

Planning and Rationalization of Public Participation in China's Environmental Management

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Abstract: In China, public participation is an essential and necessary element enshrined in many environmental management policies and laws. However, there are no specific and detailed procedures and guidelines to regulate the implementation of public participation. So far, public participation has only been explicitly stipulated as a requirement in the "Law of People's Republic of China on Environmental Impact Assessment." The legal framework was established to safeguard the right of access to environmental information, right of participation, and right of supervision for the public, after the promulgation and put into effectiveness of the "Provisional Measures on Public Participation in Environmental Impact Assessment" and the "Measures for the Disclosure of Environmental Information (on Trial)," where means of public participation, such as public survey, expert consultation, public meeting, argumentation, and public hearing, were clearly specified in these directives. However, no concrete legal guidance for public participation implementation has been written, yet. Therefore, this study is trying to construct a conceptual design flowchart for public participation in environmental management and to construct a feasible and executable prototype for public participation in environmental management, through the proposal of public participation planning for eight environmental management schemes. Furthermore, several major tasks for rationalization of public participation in environmental management are recommended to enhance the development and improvement of public participation in environmental management, in China.

Key words: Public participation; Disclosure of environmental information; Eight environmental management schemes; Pre-participation; Progress-participation; Post-participation; Self-participation; Rationalization

1. INTRODUCTION

There are three major environmental policies, "prevention first and combination of prevention & control," "polluter pays," and "the enhancement of environmental management," namely, to lay the groundwork of the development of environmental protection, in China. According to these environmental policies, eight

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environmental management schemes were developed and promulgated to include different administrative objectives, control levels and managing methodologies in the integrated policy management infrastructure to form a unique environmental management system with vigorous, flexible and effective management mechanisms (LIU & ZHANG, 1994; YE, 2000; ZHANG, 1997;). Since 1990s, many new concepts of environmental management were gradually developed to advocate more economic means and to promote the cooperative relationship between government and enterprises. The idea of public participation in environmental management was then initiated and developed. For more than decade's effort, governments, experts and the public have been trying to establish feasible methodologies and system of public participation in environmental management to fulfill the needs of Chinese society. However, In China, no specific provisions and articles regarding public participation are explicitly regulated in any laws, regulations and other related decrees, except for the "*Law of People's Republic of China on Environmental Impact Assessment*" (hereinafter referred as "the EIA Law"), which was endorsed at the 30th Meeting of the Standing Committee of the Ninth National People's Congress on October 28, 2002, and became effective on September 1st, 2003. Ever since the EIA Law, activities of public participation were then clearly regulated in the "*Provisional Measures on Public Participation in Environmental Impact Assessment*," which was promulgated in February 2006 and became effective in March 2006.

Hence, based upon three environmental policies and eight environmental management schemes, the purpose of this study is to propose a hierarchical flowchart of environmental management through the incorporation of three environmental policies and eight environmental management schemes. Furthermore, a viable mode of public participation in environmental management is then proposed through the integration of public participation into this hierarchical flowchart.

2. PUBLIC PARTICIPATION IN ENVIRONMENTAL MANAGEMENT

In China, the practices of public participation in environmental management were mainly confined at the ending stage where the environment was polluted or the ecosystem was damaged, already. In other word, it is so-called "post-participation." Rare cases of "pre-participation," for example prior to the constitution of policies and plans, and the implementation of projects, were observed. In order to enhance the environmental management system, it is necessary for the public to participate in various ways and at multi-stages, such as pre-participation, progress-participation, post-participation, and self-participation, to achieve the maximum efficiency for environment management (LAI & CHENG, 2008; MEI, 2007; ZHOU 2006).

·Pre-Participation is the premise of public participation in environmental protection where the public should participate in the legislating processes of any environmental laws, regulations, policies and plans, and before the implementation of any construction projects. It's high-level and in-depth participation.

