous expression, misleading of the GM food producers and consumer’s ignorance of the labels. (Mchughen, 2000) That’s what we should pay attention to during the development of GM label.

2.1.4 The structure and process of 2003 UK GM nation? Public debate

GM technique is wider accepted by the public than the GM food, as the former one is considered as a promising tool to develop crop variety, but GM food is considered to have potential health risk. So the public debate is mainly discussion the public’s attitudes to the GM food instead of attitudes to the GM technique itself. The public debate will gather the information about the public’s willingness to purchase GM food, their attitudes towards GM food and GM labelling, their trusts in government agencies and food producers and so on.
As mentioned above, the most famous implementation of the public debate is the case of the 2003 British GM Nation?. After decision process outlined by UK Government in May 2002, the organization gathered 9 Foundation Discussion Workshops (FDW) in November 2002, each FDW had 16-20 participants. 8 of the FDW were comprised of general public who were not actively engaged in GM issue and 1 was comprised of those who actively involved and interested in Gm issue. This debate process works by participants, just guided by 2 facilitators in each FDW. It aimed to investigate how ordinary citizens know about GM issues. The result helped to design the later public debate manner and provide materials to the subsequent debate process. From 3 June to 18 July 2003, it was the main part of the public debate named Open Public Meetings which involve 20000 participants totally. It consisted of the tier 1,2,3 meetings. Tier 1 meetings were 6 national level meetings (3 in England and one each in Wales, Scotland, and Northern Ireland), engage 1000 participants. Tier 2 meetings were 40 local meetings organized by local authority or major organizations. Tier 3 meetings were more than 600 meetings, organized by other local organizations or groups. Meanwhile, there was an interactive debate website that had accessibility to debate materials and interactive resources. It involved more than 24000 publics who couldn’t attend the public debate meetings. 2 weeks after the open public meetings, the organizer gathered 10 “Narrow but Deep” groups from the participants of the open public meetings to have close meetings. The 77 individuals were more familiar with the GM issues than the beginning, and their debate leaded to different result. The comparison of different results of different debate process can help to make better environmental decision. (Pidgeon et al, 2005)

2.2 Public debate: identification, implementation

According to Arnstien’s (1969) ladder of participation, the lowest degree of citizen participation is “manipulation and therapy (non participation), the medium degree of citizen participation is informing, consultation and placation (degree of tokenism), the highest degree of citizen participation is “partnership, delegated power and citizen control (degree of citizen power)”.

Public debate is a new public participation approach used in environmental decision making process. Different with other public participation methods, it aims to collect the concerns,
information from wide public instead of introducing information to public such as experts’ consultation meeting, public hearing. The public debate method not only pays attention to who is included and who is excluded in public participatory, but also proves that everyone’s voice will be heard and taken into consideration. Then it is very important to gather the participants and shape the public debate process. (Holmes & Scoones, 2000)

For the reasons above, public debate is a citizen participation method of the highest degree, can be considered as delegated power on the ladder 7. It is familiar with or based on the public participation methods which can also be categorized as citizen power degree, such as consensus conference, citizen’s jury, citizen advisory committee, focus groups. (see Tabel 1)
Table 1. some public participation methods of citizen power degree, adapted from Rowe & Frewer (2000)

<table>
<thead>
<tr>
<th>Public participation methods</th>
<th>Participants chosen</th>
<th>Time scale</th>
<th>characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consensus conference</strong></td>
<td>Selected by steering committee; representatives of the general public without professional knowledge on issues; ten to sixteen members</td>
<td>Three days conference after demonstration s, lectures (etc) of the topic to the participants</td>
<td>Lay panel with independent facilitator, questions expert witnesses (chosen by the stakeholder panel), meeting open to the wider public, report the conclusion of key questions all the public through written reports or press conference</td>
</tr>
<tr>
<td><strong>Citizens’ panel</strong></td>
<td>Selected by the stakeholder panel; representative of the local population; twelve to twenty members</td>
<td>Generally have meetings over four to ten days</td>
<td>Lay panel with independent facilitator, questions expert witnesses (chosen by the stakeholder panel), meeting open to the wider public, report the conclusion of key questions all the public through written reports or press conference</td>
</tr>
<tr>
<td><strong>Citizen advisory committee</strong></td>
<td>Selected by the sponsor; representative of various groups or committee with different views; may have professional knowledge of the issue</td>
<td>Need a long period of time, until have got enough public views</td>
<td>Group will examine some significant issue; interaction with industry representatives</td>
</tr>
<tr>
<td><strong>Focus groups</strong></td>
<td>Selected by the organizers; several groups with different interests may be used for one project; comprise members of sub group; may contain professional groups; only five to twelve per group</td>
<td>Single meeting usually up to two hours</td>
<td>Free discussion on topics; with video or tape recording; little influence from facilitators; used to assess opinions or attitudes; can be an important part of the whole decision making process</td>
</tr>
</tbody>
</table>
Compare with the table above, the public debate has more steps of public engagement. At the first stage, several groups of people with no professional knowledge about the topic at all and one or two groups of people with some interest or understanding of the topic will be gathered to discuss with the topic with the direction of one or two facilitators. It is called Foundation Discussion Workshops (FDW) in the case of 2003 British GM Nation? Public debate. The results of the discussion will help to design the later public debate manner and provide materials to the subsequent debate process. At the second stage, there will be many open public meetings, which are the main part of the public debate process. They will be local level meetings hold by local relative organizations; local level meetings hold by local authorities and main organizations; national level meetings hold by the central organizers who design and organize the public debate. In a good public debate case, the participants should at least be more than 1% of the whole population of the country. At the third stage, the organizers will select several groups of people from the participants of the national level meetings, who have more understandings of the topic after attendance of the open public meetings, to have close debate meetings of the same topic. It is called “Narrow but Deep” groups in the case of 2003 British GM Nation? Public debate. Finally, it will have continual evaluation of the public debate via questionnaire done by the participants, experts and wider public. The questionnaire can be done instantly at the end of the public meeting, or be taken home and sent back after finishing it. The conclusion of the decisions and results made by the participants, the analysis of the questionnaires can be reported through the written reports or press conference. The duration of the open public meetings and the close “Narrow but Deep” meetings will be one or two months, the whole public debate process including the FDW meeting and the evaluation process will cost half a year, even one year.

