AUTONOMY AND THE PARTICIPATION OF USERS IN LOCAL CZM: A KNOWLEDGE SCIENCE BASED APROACH WITH A CIRCUIT MODEL

Asami Shikida, Kanazawa Institute of Technology, Japan

Introduction

The coastal zone is a complex natural system consisting of a marine and a terrestrial environment. It is used excessively by a variety of coastal users because of its important resources. It is the narrow path stretching along the coastline covering the shallow waters of the sea and the adjacent land. The terrestrial environment and the sea are closely dependent on each other. For an island country like Japan, the coastal zone is an especially important space since approximately half of the Japanese population lives there. It is also the locus of many economic and industrial activities, such as those linked to fisheries and marine transportation. In addition, it is one of the preferred natural environments for various leisure activities.

Problems arise in the coastal zone when resources and space are over- or poorly-utilized, and when the environment's ability to sustain itself is compromised. Destruction of the beach vegetation by heavy 4WD traffic on sandy beaches is another example of the destruction of the balance between utilization and conservation. In addition, there are many different uses and users of the coastal zone. Such a complicated utilization scheme is called multipurpose utilization or multiple utilization. In this study, it is defined as "polyphyletic utilization" from the standpoint that the many kinds of utilization, although not mutually exclusive and independent, form the whole coastal zone utilization. Thus, conflicts of interest among users easily arise. Disputes over the same resource between commercial and recreational fishing are typical of the conflicts encountered in the coastal zone.

The fundamental reason behind such problem is the absence of a uniform coastal zone management (CZM) system. Although there are no rational boundaries between coastal activities, administrative boundaries have been drawn. One of the countermeasures to reconcile this situation is to establish synthetic coastal zone management, also referred to as Integrated Coastal Zone Management (ICZM) (Coughanowr et al., 1995; Clark, 1998). Seldom established, the few past implementations have proven successful.

A large number of local CZM schemes cannot be successful due to complicated joint management among managing bodies. However, the local governance of the coastal zone is considered the basic unit for the management because it is likely to contribute to creating a universal standard of national coastal zone management. From the local point of view, autonomy of local CZM is also crucial for the profitable outcomes from management.

In order to establish sustainable and autonomous management, participation of local residents and coastal users including non-residents must be achieved

to make a participatory approach work effectively. Therefore, the key to creating an effective local CZM system is to develop a useful model for both management itself and participation in the management system. Although a large number of studies have been published on this issue, only a few excellent studies have recognized the importance of the transition of management and participation of the coastal zone.

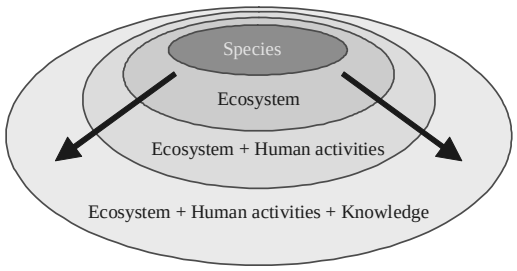
In this study, the transitional model of the local CZM with participation was proposed with the purpose of suggesting a local ICZM system. In addition, a knowledge-based model of the local CZM based on an open source approach was developed. Furthermore, the study provides useful and practical design tools for adaptive management by using participatory approach. The authors believe that this can be a unique and useful tool for designing a local CZM system.

Application of knowledge science for ICZM

It is noteworthy that little attention has been given to knowledge in the area of CZM. On the other hand, a large number of studies have been done in the area of corporate management. A famous example of this work is the series of knowledge management studies (e.g. Nonaka and Takeuchi, 1995). They discussed how to create new knowledge for better company management and how to create competitive advantage of companies.

There are numerous discussions on knowledge science in local resource management studies. One interesting example is a study on soil and water conservation in Bolivia done by Lawrence (2001). The study discussed a participatory soil conservation approach and observed dynamics of knowledge and a process of creating knowledge. Other studies concerning knowledge are found in the area of ecosystem management and adaptive management (e.g. Clark et al., 1999; Lee, 1993). These discuss the role of knowledge in resource management. Grumbine (1994) suggested that an ecosystem management program does not simply refer to either science or application of traditional resource management. It is expected to be a new approach for natural resource management. Even though the history of ecosystem management is not long enough, it has been supported by a large number of researchers and practitioners (Imperial, 1999).