·Progress-Participation is the key of public participation in environmental protection where the public should participate in the implementing processes of any environmental laws, regulations, policies and plans, and construction projects. It's supervisory participation. The supervision on the Government and enterprises shall be fulfilled through media, social activities, arbitration on environmental conflicts, and citizen election.

·Post-Participation is the assurance of public participation in environmental protection where the public should participate whenever the occurrences of environmental pollution or ecological impairment. It's afterwards controlling participation, as well as supervisory participation.

·Self-Participation is the foundation of public participation in environmental protection where the public should participate self-motivatedly in any environmental protection activities and related. It's the participation of self-consciousness, self-discipline, and self-motivation.

3. PUBLIC PARTICIPATION IN THE PROCESS FLOW OF ENVIRONMENTAL MANAGEMENT

Normally, the process flow of an environmental management scheme can be divided into a number of major phases, for example preparation & planning, drafting, first draft, revised edition, finalized edition, implementing, audit & evaluation, and summary. Some suggested activities of public participation at each phase of the process flow are depicted in the followings, as summarized in Table 1.

Table 1: Public Participation in Process Flow of Environmental Management

Stage	Level	Public Participation Activities
Preparation & Planning		Information Disclosure, Public Survey, Expert Consultation
Drafting	Pre-Participation	Public Meetings
First Draft		Written Comments, Public Conferences
Revised Edition		Written Comments, Public Hearings
Finalized Edition		Information Disclosure
Implementing	Process-Participation	Public Surveillance
Audit & Evaluation		Information Disclosure, Public Vote, Public Hearings
Summary	Post-Participation & Self-Participation	Information Disclosure, Public Surveillance

·Preparation & Planning

Thorough background investigation is performed, public opinions and comments are solicited through questionnaire and survey, and professional suggestions and recommendations are acquired through meetings and consultation with experts.

·Drafting

All the information gathered and collected during background investigation shall be disclosed to the public and used for drafting the preliminary environmental management plan.

·First Draft

Completed first draft of environmental management plan shall be opened to the public. Public meetings shall be convened to solicit more comments and suggestions, and to minimize the differences between stakeholders. Public opinions and suggestions shall be detailedly recorded.

·Revised Edition

Revised environmental management plan shall be accessible to the general public to solicit more written comments. In addition, the proposed plan should be elaborated and demonstrated during public conferences and public hearing.

·Finalized Edition

Finalized environmental management plan shall be promulgated officially. There shall be one special chapter of public participation compiled in the finalized plan to include all opinions, comments, and recommendations acquired through all public participation activities in detail, and to explicitly explain whether these opinions, comments and recommendations were adopted or not.

·Implementing

Environmental management plan shall be implemented according to predetermined schedule, under the supervision of the general public. The public shall provide the competent authority with written comments on the progress of implementation.

·Audit & Evaluation

The public shall participate in progress audit and performance evaluation on the plan. And the results shall be publicized to enable the public to understand the outcomes of the implementation of the plan and to

solicit opinions of the public. Public survey and vote can be carried out to furtherly acquire feedback from the public.

·Summary

The final reports on the accomplishment of the environmental management plan, results of the poll, and conclusions and recommendations on the plan shall all be promulgated officially.

4. HIERARCHICAL ARRANGEMENT AND PUBLIC PARTICIPATION PLANNING FOR ENVIRONMENTAL MANAGEMENT SCHEMES

Based upon the essence of environmental management, environmental management system in China is delaminated into four major layers, for example, ‘Policy Objective Management,’ ‘Environmental Impact Management,’ ‘Emissions Management,’ and ‘Supervision Management.’ The most representative environmental management system in China is mainly integrated by eight environmental management schemes, consisted of so-called ‘Three Old Management Schemes’ and ‘Five New Management Schemes,’ which are very distinctive management schemes with Chinese characters. Three Old Management Schemes, promulgated in early 1970s, are ‘Environmental Impact Assessment,’ ‘Three Synchronizations,’ ‘Emissions Fee,’ namely. And, five New Management Schemes, promulgated in late 1980s, are ‘Liability System for Environmental Protection Objectives,’ ‘Quantitative Performance Evaluation,’ ‘Centralization of Pollution Control,’ ‘Pollution Treatment Scheduling,’ and ‘Emissions Permit,’ respectively. The followings are the hierarchical arrangement and public participation planning for eight environmental management schemes, according to these four stratified layers (CHANG, WU & ZHU, 2005; CHANG 2008).