2.3 The role of the public and the scientists in the GM public debate meeting and the whole decision making process

According to Cook’s interview of 18 GM scientists-“representing a variety of departments, disciplines, roles and levels of seniority, including heads of department, lecturers, postdoctoral scientists, and postgraduate students”, they categorised the participants of the public debate into scientists, the public and opponents of GM as the press, NGOs, politicians. (Cook, 2004) They consider themselves as the first category, scientists.
In the public debate meeting, the public is the main role which can provide the information and views that the decision makers want. All the public participants should have chances to show their views, and all the views should be taken into consideration, whether they are consensual or controversial. In this part, the scientists only provide knowledge when the public participants want to have. They can not show any incentives to direct or influence the discussion. It doesn’t mean the scientists’ information and suggestions are not important. It means that the scientists’ views should be gathered by methods separated from the public debate meetings. For the reason that to make the final decision more scientific and fair, decision makers should both consider the public’s views and the scientists’ views. What they should do is to control the weight of the two parts’ influences in the final decision.

For scientists, they have two roles, both experts and the public. But for most of the public categorized by the GM scientists in Cook’s interview, normally they can only have one role as lay public. (Cook, 2004)

2.3.1 Scientist’s role in the GM public debate meeting and the whole decision making process

Generally, in public’s view, scientists have close relation with other actors, as “scientists and economic sponsors” “scientists and politicians”. (Harding,1998) But actually, for scientists they are “lonely” in the decision making process, as they are the only part of the participants who have profession knowledge. Their views sometimes will make the public feel that scientists tend to help the government to ignore the public’s safety and liberty, sometimes will hinder the government in getting some interests. Most of the time, the scientists can only have consensus with one of the other actors in the public debate, even have consensus with none. This shows the scientist’s loneliness in the public debate of scientific issues.

Scientists with different degrees of professional knowledge, different research field will have different understandings and recommendations to the public. The selection of scientists will influence the results of decision making. (Cook, 2004) For these reasons, the advices should be gained from experts with multidisciplinary knowledge, especially the adversarial views caused by the degree of the knowledge and the different understanding of the topic. Furthermore, many scientists have financial support from the government, business or academic organisation, in
order to reduce the influences from the sponsors’ interests, the relation between the experts and their sponsor should be clarified. (Weill, 2003) Then the scientists’ views and recommendations can be supervised by the public through comparing them with the sponsors’ potential interests and motivations, which can help to prove the fairness of the decision making process.

As experts in different research areas will have different understandings and views on the same topic. To reduce the biases and make the decision accepted by more people, all the potential experts (environmentalist, toxicologist, risk scientists, agriculturalist, biologist, economist, sociologist, educationist etc.) should be invited to the scientific consultation process to discuss on the same topic. (Friedman, 1998)

As the scientists have the professional knowledge on the topic, they have the ability to direct the public to make decisions which will do contributions to their interests. When the scientists aim to influence the public’s decisions while the public have different interests with the scientists, the scientists may provide distorted information to the public. (Friedman, 1998) For instance, if the scientist doesn’t like the nuclear power station, they will exaggerate the risk of nuclear power station as the radioactive risk on surrounding environment and citizens, or the existing explosion risk. Scientists’ incentives to distort information will destroy public’s trust in them.

