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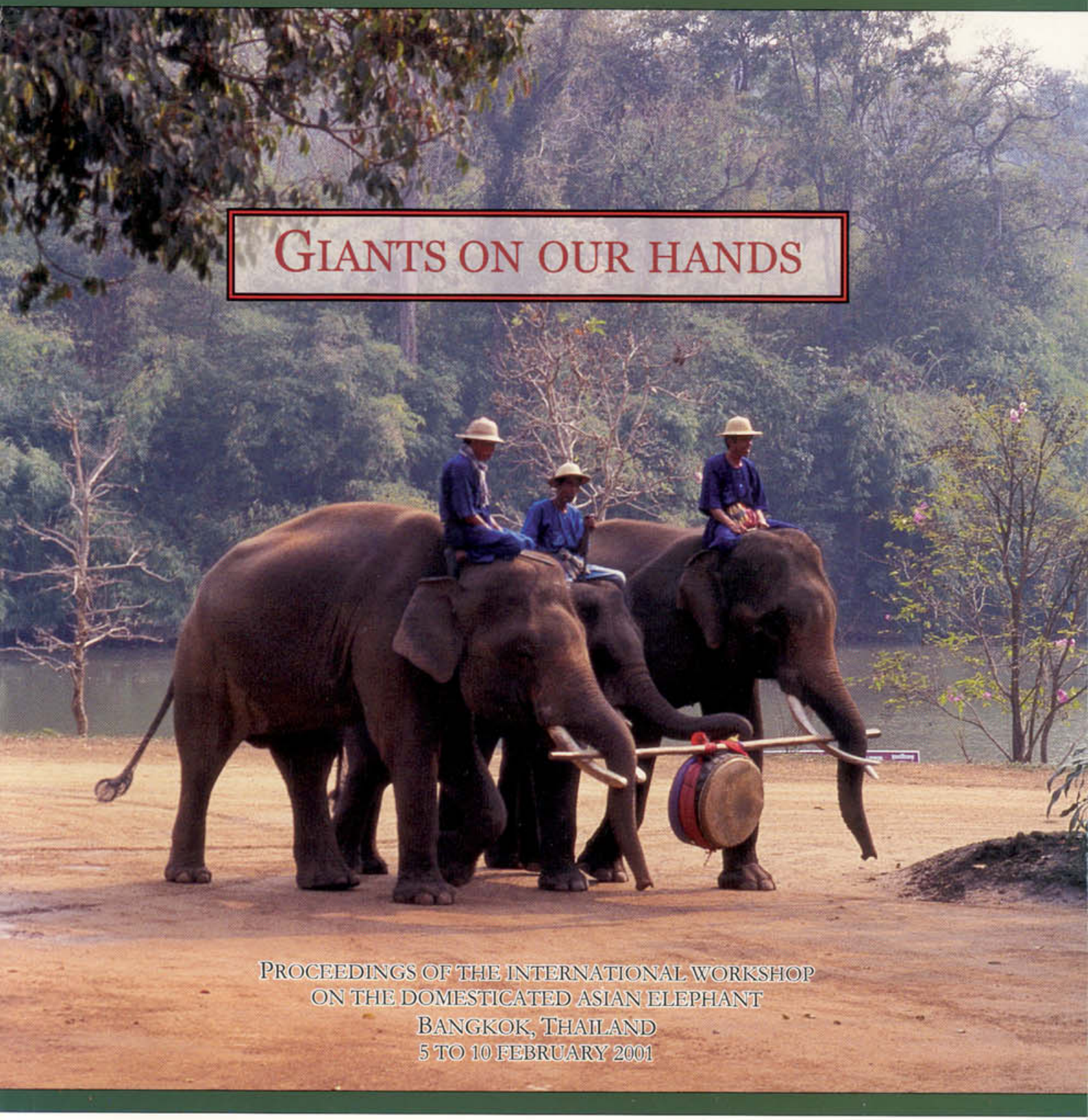
GIANTS ON OUR HANDS



PROCEEDINGS OF THE INTERNATIONAL WORKSHOP
ON THE DOMESTICATED ASIAN ELEPHANT
BANGKOK, THAILAND
5 TO 10 FEBRUARY 2001

Food and Agriculture Organization of the United Nations
Regional Office for Asia and the Pacific
Bangkok, Thailand

GIANTS ON OUR HANDS

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ON THE DOMESTICATED ASIAN ELEPHANT

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A royal white elephant of Thailand

Foreword

The Asian elephant has played an important role in the cultural, economic and social life of Asia for millennia. However, it has been increasingly marginalized in the region and, apart from Myanmar, there is now little demand for the traditional work done by elephants. Transporting goods and people over difficult terrain, for example, is now done by motor vehicles and most of this takes place on paved roads. Elephants in logging have been replaced by heavy machines in most countries, or logging itself has been banned to conserve scarce forest resources. Combined with the dwindling habitat, these changes are threatening the continued existence of elephants.

Recognizing such conditions, FAO and the Japan Wildlife Research Center (JWRC) jointly commissioned a series of studies on domesticated Asian elephants in all 11 domesticated elephant range countries in 2000. On the basis of these studies, FAO and JWRC organized an International Workshop on the Domesticated Asian Elephant, from 5 to 10 February 2001. The Workshop was attended by 101 participants from 21 countries, and produced a number of recommendations. This publication constitutes the proceedings of the Workshop.

One of the recommendations is to improve the age-old existing registration systems or to establish new ones for the domesticated elephants in every range country, for example, by introducing modern methods such as a small memory chip containing the elephant's life history, embedded under the skin of each elephant. Such a registration system would be directly linked to a sophisticated database for better care and management of domesticated elephants. Improving socio-economic conditions for mahouts and elephants is another recommendation. Unless they are provided with new sources of income, the long-standing traditional techniques and practical knowledge on elephant handling will be largely lost forever. We are pleased to see that, as a result of the Workshop, efforts to establish a data-base are beginning and a network of concerned persons is in the formative stages.

Many issues regarding the domesticated Asian elephant are shared by their wild counterparts surviving in natural habitats that have been severely threatened by human activities. Except in India, their populations have been declining under the pressure of human-elephant conflicts, illegal poaching, etc. We can easily see that other wildlife living in the same habitat have been suffering from a similar plight. We strongly feel that modern human communities must find ways to co-exist with nature. Consideration must also be given to the other species that inhabit the planet.

We sincerely hope that this publication will help increase awareness of the conservation and management of nature in general, and will serve as a useful source of information and be a good reference guide for elephant managers, specialists, NGO groups, and donors seeking opportunities to improve the management and utilization of Asian elephants, in particular.

Taisitiroo Satoo
President
Japan Wildlife Research Center

He Changchui
FAO Regional Representative for
Asia and the Pacific

Acknowledgements

FAO and the Japan Wildlife Research Center (JWRC) would like to note with appreciation the financial contribution of the Keidanren Nature Conservation Fund (KNCF) that amounted to 5 million Yen (about US$ 48 000), half of which was donated by Sekisui Chemical Co., Ltd for the country studies and the organization of the Workshop. FAO and JWRC appreciate the kind contributions of the United Nations Environment Programme (UNEP) Regional Office in Bangkok and the Thai Airways International Public Company Limited, for providing travel funds and air tickets for some of the Workshop participants.

The same gratitude is due to the Asian Elephant Art and Conservation Project in the United States of America, Melbourne Zoo in Australia, Los Angeles Zoo and Oregon Zoo in the United States of America, and Terra Natura in Spain for similar contributions, and to Fauna and Flora International, an NGO based in the United Kingdom, for sponsoring the participants from Indonesia and Viet Nam. The Smithsonian Institution in Washington D.C., the US Fish and Wildlife Service, Disney's Animal Kingdom in the United States of America, the International Fund for Animal Welfare in Belgium, and Project Elephant in India, kindly provided experts to the Workshop and Mr. James Ottaway Jr., Executive Vice President of Dow Jones and an ardent conservationist, sponsored Dr Andy Teare, an expert on endangered species databases.

FAO and JWRC would also like to acknowledge the valuable support of the Forest Industry Organization (FIO), a state enterprise of the Government of Thailand, for facilitating the field visit to FIO's Thai Elephant Conservation Center in Lampang. FAO and JWRC would also like to thank the Faculty of Agriculture, Chiang Mai University, and Ms Anchalee Aree and the Maesa Elephant Camp for hosting the final session of the Workshop in Chiang Mai, northern Thailand. The Faculty of Veterinary Science, Mahidol University, under the leadership of Dean Dr Parntep Patanakorn, kindly undertook the management of the editing and printing tasks of the proceedings.

Mr Richard Lair, an expert on the domesticated Asian elephant, greatly contributed to establishing the basic framework of the Workshop and along with Mr Masakazu Kashio played a major role in its organization. The original idea for the Workshop was derived from Mr Lair's publication (FAO, 1997) *Gone astray: The care and management of the Asian elephant in domesticity*.

FAO and JWRC would like to express their gratitude to the government officials, university researchers, NGO staff, and individuals who conducted field surveys, prepared and presented reports, and actively contributed to the success of the Workshop. Special thanks go to Professor Iljas Baker, Mahidol University, and Mr Masakazu Kashio, FAO Forest Resources Officer, for editing the proceedings.

Last, but not least, FAO and JWRC would like to express warm thanks to those participants from many countries who used their own funds to attend the Workshop.

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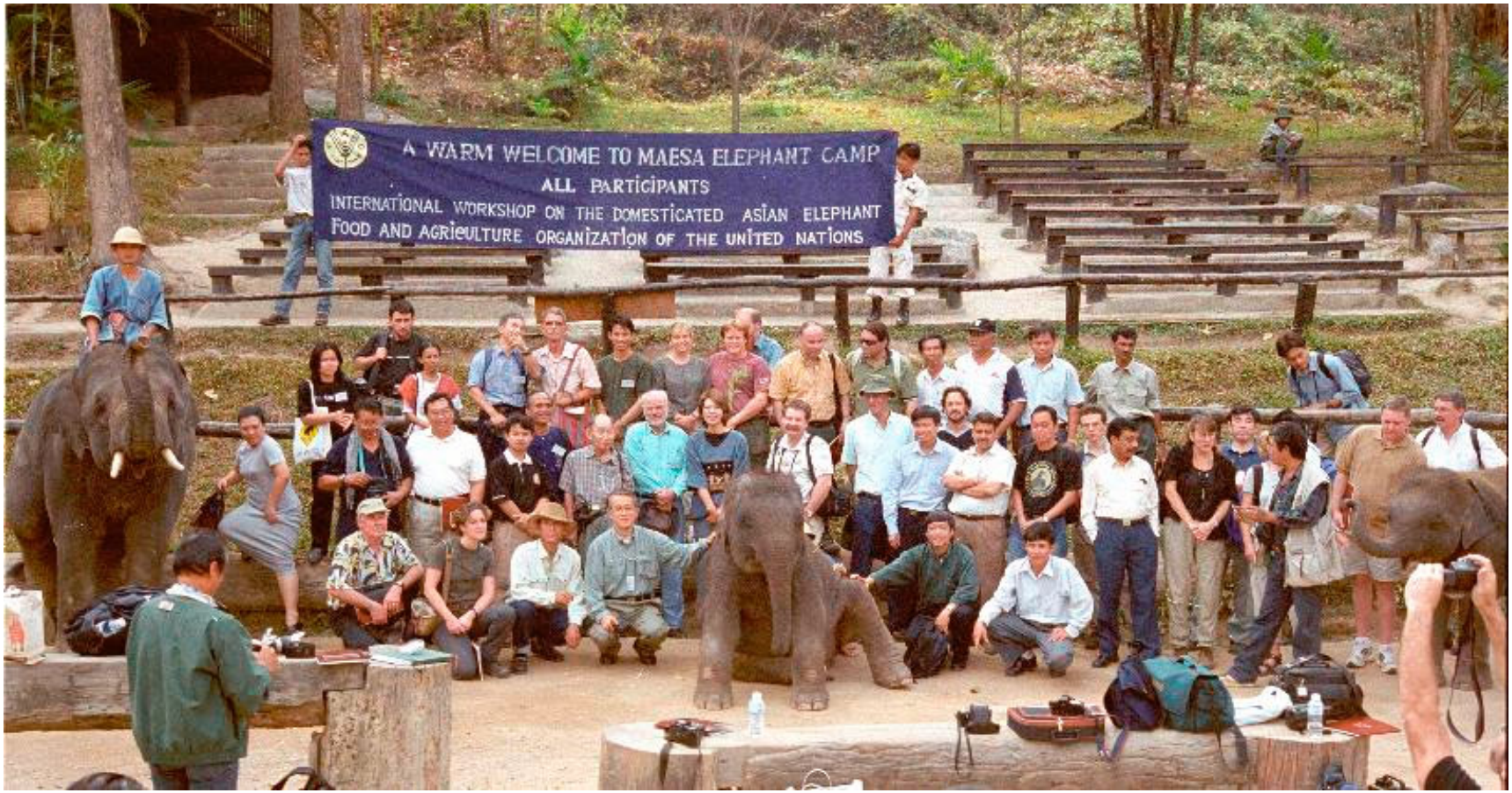

A group photograph at the Maesa Elephant Camp, Chiang Mai, Thailand

Opening address

R.B. Singh
FAO Assistant Director-General and
Regional Representative for Asia and the Pacific

Distinguished Experts;
Friends and Colleagues;
Ladies and Gentlemen,

It is my pleasure to welcome you on behalf of Dr Jacques Diouf, the Director-General of the Food and Agriculture Organization of the United Nations (FAO), and my colleagues in the Regional Office for Asia and the Pacific (RAP). I would like to congratulate the Japan Wildlife Research Center and the Forestry Development Group of RAP for jointly organizing this International Workshop on the Domesticated Asian Elephant at the beginning of the new century.

In the face of Asia's rapid growth, both the wild and domesticated Asian elephant populations are experiencing an ever-worsening crisis. The population of about 37 000 wild Asian elephants in 13 countries of South and Southeast Asia has been steadily declining, primarily because of habitat destruction. The population of domesticated elephants, estimated to be about 16 000 in 11 countries in 1995, has been declining also in parallel with their wild counterparts. Thailand had 100 000 domesticated elephants at the beginning of the twentieth century, just 100 years ago, but there are now only 3 800. The wild elephant population in Thailand declined from an estimated 100 000 to 1 500 during the same period.

The FAO Forestry Department's wildlife and protected area management programme has been active since the 1960s. The Forestry Department Group of RAP has been publishing the Regional Quarterly Bulletin on Wildlife and National Parks Management, Tiger Paper, for the past 25 years. However, nearly all of the efforts concerning elephants have been focused on wild elephants. FAO has noted that the domesticated Asian elephant receives much less global attention than its wild counterpart even though the animal is one and the same species. Funding support from donors to the domesticated Asian elephant has been next to nil.

Therefore during 1995–97, FAO launched a study on the domesticated Asian elephant and released a publication *Gone astray: The care and management of the Asian elephant in domesticity* in October 1997. This publication highlighted the lack of a proper elephant census and presented information on registration, legal status, veterinary care and health, trading, etc. It suggested more involvement from livestock departments and NGOs, as well as technical and financial assistance from the international community.

Given the fact that elephants have never been selectively bred and that most elephants in Asia are superbly pre-adapted for release, FAO would like to stress that the wildlife conservation community should consider playing a greater role in helping to monitor and assess the conditions of the domesticated sub-population. Ten or twenty years from now many of these animals will be critically important for wildlife conservation. In fact, domesticated elephants in some cases are being returned to wild settings, and also one has to keep in mind that there are various degrees of domestication. Thus, the elephant population in Asia represents a continuum. It would be interesting to study the genetic architecture of the various populations and identify the genetic pattern and control of domestication.

Elephants have always been a part of Asian cultures, religions and societies. These jumbos have shared our battlefields, royal compounds, cities, rural dwellings, work forces and of course forests. Revered as a symbol of wisdom, Lord Ganesha, the elephant-headed god, is the first god to be worshipped in India virtually on all occasions. Here in Thailand, Erawan was the elephant carrier of the four-headed god, whose statue many of you might have seen in the heart of Bangkok. On the

Indonesian island of Bali the temple doors are often protected with the elephant 'god', inscribed as Gaja Dwar (elephant gate).

Most importantly, the study of elephant behaviour, its relation with its master (mahout), a huge power being controlled by a small man, offers a rare opportunity to understand the complexities of behaviour. Asian elephants have co-evolved with the Asian people. Caring for elephants in Asia is therefore just not caring for an animal species, but it is much more than that.

Thus, I am so pleased that this first International Workshop on Domesticated Asian Elephants is being organized at the FAO Regional Office for Asia and the Pacific. Since the publication of *Gone astray* there have been increasing offers of support to help improve the situation of domesticated Asian elephants. The support of the United States-based NGO International Fund for Animal Welfare (IFAW) to an FAO project working to produce an elephant care manual is one case in point. Such goodwill and momentum should be accelerated and increasingly coordinated. Thus, there is a strong need to convene this International Workshop on the Domesticated Asian Elephant.

Ladies and Gentlemen, in closing, I wish to acknowledge the generous support of the Keidanren (Japan Federation of Economic Organizations), which contributed the major financial support for 11 country studies on elephants and the organization of this Workshop. The Keidanren Nature Conservation Fund (KNCF) has provided 5 million Yen (about US$ 48 000), half of which has been donated by Sekisui Chemical Co., Ltd, and I am pleased to see that Mr Toshihiro Arai, the President of Thai Sekisui Foam Co., Ltd, is here today.

I also acknowledge with thanks the generous contributions in cash or in kind of the Regional Office of the United Nations Environment Programme (UNEP) in Bangkok, the Forest Industry Organization of Thailand, the Thai Airways International Public Company Limited, the Asian Elephant Art and Conservation Project in the USA, Melbourne Zoo in Australia, Los Angeles Zoo and Oregon Zoo in the United States of America, and Terra Natura in Spain. Fauna and Flora International, a United Kingdom-based NGO, sponsored the participants from Indonesia and Viet Nam. The Smithsonian Institution in New York, and the United States Fish and Wildlife Service kindly provided its experts to the Workshop and Mr James Ottaway Jr., a newspaper owner in the United States of America, sponsored Mr Teare Andy, an elephant database expert. As a result of these generous contributions we have been able to bring together many experts and knowledgeable participants who will surely enrich the six-days long Workshop.

I wish you all a very challenging, rewarding and enjoyable workshop. I eagerly await the results and recommendations of your deliberations. It is now the dry season and the most comfortable time in Thailand. So, have a pleasant stay in Bangkok, and Lampang and Chiang Mai in the north during the field trip.

Now, I declare the Workshop open.

Thank you.

Welcome address

Toshihiro Arai
President of Thai Sekisui Foam Co., Ltd.
On behalf of Hirotaro Higuchi
Chairman of the Keidanren Committee on Nature Conservation

Distinguished Experts and Observers;
Friends and Colleagues; and Ladies and Gentlemen!

It is indeed a privilege for me to deliver this opening address on behalf of Keidanren and to welcome you to this International Workshop on the Domesticated Asian Elephant. We would like to congratulate FAO and the Japan Wildlife Research Center for organizing the Workshop and we are honoured to be able to provide funds for the workshop at the beginning of this new millennium – the twenty first century.

Let me explain briefly what Keidanren is. The name Keidanren is an abbreviation in Japanese for the 'Japan Federation of Economic Organizations'. It was established on 16 August 1946 as a nation-wide business association. Its membership includes 1 009 of Japan's leading corporations, including 63 foreign firms, as well as 119 industry-wide groups representing such major sectors as manufacturing, trade, distribution, finance, and energy.

The purpose of Keidanren is to work to resolve the major problems facing the business community in Japan and abroad, and to contribute to the sound development of the Japanese and world economies. To this end, many committees have been established to deal with various policy issues. We also co-operate with international bodies as well as governments and business organizations in other countries to solve international problems. Furthermore, we encourage our members to adhere to the Keidanren Charter for Good Corporate Behavior and the Keidanren Global Environment Charter in order to win the goodwill of society. The Keidanren Nature Conservation Fund, through which we are sponsoring this Workshop, is one of our commitments to the global society.

We visualize that the new century will and should be characterized by the creation of a more harmonious balance between economic activities and the environment. In the twentieth century human communities rapidly expanded their economic activities everywhere on earth in the course of scientific and technological development. In the rush to utilize more natural resources to make a more comfortable and convenient life we have been careless about the consequences of our actions. Thus we are now facing serious environmental degradation and the depletion of natural resources. Pollution of the air, water, soils and food is increasingly threatening our health. The depletion of once rich natural resources such as forests, seas, soils, minerals, animals, plants, and so forth is threatening our future prosperity.

I understand that the critical conditions facing Asian elephants are derived from the development philosophy of the twentieth century. Unfortunately, we are not free of this philosophy, and we have not found a better alternative yet. We business corporations, however, feel a change in the direction of the wind towards the future. That change is "ecologically harmonized development" that takes more care of our environment, people and communities and all living creatures on earth. This Workshop aims to explore such a subject, I believe.

I wish you all a very challenging and rewarding Workshop. We of Keidanren eagerly await the results and recommendations of your deliberations.

Thank you very much for listening to my short address. Have a pleasant stay in Bangkok, Lampang and Chiang Mai.

Welcome address

Manoonsak Tuntiwiwut
Deputy Managing Director, Forest Industry Organization, Thailand

Distinguished Experts on Asian Elephants;
Friends and Colleagues working for elephants;
Ladies and Gentlemen,

I am honoured to be here today to welcome you to this important meeting on behalf of the Forest Industry Organization, or FIO, which is the government corporation that directs the forest industry, from logging to processing of wood, in Thailand. We are proud to have been involved from the preparatory stage up to today as the local collaborator for the Workshop. Mr Richard Lair, the keynote speaker and driving spirit of this Workshop, is the Advisor to the FIO's elephant programmes. Mr Prasop and his group, who carried out a study on elephants and ecotourism for this Workshop are also FIO staff. We are also taking care of the field trip programme of the Workshop in Lampang and Chiang Mai.

Historically, FIO has been the biggest organization in Thailand taking care of and utilizing the domesticated Asian elephant. The physical power of elephants has been invaluable in our forestry operations, especially in yarding and transporting teak logs in mountainous areas. FIO provided a school, hospital or clinic, and a retirement home for our working elephants. Through our famous Young Elephant Training School in Lampang, young elephants were trained in the skills of handling teak logs by senior elephants. Wounded or sick elephants were treated either at a campsite clinic or a hospital by our elephant veterinarians. FIO employed many mahouts, or "elephant masters and operators", and young trainees.

This situation drastically changed with the nation-wide logging ban in January 1989. No more timber harvesting work was allowed after that, although some work for our mahouts and elephants, such as moving out logs that had been already girdled, felled and stocked in forests remained up to 1992–93. All logging licences issued to either government agencies or private companies were cancelled. Because FIO held about 60 percent of the 306 logging licences, we experienced the biggest impact in terms of earnings and employment, especially for the field workers and elephants. The Young Elephant Training School became obsolete and was closed. The number of working elephants and mahouts was reduced by almost 50 percent. None of the sons have taken over their fathers' profession as mahouts. It is regrettable that the skills and knowledge on handling domesticated elephants that were accumulated over centuries in Thailand are quickly disappearing. I cannot, however, criticize the mahouts because there is no future in this profession – no jobs and no income, thus no secure livelihood for either mahouts or elephants. I hope that these subjects will be discussed in this Workshop and new ideas and directions will be developed on how our elephants and mahouts cannot only survive, but also prosper in the future.

The establishment of the Thai Elephant Conservation Center, or TECC, in 1991 along the Lampang – Chiang Mai highway was one of our initiatives. All young elephants and most of the working elephants were moved to the center. They can now earn some income from visitors by demonstrating timber harvesting and some other skills. This center also has a medical center as well as a retired elephant home. There are also other activities in the center. The newly organized elephant orchestra and elephant painting activities are two ideas that have been highlighted in the media under the innovative and enthusiastic guidance of Mr Richard Lair. FIO is also working with FAO on a project to produce elephant care manuals under the financial support of the International Fund for Animal Welfare (IFAW). You will be able to see all these activities in Lampang during your field visit on 9 February.

I wish you a very rewarding Workshop. We are looking forward to receiving you at TECC in Lampang on the 9th of February.

Thank you.

Opening remarks

Masakazu Kashio
Forest Resources Officer, FAO, Bangkok

Dr R.B. Singh, Assistant Director-General of FAO and Regional Representative for Asia and the Pacific;
Mr Toshihiro Arai, President, Thai Sekisui Foam Co. Ltd;
Mr Manoonsak Tuntiwiwut, Deputy Managing Director, Forest Industry Organization, Thailand;
Asian elephant colleagues;
Ladies and Gentlemen,

Good morning everybody! On behalf of the organizer of the Workshop, FAO and the Japan Wildlife Research Center (JWRC), I would like to express my warm welcome to you all to the International Workshop on the Domesticated Asian Elephant.

Let me explain the background of this Workshop briefly. The initial idea of this Workshop was derived from the publication *Gone astray: The care and management of the Asian elephant in domesticity*, which we released in October 1997 under the authorship of Mr Richard Lair. Having an international meeting on the domesticated Asian elephant was one of the recommendations spelt out in this book. The first proposal was prepared in February 1998, and Richard and I started to find a sponsor, at the same time seeking partial funding support from FAO Headquarters in Rome. A few months later, we received a favourable response from the Smithsonian Institution in New York. We expected funds to be forthcoming by the beginning of 1999, but these never materialized.

During my home leave to Japan in the spring of 1999, I approached the Japan Wildlife Research Center in Tokyo with a Workshop proposal. Professor Satoo, the founder of JWRC, and Dr Komoda took my proposal very positively and we agreed to jointly apply for funding to Keidanren — the Japan Federation of Economic Organizations. A formal application was submitted in November 1999; it was approved in March 2000 and a sum of 5 million Yen (about US$48 000) was allocated to us. We were very fortunate in this attempt, because Professor Satoo was a board member of the application screening committee of the Keidanren Nature Conservation Fund, and Dr Komoda used his considerable negotiation skills on our behalf. Without their strong support, the 11 country studies and the Workshop would not have been possible. In this regard, we would like to express our great thanks to them again.

To provide the necessary funds for the Workshop, we called for contributions from all over the world. As a result, we have received many kind contributions, not only in cash, but also in kind, as stated in the opening address of Dr Singh. For example, we received free air tickets from Thai Airways International, and the travelling costs of experts from India, the United Kingdom (UK) and the United State of America (USA) were also provided by other organizations or institutions. The members of the Organizing Committee would like to express our heart-felt appreciation to those donors again.

As an aside, I would like to mention that another follow-up of *Gone astray* is the *Elephant Care Manual for Mahouts and Managers Project* (MTF/THAI/001/IFW) for which we have been granted US$75 000 from the International Fund for Animal Welfare (IFAW), the USA-based NGO. This 18-month project started in June 2000 and the work is in progress based at the FIO's Thai Elephant Conservation Center in Lampang.

This Workshop, being the first international conference without a strictly veterinary focus, aims to discuss all of the larger management aspects of the domesticated Asian elephant in a neutral forum. The primary objectives of the Workshop are:

1. defining the situation;
2. identifying priority areas of work, especially in registration and national laws;

3. developing work plans for each identified priority area; and
4. developing a networking mechanism.

Some of you know the situations of domesticated Asian elephants in the respective countries or states where you live or work. Different countries, it seems, have both similar and unique problems. Some countries such as India, Malaysia, Sri Lanka and Thailand, have the capacity to launch programmes either using their own funds and manpower or with the assistance of donor agencies. On the other hand, others, such as Lao PDR, have little indigenous capacity. The elephant situation varies very much by countries, states and/or provinces, so please listen to the country presentations to widen your vision and deepen your understanding on the current situations of domesticated elephants throughout Asia.

We are proud to inform you that every country study has brought new information. The Cambodian study includes the first nation-wide population census on the country's domesticated elephants. This report has also made clear the critical declining trend of the wild elephant populations. Two studies in Thailand: "Street wandering elephants in Bangkok" and "Ecotourism and elephants" are unique and timely studies providing us with rich detail. At the same time, I recognize that there are many on-going projects supported by a government such as "Project Elephant" in India, or by foreign NGOs like Fauna and Flora International (FFI), Wildlife Conservation Society (WCS), World Wildlife Fund (WWF), or in official aid programme like the United States Asian Elephant Project Fund, etc. These projects have helped our country studies a great deal.

There is an obvious linkage between wild and domesticated elephants. The former has been the major supplier to the latter historically, and even now this continues in some countries such as Myanmar. However, this supply role is diminishing. We can now see some initial activities to reverse the direction of the supply with domesticated elephants being released into the wild, for example in Sri Lanka and Thailand.

Wild elephant conservation experts and their organizations have been fighting against further degradation and loss of elephant habitat. They are keen to establish more protected areas, and are working to solve human-elephant conflict, etc. Domesticated elephant groups have been working for elephant welfare and veterinary services. Both efforts are valuable and noble. However, we need better collaboration between these two groups and coordinated activities on the ground. This is one of the issues that we will discuss during the Workshop.

As you know, laws, regulations and registration systems provide the most basic institutional framework for action. If they are not updated to reflect the current socio-economic reality they can act as barriers to the implementation of appropriate actions. And without a proper institutional framework public funds and manpower cannot be properly allocated. This subject is also going to be discussed in this Workshop.

Our intention is to discuss such subjects in the Workshop to find a way to improve the situation of the domesticated elephant both at present and in the future. Ideally, we need a very wide range of Workshop participants – from wild elephant biologists to veterinary doctors – to ensure a comprehensive and balanced view and to come up with innovative solutions. Such a gathering would also provide an excellent opportunity to bring these groups closer together. In reality, however, we did not have the budget to invite everybody, and also the response from those groups whose focus is on the wild elephant was not so positive.

As this is a neutral forum of the United Nations, please feel free to express any opinions whatsoever on the issues of domesticated Asian elephants from every angle. Some participants from government or NGO organizations may have restrictions to express personal views on behalf of their organizations. The Organizing Committee of the Workshop, however, wishes you to act in your capacity as an individual expert, and not as a representative of the authorities and organizations that you belong to.

However, please keep in mind one important point, which is that your statements should be scientific, logical, rational and either supported by research works or facts that you have directly observed or experienced. Please avoid political propaganda, emotional arguments, and personal ego, because these are neither appropriate nor constructive to achieving the objectives of the Workshop.

In closing, may I acknowledge with grateful thanks the support we have received from the FAO Representative offices in ten countries, and the UNDP Office in Malaysia. They have been taking care of many humble administrative jobs between the FAO Bangkok Office and concerned government partners or individuals. The same thanks go to the international NGOs working for Asian elephants. They sponsored national counterpart staff and themselves. Some self-sponsored participants travelled all the way from Australia, Belgium, Canada, Denmark, Japan, New Zealand, Singapore, Spain, UK, and USA for this Workshop. I appreciate their enthusiastic interest in the Asian elephant.

Lastly, I would like to convey to you the best wishes of Mr El Hadji Sène, Director of Forest Resources Division, Forestry Department, FAO, Rome. He was the key person who provided funds for the *Gone Astray* publication, which, as I mentioned earlier, was the origin of our Workshop. He sends you his greetings and wishes you a very successful outcome.

Thank you very much for your kind attention to my opening remarks.

Keynote address

A regional overview of the need for registration of domesticated Asian elephants

Richard Lair
Domesticated Asian Elephant Specialist and FAO Consultant

I firmly believe that Asian elephants, having never been selectively bred, are wild animals pure and simple, and, therefore, they should not be kept in captivity. Nonetheless, I equally firmly believe that, at least into the medium future, very few elephants will be released into the wild, partly for lack of suitable space and partly because certain elephants should not be released: dangerous bulls, likely crop raiders, etc. Thus, it falls on those who manage the 15 000 elephants in captivity to be both at once very pragmatic and very sensitive. Most of us in this room have or once had power over elephants so there is no need to explain to you the difficult choices, even soul searching, required when you meddle with the lives of these magnificent animals.

I was expected to give an overview talk, a factual overview of each country, summarizing the country reports. Unfortunately, many country reports arrived very late, and I have not had time enough to analyse them. Therefore, I will cover this subject only slightly in this keynote address. In any case, a press release covers the big picture, and the country reports – which will in many cases be further edited and improved – have the full details. Besides, you all know the big picture already. The usual story is that numbers are going down and conditions are worse than they were five years ago. The problems are the same: lack of employment, depleted forests, the loss of traditional knowledge, the increasing number of incompetent mahouts, lack of funds, the problems of tourism-related work, etc.

This talk is going to have a more personal tone than is usual for such meetings because what I am going to talk about has long been of great concern to me. As far as I know, I have written the only material about the need for registration of Asian elephants in Asia, first in an article called "Need for an international registry of domesticated elephants" in *Gajah* in 1992 (although the paper was actually written for an AESG meeting four years earlier in 1988); also much was written about registration in *Gone astray*, and let that serve as the detailed objective argument. This talk is also personal simply because the subjectivity which that tone allows will enable us to cover the ground much faster, to deal with the big picture.

I came to south India in 1978 to observe wild elephants, my only interest at the time, but in the back of my mind I presupposed limitless elephants in maharajahs' palaces and traditional logging camps far off in the forest. There is great irony in the fact that I now think it is incumbent on us to put a number on each and every domesticated elephant - and those elephants are clearly not limitless.

The subjects of this workshop are registration, law and networking. Or put another way: registration, registration, and registration. Registration enables all else; without registration, it is very difficult to make a good job of law enforcement, veterinary care, population research, economic studies, or any sort of macro-management at national or state level. Proper registration means that each animal has a unique number, usually with an implanted microchip but sometimes some other mark, plus full contact information and biodata to a very high standard. Further, that information and biodata should be in a form that is both easy to access and easy to use.

In Asia there are some elephants already registered or at least documented to meet a very high standard, particularly forestry department elephants in India and Myanma Timber Enterprise elephants in Myanmar; but nowhere in Asia are the standards of easy use and access met. And even in India and Myanmar there are thousands of elephants documented to a very poor standard or not at all.

If one accepts that elephants are in trouble and need better management and care, and if one further accepts that we only have an unclear picture of what we are managing, it then follows that all Asian countries with elephants need an integrated form and database to track and monitor that country's elephants. If the need for better data is universal, then why reinvent the wheel? As the information required is the same throughout the region, why not use the same form and the same database?

I am not an expert in any single one of the demanding scientific disciplines needed to create a registration procedure: population dynamics, statistics, computer programming, etc. But perhaps it is my lack of specialization that enables me to see not just the need – after all, every specialist sees the need for the data he wants – but rather to see the actual possibility of registering a very large number of Asia's domesticated elephants in a very short period of time.

We will explore registration later, including a country-by-country analysis, but first let us make a short excursion into the realms of law and networking.

Law

Law is fundamental, but without registration many aspects of law enforcement and humane management are impossible; the most important law, therefore, is to simply require registration on penalty of fine or confiscation. In virtually every country in the home range, but most particularly in CITES signatories, it can be safely said that law is problematic and contradictory. Much of the confusion and awkwardness arises because in most countries *Elephas maximus* is classified either as a wild animal (and an endangered one at that) or as a domesticated animal. Ethically and intellectually, I believe that elephants are wild animals. Practically, however, I believe they are usually better cared for when managed as domesticated animals, if only because livestock departments have far more of the resources elephants need – veterinarians, laboratories, highway checkpoints, etc. – than do forest departments. In fact, however, it is best if all government agencies – forest department, livestock department, law enforcement, etc. and even NGOs – join together, each doing what they do best.

A model law would be a good foundation. Creating a new law needs a bottom-up approach, at least in the initial stages. Whether talking about welfare or conservation, elephants need a special law that is built on their actual physical needs, not a law that works down from a theory. All of the people in this room are 'elephant people', and it is better that we elephant folk systematically think through all the rules needed to ensure or at least maximize humane treatment to the elephants - and only then to call in the lawyers needed to codify those rules. Any special law should provide elephants with all of the standard benefits guaranteed to domesticated animals, plus whatever special protection can be gained by virtue of their status as wild animals.

Most mahouts and many owners have a village mentality and, while often wary of government officials, they are often happy, even flattered, to deal with NGOs, academics, even foreigners. Still, getting villagers to register their elephants requires a carrot and stick approach, but with as much carrot and as little stick as possible. The stick is of course the threat of fines and penalties, perhaps even confiscation, for not registering. The carrot is usually veterinary care.

Networking

Networking is important because there are many people and institutions in need, but there are also many people and institutions ready to offer help. The very least that could and should be done is a switchboard or clearing house that helps to connect people. Much of this support, both in terms of funds and knowledge, will flow from the West to the East but particularly for knowledge there is much the East has to teach the West. Nonetheless, the need for networking is so evident and self-explanatory that I will not discuss it further here.