4.1 Policy Objective Management

Policy objective management is the administrative instrumentality of environmental management to set up the strategic objectives of environmental management as the most important guiding principles of environmental protection and management. The ‘Liability System for Environmental Protection Objectives,’ where objectives of environmental quality and work assignment are explicitly constituted, is categorized as a scheme of policy objective management. The purpose of this scheme is to amalgamate old and new management schemes into an integrated system to have the efficacies of thoroughness, interaction, collaboration, multi-surveillance, and scientific management among different schemes. Therefore, it would have decisive influence on regional environmental management missions and should be the kernel and crucial guidance for every environmental management scheme. There are four stages to carry out this scheme, constituting, promulgating, implementing and auditing, respectively. Recommended public participation activities at each stage are illustrated in the followings, as summarized in Table 2.

Table 2: Public Participation in Liability System for Environmental Protection Objectives

Stage	Level	Public Participation Activities
Constituting	Pre-Participation	Information Disclosure, Public Survey, Expert Consultation, Public Meeting, and Public Hearing
Promulgating		Display the ‘Environment Liability Book’ to the public for further suggestions and comments
Implementing	Process-Participation	Information Disclosure, Supervising the implementation of the ‘Environment Liability Book’ and proposing recommendations and corrective actions, if needed
Auditing	Post-Participation	Public Hearing

(1) Constituting

- To solicit public opinions through bulletin board, questionnaire, and interview.
 - To enable the public understanding the most urgent needs and expectations through meetings and conference.
 - To elaborate the determined objectives of all index systems through public hearing.
- (2) Promulgating
- To solicit public opinions, in written form, through the exhibition of the “Environment Liability Book” at the City Hall, the City Congress, the City Library, and other public concourses.
- (3) Implementing
- The public are entitled, authorized and encouraged to supervise the implementation of the ‘Environmental Liability Book,’ and to propose recommendations and corrective actions on any undesired or unexpected outcomes which might be resulted from any bias or incompleteness of execution.
- (4) Auditing
- As the major beneficiary, the public should be actively and aggressively involved in the review and evaluation on the outcomes from the implementation of the ‘Environmental Liability Book.’

4.2 Environmental Impact Management

Environmental impact management is the technologic instrumentality of environmental management, which can be divided into two sections, pollution prevention and pollution control.

4.2.1 Pollution prevention

The main objects of the measures are pollution sources planned to be constructed. Two key schemes, ‘Environmental Impact Assessment’ and ‘Three Synchronizations,’ are included in this section.

A. Environmental impact assessment

The purpose of environmental impact assessment is to prevent possible damages to present environmental quality from proposed pollution sources, including new pollution sources, and the expansion and/or rebuilding of existing pollution sources. There are six phases to implement this scheme, screening, scoping, forecasting, evaluating, compiling and auditing, sequentially. Recommended public participation activities at each phase are depicted in the followings, as summarized in Table 3.

Table 3: Public Participation in Environmental Impact Assessment

Stage	Level	Public Participation Activities
Screening		Information Disclosure
Scoping		Information Disclosure, Public Survey, Expert Consultation
Forecasting	Pre-Participation	Expert Consultation, Meeting, Conference and Symposium
Evaluation		Expert Consultation, Meeting, Conference and Symposium
Compiling		Information Disclosure, Public Survey, Expert Consultation
Auditing	Post-Participation	Public Hearing

(1) Screening

- To solicit public opinions through bulletin board and questionnaire.

