

Protection of coral reefs for sustainable livelihoods and development- the experience of Vietnam

1. Overview

Vietnam is known to have such rich marine resources and one of the highest level of biodiversity for the world's marine ecosystem. Vietnam has a variety of 39 types of salt water including mangroves, mudflats, brackish marshes, seagrass, coral reefs which are most productive and diverse habitat. There are 20 typical marine ecosystems where some of them have unique features of oceanography. These ecosystems provide shelter for over 11.000 organisms. There are about 1.100 km² of coral reefs distributed along the North-South coastal zone including largest ones with the highest level of biodiversity are in Central and South of Vietnam. There are about 400 types of coral reef in Vietnam which can be compared to the most diversified ecosystem in the world.

However, there have been critically drops in aquaculture production, especially inland and coastal marine ecosystem which shows some of the species are in danger. According to recent researches and monitorings at 7 primary locations along the coastal zone, the coral reefs are in bad condition, and a lot of them shows degradation development. The number of coral reefs which are in bad and very bad condition has increase with time: 14,8% (1994 - 1997), 50% (2000 - 2003)...the number of coral reefs in good condition decrease from 33,3% (1994 - 1997) to 11,6% (2004 - 2007). Among the potential threats to the coral reefs' ecosystem, the most popular and damaging is destructive fishing activities which makes 85% of the coral reefs are in medium and high level of threat; over exploitation is considered to be the major threats to about 50% of the coral reefs; 47% of them are in danger of becoming sedimentary rocks, 40% of them are in danger causing by unplanning development of coastal zone...The level of damage done to the ecosystem and biodiversity is known to be significant among marine environment problems in Vietnam. Recent researches conducted internationally and nationally have shown a number of pollution areas which cause the declining development in the ecosystems and organisms such as coral reefs, seagrass,

saltmarshes, mudflats, zoobenthos..., the community of marine organisms has shown decreased in population as well as production, fishing grounds are also narrowed. Both natural and human factors can be taken into account of causing these damages. There are many human induced causes including destructive fishing practices, waste run-off, air polluting sources, pesticide residues, heavy metals, suspended matters, oil spills. These current trends reflect an increasing threat to biodiversity. Economy expansion, population growth and promoting marine exploitation result in increasing loss and fragmentation of landscape, pollution and foreign invasive species. These threats become more serious due to a lack of organizational structures for protecting resource conservation and marine biodiversity; capacity and commitment for implementing policies; as well as natural resources management of local communities.

2. Coral reefs and sustainable development

Coral reefs and related ecosystems in coastal areas play an important role in sustainable development. Such rich biodiversity of coral reefs has made them to be the essential role in marine ecosystems. Together with coral degradation is the absence of valuable marine species and a decline in productivity of marine products. Coral reefs are usually found at low nutrient areas and nearby mangrove forests or seagrass where they get their organic matters supply from and in return, they protect mangrove forests and seagrass from wave actions. Accordingly, coral reefs take the leading role in provision of ecological services (marine resources, tourism, improvement of environment and coastal ecosystems, etc), protecting livelihoods of coastal population especially the poor. Coral reef degradation threatens livelihood of coastal population and sustainable development along coastal areas.

3. Economic, social, environmental and developmental benefits of protecting coral reefs

The protection of coral reefs has substantial benefit for economics, society, environment and development. Protecting and restoring coral reef ecosystems will result in sustaining environment and coastal ecosystems, because they are closely interrelated. Mangrove forests and coral reefs have important roles in protecting

coastal areas as well as creating habitats of marine species with high economic value. Thus, the protection of coral reefs will help coastal ecosystems to perform their functions providing ecological services to maintain livelihood of local people, particularly the poor, for sustainable development.

The biodiversity characteristics of those ecosystems sustain basic needs for human livelihood, especially the poor, such as food supplement and energy resource. It also protects the poor from natural crisis. Approximately 8 million of Vietnamese households' main income comes from marine and aquaculture production; other 12 million have part of the income comes from fishery activities. Acknowledging and recognizing the important value of biological resource and marine biodiversity provide opportunity for people especially the poor to improve their living standard.

The coral reefs are identified as medicine resource under the sea since they are the home of many organisms which have toxicity and bioactive pharmaceutical characteristics.

Furthermore, the beauty and attraction of this wildlife create a worthy economic benefit to our country in general and local people in particular by providing ecological tourism services.

In Vietnam, the coral reef protection works have made significant increase of local people' income. For example, the protection of coral reef at Hon Mun marine preservative area has not only helped to recover a number of rare coral reef organisms such as humphead wrasse, sea cucumber, and charonia tritonis and to increase the fishery production of nearby area, but also helped to increase the number of tourists who come for sea seeing, scuba diving and fishing. These result in increasing of local people's income.

4. The role of Law of Vietnam in coral reef protection.

The government of Vietnam has made a lot of effort in coral reefs' ecosystem protection. Recently, the Prime Minister of Vietnam has approved the list of 16 marine preservative areas which are nationally and internationally important. Those areas are under urgent construction. Vietnamese government has

issued a number of legal normative documents related to marine protection activities such as Law of Environment Protection, Law of Bio-diversity, Fisheries Law, Maritime Law and Regulatory Framework for management of marine preservative areas. Coral reef exploitation and destructive fishing activities (demersal trawling, dynamite and chemical fishing,...) are now prohibited across the sea of Vietnam. Legal normative documents related to marine preservation, sustainable growth as well as development toward green economy are being completed.

5. Necessary solutions and actions in accordance to international law for coral reef protection

At the moment, coral reefs have degraded significantly in Vietnam. Over exploitation is the main reason of degradation and leads to exhaustion of some marine species and unbalanced ecosystem. Therefore, the coral reefs' ecosystem in Vietnam is changing as the coral reefs are degrading and seaweed are growing dominantly which makes it difficult for the coral reefs to recover. Consequently, in Vietnam's circumstances, it is necessary to implement some comprehensive solutions to protect the coral reefs effectively such as:

- Completing the institution and policies of management and protection of coastal ecosystems, especially marine reservative areas; prioritized in land fragmentation according to function, planning exploitation and use of marine zone, buiding marine reservative areas, improving the organizational system and legal normative documents in management.

- Improving regulations and organizing exploitation activities, limiting aquaculture activities in developing zone of marine reservative areas.

- Forbiding exploitation of marine species using destructive methods and organism and non-organism exploitation in strictly protected zones and recovering zones of marine reservative areas.

- Gradually treating waste water and waste, improving the quality of seawater, preventing the eutrophication of seawater.

- Establishing and improving community model of management of marine reserve areas and coastal ecosystems, such as coral reef ecosystem and mangrove forest ecosystem.

- Developing eco-tourism based on reserve activities, and promoting propaganda, awareness raising for local officials and people to encourage their participations in marine reserve activities. Paying attention to achieved benefits of marine conservation, especially eco-tourism development.

- Disseminating rules of coral reefs exploitation to ensure understanding and strict execution among coastal population, creating changing occupation opportunities, providing livelihood. Gradually improving people's living standard so that they can actively participate in reserve activities.

- Eliminating harmful organism such as crown-of-thorns starfish and introducing more useful organisms such as urchins, *tutufa oyamais* to quickly establish the eco-balance in a way that is helpful for coral reefs' recovery.

- Searching, mobilizing financial support from non-government organizations, national and international environmental organizations in order to enhance the effects of the above missions. Strengthening cooperation with shared marine border countries to effectively manage and protect the coral reefs.