Domesticated elephants and wild elephant conservation

Dr Michael Stuewe will talk in greater length about the role of domesticated elephants in wild elephant conservation, so I will keep my remarks brief. In *Gone astray* I listed ten ways in which well-managed domesticated populations help to conserve wild elephants. Indeed, from one perspective they are one and the same population: if you capture a wild elephant and put it in chains, it is then domesticated; if you release into an appropriate place a preconditioned domesticated elephant - and most in Asia are already pre-adapted - it will very likely become a wild elephant.

From another, more conventional perspective, however, the two populations are quite distinct. Pretty much everywhere fewer and fewer wild elephants are being captured (except for Indonesia and a few other places); and no matter how imminently 'releasable' domesticated elephants might be, unfortunately there are very few suitable places into which they might be released. From this gloomier perspective, the wildlife conservation value of domesticated elephants is perhaps not very significant, thereby by default leaving the arena to animal welfare. With every passing year, I must admit, I feel less of a conservationist and more like an animal welfarist. I want to help individual animals. But I do want to help them in a realistic way, which means being objective and scientific.

But whatever the case, good data derived from proper registration is needed to assess the value of domesticated elephants in wildlife conservation.

The need

Why is there a need for a unique number? In law enforcement, such a number is needed to prevent abuse, to foil theft (a boon to the owner), but more importantly to stop illegal trade across international borders, which is rife; for example, without a sure means of identification it is easy to smuggle calves out of Myanmar (where calves are useless and cheap) to Thailand (where they are costly and in great demand). In veterinary care, there is no need to explain the need. I have been getting all sorts of information from the United States and Europe about tuberculosis (TB). If TB were to be found here in Asia, registration would be essential for long term treatment. In Thailand recently the very first case of trypanosomes was found – in a test tube with no name or number on it. In Thailand, where some elephants are treated by more than one NGO, registration could prevent an elephant getting double doses of Ivermec.

In management and population analysis, registration is needed to simply gather the required data; in Thailand (and Sri Lanka) I would suspect that full data would show that the population has a very high median age compared with a typical wild population. I think that in many parts of Thailand, if not all, a surprise result would be a fairly high birth rate, the reason being that with many cows not doing logging, and with the demand for calves in tourism, more owners are breeding their cows, cows that are in better condition than when they were logging. To test this conjecture, however, one would have to separate legally bred calves from illegally smuggled calves – another argument for registration.

Marking

Microchips are of course the most obvious and probably the best way to mark elephants. While microchips are costly, they are not prohibitively so, and I do not believe funding would be a problem. Because of the cost, however, microchip readers will always be few and far between, and it would thus be highly desirable – perhaps even essential – to have an external mark, irremovable and ineffaceable, that without any special equipment can easily be read by any livestock department official, police officer, park ranger, etc. This external number might be a lip tattoo, but is mostly likely to be an ear tag, a possibility which should be explored and would probably be quite easy – if not for the elephant's trunk and its uncanny ability to get things loose.

The registration form

The ideal registration form – let us call it 'the basic form' – would obviously include all relevant biodata and contact information. The ideal basic form would be no longer than two pages and would be designed to be filled out as simply and as efficiently as possible. The basic form would be provided to each range state country, but with the addition of the national language to English and with perhaps some small additions to deal with issues unique to that country.

The first page of the basic form should include a 'short form' with a much sparser data field than the basic form. The short form is used on occasions where there simply is not enough time to deal with many elephants, such as religious processions or festivals, or when it is difficult to elicit full information from mahouts or owners. Elephants found in the short form are obviously to be followed up later.

The basic form should have some optional secondary forms with the potential to add new forms at any point. A veterinary report form is the most obvious secondary form, as are other forms with detailed physical data (nutrition, genetics, blood, hormones, etc.). Other forms might deal with employment history or economics. The veterinary form might well be developed simultaneously with the basic form, but most of the others could be developed by – and funded by – specialists.

A very short handbook would be needed on how to correctly gather and enter data into the form and then how to subsequently access and use the database. That handbook could be printed in national or even regional languages as well.

The basic form must include provision for the owner to protect his privacy, particularly when registered by a non-government entity, so as to build trust with the owners. Owners should be given the choice of not passing the information on to the government or the general public. Owners could be given the choice of full disclosure or of disclosing all biodata, but no names or contact information.

The database

Dr Andrew Teare will talk about databases and more technical issues. I looked at both ISIS and the North American Studbook. It seems to me that, primarily because of a lack of data fields, neither would serve in Asia. My impression is that both were started at a time when computer memory was very scant – or perhaps it is just that both of those databases are simply large enough to serve the need. But while not preposterous in its demands, the new database will need much more information. There must be an existing database, probably for human or animal health care, that would, by adding some data fields, do the job. An animal database (several people have suggested ARKS) might be good if it contained provision for genealogy. On the other hand, a database for humans would be more complete, having space for addresses, phone numbers, names, etc.

My final awareness is that I do not know even enough for intelligent speculation. The bottom line is that there probably will be no need to write the software from scratch. And even if the software needed to be written in its entirety, it would be a simple enough task that could be done in any university.

Likely possibilities for registration country-by-country

Sri Lanka has probably about 200 elephants. While the Department of Wildlife Conservation registration is incomplete, I believe several researchers and NGOs have covered pretty much all the island; the Sri Lanka delegation will update this, I am sure. It seems to me that registering all of these animals could be done in a year or two.

India has always been very blurry as to numbers, but it seems that virtually all elephants are known to officials or able to be tracked down, missing only a few in the Northeast. The problem with India is that domesticated elephants fall under the supervision of different states and this means dealing with at least 11 agencies. If Project Elephant and the central government coordinated the work of the states, and if the states could involve forest departments, livestock departments, universities, etc., then registering nearly all of India's elephants should be fairly easy. Of course, some elephants will be out of their home state – but that is one of the purposes of registration, isn't it? To be able to track elephants and even to control their movements. So, India should not be hard so long as people are motivated.

Nepal and Bangladesh have very small populations, which are already well documented and could be perfectly documented in short order.

Myanmar is perhaps half extremely easy and half pretty difficult. The elephants of the Myanma Timber Enterprise (MTE) are superbly documented, both in each animals' register book 'Form J' and also in data from the Smithsonian project, about which we will hear more. For those elephants, international registration probably consists of no more than transferring data from one database to another. Myanmar's privately owned elephants will be more difficult. Some private elephants do contract work for the MTE, and registering those would be easy; most other private elephants probably get their veterinary care from forest department vets so there is at least one likely avenue to conducting a concerted effort with private elephants.

Thailand has all of the resources to do full registration of its approximately 2 500 elephants. The question is who is going to do it? The Local Administration Department of the Ministry of Interior would ideally be the agency given that they have the legal mandate and have registered elephants for 70 years, although collecting only sparse data; I am anxious to hear their views on the possibility of introducing a new form. Further, numerous NGOs have microchipped elephants and keep their own records. With a good physical infrastructure, many officials and NGOs, Thailand could very quickly register all of its domesticated elephants. The problem will be to coordinate all the various players.

In the Lao People's Democratic Republic, the Department of Livestock and Veterinary Services keeps pretty good data on most of the country's roughly 1 200 domesticated elephants. With some support it should be easy to document perhaps 80–90 percent of the elephants within a year or so. It should be noted that registration could play a very useful conservation and welfare function by controlling illegal international trade between Thailand and Laos. Calves and perhaps docile cows are certainly being brought into Thailand for tourism and it is sure that some good Thai logging elephants are going to Laos. (The Thai-Myanmar border has the same problem.)

Cambodia is a very real problem. So little is known, and infrastructure is so poor, as to make it very difficult to register elephants. Of course the lack of information makes it all the more important to identify and register the surviving elephants. The Department of Animal Health and Production, probably in association with the forestry department, would definitely need help.

Viet Nam's elephants have to be very easy to register because there are so very few elephants, and because the mahouts are all tribal and thus of interest to anthropologists. The Forest Protection Department takes a strong interest in these elephants.

Malaysia has to be very easy because there are so few elephants and they are all government-owned and cared for by the Department of Wildlife and National Park's Elephant Management Unit.

Indonesia should make for easy registration. All of the elephants are in government hands, the Directorate of Forest Protection and Nature (PHPA) (essentially the forest department), or those of a few largely highly responsible private owners. Various international conservation organizations are very active on the island of Sumatra: Fauna and Flora International, World Wildlife Fund–US, Wildlife Conservation Society, the European Union, Global Environmental Facility, and others.

The chances of success

Registering 15 000 elephants (and their future offspring) in 11 countries to a universal standard sounds daunting. Some people have told me that it is impossible, but I think not for several reasons. First, in the year 2001 nearly every elephant in Asia is very near a road so we are not talking about launching major expeditions. Second, in many countries there are existing data that could be transferred to the database, probably by completing the short form and at least partly filling some of the basic form. Third, the registration package would make it easier for people to do their own work. The real obstacle is really a lack of tools, not a lack of manpower or technical skills. Computer literacy is universal in Asia and in any case the core database should be extremely easy to use. There are plenty of people who regularly go into the field with government agencies and NGOs as part of their daily work.

All the above presupposes that the agencies and organizations involved are genuinely motivated to do the job. In the simplest case, that of motivated people with basic resources, you simply send them the software and the means to print the basic form and then await the data. Some partners might lack suitable computers and need to be given equipment. In critical situations or where partners require some inducement, there may be a need for money for per diems, fuel, etc. Obviously, the more money spent, the faster the work would go; if you bought four-wheel drive vehicles and paid local staff, the work would go very quickly indeed. But there is clearly no need for such extravagance. In any case, I do not think that finding funds will be a big problem. Through my work at the Thai Elephant Conservation Center, I get a voluminous amount of unsolicited email from people I do not know, sometimes lay people, sometimes experts, sometime institutions, and there is no doubt that there is great interest in helping. Many are interested in a particular country, which should help funding. And the fact that registration is not only needed for conservation but also has great usefulness in animal welfare efforts will make funding easier.

Conclusions

I would like to go on record as saying that I think it perfectly possible to register at very least 70 to 80 percent of Asia's domesticated elephants in three years, one year for the development of tools and two years in the field. Yes, it will be hard work, but the first two steps – devising a form and selecting or creating a database – are both relatively simple, straightforward and inexpensive. I hope we finish this workshop with a firm commitment to seriously explore the possibilities of going at least this far. I think many people and many institutions would be happy to help – not that all that many resources are required.

Devising the form and the database are bound to create interest in actually implementing registration. Sending the software over the net costs nothing. Paying to print the basic form with the addition of the national language and then distributing it costs little. I would think that perhaps 90 percent of Asia's domesticated elephants live and work within an hour's drive of an Internet cafe. These elephants have been ravaged by the harsher side of modern technology; let us give them the benefit of some protection and help from the information side of that technology.

The registration form and database are tools; they are not an end unto themselves. The purpose is to give all Asian elephants a history so that they can be individually traced. In various countries in Asia, elephants are being captured under dubious circumstances and being sent to unsuitable sites in-country or even sent to other Asian countries under even more dubious circumstances, often resulting in horror stories that never become known to the international conservation or animal rights community. Without proper registration, it is impossible to protect elephants from such abuse.

The Mahout Training School of the Forest Industry Organization at Lampang

Dr T. Satoo, President of the Japan Wildlife Research Center at the Mahout Training School, Lampang

Part 1: Record of discussions

Plenary session at the FAO Regional Office, Bangkok

Group discussion at the FAO Regional Office, Bangkok

Summary of the International Workshop on the Domesticated Asian Elephant

Masakazu Kashio

The FAO Regional Office for Asia and the Pacific and the Japan Wildlife Research Center (JWRC) jointly organized an International Workshop on the Domesticated Asian Elephant from 5 to 10 February 2001, in Bangkok, Thailand. This was the first international meeting to be held on this subject by a UN agency.

Prior to the Workshop, a series of studies in 11 domesticated elephant range countries was carried out and the results were presented to the Workshop. The main objectives were to:

1. Define the situation of domesticated elephants in eleven range countries;
2. Identify priority areas of work, especially on registration and laws;
3. Develop work plans for each identified priority area; and
4. Develop a networking mechanism.

Over 100 participants attended the Workshop. The participants came from 22 countries, including all 11 countries that have domesticated elephants, plus Australia, Japan, New Zealand, and Singapore from the Asia-Pacific region; Belgium, Denmark, France, Spain and the United Kingdom from Europe; and Canada and the United States of America from North America. The participants consisted of government officials, representatives of UN agencies, international and national NGOs, elephant keepers from zoos, researchers, representatives of the mass media, representatives of private enterprises in the tourism industry, and private individuals.

The first four days were indoor sessions in Bangkok, and the last two days were devoted to a field trip to northern Thailand to observe various elephant conservation and ecotourism activities. The summary session was conducted in Chiang Mai.

The Workshop was opened by Dr R.B. Singh, Assistant Director-General and Regional Representative of FAO. In his opening address, Dr Singh remarked that both wild and domesticated Asian elephant populations are experiencing an ever-worsening crisis. The population of about 37 000–48 000 wild Asian elephants in 13 countries of South and Southeast Asia has been steadily declining, primarily because of habitat destruction. The population of domesticated elephants, estimated to be about 16 000 in 11 countries in 1995, has also been declining in parallel with their wild relatives. For example, Thailand had some 100 000 domesticated elephants in the beginning of the twentieth century, but there are now only about 2 500. The wild elephant population also dropped from 100 000 to 2 250 during the same period.

He noted that the country studies and this Workshop were part of a continuous effort by FAO after the release of a study report, *Gone astray: The care and management of the Asian elephant in domesticity* in October 1997. This publication highlighted the lack of a proper elephant census and presented information on registration, legal status, veterinary care and health, trading, etc. It suggested more involvement from livestock departments and NGOs, as well as technical and financial assistance from the international community. Since its publication there have been increasing offers of support to help improve the situation of domesticated Asian elephants. The support of the International Fund for Animal Welfare (IFAW), an NGO based in the United States of America, to an FAO project working to produce an elephant care manual is one case in point. Further efforts should be implemented expeditiously and coordinated for maximum impact.

Results of the workshop

The team leaders of the 11 country studies reported on the latest information of both wild and domesticated elephants. The study results were very valuable in updating the number of elephants, their socio-economic situations, the latest conservation laws and regulations, activities of NGOs, etc.

After the presentation of papers from NGOs, researchers and government organizations, the participants were divided into four groups for in-depth discussions on specific themes. The major recommendations of the groups are summarized below.

Recommendations

Group 1: Socio-economic issues

The Group gave the highest priorities to the implementation of the following key actions:

1. Establish mahout associations in all range countries with the involvement of international and local NGOs as an advisory committee.
2. Encourage the registration of all domesticated elephants. To stimulate registration, owners and mahouts should be supplied with a basic first-aid manual for their elephants, medical record forms, and information on how to obtain mobile veterinarian care for serious problems.
3. Standardize training sessions stressing health care, physiology, elephant handling, specialized training for tourism, logging, patrol, census, etc.
4. Identify individuals who are holders of traditional knowledge and record it before it is lost.
5. Combine traditional techniques with current methods for more modern and effective training.

Group 2: Suggestions for a model law for domesticated elephants

The Group recommended the following:

1. Establish a network to assist countries to improve existing national laws wherever there are domesticated elephants through exchanging information, ideas, etc.
2. In addition to the 11 countries with domesticated elephant populations, the model law should cover Bhutan and China, which are also range states of wild elephants.
3. Make provisions to allow the departments administering the law to sell state-owned or confiscated elephants to private owners.

Group 3: Domesticated elephant registration

Group 3 focused their discussions on how to promote a domesticated elephant registration system in each range country and designed a standard format of items to be covered. The Group also outlined a central information database linked with national registration systems.

The Group recommended the following:

1. All domesticated elephants in every range country should be registered.
2. Every range country should identify an appropriate authority to register captive elephants, to enforce that registration, and to maintain a computerized database of registration information. The responsible authority should provide sufficient training of staff to achieve this task.
3. Every range country should collect the same basic elephant and owner information.

4. Each registered elephant would receive a unique microchip in the right shoulder and a unique permanent externally visible mark. The type of external mark and the standard location of that mark should be determined by each country.
5. Each range country should sign a Memorandum of Understanding to share elephant registration data and to establish and maintain a central database of this information.
6. Software should be created to enable each country to maintain a computerized registration database and to exchange data with a centralized database.
7. Funding to complete the open tasks should be identified by 1 July 2001. The tasks should be completed within one year of the receipt of funding.
8. A group should be formed to organize range countries regarding registration of domesticated elephants and to assist with the coordination of fund-raising efforts.

The Group identified the following future tasks:

1. Create a model registration form.
2. Create a manual that explains how to complete the registration form (assist with staff training).
3. Draft the text for a Memorandum of Understanding of members of the Domesticated Asian Elephant Registration Database.
4. Create a central database authority.
5. Create an elephant registration software system and central database.

Group 4: Framework for co-operation and networking

The Group recommended the establishment of a Domesticated Asian Elephant Interest Group (DAEIG), which would be an international multidisciplinary communication network, covering both wild and domesticated elephants. A sub-committee was formed to establish an Asian elephant website on the Internet.

Field trip

About 60 participants attended the field trip to northern Thailand to observe the activities of the Thai Elephant Conservation Center and the Mahout Training School run by the Forest Industry Organization, the elephant hospital run by the Friends of Asian Elephants in Lampang province, and the Mae Sa Elephant Camp run by a private enterprise for ecotourism in Chiang Mai province.

The participants were impressed by the dedicated conservation and health care activities and the well-organized ecotourism industry. The participants from Myanmar were keen to develop similar ecotourism facilities in their country.

Final session

The Workshop held the final summary session in Chiang Mai. The participants confirmed the success of the Workshop and approved the groups' recommendations. They promised to take follow-up activities in the countries and to meet again at the second International Workshop, which the Indonesian participants agreed to host.

Summary of country reports

A summary of the elephant status mostly extracted from the country reports is shown in Table 1. Based on a similar table prepared by Dr K. Yoneda, JWRC, in Japanese, the author modified it by extracting more information from the country reports with some supplemental information collected from other sources.

Table 1. Summary of country reports

		Sri Lanka	Nepal	India	Bangladesh	Myanmar	Thailand	Cambodia	Lao PDR	Viet Nam	Malaysia (Peninsular)	Indonesia (Sumatra)
Estimated number	**Wild elephant *1 and trend**	3,500 →	92-113 ↓	28 140-29 190 ↑	200 ↓	4 000 ↓	2 250 →	300-600 ↓	2 100-3 300 ↓	85-114 ↓	1 200-1 500 ↑?	2 085-2 690 ↓
	Dom. elephant and trend	214 ↓	171 ↑	3 400-3 600 →?	93 →? future ↓	5 500-6 800 ↓	2 500 →?	162 ↓	864 ↓	165 ↓	32+4 (Myanmar origin), ↑	614 →
	Owned by governments	Orphanage: 63	Camp & breeding centres: 77	SFD: 482	FD: 17	MTE: 4 075	FIO: 125	0	0	0	ETC: 8	ECC: 362 (or 391) (end of Dec. 2000)
Registration system & registered number		128 (legal obligation)	Only for government owned	1 300-1 400 with owners' certificate (legal obligation)	Registration at the local level (legal obligation)	3 541 (legal obligation)	1 702 (legal obligation)	Formality only because of no national legal provision	None	None	36 under special permissions (legal obligation)	Certificate (legal obligation)
Management organizations	**Responsible government authorities**	• Dept. of Wildlife Conservation • Dept. of Animal Production & Health • Dept. of National Zoological Garden (orphanage)	• Dept. of National Parks & Wildlife Conserv., Min. of Forests & Soil Conserv.	• State Forest Dept. (SFD) • Min. of Env. & Forest (Wildlife Conservation Bureau, Central Zoo Authority, Project Elephant)	• Forest Dept.	• Forest Dept., Min. of Forest (for wild elephant) • Myanma Timber Enterprise (MTE), Min. of Forest • Livestock Breeding & Veterinary Dept.	• Royal Forest Dept. (for wild elephant) • Provincial Admin. Offices (for dom. elephants) • Forest Industry Organization (FIO) • Tourism Authority of Thailand (TAT)	• Wildlife Conserv. Office, Dept. of Forest & Wildlife, Min. of Agri. & Forest • Dept. of Nature Conserv., Min. of Env.	• Dept. of Forest, Min. of Agri. & Forest • Dept. of Livestock & Fisheries, Min. of Agri. & Forest • Provincial Agri. & Forestry Office	• Dept. of Conserv., Min. of Agri. & Rural Development • Min. of Science, Technology & Env. • Province, district, & local authorities	• Elephant Training Centre, Dept. of Wildlife & National Parks • Veterinary Dept.	• Elephant Conserv. Center, Bureau of Nature Conserv., Min. of Forestry • National Science Institute • Forest Protection &Nature Conserv. Office in provinces
	Associated national and international NGOs	• Captive Elephant Owners Association	None	• Elephant Welfare Org. • Zoo outreach Org. • TRAFFIC/WWF	None	• IFS	• Friends of the Asian Elephant (FAE) • Asian Elephant Foundation of Thailand (AEFT) • Thai Animal Guardians Association(TAGA) • WWF	• FFI • WWF • WCS	• WCS • IUCN	• FFI • WWF • Maston Group • TRAFFIC	• Zoos and safaris	• FFI • WCS • WWF • IEF
Number of laws & regulations		2	2	4	1	2	9	Decrees only. National law is under preparation	9 (decrees, etc.)	6	1	2
Use of domesticated elephants (number in use)		• Forestry • Construction • Tourism • Event • Pet	• Tourism (especially for trekking) • Research • Conserv. area management • Emergency rescue work • Event	• Conserv. area mgmt. (482) • Tourism • Emergency rescue work, • Forestry • Event, • Zoo (80) • Circus (106) • Temple (192) • Status symbol • Transportation	• Forestry (72) • Circus (17) • Zoo (3) • Police (1)	• Forestry • Transportation • Event • Wild elephant management • Tourism • Agriculture work	• Tourism (969) • Event • Illegal logging • Zoo	• Transportation • Tourism (8+) • Forestry • Zoo (4) • Wildlife survey • Transportation	• Forestry • Agriculture work • Transportation • Zoo	• Tourism • Event • Ivory production (male) • Transportation	• Wild elephant management • Tourism (8) • Zoo (26) • Forestry (2)	• Tourism • Conserv. area management • Agriculture work • Forestry (2)
Capturing of wild elephant		• None (orphanage only) • Some illegal capturing occurs.	None (since 1973)	Yes (at SFD only)	None (since 1974)	None (since 1994)	• None (since the 1970s) • Illegal capturing occurs.	• None (since 1999) • Illegal capturing occurs but lessening	Yes (?)	• None (since 1960) • Illegal capturing occurs.	Yes (by the GMT authority only)	None (since 1999)
Breeding in domesticity		None (some cases in orphanage only)	Yes *2	None	Yes (very few)	Yes *2	Yes *3	None	None	Yes (very few)	None	None

		Sri Lanka	Nepal	India	Bangladesh	Myanmar	Thailand	Cambodia	Lao PDR	Viet Nam	Malaysia (Peninsular)	Indonesia (Sumatra)
Returning to wild		On-going in some cases	Not considered	Not considered	Not considered	Not considered	On-going	Need for research	Not considered	Not considered	Not considered	No place to return elephants to
Quality of mahouts		• Training required	• Training required	• Training required	• Training required	• Satisfactory	• Traditional skills still exist but in a declining trend. • Training school	• Traditional skills of minority tribes declining	• Training required (?)	• Traditional skills of minority tribes declining	• Mahoutship lost, thus trainers from India and Thailand	• Mahoutship lost, thus trainers from Thailand
Veterinary services		• By ordinary livestock vet. • Vet. training required	• Lack of manpower & funds • Vet. training required	• By ordinary livestock vet. • Potential manpower exists. • Vet. training required	• Only for GMT-owned elephant sufficient • Vet. training required	• Sufficient in MTE	• Sufficient in FIO • Significant roles played by veterinary schools	• Sufficient in zoos & camps around Angkor Wat • Vet. training required	• Lack of manpower & funds • Vet. training required	• Mainly by traditional treatment • Vet. training required	• Sufficient • Private owners requested to have vet.	• Sufficient in ECC • Mahouts also treat elephants.
Existing problems	**Wild elephants**	• Human-elephant conflicts mainly damage to agri. crops	• Destruction and fragmentation of habitat • Isolated in 4 groups with small herds	• Poaching tuskers for ivory • Serious distortion in sex ratio (less males)	• Lack of national policy, prog., staff & budget • Lack of public awareness on the issues	• Destruction and fragmentation of habitat and decline of population • Illegal hunting	• Destruction and fragmentation of habitat • Human-elephant conflicts	• Serious hunting pressure • Destruction and fragmentation of habitat by logging, human settlement, etc.	• Increasing human-elephant conflicts • No census & lack of information • Lack of national policy and strategy	• Serious hunting pressure • Destruction and fragmentation of habitat and decline of population • Many victims and revenge killing over human-elephant conflicts	• Habitat lost & fragmented • Small herds left in isolation	• Destruction & fragmentation of habitat • Protected areas not large enough • Damage to agri. crops
	Domesticated elephants	• Decline in number	• No acts & regulations to manage elephants in the private sector • Lack of vet. care	• No systematic & conscious efforts to sustain long-lasting tradition • Ignored by both wildlife and livestock groups	• Decline in number	• Decline in number • Unbalanced death and birth	• Jobless • Roaming cities for food and income	• Decline in number because of less job opportunities • No legal framework	• No registration system & poor care • Jobs lessening • Lack of national policy and strategy	• Jobs & incomes lessening • Poor care & management • Hunted for ivory during grazing	• Mahoutship lost	• Under-utilization of elephants • Inadequate land areas &facilities in ECC • Poor health care & husbandry
Counter-measures	**Wild elephants**	• Culling 120 problem elephants a year	• Wild elephants restricted to conserv. areas	• Law enforcement • Preventive measures against livestock diseases • Human-elephant conflict solving efforts	None	• Public campaign for elephant conservation • 1 Managed Elephant Range established, 4 MERs proposed	• Relocation & trial return to wild • Protected areas management improving	• Wildlife law has been drafted.	• Human-elephant conflicts resolution study • Formulation effort of national policy & strategy	• Establishing protected areas (PAs) • Basic surveys • Translocation of elephants to PAs	• Relocation programmes to protected areas	• Capturing & transferring to ECC until 1999 • In situ conserv. efforts in recent years
	Domesticated elephants	• Captive breeding at orphanage by Dept. of National Zoological Garden	• GMT-owned elephants under care • Improvement in the private sector proposed	• Project Elephant trying to improve welfare • Various training activities • Amendment of laws proposed	None	• Research programmes to promote breeding	• Active NGOs for fund raising and better care • Progressive developmnt. of ecotourism	• National registration system under preparation	None	• Awareness drives on laws and conserv., but little success	• Mahout training programmes • Ecotourism development	• Improvement of care and management • Establishment of a Indonesian Elephant Trust proposed
Objectives of illegal hunting				Ivory		Ivory, skin & meat	Infants	Ivory, bone, tails, meat, and infants	Infants, ivory	Ivory, meat, bone, tails, & infants *4		

*1: Wild elephants also exist in Bhutan and China. Those in Kalimantan are believed to be a domesticated elephant origin group.
*2: Breeding between domesticated female and wild male or domesticated male.
*3: Breeding between domesticated female and wild male.
*4: Domesticated elephants are also targeted. Ivory taken from the live animal is legally sold.

Note: Because of space limitation, the projects sponsored by the US Fish and Wildlife Service Asian Elephant Conservation Fund are not mentioned in this table. See the report of Dr Karl Stromayer in page 241 for details.

Group reports

Group 1: Socio-economic issues

Group 1 members identified the following actions as being important to support efforts to improve the socio-economic conditions of the domesticated Asian elephant and mahouts. The Group defined a mahout as "the trained person who has the ability and responsibility to care for and control the elephant with direct contact".

1. To improve the status, skills and livelihood of mahouts:

    a) Establish mahout associations in all range states with the involvement of international and local NGOs as an advisory committee.
    b) Standardize training sessions stressing health care, physiology, elephant handling, specialized training for tourism, logging, patrol, census, etc.
    c) Establish an apprenticeship system to maintain traditional knowledge (in many cases, sons of mahouts do not follow the mahout career).
    d) Establish a mahout exchange programme to share knowledge between mahouts in other countries. Translators will of course be necessary in most cases.
    e) Establish mahouts as professionals by using media, standardized training etc.
    f) Require governments or owners to supply insurance and health care for mahouts and families. Offer education (e.g. English language skills) to mahouts to improve their status.
    g) Standardize wages if possible.
    h) Combine traditional techniques with current methods for more modern and effective training.
    i) Establish a mahout certification or licence system.

2. To strengthen research on the management of domesticated elephants:

    a) Carry out veterinary research to establish baseline data for elephant health comparisons.
    b) Identify individuals who are holders of traditional knowledge, and record them.
    c) Study mahout cultures to learn how to adapt them better to the realities of modern times.
    d) Study the economic aspects of elephant businesses by types, e.g. the opportunities and prospects, investment, incomes to a farm, payment to mahouts.
    e) Study nutritional needs for elephants with easily available and affordable supplements based on blood testing.
    f) Study the feasibility of using elephant dung for by-products such as biogas, fertilizer, etc., with readily available technologies.
    g) Require owners of cultivated estates to take responsibility for elephant-proofing their lands (e.g. by constructing fences).
    h) Standardize health and safety protocols for domesticated elephant establishments.

3. To develop management protocols and sustainable employment for domesticated elephants:

    a) Encourage the registration of all domesticated elephants. To stimulate registration owners and mahouts should be supplied with a basic first-aid manual for their elephants, medical record forms and information on how to obtain mobile veterinarian care for serious problems.
    b) Encourage exchanges of veterinarians for sharing knowledge and standardizing skills related to elephant care.
    c) Establish the minimum diet requirement for elephants. Encourage local villagers to plant elephant food crops to sell to neighbouring elephant camps. This would enable the local people to benefit economically from elephants. NGOs could lease wasteland from the government to create croplands for elephant food.

d) Determine dignified employment for elephants, e.g. in tourist venues in natural habitats (not cities); legal and sustainable logging camps; patrols in national parks or other protected areas, and anti-crop raiding sites; and combine with educational programmes. However, discourage employment in circus-type show businesses.
e) Each country should determine the employment capacity of their areas and decide whether to discourage or encourage the breeding of domesticated elephants.
f) Release domesticated elephants to natural habitats.

4. To promote public awareness on elephants and their problems:

a) Develop multimedia education programmes for schools to increase students' appreciation of elephants.
b) Encourage villagers to keep and utilize domesticated elephants wherever feasible.
c) Teach respect for elephants, and strategies that allow elephants and humans to co-exist. Educate people on how elephants can benefit their societies.
d) Discourage the manufacture and sale of elephant products from skin, hair, tusks, etc.
e) Promote the use of elephant dung as by-products, e.g. biogas, paper, fertilizer, traditional medicines.
f) Educate people about the root causes of elephant attacks on humans and crop raids, which sometimes result in the death of humans and elephants.

Recommendations

It is strongly recommended that the domesticated Asian elephant range states implement any of the above actions in their countries depending on their local conditions. The following key actions are given the highest priority for implementation.

1. Establish mahout associations in all range countries with the involvement of international and local NGOs as an advisory committee.
2. Encourage the registration of all domesticated elephants. To stimulate registration owners and mahouts should be supplied with a basic first-aid manual for their elephants, medical record forms and information on how to obtain mobile veterinary care for serious problems.
3. Standardize training sessions stressing health care, physiology, elephant handling, specialized training for tourism, logging, patrol, censuses, etc.
4. Identify individuals who are holders of traditional knowledge and record it.
5. Combine traditional techniques with current methods for more modern and effective training.

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Group 2: Suggestions for a model law for domesticated elephants

Purpose

To ensure the total welfare of the domesticated Asian elephant whilst keeping in mind the conservation of wild elephant populations.

Definitions

"Domesticated elephant" means an elephant that is captured from the wild and tamed, or its offspring if not selectively bred, as opposed to "captive" (kept caged) and "domestic" (dogs, cattle, horses, cats).

"Mahout" means a trained person who has the ability to control and care for the domesticated elephant.

There are many other relevant words that will need to be defined.

Scope

To cover domesticated elephants in reference to the following:

1. Capture from the wild
2. Breeding of domesticated elephants
3. Taming and training
4. Registration
5. Annual licensing and certification
6. Incidents of ownership – purchasing, sale, rental, transfer
7. Rights and obligations of owners – insurance and health care, after death, etc.
8. Movements within range states
9. International movements
10. Reintroduction to the wild
11. Proper management of domesticated elephants
12. Registration of institutions
13. Mahouts (for details refer to Group 1)
14. Offences and penalties
15. Elephants' rights and welfare
16. Rules, regulations and minimum standards for the keeping and use of domesticated elephants by both public and private owners or enterprises
17. Research relevant to domesticated elephants

Administration

The law is to be administered by a designated governmental agency. It is suggested that a single department should have full responsibility for both wild and domesticated elephants.

Rights, duties and obligations

1. Funding to be provided by public and private sources and accountability guaranteed.
2. Provision should be made to allow the department administering the law to take care of and maintain confiscated, injured, neglected, unclaimed and retired elephants.
3. Provision should be made to allow the administering departments to arrange for institutions and/or land facilities to house and accommodate confiscated, injured, neglected, unclaimed and retired elephants.

4. Provision should be made to allow the departments administering the law to transfer custody of confiscated, injured, neglected, unclaimed and retired elephants to public or private institutions.
5. The department administering the law retains ultimate responsibility for the welfare of elephants.
6. Coordination and co-operation with other governmental (Forestry, Environment etc.), non-governmental and international organizations.
7. Provision should be made for a Technical Advisory Committee to assist the department administering the law, in policy formulation, coordination with other agencies, international programmes, special projects, etc.
8. The department administering the law will be responsible for framing, issuing and supervising the implementation of the rules and regulations pertaining to domesticated elephants.

Enforcement and penalties

1. Right to bring an action to enforce the law by:
   - Department administering the relevant law
   - NGO or any other institution
   - Individual.
2. Penalties – violations under the provisions of this law will be punishable by administrative or legal actions depending upon the seriousness of the act or omission.
3. The penalties applicable to violations shall reflect the severity of the act or omission and may include: civil damages, repair and restoration of property damaged or destroyed, specific performance, reprimands, censure, suspension or revocation of licences, confiscation, fines and/or imprisonment.

Recommendations

1. Establish a network to deal with all aspects of laws and assist countries where there are domesticated elephants, e.g. exchange of laws, ideas, etc.
2. Countries having domesticated elephants are defined as the range states of wild elephants and do not include countries that have elephants only in zoos. There are thirteen such range states.
3. Create provisions for departments administering the law to be able to sell state-owned or confiscated elephants to private owners.
4. Realizing the fact that international trade in live Asian elephants from certain range countries may not be detrimental to the survival of the species, a review of the provisions of the CITES should be carried out to facilitate some restricted movements of registered live elephants, both between recognized institutions in the range states and other countries, while continuing with the existing regulations relating to the trade in ivory of the Asian elephants.

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Group 3: Domesticated elephant registration

Purpose and justification

1. Monitoring population size and demographic status and carrying out population-wide, long-term research
    - Recruitment into population (self sustaining or import from wild)
    - Improvements in veterinary care, nutrition, animal welfare and general care.
2. Law enforcement
    - Bangkok street elephant issue
    - Animal welfare monitoring
    - Monitor origin of elephants entering captive population
    - Monitor movements within country
    - Decrease illegal trade
    - Allow legal trade of elephants and products
    - Import of elephants for the purpose of tourism
3. Better management and planning for the elephant population
    - Improved assessment of resource needs (providing extension services).
    - Employment and training programmes.
4. Genetic reservoir
    - If serving as genetic reservoir for the wild population, the domesticated population structure needs to be known.

Recommendations

1. All domesticated elephants should be registered in every range state.
2. Every range state should identify an appropriate authority to register captive elephants, to enforce that registration, and to maintain a computerized database of the registration information. The responsible authority should provide sufficient training of staff to achieve this task.
3. Every range state should collect the same basic elephant and owner information. Countries are free to collect additional information to meet their needs. The computerized database should be designed to provide some fields for entry of additional and optional information.
4. Each registered elephant would receive a unique microchip in the right shoulder and a unique permanent externally visible mark. The type of external mark and the standard location of that mark would be determined by each country.
5. Each range state should sign a memorandum of understanding to share elephant registration data and to establish and maintain a central database of this information.
6. Software shall be created to enable each country to maintain a computerized registration database and to exchange data with a centralized database.
7. Funding to complete the open tasks should be identified by 1 July 2001. The tasks should be completed within one year of the receipt of funding.
8. A group should be formed to organize range countries regarding registration of domesticated elephants and to assist with coordination of fund-raising efforts.