(2) Scoping

- To conduct survey and interview to solicit public opinions and comments.
- To convene meeting for expert review.

(3) Forecasting

- To acquire recommendations through expert consultation.

·To call for meetings and conferences to summarize public opinions and comments, and to compromise any differences and conflicts through arbitration.

(4) Evaluating

·To acquire recommendations through expert consultation.

·To summon meetings and conferences to summarize public opinions and comments, and to compromise any differences and conflicts through arbitration.

(5) Compiling

·To acquire public opinions and comments on the evaluation through public hearing.

·To file all finalized comments, consentaneous and inconsistent, into EIA Report for review by relevant competence departments

(6) Auditing

·To elaborate the results of review to the public through public hearing

B. Three synchronizations

This scheme is a very unique environmental management scheme invented and developed through the practice of environmental pollution control in 1970s, in China. After strictly evaluating procedures from ‘Environmental Impact Assessment,’ ‘Three Synchronizations’ is then applied on the approved construction project for pollution prevention. As a part of the construction project, the pollution control facility and instrument should all be designed, constructed, completed and accepted along with the design, construction, completion and acceptance of the construction project, concurrently, to ensure pollution control is fully implemented. As indicated, there are three different stages within this scheme, planning and designing, construction and test run, acceptance and operation. Recommended public participation activities at each stage are summarized in Table 4.

Table 4: Public Participation in Three Synchronizations

Stage	Level	Public Participation Activities
Planning and Designing	Pre-Participation	Information Disclosure, Public Survey, Expert Consultation
Construction and Test Run	Process-Participation	Public Survey, Expert Consultation
Accepted and Operation	Post-Participation	Expert Consultation, Public Hearing

4.2.2 Pollution control

The main objects of the measures are existing pollution sources. Two key schemes, ‘Centralization of Pollution Control’ and ‘Pollution Treatment Scheduling,’ are included in this section.

A. Centralization of pollution control

The purpose of this scheme is to congregate currently existing pollution sources together at development zones and industrial complexes to facilitate the implementation of total emissions control and integrated environmental planning. In addition, the cost of pollution control shall be effectively and rationally allocated to meet all the requirements of environmental, social and economic benefits. There are three major steps in this scheme, target selecting, treatment evaluation, and implementing. Recommended public participation activities at each step are described in the followings, as summarized in Table 5.

(1) Target Selecting

- To conduct survey and interview to solicit public opinions and comments on selecting targeted pollution sources, polluted areas, and pollutants.
- To convene meeting for expert review.

- To convene public meeting to know more about the existing difficulties and urgent needs from the public.

(2) Treatment Evaluation

- To convene meeting to consult with experts and representatives from competent authority.
- To convene conference and symposium for the feasibility analysis of pollution treatment.

(3) Implementing

- To disclose finalized propositions of pollution treatment.
- To invite the public to participate in monitoring the implementation of pollution treatment.

Table 5: Public Participation in Centralization of Pollution Control

Stage	Level	Public Participation Activities
Target Selecting	Pre-Participation	Information Disclosure, Public Survey, Expert Consultation, Public Meeting
Treatment Evaluation	Process-Participation	Expert Consultation, Public Meeting, Conference and Symposium
Implementing	Post-Participation	Information Disclosure, Public Surveillance

B. Pollution treatment scheduling

According to the plan of environmental protection management, ‘Pollution Treatment Scheduling’ is the legally mandatory means to be implemented, based upon the pollution investigation and evaluation, to set up certain time limits on pollution treatment for different pollution sources, especially in highly polluted areas. There are three major stages in this scheme, pollution investigation and evaluation, promulgation, and implementation. Recommended public participation activities at each phase are described in the followings, as summarized in Table 6.

