

and the workshop participants.

On December 8, all the participants paid a courtesy visit to Mr. Hiroya Masuda, the Governor of the Iwate Prefecture, and made a brief report on the activities of the workshop. He appreciated the efforts made by the workshop participants to discuss issues that are important to the fishery communities in the Iwate Prefecture and to assist in raising public awareness on these issues, particularly with the younger audience.

The organizing committee appreciates the excellent presentations and contributions made by all the participants during the workshop. Thanks are also due to the staff members of UNU and OMRC for their kind assistance in arrangements for this workshop. On the whole, this workshop could not have been successful without the strong contributions and cooperation of all involved.

## Ocean, man and environment: A message from dolphins and seals

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Marine pollution by organochlorine compounds has become a vital issue everywhere on earth. Since the latter half of 1960s, mass deaths of marine mammals have been often observed for the grey seal (*Halichoerus grypus*) and the harbor seal (*Phoca vitulina*) in the Baltic Sea and the North Sea. Similar events were found in Baikal seals (*Phoca sibirica*) of Lake Baikal in 1987–88, in Caspian seals (*Phoca caspica*) of Caspian Sea in 1997, and in the striped dolphin (*Stenella coeruleoalba*) in the Mediterranean Sea in 1990–91. The causative mechanism is not yet completely understood. However, organochlorine compounds such as PCBs (polychlorinated biphenyls) and DDTs must be the major factors in creating this tragedy. Seals have found to be suffering from uterine occlusion, which has resulted in decrease of reproductive rates. Meanwhile, it is likely that aquatic animals are losing their immunity against viruses. Reduction in the testosterone levels by DDE was also observed in Dall's porpoises (*Phocoenoides dalli*) from the western North Pacific.

Why are seals and dolphins vulnerable to artificial chemical substances? Since they normally have long lives and are at the top of the oceanic food chain, they accumulate a high intensity of chemical substances in their body. In the striped dolphins from the western North Pacific the accumulative concentration of organochlorine compounds in their bodies is one to ten million times higher than that found in the water. These accumulated compounds, which are soluble in fat, are passed on to

calf through mother's milk. Approximately 75–90% of the accumulated chemicals are transferred to calf. Unfortunately, seals and dolphins pass the contaminants on from generation to generation once they have been polluted because they are not capable of metabolizing them. This tragedy is now spreading throughout the world's oceans. Most of the organochlorine compounds used in the tropical areas move into the air and eventually spread over the earth. Such pollution has actually been observed even in the Antarctic Ocean. More than ten million kinds of chemical substances have been produced so far and most of them are being discharged onto the land and into the seas. We should realize that actual damage, including pollution by organochlorine compounds, is extremely severe.

In recent decades we also faced another problem of butyltin contamination. It is much more serious in the coastal areas of the developed countries compared with those of the developing ones in the Northern Hemisphere. We need to establish an effective strategy on the present marine environment issues.

From ancient times, most of people have been dependent on resources from the ocean such as fish, cuttlefish, shellfish, seaweed, and other marine organisms. What we should do right way is to recognize what is happening on our earth and to promote the conservation of the ocean. Otherwise we cannot guarantee the future for the next generation. Our priority is to launch research to monitor marine pollution and to send out the latest information to the world.

## Wildlife and birds as sentinels of ecosystem pollution

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Seabirds and songbirds are very sensitive indicators of environmental contamination. Agriculture and urban pesticide use in the United States has caused declines in bird populations in several localized regions, indicating pollution by

chemicals which are persistent in the environment. In this talk I will introduce the process of environmental monitoring of wildlife, and how studies of wildlife and bird populations have identified specific pollution problems. Eggshell thinning