Thompson (2001) said that after his examination of the derivation of food safety policy over the past 20 years, he found that scientists often help the government to ignore public’s liberty and safety. For instance, more carcinogenic substances are found likely exist in food by scientists, but they are not labelled on the food productions promptly, because of producers’ benefits or governments’ political motivations. What the scientists should do is to make a more accurate assessment of potential risk and uncertainty, in stead of coping with the severe results or just making consequently response to the existed adverse influence caused by the risk and uncertainty on the public.
2.3.2 Public’s role in the GM public debate meeting and the whole decision making process:

Kass (2000) cited from the documents of House of Lord Committee that “direct dialogue with the public should move from being an optional add-on to science-based policy making”, “public participation should be a normal and integral part of the policy making process”. To make a widely supported policy decision, it’s better to gather views from a wider range of participants with variable interests. But there is no strategy and little formal effort to establish the “baseline” condition that “would allow a firm foundation for choosing public participants in public debate to be soundly applied in the UK political context”. (Kass, 2000)

The public usually have adverse attitude in new things have likely risk in their health and daily life. For instance, the modified gene flow from the GM crops to human being’s body and the natural environment is not sure yet. The public worry about the health problem caused by eating GM crops. Increasingly, they have ethical, political and environmental concerns in GM technology, such as the welfare of the flora and fauna, influence on the biodiversity. (Wynne, 2002)

As the lay public lack knowledge of the scientific topic, they will have superficial understanding of the risks. They may overestimate or underestimate the risk, even want to have “risk free” life which is impossible in reality. Lack of knowledge will make them reject all the new techniques, which will have adverse influence on the research that aims to find and handle the potential risks. So in the GM public debate process, it’s important to be clear that what information should be gained from the public and what should be gained from the scientists. It means that the public should discuss problems of attitude issues as “how much do you agree that GM crops can resolve the worldwide starvation status?”, instead of scientific problems as “the footprint of the modified gene from the GM crops to human beings and the environment?”. Because of that although the lay public will lack scientific knowledge, they can provide detailed and wild views of social, ethical, political and natural information of the issue. (Shaw, 2002) As the public participants represent different elements of the society, they will have different views on the same topic as scientists in different research area. The difference caused by gender, age, education level, career, life experience and so on. For the public debate meeting organizers, they should gather the
resource and types of the arguments from the public and give response to serious arguments. (Cook, 2004)

In the decision making process, the public need some professional information from the scientists. But if the scientists show too much interests and wishes to join the public debate, they will be questioned by the public for their motivations, and their recommendations and information will be ignored by the public. (Friedman, 1998)

Normally, lay public’s worries about the GM products come from the NGO campaigns, the press, and even some politicians. (Cook, 2004) The public have faith in them when they accept the views from them, as the public think they point out the problems because they concern about the public’s safety and health, the society and the environment. But sometimes the NGOs, the press and the politicians have some political interests. The bias will influence the public’s attitudes in the GM issues when they are doing the public debate. So the organizers should try to select the public who are lay person without deep study of GM techniques or modified views of GM food. This will increase the representative and fairness of the public debate process.

Public’s views and concerns can influence the policy decision to some extent. For instance, Neresini’s (2000) study on Dolly sheep case shows that the lay public’s concerns on the ethical or safety risk of the cloning technique, as its possible use on human beings, make the politician to make decision to cut the finance sponsor for cloning research. The power of the public is easily be utilized by business and politicians for economic or political motivations. In Heller’s (2002) interview of Morrell (an environmental magazine editor) in 1999, he said “They say they are concerned about this technology … but how can that be true when they destroy research that is investigating potential risks? Clearly, they have another political motivation for doing this …” It’s not only the worry of Morrell, but also the worry of the public.

More and more public become aware of their ability and right to influence the environmental decision making to prove their safety and liberty. But so far, the public still have two attitudes on whether to participate in the discussing of complicated issues which need professional knowledge. Some want to participate because they think their views should be taken into consideration and they can do valuable contribution to the decision making. But some people prefer to leave it to
experts, representatives because they have trust in them and think they can do better than them. They think that if they don’t have enough knowledge on multidisciplinary areas, they must rely on scientific, technical and political experts to handle the complicated issues of the modern societies, in responsible ways. (Parkins, 2005)

2.3.3 The relationship between the public and scientists in the GM public debate meeting and the whole decision making process:

As mentioned above, both the public and the scientists’ views of GM food are necessary in decision making. The public’s decisions on their acceptances of GM food, their attitudes to GM food labelling, their GM food consuming manners and so on will be made in the public debate meeting, while the professional views of GM issues as the GM flow from the GM crops to the human beings and the environment will be gathered in separate scientist consultation or experts focus group meeting. “The conventional wisdom generally remains that public and expert opinions should not be confused, but kept separate within decision making process.” (Irwin 2006)

Normally, in the public debate meeting, the public are hoped to discuss without the direction of the scientists or specific facilitators, as they should take every second of the meeting to express their views instead of having the one way communication from the scientist to the public. The scientists will only have functions when the public want some information from them. As for the lay public, they need more general scientific knowledge to mitigate the conflicts caused by lack of them which will reduce the effectiveness of making decision on the issue. For instance, in the public debate meeting, some participants resist GM food just because they think it will make them eat DNA, while actually we will eat DNA from both the GM and Non-GM food. (Portinga et al, 2006) What’s important is that the information should not be distorted by the scientists’ biases.

