Foreword

The author, Professor U Kyaw Myint Oo, has given thirty or more years of his life to carrying out research in the field of Environmental Toxicology. This book, **Effects of Environmental Pollutants on Living Systems,** therefore, is based on the scientific findings drawn from his personal studies, his teaching experience as professor of zoology, and his engagement in many research projects in the field.

The use of pesticide in order to increase the yield in agriculture has been widespread for years, and this has brought about such undesirable side-effects as environmental pollution and destruction of wildlife. With a focus on this harmful phenomenon, the author has, since 1973, been carrying out research in the field of "Toxicity of Pesticides on Fish" and has now in this book devoted a chapter to "Pesticide Toxicity Research in Myanmar".

To any reader of this book, the three initial objectives of bringing out this publication should be apparent: the **first** is to inform the general public of how *Environmental Pollutants* can be harmful to human health and cause destruction and death to wildlife. The **second** is to help the general public come to know the precautionary and preventive measures that may be taken to avert the adverse effects of *Environmental Pollutants*, as well as what an individual may do to reduce pollution in his environment. The **third** is to encourage further research in *Environmental Toxicology*, using to advantage the research findings presented in this book.

The objectives being so, the information contained in this book should certainly help the reader become aware of how the injurious effects of environmental pollution may be averted, and at the same time educate him as to what he may do to reduce pollution in his own environment. And if this book should happen to inspire a reader to carry out further research in the field of *Environmental Toxicology*, the writer should feel that his efforts in writing this book has not been in vain.

THAN OO
President
Myanmar Academy of Arts and Science
Ministry of Education

May 2010

A Profile of Professor Kyaw Myint Oo

Professor Kyaw Myint Oo, son of U Hla Oo and Daw Kyin Sein, was born in Pyay, Bago Division. He matriculated from No (1) State High School, Pyay, in 1963. He obtained his BSc degree in Zoology in 1967 and his MSc degree in 1976 from the University of Yangon. In 1999, he was sent to the International Center for Environmental and Industrial Toxicology (ICEIT), Thailand, to study Environmental Toxicology, Pollution Control and Management under the United Nations Development Program.

He contributed his services to the state in the following capacities:

1968 - 1972	Demonstrator, Taunggyi College
1972 - 1978	Demonstrator, Institute of Medicine (1)
1978 - 1984	Head/Assistant Lecturer, Lashio College
1984 – 1986	Assistant Lecturer and Head,
	Taunggyi College
1986 - 1989	Head/Lecturer, Taunggyi Degree College
1989 - 1993	Lecturer, University of Yangon
1993 – 1995	Associate Professor/Head,
	University of Mawlamyine
1995 - 2001	Professor and Head,
	University of Mawlamyine
June, 2001 to	Principal, Bago Degree College
November 2001	
2001 - 2005	Rector, University of Taungoo
2005 - 2007	Rector, University of Dagon

He has supervised several research projects in the area of toxicity of pesticides on fish with respect to water pollution.

He has published 40 environmental conservation articles in annual magazines of various Universities, Newspaper and News Letter issued by National Commission for Environmental Affairs.

Since 1976, he has published 25 research articles concerning with Environmental Toxicology in various research journals such as: Burma Journal of Life Science, Myanmar Journal of Agricultural Science, Journal of Myanmar Society, Journal of Zoology Zoological (University of Mawlamvine), Taungoo University Research Journal, Dagon University Research Journal, Journal of the Myanmar Academy of Arts and Science, Journal of the Myanmar Academy of Technology and the ICLARM Quarterly, International Center for Living Aquatic Resource Management, Penang, Malaysia. His fields of interest are toxicity of pesticides on fish, environmental toxicology and pollution control. He gave "Environmental Toxicology" universities and colleges in Myanmar. He is also giving refresher courses on "Environmental Toxicology" to Zoology subject teaching staff of various universities under Ministry of Education.

Currently, he is a member of the executive committee, Myanmar Academy of Arts and Science, Ministry of **Education**; member, Steering Committee for Programme, Zoology Department, University of Yangon; member, Yangon University Revitalization Committee; member, **Pesticide Technical** Committee, Registration Board, Ministry of Agriculture and Irrigation, Government of the Republic of the Union of Myanmar. He is also a member of the Network of Tropical Aquaculture and Fisheries Professionals (NTAFP), International Center for Living Aquatic Resources Management (ICLARM), Penang, Malaysia.