(1) Pollution Investigation and Evaluation

- To conduct survey and interview to solicit public opinions and comments on pollution sources.
- To convene meeting to consult with experts and representatives from competent authority.

(2) Promulgating

- To disseminate the results of the pollution investigation and evaluation, and proposed schedule for pollution treatment to solicit public opinions.
- To convene public hearing to elaborate the objects, the contents, time limits and expected outcomes of pollution treatment.

(3) Implementing

- To disclose finalized schedule for pollution treatment.
- To invite the public to participate in monitoring the implementation of pollution treatment and time limits.

Table 6: Public Participation in Pollution Treatment Scheduling

Stage	Level	Public Participation Activities
Pollution Investigation and Evaluation	Pre-Participation	Information Disclosure, Public Survey, Expert Consultation, Public Meeting
Promulgating	Process-Participation	Expert Consultation, Public Meeting
Implementing	Post-Participation	Information Disclosure, Public Surveillance

4.3 Emissions Management

Emissions management can be divided into two categories, emissions control management and emissions fee management.

4.3.1 Emissions Control Management

Emissions control management is the means of administrative management to include two major measures, total emissions control and emissions trading. In order to ensure the environmental quality, total emission cap is set, according to the environmental capacity, to control the total and individual emissions from existing and proposed pollution sources in a specific area. And, 'Emissions Permit' is applied to quantitatively regulate the pollution emissions from all sources, based upon environmental quality standards and total pollution control previously determined in 'Liability System for Environmental Protection Objectives' and 'Environmental Impact Assessment.' Emissions allowance has become the legal requirement for every pollution source to comply with. Furthermore, the administrative approach, so-called emissions trading, is used to provide economic incentives for achieving pollutants emission reduction. There are four major stages in this scheme, permit application, total emissions allowance allocation, review and approval, supervision. Recommended public participation activities at each stage are described in the followings, as summarized in Table 7.

(1) Permit Application

- To conduct survey and interview to solicit public opinions and comments.
- To convene meeting to consult with experts and representatives from competent authority.

(2) Total Emissions Allowance Allocation

- To disclose finalized total emissions allowance allocation to the public.

(3) Review and Approval

- To disclose the finalized decisions on permit applications.

(4) Supervision

- To invite the public to participate in monitoring the management of emissions permit and emissions trading.

Table 7: Public Participation in Emissions Control Management

Stage	Level	Public Participation Activities
Permit Application	Pre-Participation	Information Disclosure, Public Survey, Expert Consultation, Public Meeting
Total Emissions Allowance Allocation	Process-Participation	Information Disclosure, Expert Consultation, Public Meeting
Review and Approval		Information Disclosure, Expert Consultation, Public Meeting
Supervision	Post-Participation	Information Disclosure, Public Surveillance

4.3.2 Emissions Fee Management

According to the principle of 'polluter pays,' emissions fee management is the economic scheme to charge pollution sources for their pollutants emissions. Emissions fee management is a very sensitive scheme since huge amount of money and interests are involved. Emissions fee should be collected based upon the permit, according to payment standards regulated by the government. The collected fee should be then used for environmental protection, ecological restoration, and related. Detailed financial budget and report should be submitted to the competent authority (people's representative body) for review and approval. Hence, the most significant activity for public participation is to supervise. Recommended public participation activities at each stage are described in the followings, as summarized in Table 8.

Table 8: Public Participation in Emissions Fee Management

Stage	Level	Public Participation Activities
List of Permit Certificate Payment Standards	Pre-Participation	Information Disclosure, Public Surveillance
Financial Budget	Process-Participation	Information Disclosure, Review and Approval by People's Representative Body
Records of Fee Collected	Post-Participation	Information Disclosure, Public Surveillance
Financial Report		Information Disclosure, Review and Approval by People's Representative Body

4.4 Supervision Management

One of the major purposes of environmental management schemes is to resolve the issues of environmental pollution and improve the environmental quality, through integrated environmental management and planning. Therefore, as the supervision management scheme, 'Quantitative Performance Evaluation' is adopted to quantitatively audit and evaluate the outcomes of various environmental management schemes. Through quantitative auditing indices system, the deficiency, ineffectiveness, and inefficiency of integrated environmental management and planning should be thoroughly identified for future improvement and adjustment. Recommended public participation activities at each stage are described in the followings, as summarized in Table 9.