GM issue is a new scientific and technological issue which scientists are still learning on. (Shaw, 2002) Scientists can’t tell the public about the long term effects because the lack of time and experience. Furthermore, although there are some results from the experiments made on animals, it can’t tell that GM food will have the same results on human beings. That’s why the public shouldn’t have full trusts in scientific recommendations.
2.4 Conclusion

After reviewing of the academic literatures and reports, there are some ideas of the process and contents of public debate; GM issues as GM food acceptance and GM food labeling; public’s intentions of consuming GM food; public’s attitudes to the GM food; scientists’ function in the public debate meeting; scientists’ contributions to the final decisions on GM issues; the relationship between the public and scientists in GM decision making. These ideas can help to study the most successful GM public debate case-The 2003 UK GM nation? Public debate.
Chapter 3: Methodology

3.1 Case study

As mentioned in last chapter, the public debate is the widely used public participation method to engage public into the decision making process on GM issues.

In this chapter, it studies the 2003 UK GM nation? Public debate case to find criteria for good public debate. And then, compare the criteria for good public debate with the criteria for good environmental decisions which are based on the Dietz’s study on how to make good environmental decisions to see: Whether the 2003 UK GM nation? Public debate case lead to a good decision on GM issue? How can the public debate lead to a good environmental decision?

3.1.1 Criteria for good public debate process

The design of the public debate shows organizer’s effort to meet the criteria of good public participation. According to Rowe & Frewer’s (2000) evaluation of good public participation methods, these criteria can be divided into two aspects, the acceptance criteria and the process criteria. The former one helps to evaluate whether the public participation methods are acceptable to the wider public; the later one helps to evaluate whether the public participation processes are taking place in effective manners. According to the questionnaires which are used to evaluate the public debate in the case of 2003 UK GM nation? Public debate, the main criteria of good public debate contains representativeness; transparency in the whole debate process; accessibility to resource; influence on decision; reference value to later public debate cases and cost effectiveness.( Understanding Risk team (UEA), 2004) They can be divided into acceptance criteria as representativeness, transparency in the whole debate process, influence on the final decision, reference value to later public debate cases; the process criteria as transparency, accessibility to resource and cost effectiveness.

Representativeness: “The public participants should comprise a broadly representative sample of the population of the affected public”. (Rowe & Frewer, 2000) It consists of social (age,
gender, education level) and attitude representativeness (benefits from the issue, relative health risks, acceptance of the issue). Crosby et al (1986) suggested the organizers to select a random stratified sample of the affected stakeholders to achieve good representativeness. There is a trend towards the decision makers’ paying more attentions to quantitative information from wide public instead of qualitative information from particular knowledge-based groups. (Irwin, 2001) Public debate process with wide representativeness will take more public concerns and information into consideration, finally lead to a good environmental decision that can be adopted by more persons. Then we can say that the more participants are taken into the public debate, the better the environmental decision will be achieved. But in practice, it is hard to select and aggregate so many participants for the reasons of lacking money and time. And the cost of too much money and time will lead to low effectiveness, which is another criterion of the good public debate process.

**Transparency:** There are several questions relative to the transparency of the public debate process. How participants are selected? How the result of the public debate will be used? Whether there is a public accessibility to the evaluation questionnaire results? Whether the participants can see the final decision? The organizers of the public debate should be able to give clear answers to these questions. As Frewer (1999) suggested, the transparent public debate process can allow the public to see what is going on and how decisions are being made. If there is any information can not be accessible to the public, for reasons of sensitivity or security, “it would seem to be important to admit the nature of what is being reserved and why, rather than risking the discovery of such secrecy, with subsequent adverse reactions.”(Rowe & Frewer 2000) The transparent public debate process will help the wide public to monitor the public debate process and trace the public debate results, and it will increase the public’s trusts in the final environmental decisions.

**Accessibility to resource:** “Public participants should have access to the appropriate resources to enable them to successfully fulfill their brief.” (Rowe et al, 2005) Necessary resources include information resources (summaries of the background of the environmental issue), human resources (scientist’s consultation, organization staff, facilitator), material resources (paper and pen, booklets), and time resources (participants should have sufficient time to make decisions). (Rowe & Frewer, 2000) In public debate, it's more important to gather information from
participants’ debate. Participants needn’t be quite familiar with the environmental issues; actually they make little reference to the information and material provided by organizers. But participants commonly feel lack of time to fully discuss all the issues, and facilitators don’t have enough time to conclude debate to participants either. Early accessibility to the basic background of issues can reduce the misunderstanding of general knowledge of GM food, improve the effectiveness of the public debate and increase time to discuss more issues and leave enough time to facilitators to do better conclusion of the debate. Wide discussion of the issues and good conclusion of the debate can increase participants’ satisfactions with the environmental decisions they make.