Future tasks

1. Create a model registration form.
2. Create manual that explains how to complete the registration form (assist with staff training).
3. Draft text for a Memorandum of Understanding of members of Domesticated Asian Elephant Registration Database.
4. Establish a central database authority.
5. Create an elephant registration software system and central database.

Additional studies

1. Evaluate externally visible marking techniques:
   - Compare tattooing, freeze branding, chemical branding, and ear tags.
   - Evaluate suitability of various locations for tattooing and branding.
2. Evaluate existing microchip systems and recommend a standard system for use.

Data collection form

A. Essential elephant information

- Name (but note that new owners give new names)
- Pre-existing registration number
- Sex
- Birth date or estimate, evaluation of accuracy
- Captive born or wild caught
- Origin, capture or birth location
- Temperament
- Permanent identification number beginning with country code

Parents and their ID:

- Registration location
- Current employment
  - Government
  - Private
- General remarks, distinct features
- Photographs
- Date of death
- Cause of death

B. Essential owner information

- Name of individual or institution (but there may be several owners)
- Address
- Phone, fax, e-mail
- Owner's occupation
- Age
- Sex
- Father / husband name
- Registration card number
- Acquisition method:
  - Purchase -> price, previous owner
  - Inherited

- Donation -> previous owner
- Capture
- Birth
- Trade

C. Additional data for registration

- Height and girth (give standards)
- Other body measurements (give standards)
- Eye colour
- Number of toes
- Tusker
- Life history
- Birth of offspring
- DNA fingerprint
- Elephant's employment history
- Mahout information

D. Permanent identification

Visible marking:

- Type
- Fire branding
- Chemical branding (caustic soda based branding paste)
- Freeze branding
- Lip tattoo
- Metal ear tag
- Ease of application

Invisible marking:

- Microchip
  - Cost:
  - US$2.50–US$6 per animal
  - US$0–US$2 per applicator
  - US$250–US$1 500 per reader
  - Donor(s)
  - Size: as big as possible but, depending on owner's permission, at least 5 cm
  - Location: should be applied to right shoulder
  - Name / number creation
  - Assign country code for number to begin with

E. Central database

Required outputs:

a) Elephant
   - by country and province
   - by owner
   - by origin
   - by sex and age
   - by employment type
   - by tusk / tuskless
   - by permanent ID / name
   - by purchase / sale price

b) Births
   - by number of females
   - by year
   - offspring
   - by bull
   - by cow

c) Deaths
   - by month and year
   - by cause

d) Location

e) Language
   - English
   - Hindi (India, Nepal, Bhutan)
   - Tamil (India, Sri Lanka)
   - Bangla (Bangladesh, India)
   - Singhalese (Sri Lanka)
   - Thai (Thailand, Lao PDR)
   - Burmese (Myanmar)
   - Vietnamese (Viet Nam)
   - Khmer (Cambodia)
   - Bahasa (Indonesia, Malaysia)

f) Central administering authority
   - Location
   - United Nations
   - Association of Southeast Asian Nations and South Asian Association for Regional Co-operation
   - An NGO
   - A university

g) Sharing of national information with regional database
   - Which information could be shared?
   - Elephant data
   - Who decides on information sharing?

h) Current and potential future in-country registration offices
   - MTE in Myanmar
   - Department of Wildlife and National parks in Malaysia
   - Department of Livestock Development in Thailand
   - Forestry Department in Viet Nam
   - Livestock and Veterinary Services Department in Laos
   - Forestry Department in Bangladesh
   - Forest Department in Sri Lanka
   - Forest Department in India, federal and/or state?
   - PHPA in Indonesia
   - Health and Reproduction Department in Cambodia.

Implementation

Incentives to encourage registration and/or compliance with registration laws should be received through membership in mahout association. That might also increase social status of mahout.

a) Free extension services
   - veterinary care
   - training
   - legal assistance

b) Free insurance
   - Against life and property damage to others
   - Against injury and death of elephant

c) Registration cash bonus

d) Law and policy
   - Date of registration within one month of birth or acquisition or disposal
   - Enforcement of mandatory registration to be defined by respective government
   - Frequency of renewal / update annually at purchase, sale, birth and death.

Issues to be resolved

a) Mahout
   - Registration and licensing
   - Experience / training

b) Multiple owners

c) Multiple elephant names.

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11. Andrew Teare (Moderator)
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Additional input from S.S. Bist

Group 4: Framework for co-operation and networking

Objective

An international multidisciplinary means of communication should be established to assist in efforts to improve the condition of domesticated Asian elephants in range states. Information exchanged will naturally relate to both wild and domesticated elephants.

As a result of discussions, Group 4 recommends the establishment of a Domesticated Asian Elephant Interest Group (DAEIG). The principal characteristics of the DAEIG are as follows:

1. Membership

Membership available *free of charge* to *anyone* interested in domesticated Asian elephants – mahouts, veterinarians, managers, elephant owners, zoos, circuses, eco-tour operators, animal welfare persons, etc.

2. Functions of DAEIG

Establish a website/office and organize a biennial meeting under the leadership and services of a single paid full-time coordinator.

1) Website/office coordinator

- Independent
- Southeast Asia based
- Should be a range state multilingual native
- Attached to existing impartial organization (share resources of office space, equipment, and secretarial services)
- Cost study by FAO or somebody else?
- Oversight and review (plenary session input) by FAO or somebody else?
- Maintenance and continued funding (plenary session input)
- Recommendation has been made to submit to IEF for grant funding.

Functions of the website/office

- Identify NGOs and GOs
- Identify funding sources
- Current events calendar
- Data resources
- Bibliography
- Expert consultants list
- Economic opportunities / elephants/mahouts
- Job listings
- Existing laws – national and international
- Elephant events/meetings calendar
- Manuals on-line
- Technical organizations [e.g. the Elephant Managers Association (EMA), the American Zoo and Aquarium Association (AZA), etc.]
- Studbook data
- Standards of care
- Exhibit standards
- Internet forum
- Format
  a) Questions and responses
  b) Anyone can view forum
  c) Must register to post a question
  d) Activity can be selectively viewed by last ten days, 30 days, 90 days, and one year
  e) Searchable
     - Topics
     - Laws and legislation
     - Veterinary care (when posting please state your affiliation and qualifications)
     - Welfare
     - Wild elephant issues
     - Elephant handling
     - Environment enrichment
     - Country forum
     - Nutrition
     - Suggestions/feedback for forum.

Additional considerations

- Language of site – English
- Minimal graphics
- Promote availability of e-mail, quarterly newsletter (register), and breaking news
- Non-political or idealistic – informational only
- Links to all elephant info resources / sites
- Outreach for non-web or non-English speaking persons (Fax/hard-copy newsletters sponsored by NGO) – check software to retrieve web-page by e-mail.

Sub-committee for oversight of website development

- Dr Jacob Cheeran
- John Lehnhardt
- Hank Hammatt.

2) Biennial meeting: presentations, training sessions, networking

- Follow-up to the first International Workshop on Domesticated Asian Elephant.
- Within range countries and rotate
- Sponsors for range country participants
- Limited number of participants if necessary
- Recommend organizing committee to be selected in plenary session – to determine host country and make site invitation.

3) Organizing committee

- Solicit volunteers at plenary session
- Fund-raising
- Solicit country invitation
- India/Indonesia possible sites for next workshop – need to formulate request; wait until can send info on productive outcomes of this meeting.
- Needs information from this meeting
- Goal is to have meeting in 2003.
- Identify distribution.

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Part II: Country studies

Street wandering elephants in Bangkok

An elephant grazing at an elephant camp in an open grassland area outside Bangkok

An elephant with a mahout and two food vendors at a night spot in Bangkok

A study of street wandering elephants in Bangkok and the socio-economic life of their mahouts

Viroj Pimmanrojnagool and Sawai Wanghongsa

Historical background

Historically, the relationship between Thai people and elephants can be traced back to the Sukhothai period, 700 years ago. The first known use of elephants, in the history of Siam, was during the war between King Khunsri Inthradhit of Sukhothai and King Samchon of Chod when both kings battled on elephant back. Moreover, a stone inscription from King Ramkamhaeng's reign says "...whoever would like to trade elephants can do so and whoever would like to trade horses can do so ..." This implies not only that people were allowed to capture wild elephants, but also they had knowledge and experience in keeping and using elephants. Unfortunately, the number of domesticated or wild elephants was not recorded during that time.

The first ever mention of the number of domesticated elephants in Siam was in King Narai's reign, when Louis XIV's envoy to Siam wrote that there were approximately 20 000 domesticated elephants in the Kingdom. These animals were used in warfare and were honoured with noble titles along with the soldiers after a victory of the King's forces. Indeed, the outcomes of ancient wars were not only determined by the size of an army but also by the number of elephants in its service. Victory was likely to be the reward of the side with the most and the largest elephants. Elephants were also used for transportation. King Narai himself enjoyed capturing wild elephants especially in Lopburi province. It can be estimated from the figure of 20 000 domesticated elephants that there would be approximately 200 000 elephants living in the jungles of Siam during King Narai's reign.

In former times the people of Asia used elephants in everyday life. Indeed, it is said that the lives of elephants and people were inseparable. However, the colonisation of many Asian countries by the Western powers brought several changes in the way of life of the Asian people. The first was the introduction of firearms. The more powerful and long-range destructive capability of Western firearms replaced the traditional weapons of swords, spears and the like and thus elephants were no longer used in the frontline of the battlefield. Instead, they supported the war effort in other ways, mainly carrying big guns and supplies. The last use of elephants in the frontline in Thailand (formerly called Siam) was in the war between Siam and Viet Nam over Cambodian suzerainty during the reign of King Rama III.

The new era of elephant use can be illustrated by a picture of elephants with loads of cannon that was published at the turn of the twentieth century. Though huge, elephants are not able to carry very heavy weights on their back (300 kg at the most), but they are able to pull half of their weight, or 1 000-2 000 kg. People realized, therefore, that elephants would be very good in the logging industry. In Chiang Mai alone, it was recorded that there were nearly 20 000 elephants working in the logging industry during the reign of the Great King Rama V. He was named *the King of red and white elephants* by Westerners, probably because during his reign there was a huge demand for working elephants. Several of the elephants captured were the so-called 'white elephants' (not the albino morph) that legally belong to the King. The greater the number of wild elephants captured, the greater the number of white elephants there was among them and the greater the number owned by the palace. In fact, in the reign of King Rama V, there were 19 white elephants in his palace. Thai Buddhists generally believe that white elephants symbolize the power of the King.

Siam was one of the first countries in Southeast Asia to have laws concerning elephants, especially white ones. As elephants were used in warfare, royal decrees concerning the capture of elephants were gazetted. The first law was gazetted in the reign of King Narai who was said to be very fond of elephant hunting. As they symbolized the King's power, people were encouraged to capture elephants in the hope that white ones would be discovered. Anyone who hurt or wounded white

elephants received the death penalty, as did his family. Elephants played an important role in the culture and traditions of the Siamese and they are frequently mentioned in the literature of the country. A classic book written by Rajanubkap tells the story of the ways in which people captured and trained elephants, the characteristics of white elephants and the uses of elephants in former times. Even now, they still have an important place in the hearts and minds of Thai people in all classes of society.

Internationally, elephants are listed in Appendix I of CITES. Nationally, it is legally protected by the Wildlife Reservation and Protection Act 1992. Since the 1970s no licence has been issued for capturing wild elephants. However, habitat loss, degradation and fragmentation have caused elephant numbers to decline in every part of the country. Once roaming all over the country, they are now found in just eight forest complexes, comprising a population of 2 250 individuals or only 1 percent of the elephant population estimated in King Narai's reign. The future of these animals is at least secure in the short term as they are in protected areas, although poaching does still occur. Nevertheless, there are serious problems. First, not a single forest complex contains a large enough number of elephants to sustain a viable population.[1] Second, fragmented populations tend to inbreed, and genetic erosion is unavoidable. Without proper management, these populations will die out.

The number of domesticated elephants was estimated at 2 706 individuals in the late 1980s. Once used in the logging industry, almost all of these animals are now without work, particularly since 1989 when the Thai Government suspended all logging concessions in the country, except those working in illegal logging operations and some in circus-like shows. The struggle to earn a living causes the mahouts to bring their elephants to the big cities like Korat, Chiang Mai and Bangkok, or to tourist attractions, hoping to find a better way of life for both the elephants and themselves. Several of these elephants have been accidentally killed or wounded, while others have been shot after running amok. In short, the lot of domesticated elephants is not a happy one and nobody pays much attention to them.

Activities being carried out by mahouts and their elephants

The survey conducted between 28 August and 17 October 2000 revealed that there were 41 elephants wandering in various parts of Bangkok compared with 50 animals reported elsewhere. They lived in a group of up to eight animals with three keepers each (whether owner-mahout or hired mahouts, hereafter called keepers). Considering the elephant's walking speed of 4 km an hour and food requirements of 200 kg a day, wandering elephants in Bangkok are only able to camp around the outskirts of the city. Scrub and undeveloped lands in Minburi, Bangkapi, Don Muang, Rangsit, and Suwinthawong are frequently occupied by elephants and their keepers. Six working hours give a maximum of no more than 12 km from camp sites for animals to walk back and forth or in a circle. Sometimes because of the scarcity of animal food at or near the campsite, elephants are moved to a different site. Their daily pattern of activity is described below.

Night-time activity:

Nightly activities commenced between 17.00 and 18.00 hours and were terminated by 24.00 and 01.00 hours. Selling food to feed their elephants was the main activity of the keepers during the night-time. Restaurants and food shops (hereafter shops) along the main roads were frequently visited. Lingering in front of the shops was a tactic used to persuade people to buy food to feed the elephants. Data collected in September 2000 indicated that 52.9 percent of the shops visited had elephant-food buyers, which was not significantly different from the percentage of shops visited without buyers (Chi-square test for homogeneity with Yate's correction factor, $\chi^2 = 0.48$, 2df, $p < 0.05$). Up to 11 packs of food might be bought but most buyers bought only one pack of food, whereas 20.3 percent

[1] However, the most well-known and the largest forest complex in the country, Thung Yai - Huai Kha Khaeng Wildlife Sanctuaries in the western region, is said to contain a population of 605 individuals, which is the largest number of elephants in a single contiguous area of forest in the country and may be viable.

and 16.2 percent bought two and three packs respectively. Four to 11 packs of food were only very occasionally bought (Chi-square test for homogeneity χ^2=116.48, 7df, p <0.05).

A pack of food, consisting of either bananas, pineapples, string beans, cucumbers or water melon weighing less than 0.5 kg cost 20 baht. On average, every one hour 9.53 packs of food were sold, which is equivalent to 190 baht. Elephants wandered 5–7 hours a night; thus each night one elephant could earn 950-1140 baht. The amount of food elephants consumed was estimated to be not more than 25 kg. This is equivalent to only about 13 percent of an elephant's daily food requirements.

Shops visited between 21.00 and 24.00 hours sold more food than shops visited between 18.00 and 21.00 hours. (Chi-square test for association with Yate's correction factor, χ^2= 26.42 1df, p <0.05).

Of the total amount of elephant food sold, passers-by bought significantly less than shop customers (Chi-square test for homogeneity with Yate's correction factor, χ^2= 90.32, 1df, p <0.05).

No rings made of elephant hairs were found being sold during the observations. But on one occasion the keepers allowed people to pass underneath their elephant's belly, as this is believed to bring good luck.

To summarize, money generated by all 41 elephants wandering in Bangkok amounted to 39 000 to 47 000 baht a day or 14-17 million baht a year. Almost all of the money came from shop customers' pockets. The most profitable time was between 21.00 and 24.00 hours. Food sold during the night accounted for approximately 13 percent of an elephant's daily food requirement.

Daytime activity:

Because elephants consume only a fraction of their daily requirement during the night-time, the daytime is a vital period for them. Data from interviews and observations of daytime activity showed that both elephants and their keepers did not work during the day. Elephants were chained and allowed to feed themselves, and were occasionally provided with some supplementary food. One keeper usually rested while the other bought elephant food and prepared for the touring at night.

Reasons for bringing elephants to big cities

Six elephant keepers (four from Buriram and two from Surin province) were interviewed in Bangkok. The main reason for bringing their elephants to Bangkok was that sufficient elephant foodstuff was not available in the keepers' hometowns. The rangelands in the village have been cleared to make way for agriculture and plantations, Eucalyptus in particular, which is not elephant food. Also, insufficient income in their hometown was the second reason for bringing the elephants to the city. They spent four to five months a year in Bangkok. However, they visited not only Bangkok but also other big or tourist cities such as Ayutthaya, Chiang Mai, Khon Kaen, etc., and it is estimated that a third of domesticated elephants are involved in such businesses.

Observations in Surin and Buriram in the middle of October showed that, like cattle in Africa, elephants once symbolized the wealth and position of their owners. But now, many elephant owners appear to have sold their beasts as indicated by the fact that the pens below their houses are being used to confine cattle instead of elephants as once used to be the case.

More females than male elephants were found in Bangkok. Most elephants are adult cows and, according to the keepers, pregnant. It is interesting to note that more female elephants were brought to Bangkok probably because it is believed that people take more pity on females than on males,

particularly pregnant females. These usually have the word "pregnant" in Thai printed on their bodies to prompt people to buy food to feed them. Another reason is that female elephants are less aggressive than males. It is also likely that male elephants will still be engaged in heavy work (perhaps illegally) in the provinces.

Problems associated with bringing elephants to big cities

The problems experienced by the keepers who bring the elephants to Bangkok, according to the interviews, were being arrested and fined, and being forced to move camp site by landlords and being unable to find sufficient food for the elephants.

The keepers revealed that bringing elephants to Bangkok needs a large sum of money. The hired trucks that are used to transport the elephants to Bangkok cost 5 000–6 000 baht a time. One elephant is usually accompanied by two to three persons. For the security of their lives and property, they usually camp together in the suburbs of Bangkok. Some campsites frequently accommodate one to eight elephants and up to 30 keepers.

Public opinions concerning mahouts and elephants on the streets

Several groups of people were interviewed between September and November for their opinions on street-wandering elephants.

Food shop owners:

Twenty-one food shop owners were interviewed between October and November 2000. Thirteen of those interviewed (61.9%) were between 20–40 years old and 20 (95.2%) had a primary, secondary or vocational education. While eight (38.1%) of them willingly spent money on food for wandering elephants out of pity, 13 shop owners (61.9%) refused to do so, believing that such activities should be stopped. Seven out of those 13 strictly refused to buy food for elephants. One out of those 13 was afraid of elephants and the rest (12) said it was unnecessary to bring elephants to the big cities. Nine of the shop owners (42.9%) thought that elephants and keepers adversely affected their business as they were dirty, bothered customers and damaged property.

However, most of those interviewed realized that it was the keepers, not the elephants, that were the problem. They reasoned that it was the fact that the keepers were unemployed in their hometowns that forced them to bring elephants to Bangkok. To solve such problems, they thought keepers should be helped to find work in their home provinces.

Passers-by:

Ninety-four passers-by from all sections of society and aged mostly between 20–40 years were interviewed. Sixty-one of the passers-by (64.9%) felt pity on the elephants walking in the streets of Bangkok. Twenty-seven (28.7%) strongly objected to the presence of elephants on the streets. Another six (6.4%) had no opinion. Of the 40 of passers-by (42.6%) that had previously spent money on elephants, 34 (85.0%) spent money on food, three (7.5%) spent money to pass underneath an elephant's belly to bring good luck, and two (5.0%) spent money to visit an elephant show. Of the 54 (57.4%) who had never spent money on the elephants, 31 (57.4%) strongly objected to the activities of the elephants and their keepers.

When asked whether there were any adverse impacts on their normal life, 62 (66.0%) said there were no adverse impacts. The rest (32 or 34.0%) said there were adverse impacts such as: blocking the traffic (14 or 43.8%); making them feel sad (7 or 21.9%); and causing the roads to be dirty (6 or 18.8%).

Some passers-by recommended that keepers should take the elephants back to their hometowns and find employment there. Others proposed that there should be campsites around the outskirts of Bangkok and tourism activities should be encouraged at these sites. A few passers-by thought the laws should be more strictly enforced.

Officials:

Five junior Bangkok Metropolitan Government officials (four policemen and one street cleaner) were interviewed. All of them objected to the presence of elephants because they caused traffic problems and were dirty. They stated that they had never spent any money on food for the elephants. They proposed that the elephants should be sent back to their hometowns.

Laws related to elephants

Elephants and mahouts in Bangkok are subjected to the following laws.

Draught Animals Act 1941 (B.E. 2484):

This Act regards elephants as draught animals like cattle, horses, and as personal property. To control their movement and possession, owners of elephants aged eight years old should register them at the District Office of the Local Administration Department, in which the elephant's ID was issued. If an elephant travels outside the district where the elephant is registered, owners should report to the authorities in the destination district within 30 days after arrival, unless the elephant is leased, loaned or the move is temporary. Competent officials are empowered to inspect an elephant and its ID. Unregistered elephants or elephants not conforming to the ID must be confiscated and it is the elephants' owner who must prove right of ownership.

Cleanliness and Orderliness of the Country Act 1992 (B.E. 2535):

This Act empowers the Bangkok governor to prohibit the following activities: (1) bringing elephants to streets or areas declared as restricted areas; (2) bringing elephants to government lands or state enterprise lands with planted trees or grasses with a sign saying no draught animals allowed to trespass. The owners of elephants that defecate on the street should collect the droppings and keep the street clean.

Public Health Act 1992 (B.E. 2535):

According to this Act the Bangkok governor is empowered to set aside areas where wandering animals are prohibited, for the sake of the people's living condition and for the prevention of animal-transmitted diseases. In fact, all streets and roads are prohibited to elephants.

Animal's Plague Act 1956 (B.E. 2499):

This law requires elephants moving outside the province to first obtain official written permission. The law also prohibits the trade of live elephants and their carcasses without permission.

Highways Act 1992 (B.E. 2535):

No animals are allowed to wander on roadways, pavements or road shoulders unless following the regulations issued by the Department of Highways. Bringing animals to restricted roads is a violation of the law. However, no specific regulations have been proclaimed.

Land Traffic Act 1979 (B.E. 2522):

Prohibition against obstructing pavements or pedestrian ways is the main focus of this law. No animals are allowed to wander on roadways in such a way that prevents or obstructs public movement.

Penal Code, as amended 1984 (B.E. 2527):

The law prohibits cruelty to animals, improper use of animals, or use of ill animals.

Wild Elephant Protection Act 1921 (B.E. 2464):

The capture of wild elephants is not allowed without official permission. The law prohibits the killing of wild elephants.

Wild Animals Preservation and Protection Act 1992 (B.E. 2535):

Wild elephants are classified as protected animals. The law prohibits the capture of wild elephants except for scientific research. The trade and possession of wild elephants are controlled.

Although there are already nine laws related to the prevention of elephants walking in Bangkok, many elephants can still be found walking there. Lack of enforcement and co-operation are the main reasons for this situation. Several government agencies have been empowered to tackle the problems of elephants and mahouts in Bangkok. If they seriously carried out their responsibilities, elephants would no longer be found in Bangkok. However, a number of points must be taken into account when considering the problem. Physically, elephants are huge animals and it is difficult for strangers to control them. Confiscation and seizure may bring a very serious problem to government officials, as elephants require a large space and a huge amount of food. Elephants can at times act with great ferocity and have been known to cause the death of a caretaker or spectator. This may cause competent officials to be reluctant to implement the relevant laws.

Symbolically, at least among Thai Buddhists, elephants represent angels and Thai people feel a close relationship with them. Thai people are aware that elephants helped a former king to secure the country's independence. All Thai children above three years old know something about elephants. Moreover, elephants are one of the ten animals in the Buddhist scriptures that humans are not allowed to eat. Implementation of strong and concrete measures to eradicate elephants from Bangkok may receive strong objections from the Thai public. And, anyway, driving elephants out of Bangkok without first finding alternative work for them is not a proper solution to the elephant problem.

The situations of mahouts and elephants after the ban on their activities in Bangkok

Although there are strong laws and regulations controlling the movement of elephants and prohibiting their movement in cities, violations by elephants and their keepers are common. In March 2000, the Zoological Organization of Thailand claimed that 38 elephants had been seen in Bangkok alone; 33 were females and five were males. Survey data collected in October and November 2000 gave the figure of 41 elephants in Bangkok. Before the ban on bringing elephants to Bangkok, 50 elephants could be expected. Thus, the number of elephants in Bangkok has only slightly declined.

Recommendations to improve the status of mahouts and elephants

Both domesticated elephants and their mahouts deserve a proper management response. The knowledge of mahouts about capturing, controlling and using elephants in a variety of tasks is gradually eroding. It is only the owner-mahouts who intuitively understand the nature of elephants. To some extent, these people do not abuse, overwork or act cruelly towards their animals. Ironically, the conservation and management of domesticated elephants require the conservation and management of their owner-mahouts. It has to be acknowledged that sometimes mahouts can earn quite high incomes by bringing their elephants to big cities like Bangkok and therefore owner-mahouts possessing healthy and docile female elephants are unlikely to be willing to undertake less remunerative types of employ-

ment. Clearly, alternative jobs must ensure the economic security and survival of both elephants and mahouts. Another important point to keep in mind when introducing management measures to control domesticated elephants is that 2 706 elephants require at least 540 tonnes of food each day. And the more the animals are brought together in a single camp, the more difficult it is to find sufficient food for them. To tackle the problem of wandering elephants in the long term, the following solutions are recommended:

1. The existing laws should be effectively enforced. No elephants should be permitted to travel the streets or roads in Bangkok, as this is a clear violation of the law. Insufficient food in their home provinces is not an acceptable reason for bringing elephants to Bangkok – as stated earlier, elephants obtain only 13 percent of their food requirement from walking along the streets. The elephant keepers must find the remainder of the food requirement in a nearby campsite, which is difficult, perhaps impossible, in the city of Bangkok. It should be noted that at least seven tonnes of food must be gathered daily to feed 41 elephants. This figure should be publicized to Bangkokians to reduce the public antipathy towards taking serious measures to return the elephants to the provinces. The co-operation of all agencies is required and therefore competent officials should be brought together to sit and talk about the problem of elephants in Bangkok and to find the correct way to implement the elephant-related laws. Management measures should be implemented simultaneously by all responsible agencies. A "Love elephants, Don't feed elephants" campaign should be established and widely publicized.

2. A concrete and long-term management measure should be established to stop the illegal hunting of baby elephants and to block the smuggling of baby elephants as well. Based on available information on the birth rate of less than 1 percent a year, it is estimated that no more than 30 elephants are born every year. The others must be assumed to be illegal whether from hunting or smuggling. Purported owners are required to prove their right to ownership. Regulations relating to the elephant registration process must be amended. Baby elephants should be registered before weaning rather than at eight years old as required by the existing law. It is the duty of a competent official to facilitate the registration process by visiting the campsite where the elephant is located within two weeks after being informed. The registration involves proving that all baby elephants are the offspring of registered female elephants. Baby elephants born from unregistered elephants cannot be registered. In case of difficulties in visually proving the mother-offspring relationships, molecular biology technology should be used. An elephant's ID should be renewed every five years. The registered elephants should be required by law to be inspected before ID renewal. Microchip implantation coupled with DNA fingerprinting should replace the normal process of describing an elephant's physical appearance. So far 1 702 domesticated elephants have had microchips implanted. Under this scheme, it is expected that the number of domesticated elephants will stabilise or gradually decrease.

3. The Royal Forest Department (RFD) officers should be included among the competent officials under the Draught Animals Act 19 (B.E 2484) rather than include domesticated elephants in the Wild Animals Preservation and Protection Act B.E. 2535 that the RFD is responsible for implementing. RFD officers should have the legal right to manage domesticated elephants. Encouraging mahout-owners to work with the Royal Forest Department may reduce the number of unemployed elephants. Elephants may help forest rangers to patrol jungle terrain that is difficult to patrol by walking. These activities may ensure that the animals have sufficient food, water and shelter and that the owners have a regular income from the elephant's salary. However, the health of all elephants in the employ of the RFD must be regularly inspected.

4. Domesticated elephants should be reintroduced into protected areas that presently only have a small number of wild elephants. Small populations of wild elephants in some protected areas could thereby be genetically replenished. There have been several instances of successful elephant (re)introduction, where the animals have reproduced without human intervention. The most well known case is the introduction of elephants to Borneo where they multiplied rapidly and became a part of the Borneo ecosystem. The second instance is in the Andaman islands where the elephants

were brought in to work by logging companies in the mid 19th century. After the logging operations were terminated, the animals were left behind. They reproduced freely and within two decades they had surprisingly dispersed to the nearby islands.

Some protected areas where the number of wild elephant has declined to less than ten, or where elephants have been extirpated, and could be reintroduced, include Ton-nga-chang Wildlife Sanctuary (WS), Lumnampai WS, Pumiang Putong WS, Maetuen WS, Sablungka WS, Doi Phachang WS, Puphan National Park (NP) and Huai Namdang NP. Healthy bulls and cows whose ages are between 30 and 40 years old are ideal for reintroduction.

Question and answer session

Q1: When was the ban on logging introduced by the Thai Government?
A1: In 1989.

Q2: You mentioned that many or most of the elephants brought to Bangkok are hired for this purpose. Do you know if there is a syndicate involved?
A2: The representative from the Thai Society for the Prevention of Cruelty to Animals stated that his organization knows of one syndicate in Surin that has hired out about 100 young elephants. Sometimes, elephants are also bought by wealthy families as status symbols. The cost of a young elephant is about 150 000 baht and can be paid in instalments. Some of the wandering elephants have been brought to Bangkok to raise the money to pay the instalments.

Q3: What proportion of the elephants' earnings is used to purchase food for the elephants?
A3: Usually the keeper only buys food like bananas, pineapple, string beans and the like that will be sold to passers-by who wish to feed the elephants. The keepers don't buy food specifically for the elephants. Instead, they just let them graze on grass in the temporary camps. This means that the elephants do not get enough roughage and become obese.

Q4: You mentioned that sometimes the elephants are responsible for property damage. What kind of things do they damage?
A4: Cars and tables outside restaurants. Sometimes they cause injury to people.

Q5: I know that this is extremely difficult, but have you tried to introduce domesticated elephants into the wild?
A5: The Royal Forestry Department has not done this.
Dr Khyne U Mar from Myanmar stated that this had been done in Myanmar. She said it is helpful to distinguish between "soft release" (where the captive elephant is released back into its old territory) and "hard release" (where the elephant is released into unfamiliar territory). Hard release is very, very difficult, perhaps impossible. Third or fourth generation, free-ranging young domesticated elephants are the easiest to reintroduce into the wild.

Q6: Did your study look into alternative employment for street wandering elephants? Thailand has probably more protected areas than any other country in the region, but very few elephants are used in national parks, for example, for tourism purposes. I wonder if you investigated this.
A6: The study didn't specifically investigate this, but the Royal Forest Department is currently asking park chiefs to look into the possibility of using elephants to patrol the national parks and is entering into discussions with the mahouts to see how interested they are in this work.

The care and management of domesticated Asian elephants in Sri Lanka

Jayantha Jayewardene

Introduction

The Sri Lankan people have had a long association with elephants and as a result a lasting affinity has developed between the two.

The ancient kings of Sri Lanka (the Sinhala kings) captured elephants from the wild where they were found in abundance. These elephants were used for many purposes. They were used for war against invaders from neighbouring India and to lay siege on the Portuguese and the Dutch who had captured the Maritime Provinces of the island. They were also used for ceremonial occasions, which were conducted with much pomp and pageantry. Elephants were given as gifts to the kings and potentates of countries that had friendly relations with the Sinhala kings and with whom they traded. Elephants were sometimes exported for trade to other countries where they were also used for war and ceremonial occasions.

Elephants assisted in the agricultural pursuits of man in earlier times. They assisted in the clearing of jungles for agriculture, hauling logs and clearing the land. They were also used for ploughing some of these lands. The British used them to clear the montane forests on the island to plant tea, cinchona and coffee. They were also used to transport machinery and other heavy goods to the plantations.

Elephants were used to transport material for construction activities in ancient times. For example, the ancient cities of Anuradhapura, Polonnaruwa, etc, now only their ruins remaining, would not have been built had their giant stones not been moved into place by elephants. They were also used for the construction of the large reservoirs that were the basis of the hydraulic civilization of the country.

However, over time, modern machinery gradually replaced the elephant. The machine was quicker and more efficient than a slow moving elephant. This resulted in the rapidly diminishing potential for the elephant to earn its keep. Now, most elephant owners find it very difficult to maintain an elephant, especially because the large quantity of food that the elephant requires daily to sustain it is difficult to find and, as a result, expensive.

After they captured the Maritime Provinces in 1505, the Portuguese took over the export of elephants that had formerly been carried out by the Sinhala kings. They established a special unit called the Elephant Hunt for the capture and export of elephants. When the Dutch defeated the Portuguese in 1655, the Elephant Hunt had nearly 3 000 men in its employ. The Dutch continued the capture and export of elephants. Indeed, they increased the size of the Elephant Hunt so as to increase their income through the export of elephants (Jayewardene, 1994).

The British initially captured the Maritime Provinces from the Dutch in 1796. In 1815 they captured the Kandyan Kingdom as well, and thus ruled the whole island. Unlike the Portuguese and the Dutch, the British were not interested in the export of elephants. The British finally abolished the Elephant Hunt in 1832. However, the British, seeing an opportunity for fun and excitement, started shooting elephants for sport. They also encouraged the killing of elephants by deeming them agricultural pests and paying a bounty for the shooting of elephants. It is recorded that Major Thomas Rogers killed 1 500 elephants before he was killed at the age of 41. Captain Galloway and Major Skinner are each reputed to have killed over 750 elephants. Many others have tallies of 250–300 elephants.

Some of the chieftains who helped the Sinhala kings to capture elephants were allowed to keep an elephant or two for themselves. The Portuguese and the Dutch continued this practice. This is how the

long Sri Lankan tradition of private ownership of elephants started. To this day there are privately owned elephants.

Wild elephants

Early records show that Sri Lanka had an extensive area under forest cover. These forests were the habitat of a large number of elephants. At that time elephants were found in all parts of the country except in the southwestern coastal belt from Chilaw to Matara, and in the Jaffna Peninsula in the north.

During the times of the Sinhala kings and the Portuguese and Dutch, the capture of elephants from the wild did not have a big impact on their populations. However, with the advent of the British, their numbers started dwindling rapidly. It is recorded that at the beginning of the nineteenth century there were at least 19 500 elephants and at the turn of the twentieth century there were only an estimated 2 000. This drastic reduction was brought about by indiscriminate capture and wanton killing (Jayewardene, 1994).

Varying figures are given in respect of the present elephant population in the country. The most widely accepted figure is between 3 000 and 3 500. This is partly because a survey conducted by the Department of Wildlife Conservation (DWLC) in 1994 revealed that there are about 2 000 elephants in the wild, except in the northern and eastern provinces where this survey could not be conducted. This survey found that there were 52 percent adults, 22 percent sub-adults and 26 percent juveniles. This is a healthy population structure and augurs well for the future of the elephant in the wild provided there is sufficient habitat (Hendawitharana *et al.*, 1994).

Now the Department contends that there are over 4 000 elephants in the wild. Judging from the author's observations of elephants over a long period of time, 3 500 seems closer to the correct figure. However, a large number of newly born babies is seen now.

Records collected by the author from the Range Offices of the Department of Wildlife Conservation show that, on average, about 120 elephants are killed each year. One hundred and forty elephants were killed in the year 2000. This is only the recorded figure. Many deaths deep in the jungle go unrecorded. Even if we keep this figure at a conservative 30, then 150 wild elephants die each year. With a population of 3 500, this is a loss of 3.67 percent per annum from the wild herds.

Domesticated elephants

A census of the domesticated elephant population, carried out by J.B. Jayasinghe and M.R. Jainudeen of Peradeniya University in 1970, showed that there were 532 elephants among 378 owners on the island. This assessment, which was carried out mainly with reference to location and distribution, was conducted by sending out a questionnaire to the 22 government agents at that time. They were requested to circulate this questionnaire amongst their Divisional Revenue Officers who were to provide the figures. The numbers that were arrived at were based on these replies. Unfortunately there is no record of the number of males and females amongst the 532 elephants (Jayasinghe and Jainudeen, 1970).

In 1982, the Department of Wildlife Conservation carried out a census of the domesticated elephants in the country. This census, which was again carried out through the government agents of the districts, showed that there were a total of 344 elephants made up of 190 males (of which 29 were tuskers) and 154 females. Thus there appeared to be a reduction of 188 elephants in 12 years. This was an annual average loss of 15 elephants (Jayewardene, 1994). A survey carried out by Dr How Chin Cheong of Ceylon Grain Elevators, in 1994 covered 282 elephants.