Fig. 1 Enlargement of management objectives



One interesting application of knowledge for ICZM can be found in the South African Coastal Policy (Glavovic, 2000). In that document, integration of knowledge and a process of social learning are strongly pointed out. It demonstrates that the use of knowledge can be accepted by practitioners and administrative sectors. In order to create successful ICZM, it is no exaggeration to say that the use of knowledge will decide the future of ICZM.

The importance of the use of knowledge for ICZM can be explained by looking closer at management objectives. As shown in Fig. 1, natural resource management may originally and naturally target species because the concept is easy to understand and is visible. However, survival of the species is likely to be affected by the condition of the ecosystem. Thus, management should focus on conservation of the ecosystem. Nonetheless, most ecosystems are quite vulnerable to human activity because the size and impact of human activity has recently been increasing greatly. Therefore, we should think about managing human influences. This is not a simple task if both the ecosystem and human use fluctuates all the time. It is inevitable that we will need to adapt to the change of the environment and management. In order to pursue an effective resource management, we have to change management itself to a more suitable form. It is obvious that the adaptation can be done by the creation or introduction of new knowledge. In other words, we need to manage knowledge. These changes in the management target are summarized in Fig. 1.

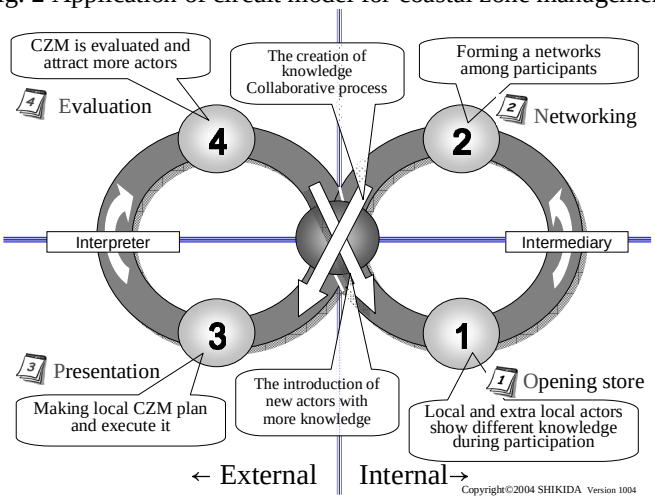
Design process of the management system by a circuit model

It is necessary to mention the importance of the user-oriented management. In this management, users are learning by utilization and contribute to the development of management by presenting their knowledge. Knowledge is often created by lead users (not bulk users). Continuous knowledge creation through social and individual learning may result in the rise of the level of management.

The author summarized these functions and developed a circuit model for creative coastal zone management from a case study on the Kotohikihama coast in Kyoto, Japan where day-to-day coastal management by a municipal government has been authorized for the first time in Japan. The model was developed in a case study on the Syonai coast in Yamagata, Japan. The author succeeded in identifying four different phases in the management process. The first is the presence of local coastal users and conservationists who are interested in better coastal management. The second is the formation of a network among people concerned about management. The third is the transmission of a conservation scheme by enacting municipal coastal regulations. The forth is the evaluation and formation of a concept. It should be noted that these phases are inter-related.

We shall now look more carefully into the typology of the model. The fundamentals of the circuit model are shown in Fig. 2. The model is characterized by four different phases: Evaluation, Opening Store, Networking, and Presentation. Each phase presents a process of management. Phases start from internal transmission to internal formation and move into

Fig. 2 Application of circuit model for coastal zone management



external transmission, then finally to external formation (see Fig. 2).