Influence on the final decision: Participants all hope their efforts in the public debate can lead to effective suggestions to the decision makers and direct influences on the final decision about GM issue. But in most practices, the outputs of the public debate are considered ineffectual. (Rowe & Frewer, 2000) It is mainly caused by the decision makers’ neglecting the public debate results for economic or politic motivations. Many public participants doubted about the decision makers’ intentions of implementing such a useless public participation process. They may think that decision makers just want to make their decisions seem to be democratic without real consideration of the wide public’s concerns. This will reduce public’s enthusiasms for public participation and increase public’s distrusts in environmental decisions. To make better decisions, it’s important to give clear feedback to public participators that how the output is used by the decision makers and how it directs the environmental decision making. Rahl (1996) suggested that “sponsors should probably be wary of accepting binding votes and giving away all of their power to public participants in case this results in the compulsory implementation of a decision based on emotion or prejudice.”

Reference value to later public debate cases: The 2003 UK GM nation? Public debate is an unprecedented practice of public debate in environmental decision making. Although it has weaknesses in implementation (e.g. not representative enough (only 0.032% of the whole UK population), lack of time resource, not transparent enough in participator selection in “Narrow but Deep” meetings and ineffectual in direct final decision making), it leaves reference value to later public debate cases to make better environmental decisions. Especially the weaknesses suggest the aspects and methods to improve public debate process. Moreover, the results of 2003 UK
GM nation? Public debate can be used to compare with the results of the later public debates on GM issues. For instance, the public’s trusts in the GM label on GM food may change in years, which can be showed in the results of GM public debate cases in different years. Through the comparison between two results, it will give suggestion in whether there is any progress in GM label policy. For these reasons, a good public debate case should have useful working experience and results which will leave reference values to later public debate cases.

Cost effectiveness: In days of environmental decision making processes without public participation, decision makers always ignore environmental risks for the reasons of economic benefits. If it can prove the effective use of money and time in the public debate meetings, it will arouse decision maker’s enthusiasm for taking a wide range of the public’s concerns into consideration, as this action can increase the public’s acceptance of the decision and the faith in government at the same time. The cost effectiveness includes the effective use of material resources, human resources and time resources. The government and financial sponsors hope to get the greatest achievements in the shortest time and least use of resources. With the support of the government, there will be more public debate practices in environmental decision making process. Consequently, the large amount of practices will lead to improvement of this public participation method. A mature public debate process will lead to better environmental decision. (Sinclair, 2004)

3.1.2 Criteria for good environmental decision making

All the environmental decisions made by human beings will lead to impacts on the physical, economic and social environment, which can be beneficial impacts or adverse impacts. A good environmental decision should lead to least adverse impacts on environment, make most contributions to good social life and fulfil decision makers’ expectations of economic benefits. Actually, it can only find a balance of the environmental, economic and social expectations in stead of being perfect. Then what is a good environmental decision? We need to base on some criteria to evaluate the decision we made. In this article, it studies the evaluation of good environmental decision making based on criteria designed by Dietz (2003), as his criteria consider all the three issues (environmental economic and social issues).
Benefits of human and other species in the environment: When an environmental decision is made, it will lead to both beneficial and adverse impacts on physical and social environment. A good environmental decision should lead to beneficial impacts both on human and environmental well-being, but it’s impossible to have this result in most situations. Different people have different evaluation of decision; Dietz (2003) divides all the people into “ecocentrism, anthropocentrism and those who partake of both value systems”. For those who ignore the right and ethic of environmental well-being (anthropocentrism), good environmental decision is that can increase human’s benefits. Ecocentrism considers good environmental decision as those make more benefit to environmental species. Those who partake of both value systems think it’s better to decide that to what extent the good decision should make contribution to both human being and other species. All the three kinds of people hope the environmental decision can lead to more benefits to those they concern about. But it’s impossible to make an environmental decision to meet all people’s requirements. The conflict between people’s requirements of benefits and the environmental decision’s function makes it difficult to evaluate an environmental decision just according to this criterion. Then we should take other criteria into evaluation.

Competence of uncertain fact and value: The circumstance we live in contains many uncertainties. A good environmental decision should be made with the consideration of not only scientific suggestion based on past experience and lab experiments, but also uncertainty of environment and the substance itself. The future is unpredicted, so a good environmental decision should have quick responses to uncertainties of long-term implementation and the potential to resolve the problems caused by the uncertainties. The environmental decision should be flexible enough to change and improve itself according to the uncertain fact in the implementation process.