Table 9: Public Participation in Quantitative Performance Evaluation

Stage	Level	Public Participation Activities
Integrated Environmental Management and Planning	Process-Participation	Information Disclosure, Public Survey
Audit and Evaluation	Post-Participation & Self-Participation	Public Vote, Supervised by People's Representative Body

5. RATIONALIZATION OF PUBLIC PARTICIPATION IN ENVIRONMENTAL MANAGEMENT

Rationalization engineering, originated from industrial engineering (LE, 2008; LI, LIU & ZHAO, 2007; LI, QI & LI, 2008; LIU, 2008; MENG 2007; ZHANG, 2007), is attempting to modify or revise existing processing modes, operation procedures and standards, according to scientific theories, rational principles, and empirical rules, in order to improve current status and to generate standard operation procedures for the future. The objects of rationalization engineering are men, machines, materials and methods (LI, ZHANG & LIU, 1998; WANG, ZHANG & HU, 1990; YANG & CHEN, 1998). The basic concepts of rationalization engineering are:

- Detailed pre-planning;
- Vigorous and flexible environment;
- Continuous management improvement cycle;

- Simple operation management system;
- Looking for the best interest of the system; and
- Emphasizing on all operation procedures.

5.1 Rationalization of Public Participation

Through the application of rationalization engineering, several feasible and applicable schemes shall be proposed to improve public participation in China's environmental management. During the rationalization processes, the following goals can be achieved (CHANG, 2005; CHANG & WU 2008; CHANG, WU & ZHU, 2005):

- To integrate different standpoints of stakeholders;
- To achieve expected targets through effective and efficient participation;
- To implement public participation plan according to specific schedule;
- To fulfill the budget limits;
- To facilitate effective communication, and positive and aggressive participation.

The purpose of rationalization of public participation is to find out the deficiency and insufficiency of public participation in environmental management in China and to propose practical and executable schemes of public participation. Based on primary concepts, the rationalization of public participation can be classified into four major categories:

- Rationalization of men: rationalization of stakeholders;
- Rationalization of machines: rationalization of legal mechanisms;
- Rationalization of materials: rationalization of information disclosure;
- Rationalization of methods: rationalization of implementation.

5.1.1 Rationalization of Stakeholders

Rationalization of stakeholders is the foundation of rationalization of public participation where stakeholders are the main body of public participation. Therefore, in order to enhance the effectiveness of public participation, it is necessary to promote the consciousness and capability of stakeholders to participate actively, aggressively and democratically, through the following two steps.

A. To reinforce the consciousness of public participation and to encourage the public to participate actively.

The public have the 'right to participate!' Participation is not to intervene in any administrative process but to exercise the basic right. All stakeholders should clearly recognize the legality, necessity and importance of public participation and actively participate to demonstrate the timeliness, tendency and inevitability of public participation. On the other hand, participation should be compulsory and obligated to the public. Through the implementation of participation, different standpoints and viewpoints toward various aspects among stakeholders can be fully expressed, discussed, and understood to avoid and prevent any biases or misjudgement, and to make appropriate decisions for the best interests of the majority. Hence, it is very important to educate the public that participation is to exercise the right and to fulfill the duty at the same time, and participation is honorable and inviolable. Furthermore, it will be very helpful to provide incentives, in the beginning, to encourage the public to actively participate and to learn through practice.

B. To elevate the capability of participation and to promote the substantiation of participation, through training and practice.