Contents

	Pages
1.Introduction	1
2.Environmental pollutants and health effects	8
2.1. Environmental pollutants	
2.2. Health effects of environmental pollutants	
2.3. Physiological classification of toxic	
chemicals	
3.Effects of air pollutants	11
3.1. Sources of air pollution	
3.2. Classification of air pollutants	
3.3. How people are exposed to air toxics	
3.4. How air pollution can hurt human health	
3.5. Health impact of specific air pollutants	
3.6. Incidences of air pollutions around	
the world	
3.7. How you can help reduce air pollution	
4. Effects of water pollutants	26
4.1. Sources of water pollution	
4.2. Health impacts of water pollutants	
4.3. Diseases caused by water pollutants	
4.4. How to reduce water pollution	

5. Effects of soil pollutants	35
5.1. Sources of soil pollution	
5.2. Harmful effects of soil pollutants	
5.3. Major soil pollutants and their	
effect on human health	
5.4. Control of soil pollution	
6. Effect of pesticides on plant, beneficial soil	
microorganisms, insects, spider, fish,	
birds and amphibians	39
6.1. Types of pesticides	
6.2. Pesticides harm the environment	
6.3. Bio magnification	
7. Effects of Pesticides on Human Health	48
7.1. How Pesticides enter our bodies	
7.2. Effects on human health	
7.3. Diseases caused by hazardous pesticides	
8. Pesticide toxicity research in Myanmar	56
8.1. Study on the insecticidal pollution	
of water by using fish as	
bio-indicator	
8.2. Residual toxicity of different	
insecticides to Channa punctata	
8.3. Relative toxicity of 10 Pesticides to	
Cyprinus carpio at different exposure periods	
8.4. Rapid detection of pesticides in	
water by using fish bioassays	

8.5. Recovery of insecticide-affected	
Clarias batrachus after being	
transferred into clear water	
8.6. Half-lives of biological activity of	
some pesticides in water	
8.7. Acute toxicity of 23 modern pesticides	
to Cyprinus carpio	
8.8. Acute toxicity of some modern pesticides	
to Cyprinus carpio and acute effect	
on gills	
8.9. Safe use of some modern insecticides	
in rice-fish culture	
8.10. Acute toxicity of some modern pesticides	
to egg, fry and fingerling of Labeo rohita	
8.11. Presenting pesticide toxicity research data	
to the Pesticide Registration Board of the	
Government of the Union of Myanmar	
9. Pesticide residues in fish, fruit, vegetable,	
meat and human	87
9.1. Pesticide residues	
9.2. Organochlorine residues in fish from	
Lake Victoria, Kenya	
9.3. Concentrations of pesticide residues in tissues	
of fish from Kolleru Lake in India	
9.4. Pesticide residues in organisms of	
Malaysian waters	
9.5. Residues in fruits and vegetables	
9.6. Residues of Cypermethrin and	
Methamidophos on cauliflower at	
various intervals after treatment.	

9.7. Levels of organochlorine pesticides residues in meat 9.8. Chlorinated pesticide residues in the body fat of people in Iran 9.9. Organochlorine pesticide residues in human fat in Great Britain 9.10. Organochlorine pesticide residues in human milk of a Hmong hill tribe living in Northern Thailand 9.11. Evaluation of organochlorine pesticide residues in human serum from populations in Portugal 10. Maximum Residue Limits (MRLs), the United Nations Codex Alimentarius Commission, 97 residue monitoring and food safety 10.1. Maximum Residue Limits (MRLs) 10.2. The United Nations Codex Alimedntarius Commission 10.3. Safe level of a pesticide residue 10.4. Monitoring the residue levels of pesticides in food 10.5. Maximum Residue Limits (MRLs) of some agricultural chemicals and environmental chemical contaminants on fish, mollusk and crustaceans 10.6. Analysis of environmental chemical residues in products of emerging Aquaculture Industry in Uganda 10.7. Trade problems arising from differing

maximum residue levels

11.	Home f	ood preparation to reduce exposure to	
	pesticid	e residues	108
	11.1.	Health hazard of pesticide residue	
		on fruit and vegetable	
	11.2.	Food preparation to reduce exposure	
		to pesticide residue on fruit and vegetable	
	11.3.	Buy organic	
12.	Effects	of toxic household chemicals	112
	12.1.	Types of toxic household chemicals	
	12.2.	The effects of cosmetics and	
		perfumes on your body	
	12.3.	Toxic chemicals affect the health	
		of children	
	12.4.	Reducing toxics inside your house	
13.	Negati	ve side effects of genetically	117
	modifi	ed foods	
14.	Effects	of smoking on human health	133
15.	Impact	of toxic chemicals on society	159
16.	Conclu	ısion	161
	Refere	nces	171