Good environmental decision should have the competence of meeting everyone’s value. But different people have different values, it makes framing social value more difficult. In addition, many environmental issues with new scientific information like radioactive waste and GM food are new, so people’s value upon those issues are not clear and easily changed from the first aware of them. (Dietz & Stern, 1995) So there are uncertainties of people’s values, not only because of the diversities, but also the variability of the values.
Before making a good environmental decision, decision makers should predict the uncertain fact and value that would affect the decision.

**Fairness in process and outcome:** The environmental decision should take the concerns of all the stakeholders into consideration. The stakeholders consist of those who affect or be affected by the decision (e.g. developer, neighbor residents), even those who are interested in the environmental issues (e.g. ENGOs, scientists). In the decision making process, all of the stakeholders’ voices should be heard and accepted, whether they are consensual or controversial voices. Every stakeholder should be given the same status, whether he has power or not, whether he is rich or poor, whether he is healthy or disabled. They have the same opportunities to express their ideas and concerns. The existence of divergence of views is allowed, and everyone can defend their opinions. Fair decision making procedural can increase the opportunity of having fair environmental decisions. Fairness is an indication of the high quality of environmental decision; it can widen the public’s acceptance of the decision.

**A reliance on human strengths rather than weaknesses:** This article studies this criterion from two aspects. One aspect is that organizers should provide the public participation information through path considering the public’s strength; another aspect is that the environmental decision should be easy for the public to accept and implement.

People have strength in accepting information from picture and voice. To make environmental decision more close to the public’s concerns, it could introduce conversation, television interview and other methods which are using picture and voice to increase public participants’ understandings and discussions on environmental issues. Then people can clearly convey their information to others and accept information from others. On the other hand, environmental decision should take what people do well into consideration. The environmental decision should help people to do their best to improve the environment quality, instead of decision that not realistic and achievable.

**Reference value for later decisions:** In many cases, we can’t judge an environmental decision good or not after short-term implementation. Undoubtedly, it contains weaknesses and strengths which will appear in long run. It’s important to learn from the weaknesses and strengths to make
improvement in decision. As Radnitzky (1987) suggested that “science is a process that is based on an ‘evolutionary epistemology’ so that we learn from our mistakes”. Environmental decision making is also such a scientific issue. Furthermore, as the individual values on environmental issues are diverse and variable, the arguments among the public in decision making process should be discussed and shown in final decision. For theses reasons, learning of uncertain values can improve the qualities of the environmental decisions made later.

**Efficient use of natural resources:** With the reduction of natural resources, especially unrenewable resources, environmentalists become more and more worried about the effective use of environmental resources in environmental decisions making. But economists think environmentalists always have too strict definition of effective use of natural resources. They think the environmental protection shouldn’t hinder the development of economics. The method to mitigate the conflict of environmentalists and economists is to design a natural resources use amount and manner that can meet both requirements. The economists should explain to the environmentalists why the amount and manner of natural resources is efficient. Meanwhile, the environmentalists should explain to the economists why it won’t hinder the development of economists. A good environmental decision should try it best to meet the efficiency of environmental resources use.

### 3.1.3 Comparison and analysis of the two sets of criteria

According to the design of public debate in GM nation UK 2003, it starts the engagement of public participants at a very early stage. Just after decision process outlined by UK Government in May 2002, the organization gathered 9 Foundation Discussion Workshops (FDW) in November 2002. The early engagement of public means early consideration of the uncertain fact and value of public. It helps to provide more time for public participants to make better decision. As with the change of the environment and public participants’ values of the environmental issues, they are likely to alter their decisions dramatically. The early engagement of public participant will allow organizers to have instant responses to the alterations and even collect different decisions of different periods to make comparison of them. Finally, the deliberative environmental decisions will be flexible to handle problems caused by the potential uncertainties in long-term implementation.
A good environmental decision making should show fairness in procedural and outcomes. This indicates that good public debate will lead to better environmental decision, as good public debate should be representative and transparent. (O’Brien, 2000) Good public debate process selects people from every part of the nation, to shape a broad sample of the whole population. It includes public who have interests in the issues, stakeholders who will affect or be affected by the issues. The sample has balanced social representative indicators (e.g. gender, education level, age), and balanced attribute representative indicators (e.g. favour the environmental issue or not, support the relative legislation or not). The good debate process should be transparent to make the public participants be clear about: How participants are selected? How result of the public debate will be used? Whether there is accessibility to the evaluation questionnaire results? Whether the participants can see the final decision?