The author carried out a survey of domesticated elephants in 1997. This survey revealed that there were about 214 domesticated elephants in Sri Lanka at that time. Of these, 107 were males and 107

were females. There were domesticated elephants in 15 of the 24 administrative districts in the country. The districts that had elephants were Colombo (34), Kandy (33), Galle (1), Kalutara (15), Kegalle (51), Kurunegala (12), Ratnapura (22), Matara (7), Hambantota (1), Matale (2), Nuwara Eliya (2), Gampaha (22), Badulla (8), Polonnaruwa (1) and Moneragala (3). It is in these districts with the highest numbers – Kegalle, Colombo and Kandy – that families have had elephants for a long time and that the more affluent families live. (Jayewardene, 1997).

There are no elephant owners in the eastern and northern provinces. There were no elephants in these two provinces even during the Jayasinghe and Jainudeen survey. They attributed this to the fact that Tamil people, who are predominant in these two provinces, are averse to risking their money on this type of livestock. The Sinhalese, on the other hand, have traditionally associated with elephants. It must be noted that the most famous elephant trappers, the Pannikans (Moors), came from the eastern province.

Other major reasons for the absence of domesticated elephants in these provinces are its dry climate and the lack of food suitable for domesticated elephants. The jungles there, however, have a number of wild elephants. The food consumed by the wild elephants is entirely different to that consumed by the domesticated ones.

Many elephants have died even since the last survey. On the other hand, only a few have been added to the number of domesticated elephants, especially after the government ban in the mid 1970s on the capture of elephants from the wild. The number added after the ban consisted of those elephants given to a few temples from the Elephant Orphanage at Pinnawela. During the period between the surveys a number of elephants have changed owners. The new owners have, in some instances, changed the name of the elephant. This made it difficult to trace the history of the elephant during the survey carried out by the author.

Most of the districts in which there are tame elephants do not have any wild elephant habitats. Because the food of the tame elephant is entirely different from that of the wild ones, the lack of jungles is not a problem for elephant owners when looking for food for their elephants. However, *jak* (*Artocarpus integer)*, *kitul* (*Caryota urens)* and coconut (*Cocos nucifera),* which constitute a large part of a tame elephant's food, is becoming scarce everywhere and owners find it difficult to obtain this food.

Elephants that are kept in captivity are mainly fed on kitul, coconut, jak, *Erythrina* species, and *bo* (*Ficus religiosa*). Elephants also eat, depending on availability, *pota wel* (*Pothos scandens*), *gonna* (*Ficus callosa*), *palu* (*Manilkara hexandra*), *nuga* (*Ficus benghalensis*), *na* (*Mesua ferrea*), *attikka* (*Ficus racemosa*), *agal adara* (*Adhatoda vasica*), *budeliya* (*Tetracera sarmentosa*) and *erabudu* (*Erythrina lithosperma*). Banana (*Musa spp.*) is also consumed when available (Godagama, 1996).

Earlier, when elephants were more freely available than they are now, the price of an elephant was comparatively low. At that time, elephants could be caught from the jungles on a permit that was easy to obtain. In their survey report, Jayasinghe and Jainudeen (1970) state that the value of an elephant was Rs. 15 000. However, it must be remembered that a Rupee had greater value then than it does now.

In a survey carried out in 1985, it was found that the highest amount that had been paid for an elephant was Rs. 275 000 for a 35 years old female elephant. However, the average price for an elephant at that time seems to have been in the range of Rs. 125 000 to Rs. 175 000. At an auction held by the Department of Wildlife Conservation in 1984, a 1.83 m (6 ft) tall female captured from the jungles was sold for Rs. 350 000. At the last Wildlife Department auction in November 1995, a male wild elephant, 2.74 m (9 ft) tall, was sold for Rs. 705 000. This male was approximately 20 years old.

An analysis of the value of elephants over the years shows that because of the smaller number of elephants being put on the market in recent times, prices have shown a tendency to increase. This is also partly because of the fact that the value of the Rupee has reduced steadily. On the other hand,

there are very few owners who wish to dispose of their elephants. Government restrictions have resulted in there being no increase in the number of domesticated elephants originally captured from the wild. There are no captive births. Both these factors restrict the number of elephants available and therefore the few for sale fetch a high price. There are a few illicit captures from the wild, but these are never brought to the open, let alone put up for public sale. The younger animals, both male and female, command better prices than elephants that are over 45 years old. The tuskers, on the other hand, whatever their age, command a very high price.

Table 1 gives details of the author's 1997 survey and Table 2 compares these details with the results of the survey carried out in 1970.

Table 1. Distribution of domesticated elephant by district – 1997

No.	District	Male	Female	Total
1	Colombo	15	19	34
2	Gampaha	12	10	22
3	Kegalle	20	31	51
4	Kandy	17	16	33
5	Matale	-	2	2
6	Nuwara Eliya	1	1	2
7	Badulla	5	3	8
8	Hambantota	1	-	1
9	Matara	4	3	7
10	Kalutara	8	7	15
11	Galle	1	-	1
12	Ratnapura	15	7	22
13	Kurunegala	4	8	12
14	Polonnaruwa	1	-	1
15	Moneragala	3	-	3
Total		**107**	**107**	**214**

Table 2. Comparison of 1970 and 1997 surveys

No.	District	1970		1997	
		Owners	Elephants	Owners	Elephants
1	Colombo	89	145	21	34
2	Kalutara	35	47	10	15
3	Ratnapura	42	49	19	22
4	Kegalle	53	87	32	51
5	Kandy	85	102	21	33
6	Matale	15	18	2	2
7	Nuwara Eliya	6	6	2	2
8	Matara	10	18	4	7
9	Galle	8	17	1	1
10	Hambantota	1	1	1	1
11	Kurunegala	21	24	10	12
12	Puttalam	1	1	-	-
13	Badulla	6	8	6	8
14	Moneragala	6	9	2	3
15	Gampaha	-	-	18	22
16	Polonnaruwa			1	1
Total		**378**	**532**	**150**	**214**

Laws

Because there was indiscriminate slaughter by those hunting for sport, villagers and those engaged in the sale of meat, which caused a rapid decline in game, the British passed a law in 1872 called the "Ordinance to prevent wasteful destruction of buffaloes and game throughout the island". This ordinance banned shooting during the months April to September.

On the recommendations of a committee appointed to review the existing laws, another law was passed in 1891 by the Legislative Council styled the "Ordinance to prevent wanton destruction of elephants, buffaloes and other game". This was the first time that the elephant was specifically afforded protection under the law.

In 1908, the Governor appointed a committee consisting of members of the Game Protection Society to make recommendations with regard to improvements in the law. The government accepted their recommendations and the Game Protection Ordinance of 1909 was passed. This ordinance related mostly to the controlled shooting or capture of elephants, buffaloes, game animals or birds, the prevention of shooting at night, the setting of traps for the capture of game, and open and closed seasons for shooting.

The Minister of Agriculture and Lands, who was also responsible for wildlife, appointed a committee in 1934 to inquire into and report on the measures necessary for the further protection of indigenous fauna and flora. The report contained very important recommendations, which were incorporated into the Fauna & Flora Protection Ordinance of 1937.

Part II of the Fauna & Flora Protection Ordinance (including all amendments up to Act No. 49 of 1993) relates mainly to wild elephants with Chapters 23, 24 and 25 relating to tame or domesticated elephants. Parts of these are reproduced below.

Chapter 23:

1) Any person who is in unlawful possession of any elephant shall be guilty of an offence and on conviction be liable to a fine not less than one hundred thousand rupees and not more than two hundred thousand rupees or to imprisonment for a term not less than 10 years and not exceeding 20 years or to both such fine and imprisonment; and the court may on the conviction of any such person make order for the disposal of the elephant in respect of which the offence was committed, having regard to the rights of any other person who may appear to the court to be lawfully entitled to the possession of such elephant.

2) A person who is found in possession of an elephant shall be deemed to be in unlawful possession of that elephant unless:
   a) He is the captor of that elephant under the authority of a licence issued under this ordinance or under any written law repealed by Ordinance No, 2 of 1937; or
   b) He is the successor in title to such captor; or
   c) He is in possession on behalf of such captor or his successor in title.

Chapter 24:

No person shall have in his possession a tusk or tush unless such tusk or tush has been registered with a prescribed officer.

1) Every prescribed officer shall keep a register for the registration of tusks and tushes in such form as may be prescribed.
2) Any person who has in his possession a tusk or tush that has not been registered shall be guilty of an offence and shall on conviction be liable to a fine not less than thirty thousand rupees and not

exceeding one hundred thousand rupees or to imprisonment for a term not less than two years and not exceeding five years or to both such fine and imprisonment.

3) The Court may, on the conviction of any person of an offence under sub section 3, make order for the disposal of the tusk or tush in respect of the offence that was committed, having regard to the rights of any other person who may appear to the court to be lawfully entitled to the possession of such tusk or tush.

4) Regulations may be made:

   a) Specifying the officer who shall have power to register tusks and tushes, and
   b) Specifying the form in which prescribed officers shall maintain registers under this section.

Chapter 24A:

1) Upon registration of a tusk or tush in accordance with section 24 every person who has in his possession a tusk or tush shall obtain a licence in respect of such tusk or tush.

2) The licence shall be obtained on application made to the prescribed officer, in the prescribed form, on payment of the prescribed fee.

3) Every prescribed officer shall maintain a register in respect of the licensing of tusks and tushes.

4) Any person who has in his possession a tush or tush without obtaining a licence in respect of the same, shall be guilty of an offence and shall on conviction be liable to a fine of not less than thirty thousand rupees and not exceeding one hundred thousand rupees or to imprisonment for a term not less than two years and not exceeding five years, or to both such fine and imprisonment.

Chapter 24B:

The Director or any officer authorized by him may at any time enter any premises where he has reason to believe the tusk or tushes are being kept, and to make such inquiries and investigation thereon as may be necessary to ascertain whether the provisions of this section are being complied with.

Chapter 25:

1) Where it appears to the Warden or any police officer or other prescribed officer that any person is in unlawful possession of any tusker or elephant, it shall be lawful for the Warden or such police or other prescribed officer to seize and detain such tusker or elephants and to apply to the Magistrate having jurisdiction over the place where the animal was seized to make order for the disposal of such tusker or elephant. And the Magistrate to whom such application is made may, after such inquiry as he may deem necessary, make such order for the disposal of the tusker or elephant as the justice of the case may require.

2) An order made under this section shall not affect the liability of any person to be prosecuted for any offence committed in respect of the tusker or elephant to which the order relates.

According to the law, every tame elephant should be registered with the Department of Wildlife Conservation and subsequently a licence obtained each year. The officials of the Department of Wildlife Conservation have to inspect each elephant before the annual licence is granted. This system is designed to ensure that the elephant was the same animal and that their owners maintain the elephants in good physical condition. Though it is an offence not to licence an elephant annually, in practice many owners do not licence their elephants each year. In fact, 22 out of 150 owners did not register their elephants with the Department of Wildlife Conservation in 1997. This is an offence and under the law the elephant can be confiscated and the owner charged in court. If the owner is found guilty, he can be fined anything between Rs.30 000 and 100 000.

All elephant tusks or tushes in the possession of private individuals, temples or any other organization have to be registered with the Department of Wildlife Conservation. However, it is not necessary to obtain an annual licence for tusks and tushes, as in the case of elephants. Here too there

are many sets of elephant tusks, especially in old family homes and temples, which are not registered with the DWLC.

The law prevents the export of any part of an elephant, but allows the export of a live elephant. This means that you could if you wish export an elephant and use any specific part, for example the tusks, after it is exported. At present, the Department of Wildlife Conservation does not issue permits for the export of any elephants from Sri Lanka, even though the law does allow it. However, presidents and prime ministers of this country have exported elephants to other countries as gifts to their heads of state. It is necessary that the export of elephants from this country be banned totally.

With regard to animal welfare Sri Lanka has, perhaps, the most antiquated legislation in the world. The governing statute is "The Prevention of Cruelty to Animals Ordinance", No. 13 of 1907, which sets out various offences and penalties for mistreatment of animals. It was last amended in 1955. It is seldom enforced. The form and scope of this legislation is substantially inadequate. Its limitations are apparent when it is compared with the animal welfare legislation of neighbouring countries such as India, i.e. The Prevention of Cruelty to Animals Act, 1960, or with similar legislation of countries such as Australia.

The existing legislation is deficient in the following areas:

1) It requires broader coverage of animal welfare issues.
2) The regulation for slaughtering animals must be made compatible with humane practices adopted in modern societies.
3) There is no regulation for:
    - research and teaching activities using animals, including animal experimentation;
    - transport of animals;
    - loads (including the number of passengers) to be carried or drawn by any animal; and
    - exhibition and training of performing animals.
4) There is no provision for a third party e.g. a registered animal welfare organization to initiate or intervene in any legal proceedings on behalf of an animal.
5) The time allowed for making a complaint to the police, i.e. three months from the date of the commission of an offence is inadequate.
6) The penalties prescribed for any cruelty to an animal are too low to have any deterrent effect, e.g. the maximum fine is Rs.100, but this may be increased to Rs. 200 in the case of a second or subsequent offence.

Since the enactment of this Ordinance in 1907, the concepts of animal cruelty and its prevention have developed over the years. The introduction of new legislation that will embrace a wider scope of matters involving animal welfare generally is now considered necessary (Weeraratna, 1999).

The cruelty perpetrated on domesticated elephants in most case goes unreported or ignored. There are instances of cruel treatment of elephants by the mahouts who are supposed to look after them. This includes overworking the animals, not giving them enough food, the unnecessary use of the goad (*hendu*), etc. There are also reports of elephants used for safari rides, as they are called, being kept in the hot sun and made to walk on the hot tarmac till they get onto the jungle paths. At Habarana, in eastern Sri Lanka, there are nearly 30 elephants used for elephant safaris. During times of drought, these animals have to share a small puddle of water for bathing. These baths are of a very short duration because there are other elephants waiting to use the same puddle. This is in contrast to the need for the domesticated elephant to stay in the water for long periods.

The amendments to the Prevention of Cruelty to Animals Ordinance must take cognizance of this ill treatment and cruelty Changes and additions to prevent further abuse of the tame elephants must be made. The new laws must also give teeth to the law enforcement authorities to take quick and strict action.

It is incumbent on the government to ensure that the welfare of elephants is protected through appropriate legislation.

Registration

Section 23(1) of the Fauna and Flora Act makes it necessary for owners to register their elephants. It also requires taking out a licence annually from the prescribed officer. In this case the prescribed officer for both the registration and the issue of annual licences is the Director of Wildlife Conservation. The annual licence should be issued consequent to an inspection of the elephant by an officer of the Department of Wildlife Conservation.

The Minister in charge of wildlife published these regulations in the Government Gazette in 1992 thus enabling the Director of Wildlife Conservation to proceed with the registration of all domesticated elephants. He was also to start the issue of annual licences in respect of each elephant. The Director, Department of Wildlife Conservation published a notice in various newspapers giving publicity to the need for all domesticated elephants to be registered by their owners. The registration fee for each elephant was Rs.500 and the annual licence fee was Rs.250. The Department commenced the registration of domesticated elephants in 1992. At present owners have registered only 128 elephants and annual licences were initially taken out in respect of this number.

The following details are recorded when registering elephants: name and address of owner; date of registration; sex; age; height at shoulder; circumference of fore feet; any permanent identification marks; any other distinguishing marks or deformities; name and address of previous owner; right of possession of present and previous owner; authority issuing licence; place where elephant is usually kept. Pasted on the registration book is a photograph of the side view of the elephant. The right of possession is based on an affidavit and licence obtained from the local municipal authority (Gam Sabha or Pradesheeya Sabha).

Up to now only 128 elephants have been registered. At the time registration commenced in 1992 there would have been approximately 260 tame elephants. In 1997 the survey of tame elephants conducted by the author revealed that there were around 214. In 1999 the Department of Wildlife Conservation initiated a survey of the domesticated elephant population in the country. This was carried out through the District Secretaries, who were requested to fill in a form with the required information, consisting of: name and address of all elephant owners in the district; number of elephants owned; male/female; and tusker/without tusks. These details are still coming in. Based on the information received so far, the Department has written to 91 owners who have not as yet registered their elephants, asking them to do so. They have been informed of the legal consequences in the event that they do not register their elephants. Errant elephant owners could be fined between Rs.100 000 and Rs.200 000 or imprisoned for a period between 10 and 20 years, or both.

In 1995, the Department of Wildlife Conservation advertized in the newspapers calling on all elephant owners to register their elephants. The response was very poor, because the Department did not take any action against even one errant elephant owner. The owners were unlikely to feel compelled to register their elephants.

The Department must take immediate action to complete the survey they started in 1999. In fact, the details obtained so far will have to be updated because many of the elephants reported on will have died. The Department should also take legal action against at least two or three elephant owners who have not registered their elephants. Then the message will go through the elephant owning community that the Department means business. The Department could also use the assistance of the Elephant

Owners Association. The Department is now preparing to insert another advertisement in the newspapers. However, if no punitive action is taken against errant owners, there will be very little response to this call.

Organizations and their major projects

There are two government departments involved with domesticated elephants in Sri Lanka. They are the Department of Wildlife Conservation and the Department of Animal Production and Health (DAPH). The Department of Wildlife Conservation, in keeping with the requirements of the Fauna and Flora Ordinance have to register all tame elephants and issue annual licences for these animals. With that the functions of the DWLC in respect of domesticated elephants ceases.

The DAPH is in charge of the veterinary services and they place veterinarians in all parts of the country. These veterinarians, by training and practice, mostly look after domestic pets and livestock. Some of those who are posted in the districts are called upon to treat domesticated elephants as well. In some instances these veterinarians have neither the experience nor the training to treat elephants. In most cases they are female veterinarians and are not keen on treating elephants because, apart from their lack of knowledge and experience, they are physically afraid of these animals. Some of the male veterinarians too are frightened of treating tame elephants.

In 1970, J.B. Jayasinghe and M.R. Jainudeen of Peradeniya University carried out a study on the domesticated elephant population in the country. Peradeniya and Colombo Universities have been engaged in research on tame elephants from time to time. Professor W. Ratnasooriya *et al.* have carried out many research studies on the testosterone levels, etc. in the elephants in the Pinnawela Elephant Orphanage and the National Zoo at Dehiwela. Anouk Illangakoon carried out a preliminary study of captive elephants in Sri Lanka and the results were published in Gajah, the journal of the Asian Elephant Specialist Group. Wasantha Godagama also carried out a study on the domesticated elephant and the mahouts. Jayasekere *et al.* did a case study of 'Elephants in logging operations in Sri Lanka'. However there is much more scope and need for the universities to get involved in research studies on tame elephants.

None of the many non governmental organizations have become involved with tame elephants in Sri Lanka except, from time to time, to voice their protests at what they feel is cruelty perpetrated on these animals by the mahouts and owners.

The Captive Elephant Owners Association of Sri Lanka was formed in 1998. The objective of this association is to build good relationships amongst all the captive elephant owners by bringing them to a common arena. In this way they can get to know each other and receive help and assistance to ensure the well being and development of domesticated elephants throughout the country.

The immediate work plans of the association include the following:

1) collecting all relevant information on all captive elephants in the country;
2) introducing an insurance scheme for elephants;
3) establishing a genetic centre for the promotion of captive breeding;
4) opening a museum and library;
5) setting up nurseries for the propagation of the species, especially *kitul* (*Caryota urens*), which the domesticated elephants feed on;
6) finding other methods (purchase, import, capture from the wild) of getting domesticated elephants for the members of the association; making medical facilities available to all domesticated elephants;
7) carrying out medical examination of all domesticated elephants periodically; and
8) providing training for elephant owners and mahouts.

Work

Elephants work for half a day, generally for five to six hours. During the other half of the day they are rested and bathed. The amount of work available for elephants has reduced greatly, mainly because tractors and other machinery, which are now available, can do this work faster. It is only in difficult and inaccessible terrain that elephants are necessary. They are also still very useful in the timber industry.

Some elephant owners do not expect any income from their elephants even though the elephants are sent out to work. They allow the mahout to hire out the elephant and earn the keep of both the elephant and the mahout. The elephants are taken away to logging sites or hotels to give tourists rides. Some owners do not know where their elephants work. The fate of the elephant is entirely in the hands of the mahout. In some instances the owner sees the elephants only at one of the temple processions or *perehera.*

Some owners keep the elephants with them and are aware, on a daily basis, what each of their elephants is doing in the form of work. The owners of a number of elephants have given their elephants out to others to look after and get work out of them. A few elephant owners do not get their elephants to do any work. They are kept as pets because the owners are fond of elephants.

Even though an elephant is supposed to work half a day, unscrupulous mahouts, at the request of those giving them work, make the elephant work longer hours. The mahout is compensated for this, usually by liquor or an extra payment of around Rs. 50 per hour.

Reduced opportunities for work mean that the elephant is the first to suffer. The quantity of food given to the elephant is reduced because of the owner's or mahout's lower income. Medical attention, unless absolutely necessary, is not given for the same reason. Sometimes, many elephants have wounds that are being treated only superficially.

The domesticated elephant in Sri Lanka is engaged in many kinds of work. These are described in the following sections.

1) Timber industry

Elephants are used to push down trees in the jungle and drag the logs onto the road. These logs are then loaded onto lorries by the elephants. At the timber yard or saw mill the elephants unload the logs off the lorry and stack them. They are hired sometimes by the estates to haul onto the road the trees that have been felled for use as firewood and timber.

A careful analysis of the use of elephants to haul logs proves beyond doubt that elephants are in many ways the ideal tool for forest operations. In the fragile ecosystems of tropical wet evergreen natural forests, mechanized logging causes ten times as much heavy damage as traditional logging using animals. Damage caused is both direct and indirect, including prevention of natural regeneration – which can lead to genetic erosion, damage to the soil structure, and hydrological modification (Jayasekere *et al.*, 1995)

2) Construction industry

From time immemorial elephants have assisted man in his construction work. The great reservoirs in the dry zone and the ancient cities that presently lie in ruins were all constructed with the assistance of elephants. They helped to haul the building materials that were used. Elephants are now used to carry steel girders used for roofs. They carry bags of sand from the rivers on to the road. Metal from stone quarries is brought to the road by elephants.

3) Tourism

Elephants are kept at tourist hotels and other places where tourists visit. They give tourists rides on their backs. Beach hotels have elephants on the beach for tourists to ride. Many tourists love to have their photographs taken either on the back of an elephant or standing by its side.

Some elephants are kept in hotels in the dry zone where there are suitable jungles close by. They are used to take tourists and even local visitors on safaris into the jungle. Tourists are taken for an hour or two, on elephant back, into the jungle where they see wildlife, including elephants.

4) Ceremonies

The most common ceremonial occasions in which elephants participate in are the annual processions or *perehera* conducted by temples all over the island. The largest of these is the *Esela perehera* conducted by the Dalada Maligawa in Kandy. Well over a hundred elephants used to participate in this *perehera*. In recent years the numbers have dwindled. The other major *perehera* is the *Navam perehera* conducted by the Gangaramaya Temple in Colombo. The Bellanwila, Kelaniya and Dondra temples also, amongst numerous other temples, conduct *perehera* where elephants participate. Some *perehera* have only one elephant participating.

The capacity of an elephant to carry out heavy work keeps on increasing until it is about 40 years of age. Its performance then plateaus for a short while and from that time on its performance gradually drops. The rate it drops at depends on the condition of the animal, the food it gets, and the hours and type of work it has to perform daily and the regularity of this work.

In Sri Lanka, elephants work 15–20 days per month. The mahouts are paid around Rs.50 per day. In some cases the mahouts are paid separately by the person who hires the elephants. Some also supply the mahouts with liquor in an effort to get more work out of the elephant. Elephants are worked for only half the day, so the mahouts are free for the rest of the day, except to bathe the elephant. As a result, the mahouts have a lot of free time, most of which, generally after bathing the elephant, is spent drinking.

Veterinary care

Though the Department of Wildlife Conservation is charged with the registration of all the domesticated elephants in the country and the issue of annual licences for these elephants, their responsibility ends there. The veterinary services for the domesticated animals in the country are provided by the Department of Animal Production and Health. This Department has posted veterinary surgeons in all parts of the country. Though these veterinary surgeons are capable of treating domestic pets and livestock, they have very little or no experience in the treatment of tame elephants. In some parts of the country there are no veterinary surgeons.

It s not only the lack of training and experience that prevents veterinary surgeons from treating elephants, but also the fact that they are not comfortable in the presence of such a large animal. During the course of their education and training they do not work with elephants. It is only very rarely that they get an opportunity to treat an elephant in their student days. Later when they are posted to field stations, they are called upon, occasionally, to treat a domesticated elephant. This is very difficult for them and it does not give them the experience that they need for the future.

Traditionally, in Sri Lanka native medicine has been used to treat elephants and it is only in a few instances that veterinary surgeons have been called on to treat tame elephants. Most elephant owners prefer native treatments. Although most of the older breed of elephant owners continue with the Sinhala or traditional treatments for the diseases and illnesses of their elephants, some owners prefer western treatments. However, most owners find it difficult to obtain the services of either a good veterinary surgeon or a traditional medical practitioner (*Veda Mahaththaya)* or native physician.

Many elephant owners come to the veterinary surgeon with their sick elephants only at the last moment, after having had the elephants treated unsuccessfully by a native physician. The elephants, in most of these cases, eventually die in the hands of the veterinary surgeon. This then serves to confirm the fallacy that has developed amongst many elephant owners that western medicine is not effective in the treatment of elephants.

Taking cognizance of the urgent need to have sufficient veterinary surgeons trained and experienced in elephant care, the Biodiversity and Elephant Conservation Trust organized a training programme for veterinary surgeons in October 1999. This training programme was for the veterinary surgeons of the Department of Animal Production and Health, who were posted in various parts of Sri Lanka where there were domesticated elephants. Twelve veterinary surgeons attended this training programme, conducted by the Faculty of Veterinary Science of the University of Peradeniya. Prof. Vijitha Kuruvita, an experienced elephant veterinarian and the Vice Chancellor of the University of Peradeniya led the lecturers. Two very experienced veterinarians, Drs S. Krishnamurty from India and Preecha Phuangkum of Thailand, along with Richard Lair and Dr Bjarne Clausen, a veterinarian from Denmark, attended the programme and contributed significantly. This training benefited the veterinarians greatly. The Biodiversity and Elephant Conservation Trust, a very active NGO in Sri Lanka, intends conducting a follow-up training programme in early 2001.

With regard to native practitioners, they do not seem to be passing on their knowledge to their children, as was done in the past. With only a few elephants in the vicinity, it does not seem useful or necessary for any other native physician to learn how to treat elephants.

The books that native physicians have compiled on the various treatments for elephant illnesses and diseases, are not being reproduced. These books, called the *Ali Veda Potha* (Book on Treatment of Elephants*)*, are hand-written by the individual physicians rather than printed. For posterity, the books should be formally published in their original language and also translated into English and published.

A number of mahouts are also adept at treating elephants. They have learned the skill from *Veda Mahaththayas* or from other older mahouts who have some knowledge of the treatment of elephant ailments and diseases. Some mahouts have worked out their own treatments.

Summary and opinions

The Land Reform Act in 1972, whereby each individual's land ownership was reduced to only 20.24 ha (50 acres), affected many elephant owners. The large landholdings that some of the elephant owners had were greatly reduced and they had to go elsewhere in search of food for their elephants, as they could no longer find it on their estates. Some owners whose elephants did not work and earn any money were hard pressed as a result of this new financial burden. Many owners sold their elephants. There was a ready market for these elephants from an increasing population of *nouveaux riches* that saw the ownership of an elephant as a status symbol. There was also a demand for elephants from the timber industries.

Elephant owners find it increasingly difficult to maintain their elephants. On the one hand the work available for elephants is getting scarcer and, as a result, incomes derived from this work are shrinking. This means that owners have to supplement the earnings from the elephants to maintain them. Moreover, food is becoming increasingly difficult to find and is as a result more expensive.

Jayasinghe and Jainudeen (1970) estimated that, on average, ten elephants die in captivity each year. The death rate has remained static since. Jayasinghe and Jainudeen conducted their survey when there were a larger number of domesticated elephants in the country and when the capture of elephants from the wild, on permits issued by the government, was allowed. Now there are no elephants coming in from the wild except those that are brought as orphans to the Pinnawela Elephant Orphanage. The government banned the capture of elephants from the wild in the mid 1970s.

The annual death rate (12–15) amongst the domesticated elephants is higher now than at the time Jayasinghe and Jainudeen conducted their survey. This is because the age of the majority of the domesticated elephants has increased since that survey and a large percentage of elephants are in the

older category. With no replenishment from the wild the number of the domesticated elephants in this country is dwindling rapidly.

The survey carried out by the author in 1997 revealed the following problems and needs of the owners of domesticated elephants.

1) Most elephant owners find that food necessary to feed an elephant is expensive and difficult to obtain. As a result of the scarcity of jak, kitul and coconut their prices have gone up.
2) In most areas it is very difficult to obtain veterinary services for the treatment of elephant illnesses and diseases. In other areas such services are non-existent.
3) A number of persons who own or have owned an elephant have indicated that they would like to own at least one more elephant.
4) Elephant owners and mahouts would like to have training in new methods of elephant management. There is a great need to change the attitudes of some of the owners of elephants and some mahouts. It is also necessary to train the mahouts, some of whom have only a very basic idea of elephant care and management.
5) Many elephant owners would like to have advice and assistance on how to breed their elephants. In this respect the Department of Wildlife Conservation and the Captive Elephant Owners Association of Sri Lanka, could be very helpful. My survey has revealed that a number of owners and mahouts have recognized the need to improve their knowledge of elephant care and management.
6) The shortage of work for elephants is making it economically difficult for some owners to keep them. This is an area that can be improved by the Captive Elephant Owners Association, which could get elephant owners to agree to operate their elephants only in a particular area. The association could also collect information about the work available for elephants and inform the owners of these opportunities.

Policy suggestions

A policy decision should be made by the government to either sell the Pinnawela elephants or allow capture from the forests. This former measure, however, should only be carried out if prospective owners meet certain criteria, which are briefly mentioned below and in more detail later on in the paper.

Above all, before any elephant is given out to private owners, it must be established that the individuals or organizations to whom the elephants are to be given have both the finances and the experience to bring up a baby elephant. They should be able to afford to keep an elephant without it being necessary for the elephant to earn its keep because now it is difficult to find work for an elephant. Experience in elephant keeping is also an absolute necessity. Otherwise, there will be inexperienced owners handling elephants that may prove dangerous and also fatal. One example of this is where a *nouveau riche* gem merchant purchased a female elephant that was captured from the jungle. This animal was pregnant and in due course gave birth. The owner, thrilled with his new pet, used to take the baby in the back of his jeep. One day when the vehicle jerked to a stop, the animal fell off, hit his head on the road and died. Elephants should not fall into the hands of those who treat them as curiosities.

Multiple strategies have to be adopted to ensure that the domesticated elephant population in this country does not diminish and that there are sufficient elephants for our domestic purposes.

1) Captive breeding is an important strategy for two major reasons: a) for elephant conservation and in trying to keep the numbers of the domesticated elephants at a high level; and b) to gain experience in captive breeding in the event of a threat of extinction of the species.

2) It is necessary to have adequate supplies of food easily available if there is to be an improvement in the maintenance of domesticated elephants. Large scale planting of the domesticated elephant's preferred foods is very essential. This cannot be done by individuals, but has to be done by an organization.

3) Improved training for mahouts in modern methods of elephant care and management is essential. Though the traditional techniques have been developed for hundreds of years and passed down, it is now time for scientific methods of elephant management to be adopted.

4) Improved veterinary services are also absolutely essential if the domesticated elephants are to be brought up well tended and cared for. The government will have to employ and train veterinary surgeons and post them to districts were there are domesticated elephants.

5) The Department of Wildlife Conservation has to play a more active role to support the owners of elephants and to ensure that there will continue to be domesticated elephants in sufficient numbers on the island.

6) The Captive Elephant Owners Association could play a very useful role by assisting in a number of areas of domesticated elephant management and care where individual owners would not be able to make much headway.

If the government adopts a policy of selling some of the large number of elephants at the Pinnawela Elephant Orphanage to selected persons, it will ensure that the elephants would be better looked after than they are now. They will be given better individual attention by the new owners and mahouts. This policy of selective disposal will ensure better care of the elephants that are left. The numbers to be sold to private owners and temples annually should be decided on the basis of the availability of suitable elephants at that time.

Those who would be eligible to buy elephants from Pinnawela should be chosen very carefully. The following criteria should be the standard requirements for eligibility to ownership. These criteria should be strictly adhered to. The Department of Wildlife Conservation and the government can decide on other criteria as well.

A panel should decide on who is qualified to own an elephant. The panel should consist of the Director of Wildlife or his senior representative, a veterinary surgeon with experience in treating elephants and one or two senior and well-known private elephant owners.

To be eligible to own an elephant, prospective owners should:

- have at least ten years experience in the care and management of elephants;
- have at least ten years experience of having owned an elephant;
- have sufficient land and access to food and water for the elephant;
- have the services of an experienced mahout to look after the elephant;
- demonstrate the financial capability to maintain an elephant without depending on it having to work to earn its keep. This is very necessary because there may be no work for elephants in the future;
- agree to a four-monthly check on the health of the elephants by a panel appointed by the Department of Wildlife Conservation. The panel will visit the new elephant owners and monitor the elephant's health and general condition. This is designed to ensure that the elephants bought by private individuals are maintained properly; and
- agree to participate in the captive-breeding programme of the Department. This should be at the cost of the Department.

Whilst making a policy decision to dispose of some of the elephants at Pinnawela periodically, it is necessary to keep in mind that the elephants most suitable for training by the new owners should be sold. The training that the elephants get at Pinnawela is sufficient to manage the elephants in a herd, but when an elephant is on its own it needs further training and disciplining to make it obey many more commands.

When considering the above suggestion it must be remembered that the Pinnawela Elephant Orphanage has elephants in excess of its capacity to manage and maintain. Selling some of these elephants to selected private owners will help to ease this problem. A number of baby elephants are brought to Pinnawela each year and are adding to the present number. On the other hand, though 1.83 m (6 ft) tall wild males may be ideal for training, there is no guarantee that their capture will be done selectively to ensure that the good breeding males are left in the jungle. How can one judge a good breeding male in the jungle?

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Interviews

Mr A.P.A. Goonesekere, Director, Department of Wildlife Conservation
Mr Edmund Wilson, Assistant Director, Department of Wildlife Conservation
Mr W. Hendavitharana, Rural Sociologist, Department of Wildlife Conservation
Mr Damsiri Karunaratne, Honorary Secretary, Captive Elephant Owners Association of Sri Lanka
Dr Seevali Ranawana, Director General, Department of Animal Production and Health

Question and answer session

Q1: Are the baby elephants living in the Pinnawela Orphanage reintroduced into the wild?
A1: There is no official policy of reintroducing captive elephants back into the wild. But there is a sort of "halfway house" into which 11 elephants have been successfully introduced so far.

Q2: Is the standard of mahoutship as good as it was in former times?
A2: The traditional skills are no longer handed down from father to son so the mahouts nowadays do not have the detailed knowledge that mahouts had in former times. They need to be trained to improve their skills. But we have also found that modern scientific knowledge suggests that some traditional practices are not good.

An Indonesian participant stated that the situation is similar in Indonesia and there is no bond between the keepers and their elephants.

Dr Cheeran stated that they have a mahout training school in South India and they have a mahoutship manual. He also stated that there is a great need for the manual to be translated into regional languages and for the introduction of a mahout licensing system.

The care and management of domesticated elephants in Sumatra, Indonesia

Baringin Hutadjulu and Ramon Janis

Introduction

The Sumatran elephant (*Elephas maximus sumatranus*) is a subspecies of the Asian elephant (*Elephas maximus*). It is the biggest land animal in Indonesia and is found only on the island of Sumatra. They are found in the island's forests at altitudes of 1 750 m, but they prefer to live in lowland forests. They also have a large home range; they move from the mountain area to the coastal lowland forest during the dry season and then retreat to the hills when the rainy season comes.

A number of factors, such as forest fires, human resettlement, logging, timber estates, plantations, agriculture expansion, shifting cultivation, and road building commonly cause the fragmentation and degradation of the island's elephant habitat. These activities, which are increasing year by year, have resulted in a rapidly shrinking elephant habitat and are responsible for the increase in the number of conflicts between elephants and humans each year.

