THE IMPORTANCE OF INFORMATION TECHNOLOGY FOR CORAL REEF MANAGEMENT IN INDONESIA: AN OVERVIEW

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ABSTRACT

Coral reefs give many advantages for human being since their ecosystem is the most productive area in the oceans. The present status of coral reef in Indonesia required great concern. Good management of Indonesian coral reefs will be needed to keep the ecosystem from damage. Information about Indonesian coral reef management tends to be separated, collected in different scales with different parameters, stored at different locations and difficult to access. The support of information technology gives an alternative solution to reduce those problems. The paper discusses the importance of information technology for coral reef management in Indonesia.

INTRODUCTION

The coral reef ecosystem is a marine ecosystem that involves different kinds of habitat. Coral reef ecosystems give many advantages for human beings because the ecosystem is the most productive area in the oceans. Economically coral reefs supply fish which are used as foods, and beach sand resources which are used as building materials. It also can be used for pharmaceutical industry and beach protection. The coral reef ecosystem is also a beautiful place in the world and it is very important for tourism.

In Indonesia, millions of people depend on the reef for food and livelihood. As much as 90% of animal protein consumed comes from marine resources (IUCN,1993). The potential sustainable yield of fish, crustaceans, and molluscs from the coral reef could be some 10%-12%, which is around 9 millions ton of the world fisheries catch. The present status of coral reefs in Indonesia requires a great concern. Only 6,41% of the reef areas are in excellent condition (Suharsono, 1998). Most of the damage coral reef is from human effect. Uncontrolled used of the coral reef ecosystem leads to rapidly increasing damage. Figure 1 shows the human activity that caused faster damage on coral reef.

Figure 1. Coral mining activity which could make faster damage on coral reef. (photo by Fadil)

Protecting coral reef from their damage, Indonesia government launch Coral Reef Rehabilitation and Management Programs, which is aimed to manage the sustainable utilization of coral reef resources in order to increase the prosperity. The program involved five components i.e locally based management, enforcement and policy coor-dination, human resources develop-ment and institutional strengthening, information and research, and public awareness. Besides, Indonesia has also established marine protected area, including coral reef conservation, sanctuary and marine park. In the national level, Indonesia has established a number of regulation and policy which is related to marine and coastal resources ma- nagement.

One important aspect in marine and coastal resources management is coral reef management. It means protection and sustainable utilization of coral reefs and associated ecosystems in the long term, with improving the welfare of coastal communities. This will be needed to reduce destructive effect on coral reef from their damage. Successful coral reef management requires development of cooperation purpose between sectoral institution, private sector and community groups to achieve one objective in utilization of the coral reef. The government institutions play a key role in management since they develop the policies that related in coral reef protection and utilization. Thus, developing coordinated policies, and also administrative arrangements will be required by government institutions. This will be achieved through well-distributed, coral reef information. The present information for coral reef management still tends to be separated, collected in different scales, and with different parameters, stored at different locations and difficult to access. It will need to be integrated to achieve the successful management of coral reef.

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Currently the development of information technology is very advanced. The technology will be an alternative solution in integrating and distributing the information. The paper discusses the importance of information technology in coral reef management.

INFORMATION TECHNOLOGY FOR CORAL REEF MANAGEMENT IN INDONESIA

Information technology (IT) is one dealing with hardware, software, intelligence, and methodologies which are needed to process information, including data gathering, data processing and mani-pulating into useful information, and the engineering of the information. Nowadays, IT plays key role in controlling daily life of human being. For example, TV and Internet as a media for distributing information all over the world, are very popular for everyone.

The scope of Information Technology is very wide, thus this paper will focus on the Internet topic which is part of the advance product of IT. Nowadays, Internet is very advance and become global. Internet infrastructures -such as telephone line, modem, and computer pheripherals- are already available and become common device for the community. For the economical reason, there will be low cost for building Internet infrastructures.

IT supported by the latest telecom-munication infrastructure has made a big influence in distributing information of all disciplines. Coral reef management is one of the important disciplines that seem to need IT for improvement.

The present conditions of information for coral reef management in Indonesia are still fragmented in different organizations, i.e. government agencies at national, provincial and community level. This will lead to information stored at different locations, and collected in different scales and parameters. Finally it creates difficulties (i.e. partially, disintegrated, and uncompleted) in accessing the coral reef information. Besides, institutional capacity for effective implementation of integrated coral reef management has not yet been developed in provincial and local communities. It is due to lack of education and training and awareness of coral reefs information. All these conditions above make great impact on coral reef, since they will generate uncoordinated policies and also a different purpose of the coral reef ecosystem. That will cause the degradation of coral reef ecosystem.

Information technology is an alternative solution to fulfill accurate, fast, up to date information for coral reef management. Supported by IT, it should also been followed by sustainable education and training to improve the institutional capacity. The support, especially in coral reef education and training, involves:

- Easier training module and material course development, which could be better prepared, updated, and access-ed;
- Simpler and faster distribution and delivery of information via wide spread multimedia; and
- Easier course material exchange among different locations without ever having to meet each other; and
- Distance learning about the coral reef itself, which could be conducted without the presence of both instructor and course participants at the same place.

Using the Internet technology it is possible to do all the things mentioned above. For example, every information could be easily shown and accessed world-widely from homepage. Then, it gives an impact to the scope of information that become abroad and accessible for the people around the world. Further, comments and supports from people around the world concerning coral reef give valuable solution to coral reefs problem solving in Indonesia through information shown on the homepage.

IT can support the awareness in coral reef management, especially through Internet communication and other media such as television and CD-ROM, through:

- Facilitating the interactive information which could be easily introduced and reached by all level of communities;
- Establishing an interactive distributed and integrated coral reef database system which could be at any place; and
- Popularizing and familiarizing the Internet especially for key roles, thus they could share and explain the coral reef information to broader communities faster and easier.

Therefore it is absolutely needed to look into the following matters:

1. Infrastructure aspect
   There will be needed additional equipment to support the Internet communication such as modem, computer pheripherals, and telephone line.
2. Economical aspect
   Additional cost is needed to provide some additional equipment and also to pay for pulses that have been used.
3. Human resources aspect
   It should be prepared for human resources that involved in de-veloping the website of infor-mation, which related to coral reefs.
4. Data security aspect
   Specific mechanism should be implemented to protect data against unauthorized updating access. That is due to the widely opened availability data on the Internet.
5. Information sustainability aspect
   Standard procedures should be implemented in order to keep the information not to be obsolete. It is closely related to ones involved in updating process.
6. Sustainability of involved people
   - Regeneration and technology transfer should be made so that greater number of people will be involved
   - The technology has to be introduced to the people especially who involved in coral reef management to make them familiar to the technology.

CONCLUSION

Up to this time those aspects above are still become major restrictions condition in Indonesia. As it is known that Indonesia is still very underdeveloped country, especially in the field of information technology. Indeed, IT is one of the solution for improving the coral reef management, but there are still some restrictions which prohibit the successful of it.

The successful information distribution for coral reef management can be achieved through the implementation of information technology in coral reef management, therefore reducing coral reef damage significantly.

Information Technology plays key roles in improving information distribution for any kind of subject, in this case, the coral reef management. Since IT could support at least in coral reef education and training, and also for increasing the awareness of coral reef information to the wide community faster and easier.

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