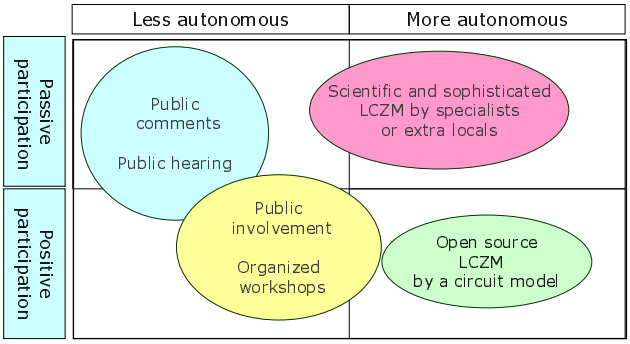
If outsiders who have knowledge in particular fields that relate to the environment or culture of a region and can demonstrate their knowledge, they may in turn advocate the importance of this knowledge to insiders. The author named this stage as “opening store” (Phase 1). After opening stores in the region, there is likely to be an opportunity for networking because those people are often interested in a new field of knowledge (Phase 2). Some tools, such as a local meeting and chances for discussion, can facilitate this. The collaborative work of people who have opened stores can result in the creation of a series of products (Phase 3). Although they are diverse, it is necessary for them to be visible to outsiders for their evaluation. Once the products of collaboration have appeared, outsiders can see them. If they are satisfactory and encouraging, the outsiders may enter into the circuit, namely the management system (Phase 4). Then outsiders can join the system after they know the rules and roles of the products. This means that outsiders can learn what they should and should not do. As a result, they may join the circuit with new knowledge that is likely to contribute to the improvement of management (Phase 1 again).

This model can be applied to the development of the local CZM system because the model describes entire design process for building the management system. However, this does simply not mean that the model can facilitate to build local CZM automatically. The key to success is encouraging coastal users to participate into the circuit model, in other words, the management system. By their participation, the management system can be further developed because they may bring their knowledge into the system. At the same time, the participants are likely to be more empowered and motivated when they join a management system. Thus, the participation can be mutually beneficial. The author thinks that this is a typical example of "manauser." This is a coined word incoporating manager and user. It is considered that the nature of "manauser" is the same as "prosumer" which

futurologist Alvin Toffler introduced. The word simply means that the coastal leading users can be transformed into coastal managers in the local CZM designed by a circuit model.

One other issue we must address is the autonomy of the local CZM system. Even though participation in the system is crucial, it should be sustainable during a certain period of time. We carefully avoid the risk of instability by the continuous affiliation of people concerned. In other words, it is important that the balance of both autonomy and participation be kept. When we keep the balance, there must be a relationship between autonomy and participation. This is classified in Fig. 3. There are four different stages based on degree of autonomy and participation. For example, public involvement is carried out under the condition of less autonomous and positive participation, on the other hand, scientific and sophisticated local CZM can be more autonomous but passive participation. The goal of the local CZM is to achieve positive participation with more autonomous condition. The author thinks that the local CZM process designed by a circuit model can fit in this condition based on the case studies at several CZM sites.

Fig. 3 The classification of local CZM based on autonomy and participation



Conclusion

The main topic of this paper is the application of knowledge science theory to the design of local CZM. The study mainly concentrated on the process of the local CZM. The author proposes a circuit model (Fig. 2) that explains transformational changes in management system by focusing on knowledge creation. Transitional and development stages of local CZM are demonstrated with a circuit model. A circuit model for local CZM can show how to design user-oriented coastal zone management by focusing on knowledge creation. The model will provide a useful design for adaptive management by introducing, networking, creating and evaluating knowledge autonomously and continuously. Not surprisingly, a higher concentration of knowledge corresponds to more effective coastal zone management.

The author believes that the model can be a unique and useful tool for designing a local CZM system. It is also predicted that coastal zone management will progress toward increased goals in openness and

sustainability. It is likely to end as user-oriented and open-source management, thus facilitating user participation in coastal zone management. The author believes that the model can be a unique and useful tool for designing a local CZM system.

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Asami Shikida
Department of Social and Industrial Management Systems
Kanazawa Institute of Technology, Japan
7-1 Ohgigaoka Nonoichi Ishikawa 921-8501 JAPAN
Ph +81-76-294-6712
Fax +81-76-294-6736
E-mail: shikida@neptune.kanazawa-it.ac.jp