As a wide range of the public’s concerns and views can be heard and taken into consideration, the whole debate process can be supervised by the public, what will make the final environmental decision be fair enough to achieve more satisfaction and adoption from the public. Moreover, the consideration of not only concerns about social and economic impacts (e.g. developer, government, neighbor citizens), but also concerns about physical environmental impacts (e.g. NGOs, local organizations) will lead to a good environmental decision contains both human and environmental well-being. (Coenen et al, 1998)

In the case of 2003 UK GM nation? Public debate, organizers paid a lot of money and time to design a representative, transparent, fair and competent public participation process that can lead to a democratic environmental decision. It had some successes according to the evaluation criteria, but lack of experience and unpredictable uncertainties still lead it to some failures. Both the successes and failures leave reference value to later public debate cases. The environmental decisions made in the public debate also leave opportunities for the public and decision makers to learn from their successes and failures.

It’s very common that in the process of achieving a better environmental decision making through one public participation method, most people just pay attention to achieve better environmental decision for public and citizens without any attention to the government and developers. Actually, the government and developers’ enthusiasms for public democracy are also
important to a better environmental decision. As they are always the financial sponsors for the public debate and they have great expectation for cost-effective public debate, they will be more easily satisfied with an environmental decision made in the cost-effective public. Moreover, cost–effective public debate can save money, time, material which is environmental friendly; it can increase participants’ trusts in the public debate process to a certain degree.

To make a better environmental decision making, the most important thing is that public debate output can have direct influence on final decision. Most of the cases of public participation, included the case of 2003 UK GM Nation? Public debate didn’t make final decision in the participation process, even didn’t have forceful impacts on the final decision. According to Arnstein’s (1969) ladder of citizen participation mentioned above, there is a long way to make citizens fully powered to make the final decision. So public debate can just make more contributions to better environmental decisions than public participation methods on lower ladders do.
Chapter 4: Observation and Discussion

4.1 Observation

After the review of the past academic articles and reports discussing about public’s attitudes to the GM food, GM labelling, public participations in making environmental decision, scientists and the public’s role in public debate and environmental decision making process, there will be some ideas of the following question which this article focuses on.

• What about the public’s acceptance of GM food and attitudes to the GM label on GM products?

The public have different attitudes to GM food, some are supporting it but some are rejecting it. The main reasons for the public to accept GM food are the increase of nutrition, the improvement of taste and the less use of pesticide. The main reasons for those who reject GM food are risk in health and safety, as how the modified gene will act in human being and the environment is not sure, and the adverse impacts on the biodiversity.

The different attitudes to GM food will lead to different GM consuming manner. In UK, all the GM products contain more than 1% GM ingredients must have the mandatory GM labels on them. The GM label couldn’t release the conflict, but at least, it can help people to distinguish GM food with Non-GM food and decide whether to buy GM food.

• What are the roles of the public and the scientists in the GM public debate meeting and the whole decision making process?

In the public debate meeting, the scientists can’t direct the discussion and influence the public’s decision, they can only communicate with the public when the public want to ask for some professional information. And the information should be without personal bias and distortion. But the scientists’ information and recommendations on the same topic will be collected in other
ways separated from the public debate meeting, as both the scientists’ and public’s views should be taken into consideration in making final decision. There should be a wide range of public representatives in the public debate meeting, and the public should try their best to express their views. The arguments among the participants shouldn’t be ignored but be paid more attentions to.

Based on the study of the case of 2003 UK GM nation? Public Debate and Dietz’s study of environmental decision (2003), there will be some ideas of the following question which this article focuses on.

• What are the criteria of good implementation of public debate as public participation method?

According to the questionnaire and final report of the 2003 UK GM public debate, there are six most important criteria of a good public debate. They are representativeness; transparency in the whole debate process; accessibility to resource; influence on decision; reference value to later public debate cases and cost effectiveness

• What are the criteria of a good environmental decision?

As a good environmental decision should take all the environmental, social and economic issues into consideration, criteria adapted on Dietz’s criteria which are designed with the consideration of all the three issues are considered good enough to evaluate environmental decisions in this article. The criteria for good environmental decision should contain benefits of human and other species in the environment, Competence of uncertain fact and value, Fairness in process and outcome, A reliance on human strengths rather than weaknesses, Reference value for later decisions.

• How can the public debate method lead to better environmental decision?

Firstly, good public debate will lead to better environmental decision, as good public debate should be representative and transparent.
Secondly, as a wide range of the public’s concerns and views can be heard and taken into consideration, the whole debate process can be supervised by the public, what will make the final environmental decision be fair enough to achieve more satisfaction and adoption from the public.

Thirdly, as the sample of the public participants in public debate is very large and diverse, the concerns about all the social, economic and physical environmental impacts will be taken into discussion. This will lead to a good environmental decision contains both human and environmental well-being.

Fourthly, a representative, transparent, fair and competent public debate process can lead to a democratic environmental decision.

Finally, the early engagement of public means early consideration of the uncertain fact and value of public, which will make the decision more flexible to response to risks in long-term implementation. (Wilsdon, 2004)

- How can we modify the public debate method to improve the quality and effectiveness of environmental decisions?

There are normally two main points of the public debate process that can be modified to improve the quality and effectiveness of environmental decisions.