Public participation is closely related to the development of democracy. Conflicts and disputations are quite common in democratic activities. Therefore, it requires well-educated background and good practice in democracy for all participants to resolve these issues by democratic means, which can be achieved

through basic training and learning process during primary democratic events, such as representatives election for class, small group, association, and community. Experience shall be accumulated through abundant practices and the concept of 'majority rule with respect to minority rights' shall be fully implemented during the exercise. Therefore, it is necessary to encourage people to democratically participate in every event, to learn the idea, the processes and the implementation of democracy.

5.1.2 Rationalization of Legal Mechanisms

Rationalization of legal mechanisms is the crucial premise for rationalization of public participation where legal mechanisms are the lawful bases for public participation. The rights and obligations enshrined in these legislations have provided the legal bases and proper justification for the implementation of public participation. Hence, to ensure the execution of public participation, it is essential to establish appropriate legal system for public participation in the following two aspects.

A. To legislate more comprehensive laws and regulations to ensure the right of public participation with noticeable and viable provisions.

In China, there is no concrete and integrated legal system for public participation in environmental management, and related system. Public participation, though clearly stipulated in the EIA Law, and other legal regulations, is only specified as a principle and requirement to be fulfilled. Literally, no detailed conditions and provisions have ever been documented to clearly specify the implementation of public participation, for example, the level, the means, the procedures, the timing, and the requirements. Consequently, it is fundamental to constitute relevant stipulations and provisions to assure the legal status of public participation, first. And then, in order for government agents to follow, firm measures for the implementation of public participation shall be evidently and detailedly enshrined in related laws and regulations for environmental management for the general public to participate.

B. To set up proper mechanisms of participation to facilitate the public to participate, in time.

With rights to participate in environmental management empowered by laws, the public are certainly willing to exercise the rights and fulfill the obligations. However, without proper participating mechanisms, it is difficult and impossible for the public to participate, even with rational legal framework and highest desire. Hence, it is necessary to identify the participating mechanisms and outline the participating procedures, such as time frame, locations, qualifications, requirements, means, etc., for the public to follow, while participating.

5.1.3 Rationalization of Information Disclosure

Rationalization of information disclosure is the essence of rationalization of public participation where information is the requisite for public participation. Without complete and sufficient information, the public will not be able to make appropriate and objective judgment. Furthermore, without proper channels for information communication and exchange, information dissemination and mutual communication shall be seriously obstructed. And public participation will be meaningless, inefficient and ineffective. Two major protocols shall be implemented to consolidate the rationalization of information disclosure.

A. To simplify the format of disseminated information to be more legible and understandable for the general public.

Due to the differences in various aspects, for example, educational background, work experience, professional expertise, the public will certainly have diverse understanding, opinions and attitude toward the same object from different standing points. Therefore, the format and substance of the information contained in distributing media (literal and colloquial) definitely play significant roles in information dissemination. In order to be more acceptable and legible for the public and to avoid misunderstanding by the public, several principles should be followed while assembling distributive information: (a) less professional, more general; (b) less technical, more universal; and (c) less terminological, more popularized.

B. To widely build channels for information communication and exchange to facilitate information dissemination.

The public cannot actually participate without accurate and enough information. In addition to information dissemination, it is important to build sufficient channels, such as broadcasting media, internet, official website, hotline, and official open-house hours, for the public to access the information and to express their feedback. Several critical factors should be carefully considered while establishing communication channels, for example, accessibility, applicability, availability, convenience, and variety.

5.1.4 Rationalization of Implementation

Rationalization of implementation is the basic operational platform for rationalization of public participation. In addition to adequate hardware and handy software, it is indispensable to have maneuverable means and executable procedures for public participation. The followings are two key issues for rationalization of implementation.

A. To implement public participation systematically and rationally with effective and efficient methodologies.

First is to establish adequate protocols of public participation and to outline the framework for each constituent, i.e., purpose, participants, time, location, topic, and processes. The procedures for each participation activity shall all be carefully designed through comprehensive consideration on cultural difference, educational background, professional expertise, extent of affected area, and environment conditions, to choose the most adoptable means for all participants. However, it is impossible to meet everyone's needs.