Since the 1980s, the Indonesian Government has tried to solve this conflict by three main activities:

1. First, population management (*Tata Liman*). This involves moving or translocating elephants from the fragmented or degraded habitat to a more suitable habitat. Every year, until the current fiscal year, the government has allocated a budget for translocating solitary, isolated or troublesome elephants.

2. Second, elephant empowerment (*Bina Liman*). This involves habitat rehabilitation, fencing, community education/extension, and training troublesome elephants to participate in human activities.

3. Third, utilization of trained elephants from the Elephant Training Centres (*Guna Liman*). This involves using domesticated elephants for forestry, agriculture and recreation activities.

However, this effort is not successful because the demand for domesticated elephants or trained elephants is very low. This creates a serious problem for the government because the greater the number of elephants staying at the Elephant Training Centres the more the government must spend on maintaining them. Since fiscal year 1997/1998, between 50 and 55 percent of the annual national budget (APBN) for elephant conservation was allocated for operating Elephant Training Centres. Thus, it appears that domesticating the elephant population is not the best method of solving the elephant problem in Indonesia.

Wild elephants

The wild Sumatran elephant was formerly found in eight provinces on Sumatra. However, the dense and tangled vegetation of the tropical rain forest there makes it difficult to estimate the number of wild elephants. In 1929, Van Heurn made the first attempt at an estimate, based on the amount of ivory exported from Sumatra, and came up with a figure of 3 600 wild elephants.

From surveys carried out by Blouch and Haryanto (1984) and Blouch and Simbolon (1985), the Sumatran elephant population has been estimated at between 2 800 and 4 800 elephants in 44 fragmented locations (Table 1).

Table 1. Estimated wild Sumatran elephant population (1984/1985)

Province	Minimum	Maximum
Aceh	600	850
North Sumatra	few	few
Riau	1 100	1 700
West Sumatra	few	few
Jambi	200	500
Bengkulu	100	200
South Sumatra	250	650
Lampung	500	900
Total	**2 800**	**4 800**

In 1993, based on the Sumatra Elephant Population and Habitat Valuation Analysis, using the VORTEX simulation method, the population of wild Sumatran elephants was estimated at between 3 500 and 4 500.

A new calculation, based on information from eight National Park and Forest Protection and Nature Conservation Province Offices and five national parks in Sumatra, estimated the population of wild Sumatran elephants in 2000 at between 2 085 and 2 690 elephants and found only in six provinces.

Table 2. Estimated wild Sumatran elephant population (2000)

Province	Minimum	Maximum
Aceh (6 locations)	600	700
Riau (18 locations)	680	790
Jambi (3 locations)	140	180
Bengkulu (6 locations)	125	240
South Sumatra (3 locations)	210	340
Lampung (16 locations)	330	440
Total	**2 085**	**2 690**

At a time of deep economic crisis in Indonesia, the pressure to conserve forest areas and elephant habitats is still very strong. But, there are no protected areas in Sumatra large enough or suitable to accommodate the annual home range of the island's elephant herds. In addition, many farmers view the elephants as a serious pest and a liability rather than an asset. Thus the population of Sumatran elephants is likely to decrease significantly over the next few years.

Domesticated elephants

When kings or sultans ruled Sumatra, there must have been a substantial number of elephants in captivity. They were used in warfare and for ceremonial purposes. With the decline of the sultans and the ascendancy of the Dutch colonial power, the capture and domestication of elephants died out.

In the 1980s when the country was developing very fast, large areas of forests and woodlands were opened up by various economic sectors. As a result, some elephant habitats became fragmented and some home ranges were reduced by human activities. Since that time, conflicts between elephants and communities around the forests have increased.

The Sumatran elephant is an endangered species and protected both by Indonesian and international regulations. Therefore, since 1985, to solve elephant conflicts and to conserve the elephant, the government has set up six Elephant Training Centres on Sumatra. On the basis of each Elephant Training Centre's Annual Report, the number of domesticated elephants in the Elephant Training Centres up to December 2000 was as follows (Table 3):

Table 3. Number of domesticated Sumatran elephants in six Elephant Training Centres

Name of Elephant Training Centre	Number of domesticated elephants					
	95/96	96/97	97/98	98/99	99/00	Dec. 2000
Lhokseumawe (Aceh)	25	90	50	39	31	28
Holiday Resort (North Sumatra)	32	11	25	25	8	18
Sebokor (South Sumatra)	18	35	45	55	57	61
Sebanga (Riau)	44	80	98	117	127	125
Way Kambas (Lampung)	80	60	140	117	99	99
Seblat (Bengkulu)	7	32	33	35	42	31
Total	**206**	**308**	**391**	**388**	**364**	**362**

The number of domesticated Sumatran elephants moved from the Elephant Training Centres to forestry companies, ecotourism or recreation companies, zoos and other conservation institutions up to December 2000 was 252 elephants. The highest number of elephants moved was from Way Kambas Elephant Training Centre, and was 193 elephants.

From 1988 until 1994, the number of domesticated elephants moved was 195, but since 1995 the number has declined rapidly. Thus, too many elephants have to be cared for by the government at the Elephant Training Centres and this makes the operating cost of Elephant Training Centres very high.

The average cost of caring for each elephant is Rp.750 000 per month. In 1995, the government's budget for caring for elephants was about Rp. 1 854 million or equal to 51 percent of the national budget for elephant conservation. And this is increasing every year because of the increasing number of elephants in the Elephant Training Centres.

One of the government's efforts to solve the budget problem for Elephant Training Centres was that in 1995 the Minister of Forestry asked 14 forestry companies on Sumatra to use a minimum of one pair of domesticated elephants per 10 000–20 000 ha, or pay an elephant conservation fee of Rp.10 million per elephant per year. But, this policy has not proved effective because almost all the companies think that is too difficult to care for elephants and anyway using mechanical equipment is considered a much more efficient way of conducting forestry operations.

Laws

Since 1931, the Dutch Colonial Law protected the Sumatran elephant. This regulation was renewed by the Declaration of the Minister of Agriculture in 1972. The latest, stronger regulation to protect the Sumatran elephant was declared in 1999. This regulation, which applies to both the wild and the domesticated Sumatran elephant, prohibits hunting, trading and keeping Sumatran elephants or parts of this animal, unless the person concerned is in possession of a government permit. Offenders are liable to a fine of Rp. 200 million and/or a minimum jail sentence of five years.

However, the regulation is not effectively reducing the number of Sumatran elephants being hunted or killed because farmers or others living around the elephant habitat do not hunt elephants for

ivory or catch them to domesticate them. The most common reason farmers and others have for killing elephants is that these animals destroy their agricultural land or their housing.

The Minister of Agriculture also declared regulation No. 179 in 1995 that stipulated that any private sector or conservation institutions that needed to use or keep domesticated elephants obtained from the Elephant Training Centres should pay an elephant training compensation fee (Rp.14 million for a private institution and Rp.5 million for a conservation institution).

The advantage of this regulation is that the government receives some budget to support the operating cost of the Elephant Training Centres. However, the disadvantage of this regulation is that it reduces the demand of the private sector and conservation institutions to take domesticated elephants from the Elephant Training Centres.

Registration

The Sumatran elephant is officially an endangered and protected animal. Keeping this animal and its parts requires a government permit. This regulation also applies to anyone who receives a domesticated elephant from an Elephant Training Centre.

Currently, there is no registration system for those who wish to utilize a domesticated elephant. Each elephant should ideally be given a registration number along with the declaration or permit letter given to the person wishing to utilize an elephant in an Elephant Training Centre. The user should be made to report regularly every month on the condition of the elephant to the Forest Protection and Nature Conservation Office in the province where the elephant is being utilized.

Organizations

1. Government

    1) Directorate General Forest Protection and Nature Conservation (PKA) – Department of Forestry.

    The Forest Protection and Nature Conservation Office in Sumatra (eight provinces), Leuser National Park, Kerinci Seblat National Park, Bukit Barisan Selatan National Park and Way Kambas National Park are directly responsible for the protection and conservation of wild Sumatran elephants in Indonesia. Five Elephant Training Centres (Aceh, North Sumatra, Riau, Bengkulu, South Sumatra) are managed by the Forest Protection and Nature Conservation Office and one Elephant Training Centre is managed by a National Park (Way Kambas). Their main activities are to drive out or translocate troublesome elephants from agricultural land or villages to conservation areas or to catch them and bring them to be trained at an Elephant Training Centre.

    2) Indonesia Scientific Institution (LIPI)

    This institution does not directly support the activities of the Elephant Training Centres, but their activities are very valuable for the Sumatran elephant conservation effort. They conduct research on wild elephant behaviour, count the elephant populations, and carry out other research work related to the conservation of the Sumatran elephant.

2. NGOs

    1) Fauna and Flora International (FFI)

    Since November 1998, this organization has worked for Sumatran elephant conservation in Aceh province and financial support has come from various sources, including FFI, The World Bank/ Global Environment Facility, International Elephant Foundation, United States Fish & Wildlife

Service, Keidanren Nature Conservation Fund and private donations. Technical support is provided by PKA, LIPI and JICA.

The activities of this NGO are biological and socio-cultural assessment, capacity building of local communities, policy development, education and awareness, forest monitoring and evaluation, and veterinary support and supplies to Sumatra's Elephant Training Centres.

2) Wildlife Conservation Society – Indonesia Program

Since January 2000 this organization has worked for Sumatran elephant conservation in Bukit Barisan Selatan National Park – Lampung. The society does not work directly for the Elephant Training Centres. Its activities are to develop more efficient elephant census, survey, and monitoring methods, to conduct a Lampung-wide survey of the elephant population, to gather data on human–elephant conflicts in Lampung, to use GIS to examine relative abundance of elephant habitat distribution, and actual potential conflict areas, and to train PKA staff, students, local NGO members and other local people in elephant survey and crop damage assessment techniques.

Unfortunately, in recent times, no university, either local or international, and no foreign funded projects have directly worked with or supported the Elephant Training Centres.

Veterinary care

Every Elephant Training Centre has one veterinarian except Sebanga Elephant Training Centre in Riau. However, this Centre has a good relation with a veterinarian from the Husbandry Office of the Local Government Office (PEMDA).

Elephant Training Centres are managed by staff from the Forest Protection and Nature Conservation Office or from a national park. Besides veterinarians, mahouts (*pawang* in Bahasa Indonesia) are also involved in the Elephant Training Centres. The number of mahouts is equal to the number of trained elephants (every mahout is responsible for the care of one elephant).

Currently, there is no networking between Elephant Training Centre Veterinarians on Sumatra and other national or international professional veterinary organizations.

Summary

1) The Sumatran elephant (*Elephas maximus sumatranus*) is a sub-species of the Asian elephant (*Elephas maximus*). It is the biggest land animal in Indonesia and only found on the island of Sumatra in a variety of ecosystems. Forest fires, human resettlement, logging, timber estates, plantations, agriculture expansion, shifting cultivation, road building are the most common causes of fragmentation and degradation of elephant habitat. As a result the number of conflicts between elephants and humans is increasing every year.

2) The population of wild Sumatran elephants in 2000 was estimated at between 2 085 and 2 690 elephants distributed in only six provinces. The population of Sumatran elephants will decrease considerably in the next few years because there are no protected areas on Sumatra large enough or suitable to accommodate the annual home range of the island's elephant herds and many farmers view the elephants as a serious pest.

3) Until December 2000, the number of domesticated elephants belonging to the Elephant Training Centres was 362 and the number moved to forestry, ecotourism or recreation companies, zoos and other conservation institutions was 252. The recent reduction of the elephant number moved out

means that the number of elephants staying in Elephant Training Centres is becoming higher. This consequently pushes up the operating costs of the Centres beyond their budgetary limits.

Recommendations

Elephant Training Centres

Elephant Training Centres are one effort to reduce the conflict between Sumatran elephants and humans. Currently, the number of domesticated elephants in the Elephant Training Centres is very high, which causes the quality of care the elephants receive to suffer. It is recommended that Elephant Training Centres:

a) increase their functions to become Sumatran Elephant Conservation Centres. These centres should not only train the elephants, but also conduct research, education activities, captive breeding and Sumatran elephant population censuses;
b) develop a Sumatran elephant registration system (studbook system); and
c) establish a trust fund to become self-supporting.

Conservation areas, habitats and elephant populations:

a) keep (as large as possible) Sumatran elephant habitats in national parks, protected forests and other forest areas;
b) identify Sumatran elephant habitats outside conservation areas and make corridors between them; and
c) develop inventory and census methods that are suitable for the conditions on Sumatra.

To resolve human–elephant conflicts:

d) the government should act as a facilitator to solve the conflict between elephants and humans. The Local Government Office (PEMDA), especially, should give more attention to elephant conservation;
e) people living around elephant habitats should be educated to view the elephant as a very useful asset; and
f) money should be collected from the central government, local government, and the private businesses that use elephant habitats, as well as national and international donors, and used to solve human–elephant conflicts.

Question and answer session

Q1: You mentioned that there is an increasing number of human–elephant conflicts on Sumatra. Can't the elephants involved be brought into the Elephant Training Centres?
A1: It is difficult to do because there are already too many elephants in the centres and there is no work for these elephants. It is very expensive to keep them there. Since 1998, translocating elephants involved in conflicts has been the preferred management strategy.

Someone suggested that domesticated elephants could perhaps be used to patrol areas where wild elephants are a problem. It was pointed out that domesticated elephants are usually afraid of the wild bulls that do the crop raiding, but it was unclear if this was because of the mahouts' lack of skill or some other reason.

There followed some general discussion on the use of insurance schemes to tackle the problem of human–elephant conflicts. One participant stated that a good insurance/compensation scheme could

prevent agriculturists and others killing troublesome elephants. Dr Cheeran said that in Kerala tribals are insured against being killed by wild elephants in the forest. But there are various forms of insurance covering mahouts, damage to elephants and crop damage. Mr Mohd. Shariff Daim from Malaysia stated that Malaysia has insurance against crop damage but farmers must first dig trenches and erect electrified fences around the perimeter of their land. Compensation did not work in Malaysia because people encouraged wild elephants onto their land so they could get compensated. Usually they did not make much of an attempt to cultivate the area. Dr Cheeran said there was a group insurance scheme in North Bengal, in the tribal areas, but it was too expensive and not sustainable.

In some places in India insurance companies incur losses by offering insurance, but they do it as a promotion scheme because they can get many names into their database for future reference. Mr Bist said that in some areas the Forest Protection Committees were insured against injury or death from elephants.

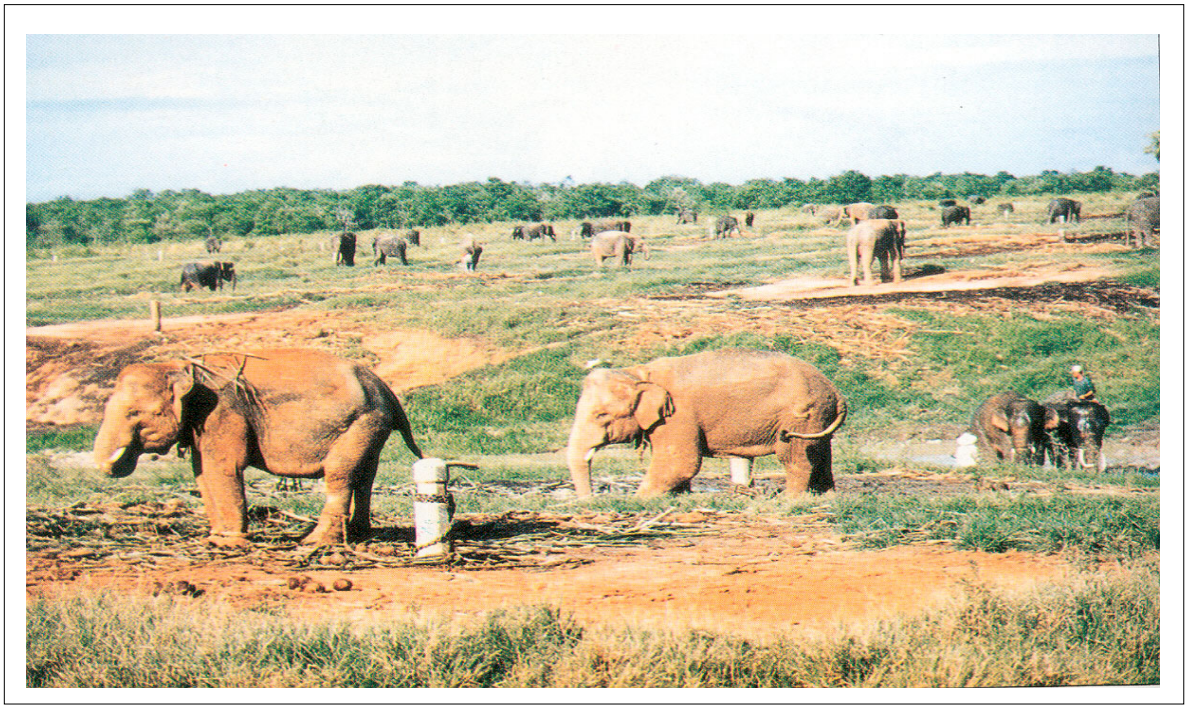
Q2: Are you happy with the quality of the mahouts in Indonesia?
A2: They are okay but do not have a close bond with the elephants.

Q3: Some Thai elephants and their mahouts went to Indonesia a few years ago, why was this? I understand it didn't work out well, could you say why?
A3: They were brought over to capture wild elephants, but it was later decided that there was no real need for them so it was agreed that they should return to Thailand.

Q4: How do you reduce the aggressiveness of elephants in the ETCs? And how old are the elephants when you train them?
A4: We use behaviour modification, mainly reducing the elephants diet. Elephants are trained between ages 6 and 19 as during these years they are more adaptive.

Dr Khyne U Mar stated that her organization had trained 50–60 cows. She said success is related to sex (males more difficult to train than females), temperament (some elephants are more difficult to train than others just because of their temperament), and size (big elephants more difficult to train than small elephants). Some young elephants can be tamed in two weeks, others take two months.

Dr Cheeran stated that drugs can be used to tame elephants instead of behaviour modification.



Elephants caught from the wild at the Way Kambas Elephant Training Centre, Lampung province, Sumatra, Indonesia

The status of Bangladesh's captive elephants

Md. Anwarul Islam

Introduction

In the early years of the eighteenth century, wild elephants were abundant throughout the eastern and northwestern divisions of Rangpur (northeast) where they frequently raided the crop fields. Several landholders kept tame female elephants as decoys for capturing these wild elephants. In some places elephants were occasionally caught in pits. This was a bad method, because the animals were frequently seriously injured by the fall into the pit. Elephants were also sometimes hunted and killed for ivory.

In Rangpur, elephants were owned by many large landowners or *zamindars*. In former times a large number of elephants was captured annually and given by the *zamindar* to the government as payment of land revenues. They were then sold by the revenue collector, and sometimes brought prices averaging only about £5 each. This practice, however, was later discontinued and the revenue was then invariably paid in cash. Some paid their tributes to the East India Company in elephants. There was a very high mortality rate among these tribute elephants. Out of seventy or eighty captured every year, only seven or eight arrived at Rangpur. Thus, later, the tribute was required to be paid in cash.

About a hundred years ago, elephants were still abundant in most of the forests of Bangladesh, even in the Madhupur forests near Dhaka (the capital of Bangladesh). In fact, there is a road in Dhaka called Elephant Road, which was used by elephants brought from Peelkhana[1], a royal elephant stable, located to the northwest of Azimpur, in Dhaka. There is also an area in old Dhaka called Mahouttuli, a locality where the mahouts of Peelkhana lived. Elephants were brought to Peelkhana from various parts of what was known then as "Bengal" for training before being sent to different parts of British India[2] where they were used by the British army to carry guns and for its commissariat. The principal non-military function of elephants was to remove logs cut from deep inside the forests. But eventually the British transferred their regular elephant-catching operations from Dhaka to Myanmar in 1900, because of the depletion of herds in the Garo Hills as a result of excessive capture.

Elephants were captured by use of a *kheda* (an enclosure constructed to capture wild elephants for domestication). This indigenous device was first used in Bangladesh in 1868. The Forest Department used it from 1915 to 1916. Large numbers of elephants were captured for domestication during the nineteenth and twentieth centuries in Bangladesh (Table 1). Just a few years before the creation of Pakistan in 1947, wild elephants had completely been extirpated from many areas where they had formerly been abundant.

The competent authority called for sealed tenders quoting the royalties the intending contractors could offer for each elephant they proposed to catch in the *kheda*. The royalty for capturing elephant by *kheda* sometimes went up to Rs.750 for each elephant (Chittagong District Gazetteer 1967). Generally, *kheda* operations were organized during the winter season, when the forests were comparatively dry.

[1] *Peel* means elephant and *Khana* means place.
[2] During the Mughal period, private *zamindars* also kept their elephants in Peelkhana on payment of fees.

Wild elephants

The elephant is now a critically endangered species in Bangladesh (IUCN/Bangladesh Redbook, 2000). No study has yet been conducted on wild elephants, but some notes on the status and distribution of wild elephants have been made by Ranjitsingh (1978), Olivier (1978), Khan (1980), and Gittins and Akonda (1982). Islam and Zabed (1992) and Islam *et al.* (1999) have studied man–elephant interactions. Today the strongholds of Bangladesh elephants are those areas that are relatively less accessible to humans, i.e. Chittagong and the Chittagong Hill Tracts in the southeast.

One non-resident herd of about 10 elephants comes down from the neighbouring Indian State of Meghalaya (especially from the Tura reserve) and strays around New Samanbag area of Maulvi Bazar district under Sylhet Forest Division in the northeast. Two other non-resident herds totalling 15 elephants come from Assam (especially from Karimganj) and are found in Durgapur of Netrokona district in the north. The presence of non-resident elephants coincides with the paddy crop seasons, i.e. February–May, and September–December. The resident herds that live in Teknaf area (southeast) frequent the neighbouring forested areas of Arakan in Myanmar and those herds that live in Sangu and Matamuhuri (southeast) frequent the forests of Mizoram state of India. Today there are about 200 wild elephants in the country, mainly in the southeast.

Captive elephants

Captive elephants (n = 93) are mostly used in the timber industry for timber hauling and in circuses. Many of these elephants are the descendants of a single cow. Most of the captive elephants are found in Maulvi Bazar district in the northeast; the owners rent out these elephants for timber hauling, or else to circus parties. Of the 17 government-owned elephants, 13 are engaged in hauling logs. Of the 93 captive elephants, 72 are used to haul logs, 17 are circus elephants, three are zoo elephants, and one is owned by Betbunia Police Station, Rangamati. Of the captive elephants, 55 are females and 38 are males (Table 2 and 3). Of the captive elephants, 57 (27 males and 30 females) are under 30 years, of which 22 (15 males and 7 females) are under 10 years (Table 3). The age of six males and eight females could not be ascertained. People hire elephants to haul logs at the rate of Tk. 1 200 (c. US$ 60) for the whole day. Circus elephants are rented out for around Tk. 100 000 (US$ c. 1 900) for one year. The price of a log hauling elephant ranges from US$5 000–10 000, whereas a circus elephant may cost up to US$15 000.

Law

Elephants received some protection under The Elephant Preservation Act, 1879, known as the Bengal Act 1879 VI, which has been repealed. All wild elephants are now protected under the Third Schedule of the Bangladesh Wildlife (Preservation) (Amendment) Act, 1974. All reptiles, birds, and mammals under this schedule are protected animals, i.e. animals which cannot be hunted, killed or captured. The rogue elephants, listed under Part II of the First Schedule, can be hunted with a special permit in places as declared by the Chief Wildlife Warden (in fact there is no such post in the Forest Department!). There is nothing in the Act to protect domesticated elephants.

However, Article 9 states:

1) Any person having the control, custody or possession of any wild animal or meat or trophy of any wild animal shall, within such period as the Government may by notification in the official Gazette specify, declare to an officer the number and description of such wild animal, meat or trophy and the place where it is kept.

2) On receipt of such declaration, the officer shall enter upon the premises of such person in the prescribed manner and such person shall produce the declared wild animal, meat or trophy for

inspection and verification before such officer; and if the declaration is found correct, the officer shall fix upon or put such mark of registration on such wild animal, meat or trophy as may be prescribed as lawful possession.

3) No person shall counterfeit, exchange or in any way interfere with any mark of registration fixed or put on by the officer on any wild animal, meat or trophy.

4) The officer shall, on being satisfied that the requirements of clauses (i) and (ii) have been fulfilled, issue, in the prescribed manner, a Certificate of Lawful Possession of such wild animal, meat or trophy.

5) The authorized officer may, pending legal action, seize any wild animal meat or trophy that has not been legally acquired or imported under this Act.

Regarding trade, Article 15 states:

1) No person shall, with a view to carrying on a profession, trade or business, buy, sell, or otherwise deal in wild animals, trophies or meat or process or manufacture goods or articles from such trophies or meat unless he is in possession of a valid permit, hereinafter called a Dealer's Permit, issued for the purpose by an authorized officer.

2) An officer may grant, or refuse to grant without assigning any reason, a Dealer's Permit to any person to deal in any wild animal, trophy or meat, or any class of wild animals, trophies, or meat specified in such permit.

3) A Dealer's Permit shall be issued on payment of the prescribed fee and shall remain valid for a period of one year from the date of its issue unless earlier cancelled.

4) (i) The holder of a Dealer's Permit shall maintain such register or record of his dealings as may be prescribed and shall produce it for inspection at any reasonable time when called upon to do so. (ii) The officer may suspend or cancel the Dealer's Permit at any time and if he suspends or cancels it, he shall record in writing the reason for doing so.

5) Nothing in this Article shall be construed to exempt the holder of a dealer's permit from complying with the provisions of Articles 8, 9, 11, 12, and 13."

The Forest Department has no knowledge of how many domesticated elephants there are in the country, although the department is the 'custodian' of the country's wildlife. And the elephant owners do not know what the responsibilities of the Forest Department are.

Registration, care and management

All the circus parties are registered with the district commissioner's office. According to the circus parties, no separate registration is needed to employ wild animals in circuses. The mahouts and the owners are ignorant of the legal status of their elephants; they are even ignorant of the necessary daily diet for a captive elephant; proper veterinary care is also absent. Only the government-owned elephants receive good veterinary care. Some elephant owners claim that their elephants are registered with the local administration, but are reluctant to show the papers.

Under the existing law the registration of the captive elephants is the jurisdiction of the Forest Department, but the department has taken no initiative so far. Wildlife conservation has never been a priority issue in the country. There was a Wildlife Circle in the Forest Department, but this was abolished long ago and now it is the responsibility (at least in theory) of the divisional forest officers to look after wildlife matters.

The government does not have the means to provide adequate manpower and budget for managing the wildlife in the country. No government or NGO is actively working in the field of wildlife conservation, nor is there any public participation. Moreover, there exists no effective awareness campaign in the country. There is no communication between the government and the researchers who are working in the field of wildlife conservation.

Recommendations

1. There should be a compulsory nationwide, central elephant registry. Information on births, deaths, and transfers (including trading) of all domesticated elephants should be properly maintained.
2. All the mahouts and the owners of the elephants should also be registered.
3. An elephant managers association should be established to facilitate the sharing of experiences.
4. Education and training materials should be prepared for the managers of the captive elephants.
5. As Bangladesh's forest areas continue to diminish, there are fewer opportunities for elephants to be employed in the timber industry. Thus many owners are now prepared to stop keeping elephants. These elephants could be used in tourism, ceremonial processions, etc. But a management plan for their care is essential.

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Table 1. Partial record of elephants captured in Bangladesh during the 19th and 20th centuries

Place	Number of elephant captured	Period of capture
Dhaka hill (Madhupur)	413	1868-76
Chittagong	85	1875-76
Dhaka hill	503	1876-80
Jayalla (Chunati, Chittagong)	36	1938
Sylhet	3	1947-1962
Chittagong	151	1947-1962
Chittagong Hill Tracts	320	1947-1962
Ukhia (Cox's Bazar)	10	1965
Ramgar (Chittagong)	2	1984
Matiranga (Khagrachari, CHT)	3	1985
Kaptai (Chittagong Hill Tracts)	3	1985
Ramgar (Chittagong Hill Tracts)	3	1985
Edgaho (Cox's Bazar)	1	1985
Kaptai (Chittagong Hill Tracts)	1	1985
Total	**1 534**	

Table 2. Captive elephants of Bangladesh

Owner of elephant (age), profession and address	No. of elephant(s), and sex	Name of elephant(s), and sex	Age	Source of procurement: bought (price)/ bred/hired (cost)	Type of work	Mahout (age), home district	Registered/ unregistered
1. Niranjan Sarker (48), circus business; The Lion Circus, Bardhan Para, Keraniganj, Dhaka	4 (2 M, 2 F)	• Gopal (M) • Chand (M) • Chandrika (F) • Rashmoni (F)	30 8 (born 10.1.1992) 25 2 (born Nov. 1998)	Bought for Taka 475 000 in early 90's from Kaptai, Chittagong Hill Tracts (CHT) (when 1 US $ = c.Tk. 42) Offspring of Gopal & Chandrika bought for Taka 475 000 in early 90's from Kaptai, CHT (1 US $ = Tk. c. 42) Offspring of 1 & 3	Circus work	• Jiban Sarker (40), Bardhan Para, Dhaka • Babul Sarker (42), as above • Rabi Sarker (37), as above • Saru Mia (48), Rajshahi • Hakim Mia (38), Khulna • Saidul (44), Rangupr	The circus was registered with the District Commissioner's (DC) Office, Dhaka in 1905; no separate registration is needed for elephants (the registration for the circus allows the use of wild animals)
2. Basanta Babu (44), circus business; The Sonar Bangla Circus, Keraniganj, Dhaka	1 (M)			Bought from Maulvi Bazar for c. Tk 400 000	Circus work		Registered with District Commissioner's Office at Dhaka
3. Kamal Ratan Sarker (45), circus business; The Laxmi Narayan Circus, Bardhan Para, Keraniganj, Dhaka	1 (F)	Raj Laxmi (F)	18	Bought when young from Maulvi Bazar for Tk 500 000	Circus work	• Abdul Ghani (32), Sylhet • Md. Ershad Ali (55) • Falu Mia (26)	Registered
4.Bangladesh Forest Industries Development Corporation (BFIDC)	13 (4 M, 9 F)	• Raikhang Bahadur (M) • Sher Bahadur (M) • Sheth Bahadur (M) • Saikat Bahadur (M) • Lutchi Rani (F) • Bano Rani (F) • Mukti Rani (F) • Raj Rani (F) • Bijoy Rani (F) • Banosri Rani (F) • Santi Rani (F) • Sova Rani (F) • A female	28 15 12 8 26 39 28 17 4 3 2 Born on 22.2.2000		Logging and lumber operations		
5. Police station, Betbunia, Rangamati, CHT	1 (M)	Sher Bahadur (M)	75	Caught from Teknaf forests	No specific work	• Md. A. Hamid (51), Rangamati • Nurul Haque (60), Rangamati	Unregistered

Owner of elephant (age), profession and address	No. of elephant(s), and sex	Name of elephant(s), and sex	Age	Source of procurement: bought (price)/ bred/hired (cost)	Type of work	Mahout (age), home district	Registered/ unregistered
6. Abdul Samad (62); The New Star Circus, Datiara, Brah-manbaria (Licence no. 05/1974/Brahmanbaria)	2 (1 F, 1 M)	• Nayantara (F) • Sekandar (M)	60 45	Owned by the circus from birth Hired from Chittagong at the rate of Tk 6000 per month	Circus work	• Md. Ledu Mia (40), Laxmipur • Gazipur • Md. Mostafa (30), Feni • Jhenidah (1 & 2 for elephant no. 1, and 3 & 4 for no. 2)	Registered with District Commissioner's Office at Brahmanbaria
7. Asaf Uddin; Olirghat, Gocchhalbari, Kulaura, Maulvi Bazar	1 (M)	Hiralal	20	Bought (?)	Rented out for logging/ lumber operations	• Reazuddin (35), Kachurgul, Juri, Kulaura, Maulvi Bazar • Renu Mia (30), as above	Unregistered (?)
8. Samad Mia, address: as above	2 (F)	• Rangamala • Kaitari	18 13	Bought;Tk700 000 (daughter of Batash Piyari) Bought (daughter of Batash Piyari)	As above	• Akhlas Mia(35); • Shuknachra, Juri, Kulaura, Maulvi Bazar • Maqbul Ali (25)	Unregistered
9. Haji Aftab Uddin (72), Juri, Baralekha, Maulvi Bazar	1 (M)	Belal Bahadur	23	Bought; Tk 200,020 from Chittagong in 1987	Logging & lumber ope.; marriages & ceremonial processions	• Rafiq Mia (32); Sagarnal, Fultala, Maulvi Bazar • Kalam Mia (25)	Unregistered
10. Md. Idris Ali (80); Rajnagar, Prithimpasha, Kulaura, Maulvi Bazar	1 (M)	Kajal Bahadur	40			• Rashid (30) • Ayub Ali	
11. Mafiz Ali, Majid Ali, Maiub Ali	3 (2 F, 1 M)	• Female • Female • Male	50 15 20		Logging & lumber operations at CHT		
12. Md. Nawabullah Mia (75); Pattai, Karmadha, Kulaura, Maulvi Bazar	5 (4 F, 1 M)	• Sundar Mala (F) • Female • Female • Female • Amir Bahadur (M)	50 22 18 c. 3 9				
13. Md. Najib Ali (53); farmer, businessman; Mahishmara, Karmadha, Kulaura, Maulvi Bazar	3 (2 F, 1 M)	• Chandan Tara (F) • Nayan Tara (F) • Chinu Lal (M)	40 25 8	Bought from Chittagong for 1 35000 in 70's			Registered with Union Parishad (?); fee Tk 100 per yr

Owner of elephant (age), profession and address	No. of elephant(s), and sex	Name of elephant(s), and sex	Age	Source of procurement: bought (price)/ bred/hired (cost)	Type of work	Mahout (age), home district	Registered/ unregistered
14. Md. Yakub Ali (brother: Md. Suruj Ali (60)); Husnabad, Karmadha, Kulaura, Maulvi Bazar	12 (7 M, 5 F)	• Maniklal (M) • Lal Bahadur (M) • Rang Bahadur (M) • Sharif Bahadur (M) • Unnamed (M) • Unnamed (M) • Jamal Bahadur (M) • Sundarmala (F) • Mohanmala (F) • Unnamed (F) • Kamala (F) • Kanchanmala (F)	- - 7 4 7/8 months 2 c. 35 - - 1.5 (32)				
15. Md. Abu Lais (65), Srinathpur, Kamalganj, Maulvi Bazar	1 (M)	Madankumar	5			Azad Mia (35)	
16. Alhaj Abdul Hannan (70), Chitlia, Kamalganj, Maulvi Bazar	2 (1 F, 1 M)	• Panrani (F) • Sthal Bahadur (Jump Baha-dur) (M)	17 4		Logging and lumber operations at CHT	• Md. Zainal Mia (42) • Md. Noor Mia	
17. Md. Madres Ali (58), farmer; Chitnia, Kamalganj, Maulvi Bazar	1 (F)	Kushumkali	40	Bought when 2 from a Chittagong kheda for Tk 2700		Md. Majnu Mia (40)	
18. Md. Chinu Mia (50), farmer; Husnabad, Karmadha, Kulaura, Maulvi Bazar	2 (F)	• Kanchanmala • Fulmala	60 12		Logging and lumber operations at CHT	• Osman Ali (40), Purba Karmadha • Maram Ali (35)	
19. Md. Giasuddin Ahmed (55); business & politics; Aringabad, Daxminbag, Barolekha, Maulvi Bazar	1 (M)	Hiralal	25	Bought from India			
20. Md. Shahid Ahmed (40); business; Rasogram, Goalta Bazar, Barolekha, Maulvi Bazar	2 (F)	• Sufia • Rezia	28 19				
21. Giasuddin, Chairman (brother: Imanuddin); Daxminbag Union Office, Barolekha, Maulvi Bazar	1 (F)						

Owner of elephant (age), profession and address	No. of elephant(s), and sex	Name of elephant(s), and sex	Age	Source of procurement: bought (price)/ bred/hired (cost)	Type of work	Mahout (age), home district	Registered/ unregistered
22. Alhaj Abul Hossain (62); business; Chittapur, Fujanagar, Barolekha, Maulvi Bazar (& Naya Sarak, Sylhet)	5 (3 F, 2 M)	• Kamala (F) • Rangmala (F) • Bijli (F) • Badshah (M) • Bahadur (M)	50 38 5 8 7	Bought from Chittagong			
23. Shamim Choudhuri (55); business; Purbo Daxmin Bhag, Daxminbag, Barolekha, Maulvi Bazar	4 (3 F, 1 M)	• Rangmala (F) (sick) • Fulmala (F) • Sundarmala (F) • Unnamed (M)	70 32 8 1	Auctioned by govt., bought for Tk 1700 - - -	Three at Chittagong, one at Barolekha (earns Tk 1200/day for logging and lumber operations)		
24. Md. Sipar Reza (23), s/o Abdul Mokdadir (Chairman), Biswanathpur, Juri, Kulaura, Maulvi Bazar	1 (F)	Noorjahan	14	Bought from Kalam Mia for Tk 250 000		Akbar Ali (35)	Registered with Zila Parishad
25. Khorshed Ali (55); (brother: Taleb Ali , 40); Bhabaniganj Bazar, Juri, Kulaura, Maulvi Bazar	1 (F)	Rabeya Sundari now with a circus, owned by a Hindu, who named her Raj Laxmi; for details see No. 3)	18	Bought from Md. Emdadul Haque of Sujanagar, Barolekha, Maulvi Bazar, for Tk 250 000 in 1996	Rented out to Laxmi Narayan Circus of Nababganj, Dhaka, for 60 000-90 000/yr	• Khalil Mia (50), Sujanagar, Barolekha, Maulvi Bazar • Ghani Mia (30) of Kulaura	
26.Shamsuzzaman Ranu (Ranu Mahalder), 43; Kaminiganj Bazar, Juri, Kulaura, Maulvi Bazar	1 (M)	Kamal Bahadur	12	Bought from Alhaj Yakub Ali for Tk 380 000 in 1996	Logging & lumber operations	• Ripon Mia (28), Faki Mia	
27. Mashuk Ahmed (35); business; Fultala Bazar, Fultala, Kulaura, Maulvi Bazar	5 (3 F, 2 M)	• Fulkali (F) • Gulbahar (F) • Unnamed (F) • Hiralal (M) • Unnamed (M)	25 60 12 35 2	- Recently bought for Tk 700 000 from Golapganj, Sylhet -			
28. Alhaj Moinuddin, Bhabaniganj Bazar, Juri, Kulaura, Maulvi Bazar	6 (3 F, 3 M)	• Helenmala (F) • Rasgolla (F) • Kasalong (F) • Lal Bahadur (M) • Hira Lal (M) • Bijoy Lal (M)			Logging & lumber operations	• Suruj Ali (50) • Firuz Ali (50) • Monir Ali (35) • Batchu Mia (27) • Arzat Ali (35) • ATM Zalil (50), Byojit	

Owner of elephant (age), profession and address	No. of elephant(s), and sex	Name of elephant(s), and sex	Age	Source of procurement: bought (price)/ bred/hired (cost)	Type of work	Mahout (age), home district	Registered/ unregistered
29. Biren Chandra Das (55) & Arun Chandra Das (57), The Royal Bengal Circus, Gaurnadi, Barisal	2 (F)	• Mohanmala • Madhumala (one Bahadur, male, died in Dec. 1999, at the age of 26)	60 35	Bought from the Capital Circus in 1980 for Tk 160 000 A migrant from India; caught by army at Comilla Cantonment and sold it for Tk 51 000 in 1975	Circus work	• Alamgir (37); Gaurnadi, Barisal • Saidul; Melapanga, Domer, Nilfamari	Registered with DC Office at Barisal
30. Md. Bazlu Mia (40), The Daxmin Bangla Circus, Mosra, Akhrakhola, Satkhira	1 (F)	Sundarmala	20	Hired from Maulvi Bazar (rate Tk 100 000 per year)	Circus work	• Md. Fazal (55) from Sylhet • Rabiul (30) from Kushtia	Registered with DC Office at Satkhira
31. Md. Akbar Ali Mia (72), The Rawshan Circus, Kazipara, Saidpur, Nilfamari Md. Akbar Ali has another circus, The Rajmahal Circus, Old Babupara, Saidpur, Nilfamari	3 (2 M, 1 F) 1 (M)	• Golap Bahadur (M) • Sadulla Bahadur (M) • Kanchanmala (F; mother of Sadullah) • Golap Bahadur	18 4 23 28		Circus work	• Md. Hakim (27), Mithapukur, Rangpur • Md. Jahangir (24), Sadullapur, Gaibandha • Md. Majibar (Mantu) (55), Lalbari, Badarganj, Rangpu • Md. Mostafa (17), Bamanga, Kalai, Jaipurh • Hasmat (42), Saidpur, Nilfama • Amir Ali, Saidpur, Nilfama	Registered with DC Office
32. M. A. Abdus Sattar, The Bulbul Circus, Mahasthan Garh, Bogra	2 (1 M, 1 F)	• Amir Bahadur (M) • Kamala Sundari (F)	20 25	• Hired from Rana Chowdhury of Maulvi Bazar (rate: Tk 80 000 per year) • Hired from Mahiuddin Chowdhury of Maulvi Bazar (rate: Tk 80 000 per year)	Circus work	• Md. Selim (28), Mahasthan Garh, Bogra • Tofazzal (32), Mahasthan Garh, Bogra	Registered with Bogra DC Office
33. Dhaka Zoo, Mirpur, Dhaka	3 (F)	• Kusum • Pabantara • Kajaltara	60 60 35	- - Donated by DC, Bandarban		• Mosadder Ali (60), Kulaura • Ali Akbar • Mansur Ali • Mohammad Ali	

Note: 1) Total 93 (55 females, 38 males) elephants.
2) Elephant No. 3 and No. 25 is the same elephant.