Firstly, it’s very common that in the process of achieving a better environmental decision through public debate, most people just pay attention to achieve better environmental decision for public and citizens without any attention to the government and developers. Actually, the government and developers’ enthusiasms for public democracy are also important to a better environmental decision. As they are always the financial sponsors for the public debate and they have great expectation for cost-effective public debate, they will be more easily satisfied with an environmental decision made in the cost-effective public. Moreover, cost–effective public debate can save money, time, material which is environmental friendly; it can increase participants’ trusts in the public debate process to a certain degree.
Secondly, the results of the public debate should be assured to have direct influences on the final environmental decisions. As the public debate is on a very high step of Arnstein’s (1969) Ladder of Citizen Participation, it means that the public participants should have high decision making authorities. The public debate should be the last step to citizen control degree in making environmental decision, which means the public’s suggestions should be the main contribution in decision making. The results of the public debate should have direct influence on final decision, while the truth is that they are generally ignored by the decision makers for economic benefits or political reasons.

4.2 Discussion

4.2.1 Several points may be confusable in the former chapters of this article

- GM issues in the public debate meetings

The GM issues in the public debate mainly refer to the public’s attitudes to GM food, GM label on GM product, public’s GM consuming manners, public’s trust in government’s ability of proving human’s safety and liberty, instead of issues need the lay public’s deep understanding of the GM technique.

- Public

The Public in the GM public debate refer to lay public without professional or modified information of GM technique.

- Public debate

Public debate in the article means formal and well designed public debate meetings of different levels organized by a specific group of authorities. It should have the selected public participants, place for the public participants to gather for the meetings, all kinds of resources needed for the meetings.

- Facilitator
Facilitator is the specific person provided by the organizer to act in small group meetings. They take record of the meeting and assure that every member can present his views, but they couldn’t put any direction and disturbance in the discussion.

- **Environmental decision**

In this article, the environmental decision refers to the public’s decision on environmental issues which contain “deep” scientific knowledge as GM food, radioactive waste. As the lay public don’t and shouldn’t have professional or modified knowledge on the issues, they mainly make decisions on their attitudes to the environmental issues.

### 4.2.2 Recommendations

In the existing cases of public debate in making environmental decision, they show the problems of not representative and transparent enough, high costs of time and money, waste of material resources and so on. Actually, we can use the internet to resolve these problems.

We can take the public debate on GM issues for an example. The government can design a specific website on the topic of GM public debate which is open to everyone. That means the process and results of the public debate can be monitored and traced by the public. People can access to the information material and leave their views on the website at anytime. The e-vision results can be checked, which can reduce the use of paper. The main weakness of the internet public debate is its difficulty in recognizing the identification of the participant.
Chapter 5: Conclusion

Based on the literature review, we found that the public have no consensus on the attitude to GM food. Some will reject GM food mainly because that they consider GM food as health hazard, while others support GM food as it will increase the quality of the food (nutrition, taste etc.) and reduce toxic waste (pesticide, weed killer etc.). To mitigate the conflict between them, it introduces the GM labelling into the GM food market. The greatest function of the GM label is to help people distinguishing GM food from Non-GM food. To make decisions on GM issues, both the scientists’ and public’s views should be taken into consideration. In the public debate meeting process, the scientists only have functions when asked for information form the public participants, they can’t direct the discussion and influence the public’s decision in this process. There should be a wide range of public representatives in the public debate meeting, and the public should try their best to express their views. The arguments among the participants shouldn’t be ignored but be taken more attentions to. The scientists’ views on the same topic will be gathered in other ways separated from the public debate meeting.

According to the case study of 2003 UK GM nation? Public debate, we can see that the criteria of a good public debate should contain representativeness; transparency in the whole debate process; accessibility to resource; influence on decision; reference value to later public debate cases and cost effectiveness. And according to Dietz (2003), the criteria for good environmental decision should contain benefits of human and other species in the environment, Competence of uncertain fact and value, Fairness in process and outcome, A reliance on human strengths rather than weaknesses, Reference value for later decisions.

Through the comparison of the two sets of criteria for good public debate and good environmental decision making, it shows that there are no conflicts between the two sets of criteria. Furthermore, the good public debate method really can lead to better environmental decision. It is not only better for public participants, but also better for decision makers. For instance, the representativeness and transparency of public debate can make contribution to fair environmental decision which considers both the human and environmental well-being.
Moreover, the early engagement of public participants can lead to deliberative environmental decision and improve public’s trust in the decision.

Finally, public debate aims to gather information from public participants instead of conveying information to them, the organizer and participants pay little attention to the basic background information. This leads to unnecessary arguments in debate process, which will reduce time for wider issues. According to this, it is better to provide early accessibility to basic background information before the formal debate. But the information shouldn’t be too deep and should be without suggestions from scientist or others which could lead to bias environmental decision. The background information can be pictures, videos, voices which can be easily accepted and understood by the lay public.
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