B. To set up strict standards for implementation and surveillance mechanisms for public to participate.

Second, the operation procedures shall be regulated to form the "Standard Operation Procedures (SOP) for Public Participation," including objectives identifying, participants screening, time and location selecting, targets setting, and methods scoping. Furthermore, surveillance mechanisms should be accessible and available for the public to supervise the implementation of public participation.

5.2 Standard Operation Procedures for Public Participation

The improvement of public participation should be an iterative cycle of plan (process development), do (process implementation), check (review and analysis), and act (process enhancement). Since the standard operation procedures (SOP) for public participation are only principal guidelines for implementation, the feasibility of applicability of the SOP for public participation are greatly depending on the accumulation of practical and empirical experience. Nevertheless, several principles can be concluded as followings.

A. To identify the topic

As people should have diverse opinions with respect to various issues concerning to their own interests, it is certainly of the first priority to clearly identify the core issues to set up the central topic for public participation, where many issues might be involved. It's also very important to arrange one topic at a time so everyone can concentrate on the specific topic to avoid divergent discussion.

B. To identify stakeholders

Stakeholders are the key players for any public participation events. All related stakeholders should be categorized according to the topics, phases, and levels of participation and extent of affected area to identify adequate participants with appropriate background and professional expertise, and representatives from affected area.

C. To select suitable approaches for participation

The approaches of participation should be carefully selected according to the purposes, topics, phases, and levels, such as questionnaire, expert consultation, hotlines, open-house interview, public meeting, conference, public hearing, and public surveillance, to meet the particular needs.

D. To define the scale of participation

In order to smoothly fulfill the purposes of participation, the scale of participants should be cautiously calculated to set up the numbers of participants from different sectors with various background, professional expertise, different areas, and representatives from interested parties.

E. To design the processes of participation

The agenda and schedule should be rationally designed to precisely demonstrate the topics and purposes. In addition, sufficient time should be provided for participants to conduct mutual communication and information exchange. Besides, the processes should be concentrated on the predefined course to achieve the anticipated goals.

F. To ensure information communication and exchange

Information communication and exchange is the prerequisite of public participation. Hence, it's of great importance to make sure the content of disclosed information is legible and understandable, first. And then, it is crucial to ensure all the channels of information communication and exchange are available, accessible, and convenient for the participants. At last, it is necessary to establish information feedback mechanisms to facilitate mutual communication.

G. To set goals of participation

Public participation is a long-term multi-phase process. Indeed, it will require longer time for the public to reach consensus due to the differences. Usually, it will be impossible and impractical to achieve multiple goals at one phase. Thus, it's of great significance to set a precise goal for each phase of participation. A successful public participation is attained through the accumulation of small accomplishment at each phase.

6. CONCLUSIONS

Public participation is the foundation of environmental management and an essential element of successful environmental management. Without efficient and effective public participation, solid achievement cannot be accomplished by the environmental management system. Through integrated designing, public participation activities in environmental management system can be substantial, feasible and operational. In addition, the establishment of process flow for public participation in environmental management will be very practical for the implementation and promotion of public participation. However, the design for public participation shall be very flexible due to different subjects, various stakeholders, diverse spatial distribution, and a lot of essential factors and conditions. Therefore, there is no defined or fixed mode of public participation in environmental management.

Nevertheless, in order to promote and implement public participation in environmental management, many measures, such as legal requirements, educational means, and information disclosure approaches, etc. shall be constituted. Furthermore, experience can be accumulated through many empirical practices which are very important for the construction and development of public participation.

With good planning and rationalization of public participation, public participation can be implemented through regulated procedures. The outcomes shall be expected and monitored, with the application of standardized procedures, to furtherly promote the development of public participation.

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