Table 3. Age and sex groups of the captive elephants of Bangladesh

Age	Male	Female
1 – 10	15	7
11 – 20	7	12
21 – 30	5	10
31 – 40	3	8
41 – 50	1	3
51 – 60	0	6
61 – 70	0	1
71 – 80	1	0
Unknown	6	8
Total	**38**	**55**

(Age of six males and eight females could not be ascertained)

Question and answer session

Q1: You mentioned that some elephant owners were reluctant to show their animals' registration papers, why was this?

A1: They are supposed to register their animals with the Forest Department, but if they haven't done so they just tell the local government officers that they have registered their animals but don't have the registration certificates with them.

Q2: In general what is the Bangladeshi people's attitude towards elephant conservation?

A2: Well, they are not against it but in such a poor country poverty reduction is a clear priority. And anyway with such poverty it's difficult for the government to find money to spend on animal conservation.

Q3: Are traditional mahout skills still alive?

A3: No.

Q4: Does this explain why there are so many females and so few males amongst the domesticated elephant population?

A4: Yes, females are easier to train.

Q5: What is the Islamic attitude towards animals?

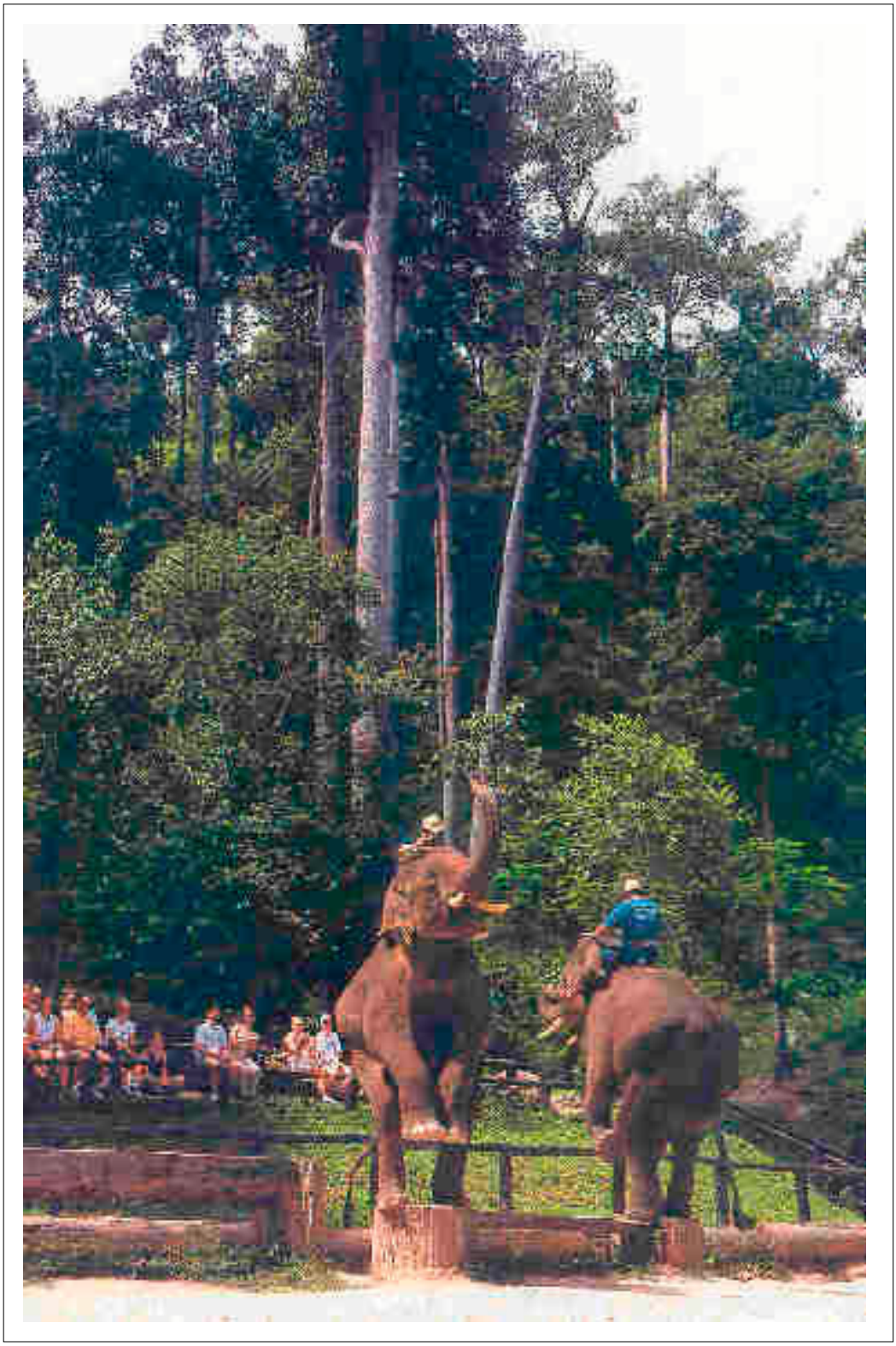
A5: It is positive but not the same as in Hinduism or Buddhism. But it should be noted that the attitude of some of the tribal people who are non-Muslim is changing and some of the taboos are breaking down. For example, some of them now eat elephant meat that in former times they never did.

Q6: Are elephants captured from the wild?

A6: No, this hasn't been done for some time.

Q7: Do you know how many wild and domesticated elephants there are in Bangladesh?

A7: No, the data we have are not reliable. We are hoping to get funding to undertake a proper survey.



An elephant show at a tourist spot in northern Thailand

The status, distribution and management of the domesticated Asian elephant in Cambodia[1]

Chheang Dany, Hunter Weiler, Kuy Tong and Sam Han

Introduction

Funding provided by FAO for this study allowed the first ever nationwide census of domesticated elephants in Cambodia. This is highly significant, and should be regarded as a benchmark for future monitoring of the country's domesticated elephant population.

The census was conducted by the Wildlife Protection Office (WPO) of the Department of Forestry and Wildlife (DFW), Ministry of Agriculture, Forestry, and Fisheries (MAFF). WPO officials from most provinces were contacted. Extended site visits were made to Mondulkiri, which has the largest elephant population in Cambodia. Sites in Siem Reap, which has highly visible tourist elephants at Angkor Wat, were visited only briefly, as were sites in Takeo and Kampot, which have zoo elephant populations.

Wild elephants

At present, the exact status of wild elephants in Cambodia is unclear. In 2000 and 2001, for the first time, specific elephant focused surveys began to establish locations and approximate numbers for the various populations. Because of the incomplete nature of the work and the inherent difficulties of surveying low-density populations in forest habitats (Heffernan *et al*., 2001), the total population size is unknown. Field surveys are ongoing, but on the basis of the information available now, the authors believe that it is possible that between 300 and 600 wild elephants remain in Cambodia. This is considerably lower than other recent estimates of 2 000 (Kemf and Jackson, 1995) and 500 to 1 000 (Osborn and Vinton, 1999).

The most important elephant range remaining in Cambodia appears to be the southwest mountain complex, consisting of the Cardamom (Kravanh) Range, the Elephant Mountains, and Phnom Aural. This region occupies portions of the provinces of Battambang, Pursat, Koh Kong, Kampong Speu, and Kampot. Large numbers of elephants appear to be using the Areng Valley, down to Botum Sakor National Park, and a cautious estimate is that these comprise up to four or five groups (Heffernan et al., 2001). Elephants are known to be present in the Phnom Samkos Wildlife Sanctuary, largely in Pursat province (Daltry and Momberg, 2000). Other small and fragmented herds are known to be present in the Phnom Aural Wildlife Sanctuary (B. Long, personal communication) and in the Kirirom and Bokor National Parks in the Elephant Mountains (J. Walston, personal communication). All populations are under constant stress from a combination of factors, including anarchic logging practices, agricultural conversions, and human resettlement. In particular, hunting pressure is relentless in many areas as a result of the continued demand for ivory and other elephant products, as witnessed in the shops of Phnom Penh and Siem Reap, amongst other places (E. Bradley Martin, personal communication). Within the past year, organized hunting groups have shot numerous elephants for ivory, bone, and tails, particularly in Koh Kong and Western Pursat provinces.

A second important elephant area in Cambodia is Mondulkiri province, located east of the Mekong River and bordering the Vietnamese province of Dak Lak. Recent field surveys by World Wide Fund for Nature (WWF), Wildlife Conservation Society (WCS), and by Fauna and Flora International (FFI), working with the DFW, the Department of Nature Conservation and Protection

[1] This is a revised version of the paper that was presented at the International Workshop. It contains information that was not available at that time.

(DNCP), the provincial forestry department and local hunters, have confirmed herds of elephants in four districts. Limited survey data have been collected, but because of large-scale movements of at least one herd, population estimates are impossible at this time. Opportunistic hunting still occurs widely, as evidenced by the skeletal remains of recently hunted individuals, hunter accounts, and the trade in elephant products.

WWF, DNCP, and DFW have confirmed small, scattered populations of elephants in Western Virachey National Park in Ratanakiri province, located east of the Mekong and bordering Viet Nam and Lao PDR. The available evidence suggests that the total number of elephants is low, although in Siempang district the number is probably viable for conservation. (A. Maxwell, personal communication).

West of the Mekong and north of the Tonle Sap lies a large lowland dry evergreen forest encompassing portions of Kratie, Stung Treng, Kampong Thom, and Preah Vihear provinces. FFI and DFW have just completed field surveys in this forest. Initial estimates indicate only one group, with probably as few as three individuals, remaining in the whole forest. The entire forest is under logging concession and logging is extensive. There is a large core area that has not yet been logged and is, therefore, in exceptionally good condition. There is little sign of humans and important populations of pileated gibbons and small and medium size carnivore communities are found there. However, large mammals are no longer found because of hunting.

In the area focused on Chhep district of Preah Vihear, near the Lao PDR border, WCS, DNCP and DFW field surveys have recently confirmed a population of elephants, consisting of multiple small groups. Widespread logging is taking place in the area, and although provincial and district governors have recently forbidden any hunters to shoot elephants, these herds are under severe hunting pressure.

As would be expected from such continued hunting pressure, both focused and incidental (as a result of soldiers being based in the forest), and the availability of large tracts of forest habitat, wild elephants in Cambodia appear to be on the move almost continuously.

By the end of this field season, WWF, WCS, FFI, DFW and DNCP will have conducted initial elephant surveys in most of the significant elephant ranges. Workshops are planned for June and July 2001, to assess the present situation in the light of this year's data, and prepare an action strategy, including prioritization of key areas for conservation and protection activities. Landscape-scale elephant conservation projects are required, especially those that can find a balance between policies suiting humans and habitat focused conservation. Most elephant populations in Cambodia move in and out of designated protected areas and logging concessions to fulfil different food and habitat requirements. Elephants do not require pristine unlogged forest, and strategies incorporating the various stakeholders' interests in elephant areas are to be encouraged.

It is likely that some of the existing populations could recover to natural levels if the necessary protection measures are implemented successfully, though some herds may no longer have the diversity in their remaining gene pool to survive any of the predictable stochasticity from the environment and demographic pressures. Cambodia's human population of about 11 million is quite small, relative to the total country area, and large intact blocks of wildlife habitat remain. If trends in gun control, hunting reduction, development and enforcement of legal measures, forest area planning and management all continue, Cambodia's wild elephants have a chance of survival into the next decade, leaving sufficient numbers to recover, in theory, to natural levels, according to habitat availability at that time.

Domesticated elephants

The just completed survey of all provinces in Cambodia resulted in a total of 162 domesticated elephants. This is considerably lower than the estimate of 300 to 600 published in *Gone astray* in l997.

Whilst this latest survey is not expected to have detected all the domesticated elephants in Cambodia, it can be regarded as the best estimate available at this time (see Table 1).

Table 1. Domesticated elephant numbers

Name of province	Estimated number of domesticated elephants
Mondulkiri	91
Ratanakiri	39
Siem Reap	11
Stung Treng	5
Kampong Speu	4
Kampot	3
Kandal	3
Takeo	2
Kratie	1
Kampong Thom	1
Koh Kong	1
Phnom Penh	1
Total number	**162**

Mondulkiri (91): In Mondulkiri, records of domesticated elephant numbers have been kept since at least 1995 (Lic Vuthy *et al.*, 1995). In 1995, 104 elephants were reported and is considered to be a reliable minimum (Lair, 1997). In 1999, the number of domesticated elephants recorded by the provincial forestry department was 93, in 2000 it was 83 and in July 2001 it was 91. In order to cross check the data, two districts (Pichreada and Orieng) were checked by two of the authors, who recorded the same number (91) of elephants as on the records.

Ratanakkiri (39): Because of the long distance to this province from Phnom Penh, a member of the survey team spoke to three provincial officers by telephone (one from each of the Department of Forestry and Wildlife, the Department of Animal Health and the Department of Nature Conservation and Protection). They each confirmed the figure of 39 domesticated elephants in the province (according to the most recent record kept by the provincial DFW in June 2001).

Siem Reap (11): A field visit to Siem Reap (where all 11 elephants were observed) and discussions with the Deputy Director of the provincial office of the DFW indicated that these are the only domesticated elephants in the province.

Stung Treng (5): A telephone call was placed to the Deputy Director of the provincial office of the DFW who gave this figure.

Kampong Speu (4): Field staff visited this province, and an official from the provincial office of the DFW was interviewed. The official stated that five domesticated elephants had died between 1995 and 1996 as a result of old age.

Kampot (3): Field staff visited this province and, in the company of officials from the provincial office of the DFW, three elephants were observed. These officials believe that no other elephants are present.

Kandal (3): Field staff visited this province and, in the company of officials from the provincial office of the DFW, three elephants were observed. These officials believe that no other elephants are present.

Takeo (2): Field staff visited this province and, in the company of officials from the provincial office of the DFW, two elephants were observed. These officials believe that no other elephants are present.

Kratie (1): A telephone call was placed to the Deputy Director of the provincial office of the DFW who gave this figure.

Kampong Thom (1): A telephone call was placed to the Deputy Director of the provincial office of the DFW who gave this figure.

Koh Kong (1): A telephone call was placed to the Deputy Director of the provincial office of the DFW who gave this figure.

Phnom Penh (1): This elephant is employed in the tourism industry and is well known.

Discussion of the status of domesticated elephants

Suspicion of the authorities by local people and their strong tendency to avoid the intrusion of officials make full reporting unlikely and suggest that these figures must be considered as reliable minimums only. However, declarations of ownership may be difficult to avoid, especially as development and transport links improve and the communities become less isolated. Moreover, registration carries no further responsibilities as there is no legal framework and may be regarded simply as a formality. Further research, therefore, should examine this issue of the reliability of reporting more closely.

Because of the time constraints of the investigators involved, independent confirmation of numbers given by provincial officials was not always possible. Moreover, it is possible that births or deaths may have occurred fairly recently, and these would not have been recorded at the time of investigation.

Because of the inherent problems in collecting information on domesticated elephants, it is unlikely that the previous estimates (Lair, 1997; Kemf and Jackson, 1995; McNeely, 1975) are sufficiently rigorous to form the basis of any assessment of trends in numbers. However, it is certain that there has been a reduction in the numbers of domesticated elephants as a result of decreased opportunities for industrial work, e.g. logging and heavy lifting, which have been mechanized almost everywhere.

This survey should be regarded as a baseline survey, despite the limitations noted above, as it gives a detailed provincial breakdown.

In l999, Mondulkiri provincial DFW officials recorded 93 elephants, but by 2000 the number had declined to 83 elephants. These ten elephants 'lost' between 1999 and 2000 were in fact sent to Siem Reap. According to the last double check conducted by Mondulkiri DFW in June to July 2001, 91 domesticated elephants were recorded. Others were possibly sold to Thailand and Viet Nam between l999 and 2000. During this period, six calf elephants were captured, ranging in age from 6 months to five years old, according to provincial DFW sources. One particular young elephant that avoided the hunters was brought to the WPO Wildlife Rescue Center in Phnom Penh. During a hunt, the mother of this individual was killed, and the young animal ran into a village. It was caught in a villager's kitchen searching for food. The villagers negotiated with the DFW as they did not wish to raise the elephant. In the end, an undisclosed sum of money was paid to bring the young animal to the Wildlife Rescue Center. This young animal unfortunately died on 5 April 2001 because of an infection following an accident that resulted in a number of broken bones.

Elephants normally belong to clans of the Phnong minority. Each clan is composed of 10 to 35 families, and each family in that clan has the right to use any elephant. Furthermore, ownership is passed on from generation to generation, so sometimes an elephant belongs to three or four generations of a clan at the same time. Therefore, the chances of double counting (at least!) are quite high in any simple

interview census. The numbers cited in this report are expected to be accurate because they were crosschecked by provincial and DFW staff, who have been recording the animals in this area for quite some time. In two districts cross-checked by surveyors, the number recorded was consistent with the number counted.

Elephants are rarely bred in captivity, often because of local taboos or financial concerns. Moreover, expeditions to capture wild elephant are conducted less often than in previous years because of a decreased demand for elephants and the availability of alternative incomes for local people. For example, in Koh Nhek district of Mondulkiri, according to one local commune chief, many former elephant hunters are now engaged in wet rice production, and have little time to organize large-scale expeditions. Furthermore, uncontrolled hunting and warfare have decimated the population of wild elephants, making it more difficult to locate and catch young individuals. This situation is exacerbated by the problem of killing wild females to obtain calves, the net result being that the young, the breeding females and the future breeding of the captured animal are all removed from the total wild elephant population.

Although the country's forest area is still extensive, the people's houses, especially in old communes, are being located farther from the forest edge. Owners cannot allow the elephants to forage a long distance from the house for fear of hunters after ivory, "medicinal parts" or meat. Because of the increasing numbers of people living in areas traditionally inhabited by elephants, destruction of crops while foraging is becoming more common, leaving the owners with another headache if they leave their elephants to roam free. People are therefore obliged either to mind their elephants all day, or to go to the forest to collect food for their prized pet. This, coupled with rural poverty in many areas, makes the prospect of elephant ownership less inviting.

Widespread availability of motorbikes and military trucks has also resulted in a greatly reduced demand for elephants for transport and labour (log haulage was formerly a primary use of domesticated elephants).

Many of the domesticated elephants today are extremely old. For example, only one elephant in the whole of the Siem Reap group is below 45 years old. All the elephants are believed to be wild caught, and some, according to one informant, have been trafficked through Mondulkiri. During the Pol Pot regime, some domesticated elephants reverted to a wild state. Very few wild elephants were captured during the period 1980 to 2000, according to local people in Mondulkiri. Only a few old men still know the traditional techniques of how to catch and train elephants. Their skills are not being passed on to the next generation, which seems to prefer mopeds to elephants. This is an indication that the cultural heritage is dwindling, along with the symbiotic expanses of forest.

In Phnong culture, it is believed that if a domesticated elephant gets pregnant or even has sexual relations, unhappiness will result for the entire village. Many villagers still maintain this belief. Therefore, the owner of a pregnant elephant often must pay compensation to all villagers, such as a hosted feast where at least three buffalo and three pigs are sacrificed and a large quantity of rice wine is consumed. A village committee, in accordance with commune regulations, generally determines the required scale of these sacrifices. The resulting time and cost of these parties is a lot of trouble for an elephant owner, and discourage any thought of breeding domesticated elephants.

Legal status

Currently, there is a general lack of laws governing animal issues in Cambodia and there are no specific laws governing domesticated elephants. A draft wildlife law has recently been prepared by DFW, with technical assistance from WCS and WWF and financial support from the British Embassy in Cambodia. This draft will be presented to interested organizations for review at a workshop later in 2001. The law will deal in detail with both the capture and killing of wild animals.

In the meantime, there are a variety of wildlife-related decrees, sub-decrees, declarations, etc. in place that are confusing and contradictory. These are poorly known and generally misunderstood, particularly in rural areas, where most human-wildlife contact takes place. Order No. 2, requesting the restriction of illegal logging, issued by the Royal Government of Cambodia (RGC) on 6 January 1999, and Declaration No. 1, "Actions of Forest Management and Law Enforcement", issued on 25 January by RGC, explicitly banned all capture and killing of wildlife in Cambodia. Thus, a lack of laws is not the whole problem. The problem is the rural people's lack of comprehension of the policies. Lack of enforcement by the authorities is also a major obstacle to the successful protection of wildlife in general, including elephants.

Very little enforcement of wildlife laws takes place. Two actions involving elephants that have taken place in recent years illustrate this. In one case, four domesticated elephants being transported between provinces for sale were intercepted and confiscated by the DFW, but the Kratie Provincial court ordered the government to return the elephants after the owners sued. In July l999, a farmer in Kampong Speu fired into a herd of elephants that had been grazing on his crops for several nights. He killed a female and captured the calf, which he sold for US$460. The farmer was arrested and released after he paid half his profit in fines. The calf was subsequently sold to a government official with a private zoo for US$1 800. A third case, however, illustrates that the situation may be changing for the better. DFW was negotiating with a group in Srey Huei Commune in Koh Nhek district of Mondulkiri province to arrange transfer of a captured calf to the Phnom Tamao Wildlife Rescue Center, near Phnom Penh. However, due to fears of being fined and legal action being taken, the animal was released back into the forest. The people of the commune then told officials that the animal had escaped. This indicates that people are beginning to understand that the law will not allow them to continue to capture these animals from the wild. Moreover, if they are forced to relinquish ownership of captured animals repeatedly, they will quickly learn that the effort and time required to mount a hunting operation is simply wasted.

On 30 April l999, the Royal Government of Cambodia issued Sub-decree No. 38, Management and Control of All Types of Firearms and Explosives. This prohibited civilian possession of firearms and all civilians were ordered to turn in their guns. This has been so effective that in most provinces officials and hunters report that there are far fewer people in the forest with guns these days. However, in the Cardamom Range, elephants are still being killed at an alarming rate by the placement of landmines on elephant trails.

Registration

There is no nationwide registration of domesticated elephants, although in Siem Reap there is province-level registration of the tourist elephants at Angkor Wat, and in Mondulkiri the provincial office of the MAFF takes on this task. Responsibility for a registration system lies with DFW. The concept for this is currently being designed and will be implemented by the DFW/FFI Elephant Programme. The basis of this will involve collecting locality and ownership data, a physical description, a photograph, and implantation of a small microchip by experienced veterinarians. This information will be stored in a central database. Owners throughout the country will be notified of the requirement to register their elephants, and they will be allowed a reasonable time to contact the authorities. Failure to comply with this requirement will initially lead to a small fine, followed by the confiscation of illegally captured animals.

Organisations and their major projects

There are no major projects dealing specifically with domesticated elephants in Cambodia, although the DFW/FFI programme is preparing to take responsibility for some aspects of this work,

thus ensuring government involvement. Moreover, as noted previously, WCS and WWF are assisting the DFW to prepare a new wildlife law, which will include details of domesticated elephant protocol.

Under the Asian Elephant Conservation Fund, the United States Fish and Wildlife Service has funded two projects in Cambodia: one involving WWF, WCS, DNCP, and DFW, and one involving FFI, DFW, and the Asian Elephant Research and Conservation Centre (AERCC) in India. The combined efforts of both projects will result in field data from all of the major elephant ranges and a far better understanding of the present status and distribution of the Asian elephant in Cambodia.

WildAide is working with the Forest Crime Monitoring Unit of the DFW nationwide in efforts to control illegal hunting and the wildlife trade.

Cat Action Treasury (CAT) and the University of Minnesota are working with the DFW to develop the Community-based Tiger Conservation Project. Regional offices have been established in Koh Kong, Preah Vihear, and Mondulkiri. Over 30 ex-hunters have been recruited as wildlife rangers. Recently, a Koh Kong wildlife ranger discovered six dead elephants. He photographed these and then recorded their GPS locations and passed on the information to the authorities. The investigation which followed resulted in the break-up of an elephant hunting gang.

Employment of domesticated elephants

Eight elephants in Siem Reap are used to transport tourists at Angkor Wat, two are in training, and one calf is being raised.

In Kampot, two elephants are in a private zoo. One originated in Koh Kong, and another in Mondulkiri. A medicine seller uses a third elephant for transportation. This elephant, age 38, is reported to have originated in Kampot.

In Takeo, a number of calves are being looked after in the Phnom Tamao Zoo and Wildlife Rescue Center to promote conservation education and to protect the calves from exploitation. One of these elephants (age 3) was confiscated in Koh Kong. Another animal (aged 2) was collected from ethnic minorities in Mondulkiri, but recently died, following an accident.

One elephant is engaged in tourist activities in the heart of Phnom Penh, at Wat Phnom. The elephant is used to give rides. Three elephants are also based in a private zoo, owned by a Frenchman, on an island in the Mekong River, close to Phnom Penh.

In Mondulkiri and Ratanakiri, Cambodia's largest population of domesticated elephants is still used for transport and occasionally for log transport. Most owners are from minority ethnic groups. Mondulkiri elephants have been used on several wildlife surveys, and two Ratanakiri elephants were employed during the production of a documentary film in l999 called "Search for the Kouprey". Elephants are most used during the rice harvest in Northern Mondulkiri and the cost of hiring them is increased accordingly at this time. Occasionally, elephants are used for an unusual task, but not always with success – the final outcome of Mondulkiri province voting in the l998 election was delayed by a day when a lovesick elephant transporting ballot boxes ran off into the forest after a wild elephant. After the ballot boxes were recovered, a helicopter was called in to prevent further delays.

Veterinary care

The Siem Reap elephants used for tourist transport at Angkor Wat are well cared for and appear quite healthy. A local veterinarian performs a medical and health check once a week. An international veterinarian from Thailand specializing in domesticated elephants sees the elephants one a month and

is also available for emergency cases. Within the last year, one elephant has died of illness and one has died of old age. The adult elephants receive about 200 kg of food a day, consisting of sugar cane, coconut leaf, green leaves, and grass. The two years old baby elephant is fed milk. Arrangements are being made for the transfer of eight more elephants from Mondulkiri to Angkor Wat to assist in the tourist trade. This transfer has been approved by WPO, with the provisions that regular checks will be allowed on the welfare of the animals, and the new owner will facilitate breeding of the domesticated animals to establish a non-wild caught pool of animals within the famous temple complex.

The juvenile elephants at Phnom Tamao Zoo and Wildlife Rescue Center are the only other domesticated elephants in Cambodia *confirmed* to have an adequate diet and medical care. They are fed milk, boiled rice with beans, palm sugar, and sugar cane and are under strict veterinary supervision.

Anecdotal evidence indicates that many elephants kept in remote villages are poorly treated and not properly fed, although the availability of wild feed, especially for those animals that work in or near to the forests, probably improves their diet.

Summary and recommendations

Once an important part of Khmer life, the domesticated elephant population is now quite small and will almost certainly continue to decline, mainly because of improved roads, a preference for motorized vehicles, bans on wild elephant capture, a limited wild elephant base, and an ageing domesticated elephant population. With no younger animals coming in and the loss of knowledge of how to capture and train elephants, the cultural heritage associated with this way of life is also in decline. It may be that the domesticated elephant will disappear from Cambodian culture, except in memory and art. Supplementation of the domesticated population is not acceptable because of the great threat of extinction hanging over the wild population. The transfer of elephants from Thailand could fill the requirements of a booming tourist market, but wild capture for domestication is now completely unacceptable anywhere in Indochina.

1. The working group recommends that DFW establish a programme for the registration of all remaining domesticated elephants in Cambodia. Regulations should be developed to ensure the humane care, feeding, and employment of these elephants. Elephant owners should be educated on the regulations, and a system and schedule of compliance inspection, reporting, and enforcement should be established. This must go hand in hand with attempts to stop the hunting, capture and the domestication of wild individuals.

2. If it is shown that any ethnic or rural populations are in need of a working elephants, and to maintain a tourist transport base at Angkor Wat and other tourist centres, a study should be carried out to determine the feasibility of breeding domesticated elephants.

3. A study should be carried out to determine the feasibility of rehabilitating domesticated elephants to a wild state. This has been shown to be possible in previous studies (R. Lair, personal communication), and should be encouraged in any cases where owners cannot keep their animals in a humane condition.

4. Reasonably priced veterinary support should be made available to all remaining domesticated elephants in Cambodia.

5. Clear dietary guidelines should be developed and distributed to all owners of domesticated elephants, along with details of the forthcoming registration programme.

6. Cooperation with Thailand, Lao PDR, and Viet Nam should be developed to ensure that the issue of domesticated elephants and dwindling wild populations are considered a regional, not just a national, issue. Interestingly, the results from a preliminary analysis of mitochondria DNA

demonstrated that elephants from Thailand and Cambodia share a number of heliotypes. This is consistent with there being little genetic differentiation between elephant populations from these two countries (P. Fernando, personal communication).

7. The new draft of the Cambodian wildlife law should contain one article that deals with the issues relating to the overall welfare, capture, procurement, ownership, transfer, sale and movement of domesticated elephants in and out of the country, and should address the needs of animals that have been converted from the wild to pet status.

8. Supplementing dwindling domesticated elephant "herds" with individuals from areas with a surplus, such as Northern Thailand, should be examined.

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Question and answer session

Q1: Did you say in your presentation that you have completed a countrywide survey of domesticated elephants?
A1: No, it is ongoing.

Q2: Is there much elephant trading in Cambodia?
A2: It has probably reduced in recent years but there is still some poaching to sell the ivory and for the traditional medicine trade. Thai and Chinese are involved in the trade.

The care and management of the domesticated Asian elephant in Myanmar

U Tun Aung and U Thoung Nyunt

Introduction

The Union of Myanmar is situated in Southeast Asia. Its geographical coordinates are 9°53' to 28°25'N latitude and 92°10' to 101°10'E longitude. It comprises a total land area of 676 533 square km, spread over 14 administrative states and divisions. There are four main rivers, an extensive network of feeder streams, many mountain ranges and a long coastline. Approximately 75 percent of the country lies within the tropics and the remainder lies in the subtropical and temperate zones. The annual rainfall is 900 mm in the Dry Zone and over 5 000 mm in the coastal region and other parts of the country. The average temperature is below 10°C in the hilly region and over 40°C in the Central Dry Zone (Forest Resource Division, 1993). The great variation in rainfall, temperature, soil and topography results in many different forest types, such as evergreen, semi-evergreen, and mixed deciduous forest, which are the most important for the elephant. Bamboo, one of the preferred foods of the elephant, is abundant in Myanmar's forests.

The elephant is not only of great cultural and historical significance in Myanmar, but is also of major economic importance in the country's timber industry. There were 4 075 elephants in timber harvesting operations in the Union of Myanmar in 1999–2000. The elephants of Myanmar are providing an invaluable service to the country not merely by supporting the national economy but, more importantly, by conserving the environment. It is universally accepted that animal skidding is the most environmentally friendly method of logging. Elephant skidding will continue to play a vital role in the timber operations of Myanma Timber Enterprise (MTE) for the foreseeable future, particularly in the many mountainous and swamp areas of Myanmar's forests.

MTE is the sole government agency involved in the timber industry and is responsible for the extraction, processing and marketing of the country's teak and other hard woods. MTE earns nearly 30 percent of the nation's foreign exchange.

Although the domesticated elephant populations (of known size and demographic characteristics) belonging to MTE and private owners are properly kept and receive regular and skilful veterinary care, the country's domesticated elephant population is declining year by year.

The great majority of domesticated elephants were procured directly from the wild elephant population by capturing and training them over several decades. Now the wild elephant population is also declining year by year. The main cause of the decline is poaching for ivory, skins and meat.

To ensure the protection and welfare of Asian elephants throughout their range in Myanmar and guarantee their long term survival, an effective management strategy, proper veterinary care of domesticated and wild elephants, a good education programme and projects and a public awareness campaign on the need to conserve wild elephants, adequate trained staff and funds, and collaboration with the Japan Wildlife Research Center (JWRC) and other organizations, associations, and groups are crucial.

Myanmar's elephants, both wild and captive, are widely distributed throughout the country.

Wild elephants

Wild elephants in Myanmar are widely distributed throughout the whole country except for the Dry Zone areas. The total area of wild elephant habitat is over 115 600 sq. km in 87 township areas

(Myint Aung, 1994). According to a questionnaire survey done by the Nature and Wildlife Conservation Division in 1990–1991 (Tables 1 and 2) the estimated population was 4 639, which excluded Kayah State (U Uga, 2000).

The wild elephant population size has been estimated from time to time by the Forest Department, through reliable local informants and questionnaire surveys. Documented figures are as follows:

1942	5 500	(Burma Forest, Vol. 5. No.2)
1949	5 000	(Smith)
1950	6 000	(Willion)
1959	6 500	(Tun Yin)
Between 1960 and 1961	9 660	(FD, Unpublished data)
1962	9 057	(Wint – Sein Maung)
Between 1969 and 1970	7 340	(FD, Unpublished data)
1972	6 000	(Caughley, 1980)
1974	8 500	(Hundley) (Olivier)
1977	5 000	(Hundley). (Olivier, 1978) (Guardian Magazine June 1979, U Tun Yin)
1980	6 008 (± 1 000)	(Hundley) (Report to AESG.)
1980-81	5 508	(FD, Unpublished data)
1982	6 560	(Thet Htun)
Between 1990 and 1991	5 000 to 10 000	(FAO, 1983)
1991	4 000 to 6 000	(Myint Aung and Ye Htut,)
1996	5 000	(FD, 1996)

In 1999-2000, the wild elephant population was less than 4 000 widely distributed throughout Myanmar but mainly in the northern hills, the Arakan Yoma, the Bago Yoma, the Taninthari Yoma, Shan State and Chin State (Myint Aung, 1994 and U Uga, 2000). Thus, the wild elephant population trend is downward and can be explained by three factors. First, elephant habitats are shrinking at a faster pace than ever before and habitat fragmentation and disturbances to elephant ranges and corridors are quite common nowadays. This has resulted in a reduced carrying capacity to hold a viable population in many elephant ranges, especially in heavily disturbed pockets of habitats. Second, serious physical disturbance to elephants and the blocking of their regular movements has resulted in a decreased birth rate among the wild elephants. Third, poaching for ivory has resulted in the death of many wild elephants (U Uga, 2000).

Further poaching, continued habitat loss and habitat fragmentation and also seasonal migration routes being blocked and cut, may cause homeless and frightened elephant to stray into paddy fields, sugarcane fields, banana plantations and other farm lands, resulting in more and more human–elephant conflicts in the near future. The continued survival of the country's elephants, which are internationally endangered and regarded as a worldwide flagship species (U Uga, 2000), is threatened and serious measures to tackle the problem must be urgently implemented.

Domesticated elephants

It is normally accepted that domesticated elephants were put into the service of man almost 2 000 years ago in Myanmar. Historical depictions of war elephants date back to the time of King Anawrahta of Bagan in the year 1044 AD. He conquered Thaton, a flourishing seaport at that time, and after subduing it, brought back to Bagan (together with other sacred relics of Lord Buddha) thirty sets of Tripitaka placed on the backs of thirty two white elephants that had been the property of King Manuha of Thaton (U Toke Gale, 1974).

Ancient kings possessed elephant forces. Indeed royal cavalry and infantry were of no use without an elephant corps that played a similar role to the tank regiments of present day armies. And there is a record showing that joust fighting on the backs of elephants took place during a war between the two powerful kings of Ava and Hanthawaddy.

Before 1942, the total number of elephants owned by the Timber Industry of Myanmar was about 10 000 and 6 500 of these were full grown, 2 500 were trained calves between the ages of five and eighteen and about 1 000 were calves.

By the end of the Second World War in 1945, only about 2 500 full grown elephants, less than one half of the pre-war amount, were available for the extraction of timber (U Toke Gale, 1974).

After 1948, the number of elephants owned and hired by MTE was as follows:

Year	MTE owned	Hired	Total
1962–1963	1 526	1 336	2 862
1988–1989	2 959	2 290	5 249
1999–2000	2 715	1 360	4 075

As can be seen from the data, elephants owned by MTE increased between 1962-63 and 1988-89 and then slightly decreased between the 1988–89 and 1999–2000 period (Tables 3 and 4). Map 1 (page 97) shows the existing distribution of MTE's elephant camps.

An animal census carried out by the Livestock Breeding and Veterinary Department (1993-94), revealed the following picture of the privately owned domesticated elephants:

	Male	Female	Total
Under 5 years old	151	170	321
5 to 15 years old	302	332	634
Above 15 years old	749	1 014	1 763
Total	1 202	1 516	2 718

Source: L.B.V.D Headquarters, Yangon

In 1999–2000, the elephants registered with the Forest Department consisted of:

	Male	Female	Total
Forest Department	7	5	12
Myanmar Timber Enterprise	737	935	1 672
Private owners	762	1 095	1 857
Total	1 506	2 035	3 541

Source: Forest Department Headquarters, Yangon.

For fuller details by state/division see Table 5.

Apart from the above registered elephants, some elephants are being raised in zoological gardens, national parks and elephant sanctuaries, as follows:

a) Hlawga National Park 6 elephants
b) Zoological Garden (Yangon) 3 elephants
c) Zoological Garden (Mandalay) 2 elephants
d) Gwa Elephant Range 3 elephants
e) National Park (Alaungdawka thapha) 14 elephants.

Laws

With regard to elephant management in Myanmar, elephants were first legally protected under the Elephant Preservation Act 1879 (Saw Han, 1984) that regulated hunting and capture. They were then protected by the Burma Wildlife Protection Act, 1936 (revised in 1956), under which hunting was prohibited except by licence. According to the Protection of Wildlife and Wild Plants and the Conservation of Natural Areas Law, 1994, elephants were listed as a completely protected species, and their capture was prohibited, except for scientific purposes. But even then one first had to obtain a licence (U Uga, 2000).

Regarding current legislation and law enforcement, the Forest Law, 1992 and the Protection of Wildlife and Wild Plants and the Conservation of Natural Areas Law, 1994 have been enacted. With regard to international obligations, Myanmar has been a party to CITES since 1997 and the Convention on Biological Diversity (CBD) since 1994. In addition to law enforcement, and for the more effective conservation of wildlife species, including elephants, Myint Aung (1994) recommended that a nationwide anti-poaching campaign be carried out in Myanmar (cited in U Uga, 2000).

The Protection of Wildlife and Protected Area Law (The State Law and Order Restoration Council Law No. 6/94 dated 8 June, 1994) consists of 12 chapters: 1) Title and Definition, 2) Objectives, 3) Formation of the Committee and Functions and Duties Thereof, 4) Designation of Protected Areas and Establishment of Zoological Gardens and Botanical Gardens, 5) Protected Wildlife and Wild Plants, 6) Hunting, 7) Right to Establish Zoological Gardens and Botanical Gardens, 8) Registration, 9) Taking Administrative Action, 10) Appeals, 11) Offences and Penalties, and 12) Miscellaneous.

The objectives of this law are to:

a) implement the policy of protecting the country's wildlife;
b) implement the policy of conserving the country's protected areas;
c) carry out the country's obligations in accordance with the international conventions agreed by the state in respect of the protection of wild species of both flora and fauna and representative ecosystems occurring in the country;
d) protect endangered species of wild flora and fauna and their habitats;
e) contribute to the development of research on natural science;
f) establish zoological gardens and botanical gardens for the protection of flora and fauna.

Under Chapter 5, Protected Wildlife and Wild Plants, section 15 (a), elephants and another 38 mammals have been listed as completely protected wildlife species.

Under Chapter 11, Offences and Penalties, section 37 mentions that whoever commits any of the following acts shall on conviction be punished with imprisonment for a term that may amount to 7 years or with a fine which may amount to kyats 50 000 or with both: (a) killing, hunting or wounding a completely protected wildlife species without permission, and possessing, selling, transporting or transferring such wildlife or any part thereof; (b) exporting without the recommendation of the Director General of the Forest Department a completely protected wildlife or protected wild plant species or any parts thereof.

Registration

Domesticated elephants (privately owned and state owned) have to be registered at the Forest Department under the Essential Supplies and Services Act, the Burma Act XLVII, 1974, and the Elephant Registration Act, 1951.

MTE elephants are registered at the Forest Department at the age of five years old and above. The renewal of registration is required every three years. If an elephant gives birth, MTE personnel must inform the nearest Forest Department office within three months of the birth.

To register a domesticated elephant with the Forest Department a registration fee and three photographs of the elephant (front, right side and behind) must be submitted with the application. The registration fees scale is as follows.

a)	MTE elephants	- Registration fee	2 500 kyats (for each elephant)
		- Renewal fee	750 kyats
b)	Privately owned	- Registration fee	10 000 kyats (for each elephant)
		- Renewal fee	3 000 kyats

Captive born elephants and captured wild elephants belonging to MTE are also registered at the MTE headquarters from birth to death. A registration number and the name of the elephant are given after training. After receiving the name and registration number of the elephant, MTE personnel use a branding iron to affix the registration number and a star onto both buttocks of the elephants.

In former times, up to 1942, five European firms and one indigenous firm worked the country's teak forests, and they marked and registered their elephants as follows:

Companies	Registration mark (by branding)
Bombay Burma Trading Co., Ltd.	C
Steel Brothers Co., Ltd.	SB
McGregor and Co., Ltd.	M
Foucar Co., Ltd.	F
T.D. Findlay and sons	TD
Ba O Co., Ltd.	O

At present, MTEs mark their elephants with a star and the FD mark their elephants with the letters FD.

Under the Protection of Wildlife and Protected Area Law 1994, Chapter 8, Registration, Section 26(a) mentions that, "A person who possesses a souvenir or wears as a traditional custom any part of a completely protected wildlife species, before this law came into force, shall register it at the relevant township Forest Department in the manner described by the Minister of Forestry".

In Section 27, the law mentions that a forest officer who has been assigned to perform the functions of registration by the Director General: (a) may scrutinize the application for registration under section 26 in the prescribed manner and register or refuse registration; (b) if registration is accepted under subsection (a) he shall issue a certificate of registration to the applicant.

Organizations and their major projects

MTE and FD have both been active in conserving and maintaining the population of domesticated and wild elephants. The Forest Department has prohibited the capture of wild elephants since 1994–95, although after 1994–95 MTE captured a few wild elephants in areas where there were conflicts between the elephants and people. To maintain the MTE elephants, MTE carried out the following projects with the assistance of the I.F.S. (International Foundation for Science – Sweden):

1) The development of RIA of serum progesterone to study the estrus cycle of Myanmar cow elephants to improve breeding management. (Daw Khyne U Mar, Manager of Research, MTE).

2) The study of spermiogram of elephants' semen with special reference to its employment for natural and artificial breeding. (U Aung Tun Khine, Assistant Lecturer, University of Veterinary Medicine, Yezin).
3) The establishment of a programme of captive breeding by natural mating of timber elephants in Bago Division. (U Soe Win – Assistant Manager (Vet) MTE).
4) The initiation of database management of a stud book of domesticated elephants from the Union of Myanmar. (U Thaung Nyunt – Assistant Manager (Vet) MTE).

The long-term survival of elephants is crucial to the Myanmar ecosystem. It cannot be ensured only by conservation of elephant habitat and the enactment of laws designed to protect them. A nationwide campaign is needed to educate people about the ecological interactions between elephants and their environment.

The Asian Elephant Specialist Group (AESG) meeting in Yangon in 1997, jointly sponsored by the Ministry of Forestry and IUCN/SSC), recommended the conservation of wild and captive elephants in Myanmar with the assistance of other countries and some relevant international organizations, such as the Wildlife Conservation Society (WCS), the Asian Elephant Specialist Group (AESG), the Smithsonian Institution (SI), etc.

The Forest Department has tried to establish Managed Elephant Ranges (MERs) that would be managed by the Nature and Wildlife Conservation Division. Five elephant ranges have been proposed (U Uga & Ye Htut, 1997) namely, Yakhine Yoma Elephant Range (Yakhine State), Tanine Elephant Range (Kachin State), Bago Yoma Elephant Range (Bago Division), Mayyu Elephant Range (Yakhine State), and Taninthari Elephant Range (Taninthari Division). These should be established as soon as possible (U Uga, 2000).

The work of domesticated elephants

Domesticated elephants are used mainly for the following purposes:

1) timber extraction (logging);
2) transportation (as baggage elephants in hilly forests);
3) religious ceremonies and processions;
4) capturing wild elephants (as *kunchee* elephants);
5) state functions and ceremonies;
6) tourism (for elephant shows and trekking in the jungle);
7) agriculture activities in difficult terrain, especially in the northern part of Myanmar.

Trained domesticated elephants are used mainly for logging in Myanmar. Timber elephants enter the forest (work-sites) around mid-June when there is enough water and food for them. About 1 700 working elephants owned by MTE and about 1 500 owned by private contractors were engaged in timber extraction work in 1999–2000. Usually elephants work from mid-June to mid-February with a short break of two or three weeks at the end of October when the weather is extremely hot.

Usually, the working week is fixed at five days, but elderly elephants or elephants in poor health sometimes need extra resting days. The working hours are four to eight hours per day, depending on the weather, the dragging path, the health of the elephant, the topography, the size of the logs, and the amount of fodder and water available for the elephants. The baggage elephants are used to transport the equipment used for forest operations, the utensils of the inspection officers and forest rations. Logging by elephants is still widely practised and is the most suitable means under the prevailing selective felling system of Myanmar. The economic and environmental advantages of using trained elephants in forestry operations are numerous. A fully trained elephant is an investment for a lifetime. Such an elephant has a working life of 30 years (U Saw Richard *et al.*, 2000).

Three kinds of working elephants

1) Trained calves (age 5 years to 17 years) are engaged in transporting the personal equipment of the staff involved in timber operations and rations for the elephants in the rainy reason and early winter season before the construction of logging roads.

Maximum loading capacity:

Age 5–12 years	-	30 kg
Age 12–15 years	-	70 kg in plains areas
	-	45 kg in hilly areas
	-	30 kg in steeper and difficult areas
Age 16–17 years	-	100 kg.

Travelling limits:

- Not more than 25 km per day in flat areas.
- Not more than 16 km per day in mountainous and muddy paths.
- Not more than 3 strenuous marches without any rest period.

2) Logging elephants (age 18 years to 55 years) are engaged in dragging logs and pushing logs according to their power or strength from tree stumps to the point where they are measured or to the streams in which they are floated.

3) Yelaiking elephants are engaged in freeing the jammed logs floating in the stream to enable them to continue on their way to the rafting depot.

Working capacity:

100 to 180 hoppus tons[1] / head / year for teak logs
180 to 240 hoppus tons / head / year for other hard woods.

Maximum loading capacity:

18–24 years	-	Light dragging work
25–45 years	-	Full working
46–55 years	-	Work capacity declines
56–60 years	-	Very light work
Over 60 years	-	Retired.

Classification of working elephants according to their dragging power:

- A first class elephant can drag more than 2 hoppus tons logs at a time
- A second class elephant can drag 1 to 2 hoppus tons logs at a time
- A third class elephant can drag 1 hoppus ton logs at a time
- A fourth class elephant can drag less than 1 hoppus ton.

Veterinary care

For veterinary care of the domesticated elephants, the veterinarians go from camp to camp and elephant to elephant to give the necessary treatment with modern drugs and traditional medicines. The major health problems of the elephants in Myanmar are parasitic infestations and nutritional disorders. Contagious diseases such as anthrax and haemorrhagic septicemia (H.S.) are controlled by using

[1] 1 hoppus ton = 1.8 cu. m.

vaccines and by segregation. The elephants undergo stool, skin and blood checks quarterly at the Central Laboratory or a Regional Laboratory of the Livestock Breeding & Veterinary Department.

In Myanmar there are 87 veterinarians caring for the health of domesticated elephants as follows:

Organization	Graduates	Dip. in Vet. Med.	Total
MTE	19	58	77
FD	10	-	10
Total	29	58	87

The veterinarians from MTE inspect each elephant at least once a month routinely and if necessary to give treatment, they stay at the elephant camps, sometimes for long periods.

MTE purchases veterinary medicines from foreign and local companies. This involves considerable expense as can be seen from the following information:

Financial Year	Local Currency (kyats)	Foreign Currency (US$)
1995–1996	1 050 000 kyats	120 000
1996–1997	1 030 000 kyats	-
1997–1998	1 400 000 kyats	270 000
1998–1999	1 200 000 kyats	-
1999–2000	1 310 000 kyats	260 000

The numbers of tool and blood tests given to timber elephants between 1996 and 2000 (Central lab – LBVD Yangon) are as follows:

Year	Stool Test	Blood Test
1996	419	186
1997	432	380
1998	888	987
1999	709	1 183
2000 (Up to 26.12.2000)	302	992

The elephants of the MTE all receive excellent veterinary care. Caughley (1980) states that veterinary treatment and training in Burma is modern, highly developed and backed by an elaborate recording system.

Summary and recommendations

Elephants have had a relationship with Myanmar society for a long time in terms of religion, culture and the economy. Elephants still play an important role in logging because of the topography of the country and the selective felling system of Myanmar. Wild and domesticated elephants are found throughout the country. In the first half of the twentieth century there were about 5 500 wild elephants (in 1942) and about 10 000 captive elephants (in 1942), but in the latter part of the century there were about 4 000–6 000 wild elephants and about 6 000–7 000 captive elephants in Myanmar. So the population of elephants in Myanmar has declined gradually, because of poaching, deforestation, loss of habitat, habitat fragmentation and overload. Appropriate solutions are urgently required to ensure the long-term survival of both captive and wild elephants. The remaining population of Asian elephants is at a critically low level and is declining gradually throughout most of their ranges. The continuing loss of habitat for wild and domesticated elephants and the unbalanced death and birth rate

of domesticated elephants are the primary obstacles to maintaining a viable elephant population in Myanmar.

The Ministry of Forestry has laid great stress on implementing a comprehensive management programme incorporating both wild and domesticated elephant populations. It is hoped that this will ensure the continued survival of this species. In other words, the Ministry of Forestry is giving priority to both the *in situ* and the *ex situ* conservation of elephants in Myanmar. Uga and Ye Htut (1997) recommended the expansion of the protected area network including managed elephant ranges. Myanmar has already established the first elephant range called Yakhine Yoma Elephant Sanctuary. In the long-term a network of elephant ranges throughout the country will be gradually established.

The average birth rate of timber elephants is 3.1 percent and the death rate is 3.3 percent (based on the total population). The breeding age of timber elephants is as early as eight years old and as late as 55 years old. But the average breeding age of cow-elephants is from 18 years old to 50 years old. To encourage captive elephant breeding, MTE appoints elephants of both sexes to the same logging teams and allows them a night out for free grazing and mating. To get better elephant breeding results, MTE has initiated a research programme to raise the calving rate of cow-elephants between the ages of 15 and 18 that are used for travelling and transport purposes (light work). For the sake of the long-term survival of elephants in Myanmar, all foresters belonging to the Ministry of Forestry, especially those in the Forest Department and MTE, and decision makers at all levels, are strongly urged to view the forests as complex ecosystems, to pay adequate attention to saving elephant habitat, to promote the welfare of staff working with elephants and to co-operate with other countries.

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Table 1. Population estimate of wild elephants

(Based on a questionnaire survey by Wildlife Division, FD, 1990-1991)

State/Division	Population	Remark
Kachin	110	- Estimate for townships area.
Kayah	-	- Not available
Kayin	170	
Chin	0	
Sagaing	1 180	
Tenasserim	100	
Bago	230	
Magwe	4	- Estimate for Saetotetaya Township
Mandalay	33	
Mon	100	
Yakhine	1 161	
Yangon	117	
Shan	1 254	
Ayeyarwaddy	180	
Total	**4 639**	

Source: Myint Aung, 1994

Table 2. Personal estimate of wild elephant population (1991)

State/Division	Population (minimum)	No. of townships where wild elephants distributed	Approximate area with wild elephants (sq. km)
Kachin	850	11	19 900
Kayah	50	2	850
Kayin	170	3	5 500
Chin	-	-	-
Sagaing	800	18	22 000
Tenasserim	150	6	18 500
Bago	280	14	12 000
Magwe	25	2	1 200
Mandalay	100	10	3 750
Mon	100	1	1 250
Yakhine	750	8	16 500
Yangon	110	2	950
Shan	550	5	8 700
Ayeyarwaddy	180	5	4 500
Total	**4 115**	**87**	**115 600**

Source: Myint Aung, 1994

Table 3. Distribution of MTE elephants (1999–2000)

State/Division	Own elephant			Hired elephant
	FG	TC	CAH	
Kachin	45	21	3	86
Kayah	-	-	-	-
Kayin	-	-	-	-
Chin	61	23	7	37
Sagaing	524	292	82	191
Taninthari	-	-	-	-
Bago (West)	220	101	15	99
Bago (East)	175	108	12	585
Magwe	362	123	45	34
Mon State	-	-	-	-
Mandalay	132	70	6	134
Shan (South)	32	5	3	37
Shan (North)	35	40	7	51
Shan (East)	-	-	-	-
Yakhine	35	28	-	19
Ayeyarwaddy	72	30	1	87
Yangon	-	-	-	-
Total	**1 693**	**841**	**181**	**1 360**

Note: FG = Full grown; TC = Trained calf; CAH = Calf at heel

Table 4. Status of MTE elephants and hired elephants

Year	Full grown (18-above)	Trained calf (4-18 years)	Calf at Heel (0-4 years)	Total	Hired elephant
1962–63	883	398	245	1 526	1 336
1988–89	1 520	1 038	401	2 959	2 290
1999–2000	1 693	841	181	2 715	1 360

Table 5. Registered elephants at Forest Department (1999–2000)

State/ Division	FD			MTE			Private			Total		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Kachin	-	-	-	38	25	63	220	333	553	258	358	616
Kayah	-	-	-	-	-	-	17	17	34	17	17	34
Kayin	-	-	-	-	-	-	112	167	279	112	167	279
Chin	-	-	-	34	53	87	4	3	7	38	56	94
Sagaing	-	-	-	156	238	394	30	36	66	186	274	460
Taninthari	-	-	-	-	-	-	43	70	113	43	70	113
Bago	2	1	3	141	183	324	207	316	523	350	500	850
Magway	-	-	-	187	216	403	19	27	46	206	243	449
Mandalay	-	-	-	69	102	171	8	6	14	77	108	185
Mon	-	-	-	-	-	-	7	14	21	7	14	21
Yakhine	2	2	4	23	14	37	4	14	18	29	30	59
Yangon	-	-	-	-	-	-	-	-	-	-	-	-
Shan	3	2	5	37	54	91	33	26	59	73	82	155
Ayeyarwaddy	-	-	-	52	50	102	58	66	124	110	116	226
Total	**7**	**5**	**12**	**737**	**935**	**1 672**	**762**	**1 095**	**1 857**	**1 506**	**2 035**	**3 541**

Question and answer session

Q1: What are the management links between wild and domesticated elephants?
A1: No real management links. Wild elephants are only counted, not managed. Domesticated elephants are generally worked for five to seven hours per day and let into the forest to rest. In such circumstances cows are generally impregnated by wild bulls.

Q2: Are wild elephants being domesticated?
A2: No, they are only caught for scientific purposes.

Q3: What do you do to enhance breeding success?
A3: In general there is only natural breeding but we do give the cows some nutritional supplements that helps with their pregnancies.

Q4: You need a constant supply of elephants for logging but if you rely on natural breeding don't you find that the supply goes down before it goes up?
A4: Yes, that is right.

Q5: Do all the vet technicians you employ have Bachelor's degrees?
A5: Yes.

Q6: Does MTE carry out reforestation to ensure that there will always be employment for elephants?
A6: Yes, we carry out reforestation.

Q7: Are there any official channels for talking about elephants among Myanmar, Thai and Indian institutions or agencies?
A7: No.

Q8: The best way to log sustainably is to use elephants rather than mechanize, is this official policy in Myanmar?
A8: Yes, selective logging using only elephants is the official policy.

Q9: Do private owners capture wild elephants?
A9: No. They do domestic breeding or release cows into the wild to get impregnated.

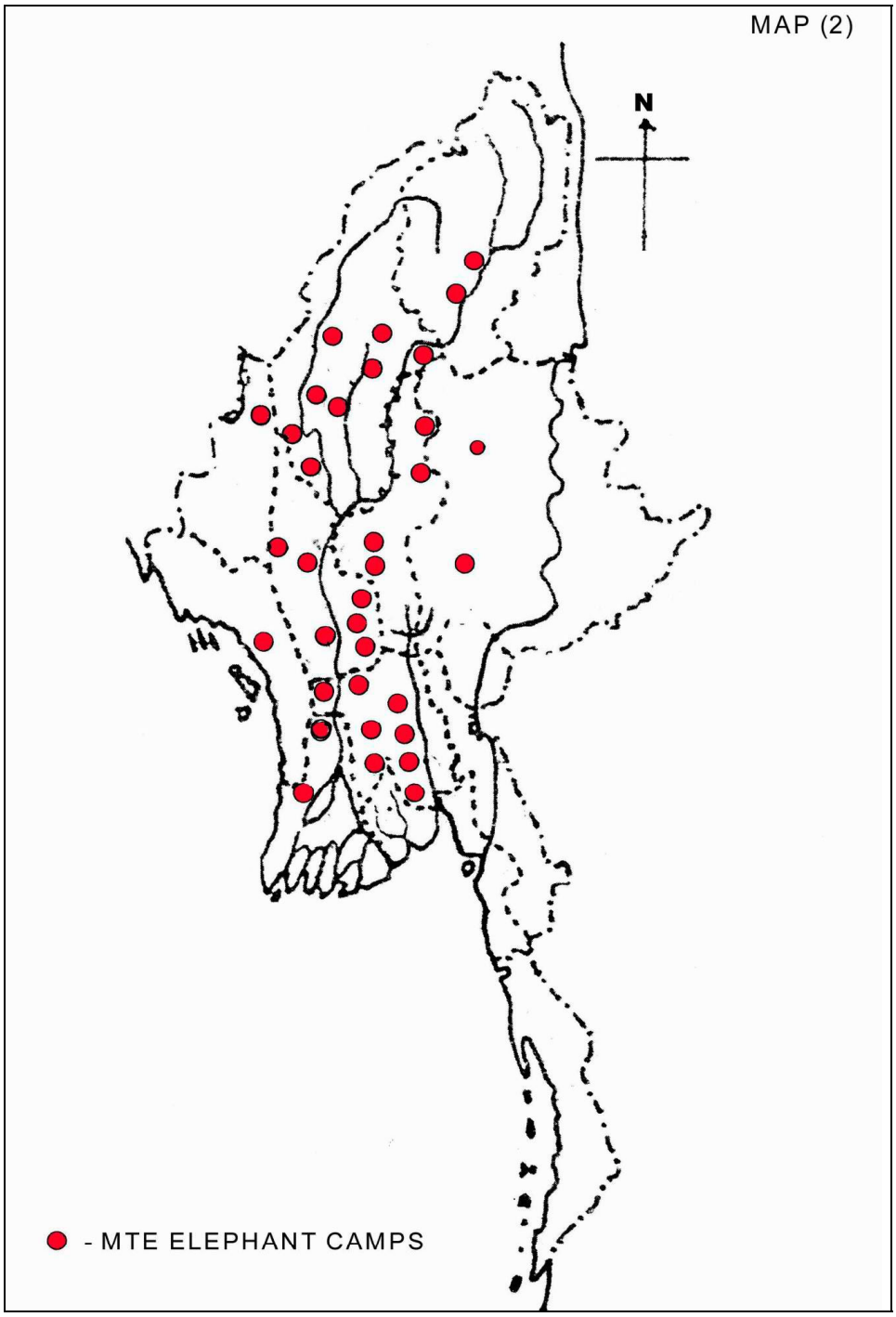
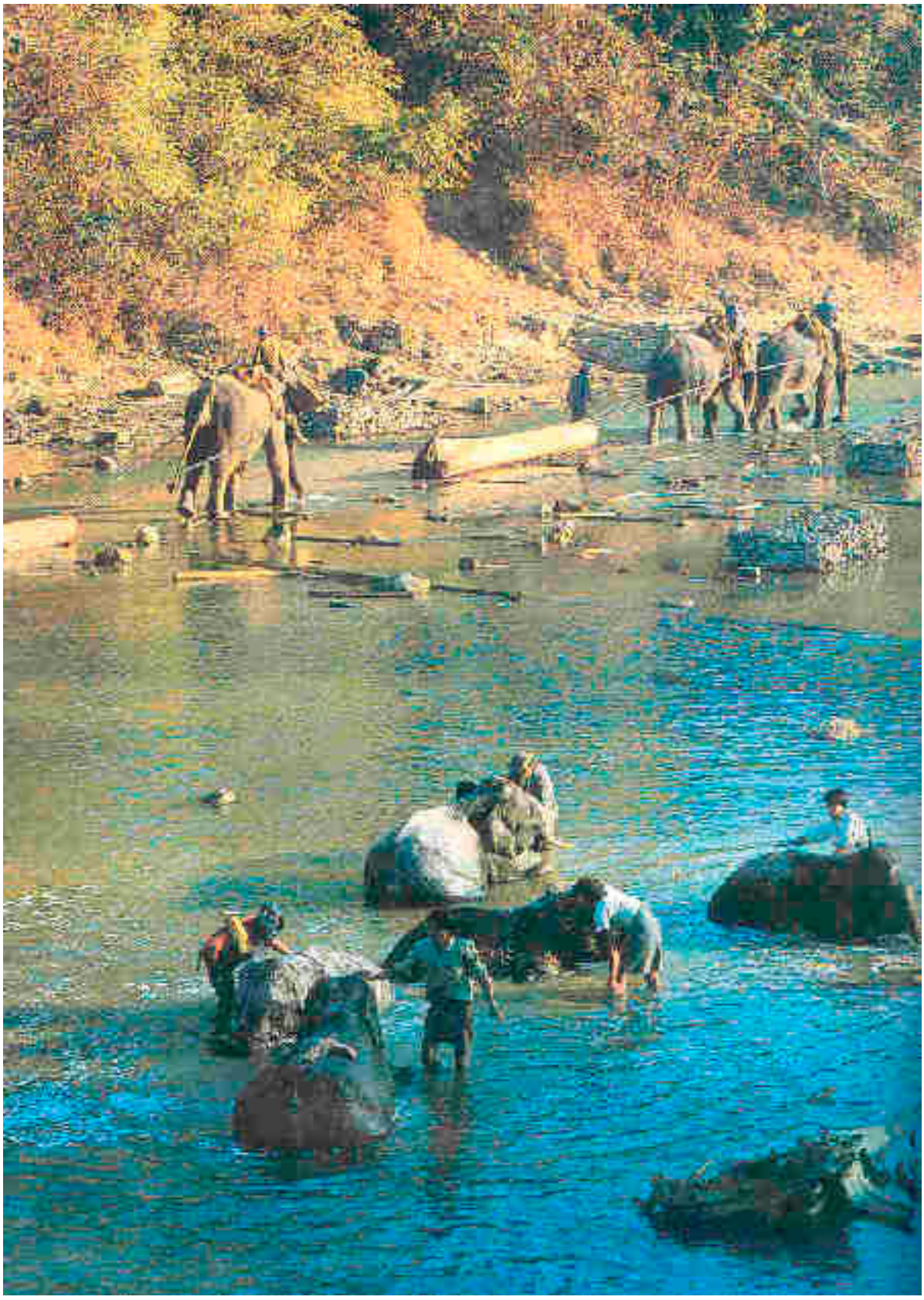


Fig. 1. Map of MTE elephant camps



Logging elephants – important partners in the teak forestry of Myanmar.

The challenge of managing domesticated Asian elephants in Nepal

Fanindra R. Kharel

Introduction

Almost 57 percent of Nepal's land was covered by forest in 1961 (Kharel, 1985). This was reduced to 29 percent during the last four decades (HMGN, 1999). The loss of forest resources, largely limited to the lowlands (the Terai region), was mostly the result of extensive clearing for agriculture and commercial timber operations aided by an increased fuelwood demand by a burgeoning population[1]. This resulted in the loss of wild Asian elephant habitat and, consequently, a decrease in the number of elephants found in Nepal.

The Asian elephant (*Elephas maximus*) is endangered throughout the region and is in danger of becoming extirpated in Nepal. A rapidly growing human population and its need for land development have led to an increase in the incidence of human-elephant conflicts. As a result, the elephants are now mostly confined to national parks and wildlife reserves.

The history of the capture, taming and use of Asian elephants is a long one. Domesticated Asian elephants have long been associated with religious beliefs and practices, and the elephant was a status symbol of a wealthy owner in the past. Now, the domesticated elephants in Nepal are used for forest excursions, and for entertaining tourists in parks and reserves. They have also become an important scientific subject for wildlife biologists, park/reserve managers and field investigators. Elephant camps have been established along with protected areas located in the lowlands of Nepal, namely the Koshi Tappu Wildlife Reserve (KTWR), the Parsa Wildlife Reserve (PWR), the Royal Chitwan National Park (RCNP), the Royal Bardia National Park (RBNP) and the Royal Suklaphanta Wildlife Reserve (RSWR).

Realizing the need to conserve the declining population of wild elephants in Nepal, a Task Force was commissioned in 1985 by the Chief Secretariat of His Majesty the King to carry out a study and make recommendations on the management of elephants in captivity. As a result of the recommendations contained in the Task Force Report (1985), an elephant breeding center was established at Khorsor in RCNP in1986. The objectives of the breeding center were to begin scientific breeding and carry out research on elephants. It was also expected to gain experience in elephant management and their use in the management of protected areas. Initially, the elephant breeding center began with 22 elephants (16 from India, four from Thailand and two from Myanmar). Today, the number stands the same and consists of three adult males, two juvenile males, 13 breeding females and four infants.

The above mentioned elephant camps and breeding center have played a key role in conserving this species through captive breeding.

Status of wild elephants

Until 1960, there was a large number of Asian elephants throughout the entire lowland forest area of Nepal. As a result of a massive human resettlement programme the forest cover was extensively cleared, and the elephant population dwindled to about 100 individuals.

[1] The human population growth rate of Nepal's tropical region is an average of 2.66 percent per year and this was exacerbated by migration from the hills to the lowlands.

Based on the spatial movement of the wild elephants, the country's elephant population has been categorized into four groups or sub-populations.

1) Eastern population: The population of this region is confined to the highly degraded and fragmented forest patches. This population consists of temporary migrants from the neighbouring state of West Bengal. The total sub-population varies between 10–15 individuals and is mostly seen during the paddy-harvesting season that lasts from September to October (personal communication, Department of Forest personnel).

2) Central population: This comprises 25–30 resident animals within the Parsa Wildlife Reserve (PWR). Some splinter groups of this population have found their way into the adjoining Royal Chitwan National Park (RCNP) as well as into the buffer forest of the PWR (Chief Warden, PWR, personal communication and from an analysis of animal sighting reports of the last ten years).

3) Western population: The western population has been of particular interest since it was noted that there were only two bulls within the Royal Bardia National Park (RBNP) in 1987. However, later in the early nineties a herd of 25 elephants was sighted and recorded for the first time. These herds were known to have migrated in from the RSWR and from the adjoining forest areas of India and Dudhwa National Park. In 1994, 32 elephants were recorded in totality and have become residents for most of the year. The current population is between 45 and 50 individuals (S.S. Bajimaya, personal communication in 2000 and an analysis of animal sighting reports of the last 20 years). With this recruitment, it has become the largest sub-population of elephants in Nepal.

4) Far-western population: This population is not as stable as the populations of other places. The initial population was found to be between 25 and 30 animals. However, the population has reduced drastically over the years. These animals used to cross to the Indian side of the border during certain periods of the year and resided mainly in RSWR. They were seen moving along the foothills of the Siwalik Hills, eastward to RBNP and then returning by the same route. This movement of elephants has ceased since 1994. Now a herd of 12-18 animals (M.B. Pandey, personal communication in 2000 and an analysis of animal sighting reports of the last 15 years) can be seen in and around this area.

Status of domesticated elephants

Available records indicate that the management of domesticated elephants in Nepal has a long history and is said to have begun in 1903. At one time there were 31 elephant camps throughout the lowlands of Nepal. The capture and training of wild animals was a common practice in the past. A total of 17 domesticated elephants were released into the wild in 1914 and 10 wild elephants were captured for domestication during 1954–1970.

Although the reason for releasing elephants into the wild is not mentioned in reports, it can be assumed that those elephants were released because of the difficulty of finding them work or because of their old age. If we analyse the elephant population data at ten-year intervals from 1903, there is a clear indication that the population has decreased over the years (Table 1 and Fig. 1).

Table 1. Elephant populations at ten year intervals between 1903 and 1973

Years	1903	1913	1923	1933	1943	1953	1963	1973
No. of elephants	328	234	198	199	180	136	80	47

Source: Janchbujh Kendra Bibhag, Raj Durbar (1986)

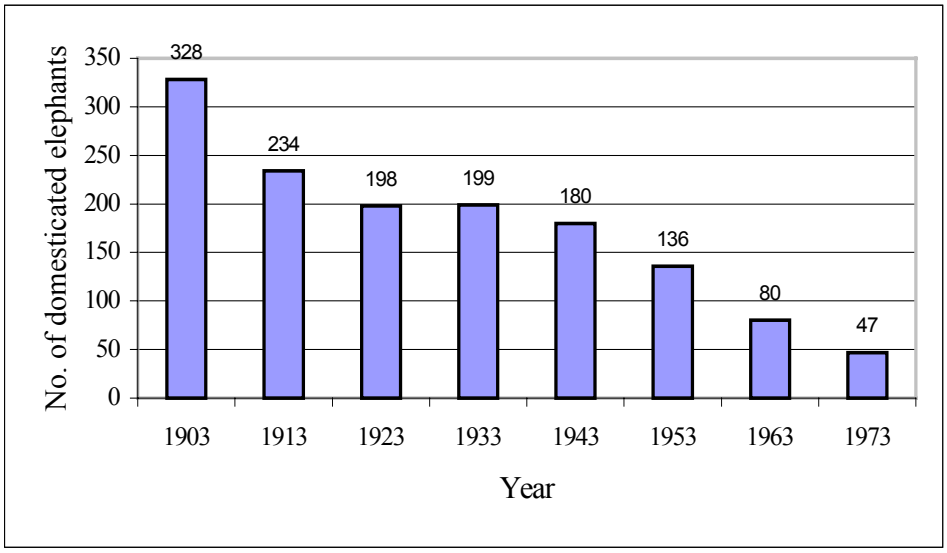


Fig. 1. Declining trend of domesticated elephant populations at ten-year intervals between 1903 and 1973

Since 1978, the management responsibility of the domesticated elephant camps has been given to the Department of National Parks and Wildlife Conservation (DNPWC) by His Majesty's Government of Nepal (HMGN). Accordingly, parks and reserves at KTWR, PWR, RCNP, RBNP and RSWR have maintained trained elephants. One elephant breeding center in RCNP has also been established and comprises 22 animals.

The number of elephants in these parks and reserves, including the breeding center, totals 77. Other than these elephants belonging to the government, the King Mahendra Trust for Nature Conservation (KMTNC), a prominent national NGO, and various hotels inside and outside of RCNP and outside of RBNP also keeps a significant number of elephants to cater to the needs of tourists and to conduct research. Tables 2 and 3 show the total number of domesticated elephants spread across the different camps.

Table 2. Domesticated elephants in government camps

Names of camps	Male			Female			Total
	Adult	Sub adult	Juvenile	Adult	Sub adult	Juvenile	
KTWR Elephant Camp	-	-	-	10	-	-	10
PWR "	-	-	-	8	-	-	8
RCNP "	11	-	-	9	-	-	20
RBNP "	-	-	-	10	-	-	10
RSWR "	-	-	-	7	-	-	7
RCNP Breeding Center	5	-	-	13	4	-	22
Total							**77**

Table 3. Domesticated elephants in private camps

Names of camps	Male			Female			Total
	Adult	Sub adult	Juvenile	Adult	Sub adult	Juvenile	
KMTNC, RCNP, Sauraha	-	-	-	5	-	-	5
KMTNC, RBNP	-	-	-	2	-	1	3
Hotel, West Nepal Adventure, RBNP	-	-	-	5	-	-	5
Hotel, Machan Wildlife, RCNP	1	-	-	9	-	-	10
Hotel, Chitwan Jungle Lodge, RCNP	-	-	-	9	-	-	9
Hotel Narayani Safari, RCNP	-	-	-	8	-	-	8
Hotel Tiger Tops, RCNP	3	-	1	10	-	-	14
Hotel Island, RCNP	-	-	-	6	-	-	6
Hotel Temple Tiger, RCNP	-	-	-	7	-	-	7
Central Zoo Jawalakhel	-	-	-	1	-	-	1
Individual Hotels at Sauraha outside the RCNP	-	-	-	17	-	-	17
Hotel at Piprahar outside the RCNP	-	-	-	2	-	-	2
Hotel Gaida Wildlife Camp, RCNP	-	-	-	7	-	-	7
Total							**94**

Altogether, there are 171 domesticated elephants in Nepal. This figure, which shows an increasing trend, is rather encouraging when we remember the decreasing trend of wild elephants seen from 1903 to 1973 (Table 1 and Fig. 1).

Current legal status of the Asian elephant

Under the provision of the National Parks and Wildlife Conservation (NPWC) Act 2029 (1973) and its 4th amendment 2049 (1993), the wild elephant (and another 25 species of mammals) falls under the protected species list (Appendix 1). According to section 26(1) of the NPWC Act, the killing or wounding of a wild elephant or buying any part of it (trophy) is punishable by 5 to 15 years imprisonment or a penalty of NRs. 50 000 to 100 000, or both. According to section 25 (1) of the Act, anyone furnishing information leading to the capture of anyone who kills or wounds a wild elephant is entitled to a reward of up to NRs. 50 000. Similarly, anyone furnishing information regarding those involved in selling or buying of any wild elephant-related product is entitled to a reward of up to NRs. 10 000. To implement these legal provisions, the Royal Nepalese Army has been deployed in national parks and wildlife reserves, except in Makalu–Barun National Park and Conservation Area (located in the High Mountain region) and in hunting reserves.

However, there is no specific legal provision to handle the keeping of domesticated elephants by hoteliers for the purpose of tourism, and by the government for various purposes including anti-poaching operations. Although, the Elephant Management Rules 2022 (1966) were passed by the HMGN, the rules were later repealed by the Civil Service Act 2049 (1993). The old rules had defined the standard of the elephant camps operated by the government, the Terms of Reference (TOR) of the chief of the camp, the authority for elephant control as well as the arrangements for the use of the elephants, and the procedures to be followed to dispose of a dead elephant after its natural death. Nevertheless, the new rules framed under the Civil Service Act 2049 (1993) made arrangements for three people to look after each elephant, namely a *Pachhuwa*, a *Phanit* and a *Mahut*. A hierarchy of one *Rahut*, one *Daroga* and one *Shubba* (senior clerk level) positions to supervise daily elephant

caring activities has been stipulated for each elephant camp with the capacity to keep up to ten animals. To supervise all the government managed elephant camps in the country, an officer level position has also been provided by the rules framed under the Act. In addition, there is a daily food ration scale per elephant. According to the scale, an adult elephant is entitled to get 15 kg of paddy, 1.7 kg of sugar, 0.05 kg of salt, 15 kg of dry straw, 15 kg of carrot, 1.5 kg of pumpkin, 2.1 kg of potato, 80–100 kg of grass/fodder and 150 litres of drinking water.

However, it is not necessary for the private sector to abide by these provisions of the Civil Service Act, including the food ration scale system, when taking care of privately owned elephants. For the sake of these animals, a Domesticated Elephant Keeping and Management Act and Regulations are essential. These would ensure that government owned elephants and privately owned elephants are treated equally.

Registration of domesticated elephants

Since the enactment of the National Parks and Wildlife Conservation Act 2029 in 1973, the capture of wild elephants for domestication has been strictly prohibited and no wild elephant has been captured. There is no report of breeding among the cow elephants kept by the private sector at hotels and safari camps, except one at the Tiger Tops in 1980 and one very recently in 2000, in KMTNC/ RBNP. The Tiger Tops calf was later trained at the government-owned elephant breeding center in RCNP and the recently born calf is being taken care of by the KMTC/RBNP itself.

The registration system is only applied to government-owned elephants and consists of giving a new name to a calf. There is a tradition in Nepal of accompanying the names of elephants with a word identifying their sex: *Gaja* or *Prasad* denotes a male and *Kali* denotes a female. Before the restoration of the multi-party democratic system in 1990 in Nepal, the birth of a baby elephant used to be reported to the Royal Palace which provided a new name for the calf and appointed a caretaker for the elephant who then received the food rations for the baby elephant. After the baby reached the age of eight years, it was treated as an adult and received full rations. Since 1990, the Department of National Parks and Wildlife Conservation (DNPWC) has provided names for baby elephants after being sent news of a birth by the concerned warden. The positions of caretaker of the additional elephant are created by His Majesty's Government of Nepal (HMGN) and is processed through the Ministry of Forests and Soil Conservation (MFSC) as per the proposal forwarded by the DNPWC.

For breeding purposes, a *Birendra Prasad*, a good servicing male, is used. However, most of the newborn elephants are the products of visiting wild elephants. The data on elephant births in Nepal from 1979 to mid 2000 is presented in Table 4.

As no regulations cover the registration of privately domesticated elephants owned by private owners it is imperative that a new policy be framed to address this issue.

Elephant care

The Department of National Parks and Wildlife Conservation (DNPWC) under the Ministry of Forests and Soil Conservation (MFSC) is the only government agency responsible for taking care of Asian elephants in the wild. The DNPWC has played a major role in taking care of the animals by managing elephant camps in the protected areas located at various locations in the lowlands of Nepal. The DNPWC was also instrumental in establishing a breeding centre. Apart from the DNPWC, the private sector (hoteliers) have kept significant numbers of elephants for tourism purposes, especially for trekking to view wildlife in and around the parks and reserves. There is a strong need for further research and collaboration related to the captive-breeding programme. So far, no national or international organization has provided support to the Department for this.

Table 4. Births of domesticated elephants

Name of mother	Calf's name	Year of birth	Status	Sire	Remarks
Tribhuvan Kali	Unnamed	1979	killed	Ganesh Gaja[2]	Kicked by mother after parturition
Durga Kali	Samsher Guj	1980	alive	Wild	Tiger tops
Manju Kali	Nirajan Prasad	1981	,,	Ganesh Gaja	Born at KTWR
Tribhuvan Kali	Gyanendra Prasad	1981	,,	,,	,,
Rup Kali	Puja kali	1984	,,	,,	,,
Aishwarya Kali	Dipendra Prasad	1984	died	,,	Died at age 6 in KTWR
Dipendra Kali	Unnamed	1986	,,	,,	Died after 9 days in KTWR
Tribhuvan Kali	Gyanednra Prasad	1981	alive	,,	KTWR
Rup kali	Puja kali	1984	,,	,,	,,
Aishwarya Kali	Dipendra Prasad	1984	died	,,	Died after 9 days in KTWR
Tribhuban Kali	Prerana Kali	1986	live	,,	KTWR
Rampyari Kali	Chitwan Kali	1987	,,	,,	RCNP
Bhrikuti Kali	Ram Gaja	1987	,,	,,	,,
Rupa Kali	Ganesh Kali	1990	died	,,	Died 2 hours later in RCNP
Komal Kali	Stillborn	1993	dead	Wild	Born dead, RCNP
Rampyari Kali	Bahadur Gaja	1994	alive	Birendra pd.	RCNP
Rup Kali	Unnamed	1996	died	Wild	Dead after 9 days in RSWR
Pawan Kali	stillborn	1997	dead	,,	Born dead, RBNP
Prerana Kali	Gandaki Kali	1998	alive	,,	RCNP
Sitashma Kali	Karnali Kali	,,	,,	,,	,,
Sashi Kali	Rapti Kali	,,	,,	,,	,,
Bhawani Kali	Stillborn	1999	dead	,,	,,
Sashi Kali	Narayani Kali	2000	alive	,,	,,
Laxmi kali	stillborn	,,	dead	,,	Born dead, RCNP
Shanti Kali	Unnamed	2000	live	,,	KMTNC, Bardia

Source: DNPWC

[2] A very popular giant semi-wild bull and a regular visitor to KTWR Elephant camp. The bull used to mate with the captive females and played a significant role in the history of captive breeding of elephants in Nepal. This bull has left eight of its live calves behind from various cows. In 1991, the bull died of septic wounds.

Use of elephants

As outlined earlier, domesticated elephants are mostly being used for forest excursions and for entertaining tourists in parks and reserves. The elephants have been heavily used by park/reserve managers and field investigators for the study of flagship species such as the Royal Bengal Tiger (*Panthera tigris*) and the Greater One Horned Rhinoceros (*Rhinoceros unicornis*).

Without the use of elephants, it is almost impossible to capture large mammals and carry out research studies. For example, the DNPWC was successful in translocating five rhinos between 1986 and 2000 from RCNP to RBNP and RSWR to establish a viable population there. In total, 58 rhinoceros were translocated to RBNP and four to RSWR. Similarly, elephants are being used for counting rhinoceros. The service provided by these elephants in all aspects of park management cannot be evaluated in monetary terms.

The elephants are also being used for conducting wildlife monitoring and anti-poaching activities in the parks and reserves. Moreover, the elephants are being used for rescue operations during natural calamities such as floods. The elephants are essential to the performance of special ceremonies such as royal weddings and during the coronation of the heir apparent.

In addition to all the above mentioned, the elephants are being used for promoting ecotourism. Because of the influx of wildlife tourism in and around the parks and reserves, the demand for elephants has increased from the private sector such as hoteliers and tour operators. In this respect, elephants are a very important source of income for their owners: an owner can legally charge a foreign tourist Rs.650 for providing two hours of riding on an elephant. An elephant can carry four tourists at a time and that amounts to Rs.1 300 per hour.

From the above discussion, it is safe to conclude that there are tangible and intangible benefits associated with elephants, if the animals are kept and managed properly. There is also scope for the private sector to keep elephants because of the increasing trend of tourists visiting parks and reserves.

Veterinary care

Although there is a Department of Animal Health with an extensive network in 75 administrative districts of Nepal to take care of animal health, there is very little information about veterinary care for elephants. The DNPWC has only one Veterinary Officer and various paramedical assistant positions to take care of elephants kept in various camps and a breeding centre. Moreover, the DNPWC does not have sufficient funds to purchase the necessary drugs and equipment to take care of its elephants. In general, the veterinary care service is relatively poor and assistance is being solicited from a variety of sources.

Summary and recommendations

As in other parts of the world, the destruction of dense forests led to the shrinking of the habitat of the Asian elephant in Nepal. To cope with the situation, the HMGN enacted the NPWC Act in 1973 to provide strict protection to this species (as well as another 25 mammals) in the wild. Domesticated elephant camps and a breeding centre, along with a hierarchy of supervision personnel, were established for captive elephants. Combined with veterinary care, the allocation of individual animal caretakers, and a system of daily food rations for the animals these measures helped to increase the number of elephants in captivity. The use of elephants in parks and reserves is essential for tourism and other activities. However, there are no specific acts and regulations to bring the private sector within the framework of the system established and practised by the government regarding the registration of animals, their care and their use. This has to be remedied by a provision in the NPWC

Act and by HMGN framing appropriate regulations to address these issues. In addition, the following recommendations have been made for the welfare of domesticated elephants.

1. Because of the lack of sheds in elephant camps, the chained elephants are under the open sky throughout the year, even during the cold frosty nights of winter and the hot sunny days of summer, which shortens the lives of elephants. Therefore, the construction of sheds in all government and private elephant camps is required.

2. Because of the lack of compound walls in all elephant camps, the intrusion of domestic cattle poses a serious threat of transmitting various diseases to the elephants. To prevent this, the construction of compound walls is essential.

3. There are inadequate in-house store facilities and space to store food rations, fodder/grasses and straw. These should be provided in all elephant camps.

4. Reduced availability of fodder during the lean period means that there is a high level of damage to the surrounding vegetation caused by trampling. To sustain the elephant fodder supply in perpetuity the plantation of palatable species is recommended for government as well as for privately kept elephants.

5. Personnel employed in the elephant camps have had to learn to take care of the elephants on their own. Training in all aspects of elephant care and management should be provided to staff at all levels.

6. There is a need for research and monitoring of the domesticated elephants' impact on parks/ reserves and buffer zones as an integral part of national park management.

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The present status and management of domesticated Asian elephants in Viet Nam

Trinh Viet Cuong, Tran The Lien and Pham Mong Giao

Introduction

On a national scale, almost all of the forested areas in Viet Nam are located along the international borders with Laos and Cambodia, although some forested areas remain in various remote and inaccessible areas, such as in the far north and northwest. In lowland areas, human impacts, especially the conversion to industrial tree plantations, agricultural land, and human settlements have rapidly devastated (and continue to devastate) many forests. Moreover, logging, the exploitation of forest products and hunting are also adversely impacting the quality of the remaining forests. Population expansion has created a dilemma of Malthusian proportions in Viet Nam, and the resulting development and expansion of infrastructure, industry and agriculture can be regarded as the principal causes of bio-diversity decline and forest depletion in Viet Nam. The Government of Viet Nam is well aware of this issue, and has made considerable efforts to strengthen nature conservation activities by enlarging the protected area network. At present, there are 11 national parks, 53 natural reserves, 17 species reserves/habitats and 25 protected landscapes giving a total area of 2 340 440 ha set aside for the purpose of conserving bio-diversity and protecting fauna and flora in the remaining forest areas.

The Asian elephant (*Elephas maximus*) in Viet Nam (both wild and domesticated) is becoming increasingly endangered, and without urgent action, in terms of on-the-ground conservation, the species faces extinction. In 1996, a joint action programme, "Rescue of elephant species threatened with extinction in Viet Nam", between the Ministry of Agriculture and Rural Development (MARD) and Fauna and Flora International (FFI) was proposed. The programme is still active and has been carried out with great efforts from both sides in recent years.

Currently, there may be only two areas suitable for long term elephant conservation and it is absolutely essential that these areas are properly protected because their elephant populations are considerably higher than those in other places, and probably represent the only populations in the country whose long-term survival is likely. The areas are Dak Lak province (high plateau in West Viet Nam) which is suitable for the conservation of wild and domesticated elephants and Nghe An province (Central Viet Nam) which is suitable for the conservation of wild elephants.

The elephant has long been an animal of enormous cultural, religious and even political and economic significance in Viet Nam. Revered by certain ethnic minorities, domesticated elephants played a crucial role transporting supplies and weapons during the wars of independence, as well as gracing the royal courts of Hue as symbols of the power and majesty of the old kingdom. Even today elephants still play an active part in Viet Nam's culture and economy, for transportation, in zoos and circuses, at festivals and as an important facet of ecotourism.

The status of wild elephants

The results of countrywide surveys conducted in the last 30 years document the critical decline of the wild elephant population. It is also evident that in many areas where elephants were known to occur, they no longer exist or their range has been severely restricted. Thus even in those areas where elephants still remain, they are generally only in very small and isolated herds. Indeed, the largest known herd in Viet Nam is found in Dak Lak, and consists of only 15–20 individuals (Trinh Viet Cuong, 2000). The elephant population was undoubtedly declining in the 30 years prior to the Viet Nam War. During the war, however, the elephant population was directly affected by bombing as elephants were used for transporting supplies. Since then, elephant numbers have been rapidly falling

as a result of poisoning (from agent orange, napalm and other defoliants), hunting, deforestation and habitat loss.

After the war, in the period from 1975 to 1980, the number of elephants was estimated to be about 1 500–2 000 individuals (Le Vu Khoi and Do Tuoc, 1989) with elephant ranges located across most of the country. Since 1980, the number of elephants began decreasing for several reasons:

1) Agricultural conversion has destroyed thousands of hectares of forest.
2) Logging has significantly reduced the forest area.
3) The extraction/exploitation of NTFPs has degraded many elephant habitats.
4) Forest fires.
5) Hunting for ivory.

The result is that the majority of elephant populations are very small, have become extremely dispersed and isolated with a hugely restricted range. In short, many areas are not suitable, nor are the populations large enough to be viable and there is little hope for their long-term survival.

In the period from 1990-1992, the number of wild elephants was estimated to be about 400–600 individuals (Dawson *et al.*, 1996). In this period a great number of wild elephants and even domesticated elephants were killed for ivory. In the period 1993-1995, the elephant population fell to about 258-305 individuals in a total of 33 elephant ranges. Data collected between 1996 and2000 suggests that there are only 19 elephant ranges left with a total of 85–114 individuals. These figures show, within ten years from 1990 to 2000, 14 elephant ranges have become non-existent, and the total elephant population has declined by more than 70 percent (see Table 1, and Fig. 1). All elephant ranges have been affected, with the elephants dispersing into small groups of five or six individuals. Many herds have only females, which means they have no possibility of reproducing and building up their populations.

From an overall perspective, North Viet Nam has no elephants and in Central Viet Nam there are some elephant ranges with very small and scattered populations. They are extremely isolated, with little or no chance of grouping together to form healthy, viable populations. Their range is mostly restricted to the border regions with Lao PDR and Cambodia. Dak Lak is now the only province to possess a significant population of elephants, but they are facing a number of threats and conflicts. In South Viet Nam, elephant populations are very small, isolated and face food shortages.

Table 1. The estimated declining number of wild elephants in Viet Nam

Year	Minimum individual number	Maximum individual number	Data source
1980	1 500	2 000	Le Vu Khoi
1992	400	600	Dawson *et al.*
1995	258	305	Trinh Viet Cuong
1997	160	170	Do Tuoc
2000	85	114	Trinh Viet Cuong

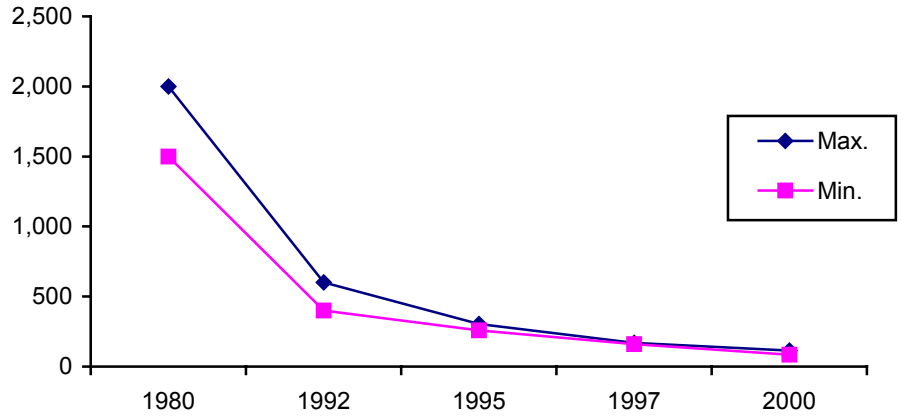

Fig. 1. The decline in the number of wild elephants in Viet Nam

Causes of the decline in wild elephant populations

Forest habitat has been reduced, males are hunted for ivory, and elephants have been killed during human–elephant conflicts or as a result of human revenge attacks. In the high plateau area of West Viet Nam, wild elephants are also caught for taming.

The statistics below demonstrate the seriousness of the situation:

1. In Muong Te (Lai Chau province), in the period 1974–1976, there were approximately 180 elephants, however, by 1991 the numbers had declined by 91 percent with only 15 individuals left. Illegal hunting for ivory occurred intensely between 1987 and 1989. Elephant tusks were sold to Laos. It is reported that in Lai Chau town the FPD recovered about 250–300 kg of ivory, an amount that probably originally required at least 30 elephants to be killed by illegal hunting, and some of these, judging by the size of the recovered tusks, were still too young for ivory cutting. At present, there is no evidence to support the belief that elephants still exist in this province (Pham Mong Giao *et al.*, 2000)

2. The adjacent area between Binh Thuan, Dong Nai, Ba Ria and Vung Tau, between 1979-1983, contained more than 500 000 ha of forest with approximately 80–90 individuals. In 1992, as a consequence of heavy forest disturbance, the elephant population decreased by 44 individuals (Sharif B. Daim; Pham Mong Giao). By October 1999, it had no more than six individuals (Trinh Viet Cuong & Tran The Lien). The population had declined by 93 percent in 17 years.

3. Between 1960-1965, in Tra Mi and Tien Phuoc (Quang Nam province), there were two herds of elephant totalling about 80 individuals. In 1997, there were only approximately eight to nine individuals (Trinh Viet Cuong, 1997). Recent surveys conducted in May 2000, revealed there are only six individuals left (Trinh Viet Cuong, 2000).

4. In 1975, reports from local people indicated that Dak Lak had hundreds of elephants. In 1996, the population was estimated to be around 40 individuals (Dawson, Do Tuoc and Trinh Viet Cuong and Pham Mong Giao, 1996). Surveys conducted in September 2000 demonstrated a further decline of around 50 percent in four years to 15–20 individuals (Trinh Viet Cuong, 2000).

5. During 1990-1995, Nghe An province possessed a population of 40–50 individuals although surveys one year later in 1996 estimated the population to be around 17–24 individuals. However, at present, the population can be expected to be much lower.

Another matter that should also be considered is that of human-elephant conflict (HEC). It is not a new occurrence in many Asian countries, but this is one of the main threats to the existence of wild elephants. The data collected shows that HECs are proportionate to the area of forest converted in the interests of human expansion and development. From 1993 to 1997, a wild elephant herd in Tan Phu Forest Enterprise (Dong Nai province) killed nine people. In 1998, an elephant herd raided crops, huts and killed a further three people. In 1999, an elephant herd in Tan Phu (Dong Nai) (about five individuals including one young animal) crossed La Nga River to Binh Thuan province where they raided crops, destroyed huts and killed a married couple who had been staying in the forest. Later the elephants entered Bien Lac-Nui Ong Natural Reserve, Duc Linh district and killed two illegal loggers who had been staying in the forest. Still later, the elephants killed a firewood collector who had been staying in the forest.

During 10 days at the end of May 1999, an elephant herd killed five people (spontaneous immigrants), who were converting the forest for cultivation. Local authorities and other relevant agencies took active measures to urgently assist the victims' families, and at the same time informed local people about HEC conflict avoidance/mitigation measures.

In Viet Nam, human-elephant conflicts take place in many districts and provinces. There are nine areas among the 19 elephant ranges where human-elephant conflicts are taking place because of the reduction in areas of suitable habitat and the resulting food shortages. Because agricultural areas are located in or near forests, it is difficult to avoid crop damage because the crops, fruit trees, starch trees, and industrial trees such as sugarcane are palatable to elephants. Consequently, the human-elephant conflicts inflict heavy impacts on the local economy and rural livelihoods. As mentioned above the outcomes can be very grave indeed, including human deaths in some places, frightening local people off and leading to villagers driving elephants away or killing elephants out of revenge or for protection. At present, there are no effective measures to minimize HEC and some measures used by local people to drive elephants away are becoming increasingly ineffective as the elephants become habituated to this behaviour. Currently, levels of compensation and assistance for victims of HEC are very low, thus local people tend to do what they can to protect themselves, including killing the elephants.

The status of domesticated elephants

At the turn of the century, Indochina was home perhaps to nearly half the entire Asian elephant population. As in India, the capture and domestication of wild elephants in Viet Nam was a traditional activity. Domesticated elephants were sold to neighbouring countries such as Cambodia and Laos.

Domesticated elephants are mainly concentrated in Dak Lak province (Tay Nguyen), the highest numbers are in Buon Don and Ea Sup districts where the ethnic minority peoples (M'Nong, Gia Rai, E De) have long held the tradition of catching and domesticating wild elephants. The domesticated elephants are used for a number of purposes such as transporting supplies, logging, travelling in forests (hunting, collecting forest products), taking part in festivals, worship or tourist services.

Some people, particularly those involved in ecotourism, would like to see the practice of capturing and domesticating wild elephants to be continued and perhaps expanded, however, this should be resisted on a number of grounds: (1) Elephants are state property; (2) the law prohibits the hunting of wild elephants for domestication; (3) elephants rarely breed in captivity in Viet Nam and thus domestication prevents the long term survival of the species in this country.

The number of elephants captured has been reduced during the last five years. However, this activity still takes place annually. Before 1990, every year 10–12 wild elephants (Do Tuoc, 1989) were captured in the Ban Don area (Buon Don district). The hunters who catch a large number of elephants are accorded considerable status and respect by their peers. Based on the data surveyed in 1979–1980, Dak Lak

province reportedly had 502 domesticated elephants. There were 299 animals left in 1990, and only 169 animals existed in 1997 in ten districts, a reduction of 130 domesticated elephants in seven years. According to recent survey statistics (12/2000), there are 138 domesticated elephants remaining in Dak Lak province, a decline of 364 individuals (1980-2000), and there are 27 individuals distributed in other parts of the country. Thus, the total number of domesticated elephants in the whole country is only 165 individuals (Table 2 and Fig. 2). Most of the domesticated elephants originate from Buon Don and Ea Sup districts (Dak Lak province).

Table 2. The declining number of domesticated elephants in Viet Nam

Year	Individual number		Data source
	Dak Lak province	Whole country	
1980	502	600	Dak Lak FPD
1990	299		Dak Lak FPD
1997	171		Trinh Viet Cuong, Dak Lak FPD
2000	138	165	Trinh Viet Cuong, Tran The Lien, Pham Mong Giao

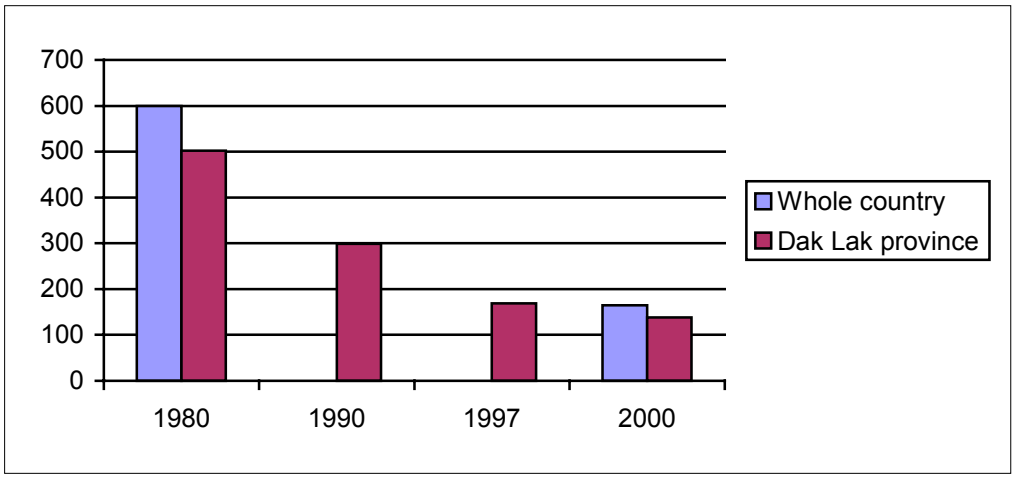

Fig. 2. The declining domesticated elephant population in Viet Nam

The numbers of domesticated elephants in Dak Lak province in 1990, 1997 and 2000 were 299, 171 and 138 individuals respectively. Between 1990 and 1997, there was a decline of 33.7 percent and between 1997 and 2000 there was a decline of 27.5 percent. The 138 domesticated elephants in 2000 consisted of 95 females and 43 males. In terms of age, 40 (29 %) were over 50 years old, 87 (63 %) were between 20 to 49 years old (breeding age) and 11 (8 %) were under 20 years old and not mature enough for breeding (see Table 3).

Causes of the decline in the domesticated elephant population from 1990 to 1997

1. The number of wild elephants has decreased in Buon Don – Ea Sup region, therefore it has become increasingly difficult to capture elephants. Furthermore, the law prohibits the hunting of elephants, and the catching and taming do not take place as openly as before. Good hunters specializing in capturing and domesticating elephants are scarce nowadays and many of those who practised the art as a livelihood or on a regular basis are now old.

Table 3. The declining domesticated elephant population in Dak Lak province, 1990-2000

Name of district	1990				1997			2000		
	Male	Female	Unclear sex	Sub-total	Male	Female	Sub-total	Male	Female	Sub-total
Buon Don					28	11	39	18	15	33
Ea Sup	44	26	2	72	12	16	28	6	9	15
Lak	5	34	2	41	5	20	25	2	18	20
Krong Bong	3	30	4	37	1	15	16	1	9	10
Dak Rlap	5	23		28	2	14	16	1	23	24
Krong No	22	14	1	37	5	8	13	5	6	11
Dak Mil	21	15		36	7	6	13	7	4	11
Dak Nong					2	12	14	0	8	8
Krong Ana		14		14		5	5	2	3	5
Krong Nang	6		1	7		2	2		1	1
Krong Buk		6		6						
Cu Mgar	2			2						
Ea Hleo		6		6						
Krong Pak		10		10						
Ea Kar	3			3						
M' Drak										
Cu Jut										
Ban Me Thuot										
Total	**111**	**178**	**10**	**299**	**62**	**109**	**171**	**42**	**96**	**138**

2. Elephants are used as a source of labour, so the mahouts do not want their elephants to breed, as this would prevent them from working. When domesticated elephants are left in the forest to feed, they are always tied to trees with a leg-iron, so it is really hard for them to breed with wild elephants or even with other domesticated elephants.

3. Recently, economic and social development has meant that machines are now replacing elephant labour, and using elephants for transportation is becoming less and less appropriate or necessary. Without these sources of work, elephants have become a "burden" for poor families who own them. In some places, they have to sell their elephants. Elephants are still useful in areas where transportation is not developed or in some places where there is tourism potential.

4. Forests areas are being converted for other land uses such as construction, national defence, industrial tree plantations of coffee and rubber. This fragments the elephant populations and reduces the chances for breeding as well as leading to food shortages.

5. At present, the domesticated elephants are still not controlled. The mahouts can sell or exchange their elephants illegally, for more benefit. This is done by transferring to someone inside the region or selling it to other districts and provinces including Lao PDR and Cambodia. Some households exchange elephants for oxen and buffaloes, etc.

6. Many elephants have died because of mahouts' carelessness, shortage of food and water in the dry seasons (annually, from November to April). Some have died of old age and weakness and lack of medical treatment, some have died of overwork. In some cases, elephants have died as a result of fighting with each other to get food in feeding areas or to breed with a wild elephant.

7. Many elephants (male) have been illegally shot for ivory while feeding in the forest. Ivory and elephant bone products are sold in many souvenir shops in tourist places, airports or in big towns and cities.

Some information on the commercial value of elephants and associated products

1. Information on prices of selling domesticated elephants (survey records in May 2000 at the exchange rate: US$1 = 15 000 Viet Nam dong)

1) Illegal sale to Cambodia: price unclear as they are exchanged for oxen, buffaloes or tools or equipment.
2) Sale inside Viet Nam (to other provinces): 30–60 million VND/individual (equivalent: US$2 000–4 000). For example: in 1998, in Buon Don district, two elephants were sold to Dam Nha Phu Ecotourist Company (in Khanh Hoa province); one male (four years old) for a price of 30 million VND; one female (15 years old) for 50 million VND.
3) In 1993, the elephant relocation programme planned to buy three mature elephants (male and female) at a price of 100–150 million VND in Krong Bong district (Dak Lak province) to use them for catching problem elephants in Ba Ria, Vung Tau, Dong Nai, Binh Thuan (where human-elephant conflicts were known to occur). The programme eventually decided just to rent the elephants.

2. Information on sale price of elephant products:

a)	Rough ivory:	7.5 million VND/kg (equivalent: US$500/kg) In Buon Me Thuot
b)	Small ivory statuette (about 0.2 g):	300 000 VND (in Buon Me Thuot)
c)	Large, decorated ivory statuette:	1.8 million VND (Plei Ku)
d)	Ivory bracelet:	700 000–1.5 million VND (Plei Ku, Hoi An)
e)	Dry leg bone (about 10 kg):	300 000–400 000 VND

In Dak Lak province, the Forest Protection Department (March 2000) caught one man who was collecting domesticated elephant products from Lak district:

a)	Dry leg bone (43 kg):	1.5 million VND
b)	Elephant meat, skin, trunk and tail (499 kg):	2 million VND
c)	Ivory cigarette-holder:	20 000 VND
d)	Ivory ring:	5 000VND
e)	Make-up box:	50 000–80 000 VND
f)	Ivory knife with decoration:	60 000 VND
g)	Ivory necklace:	50 000–60 000 VND
h)	Elephant tooth:	50 000 VND

Law

Viet Nam's elephants are on the brink of extinction, however, this is merely symptomatic of a general trend in the rapidly declining biodiversity of the country. Indeed, there are many species whose status must be regarded as endangered or critically endangered now in Viet Nam. The main reasons for this are hunting and the illegal wildlife trade. Although some violators have been fined or sentenced heavily and enforcement has improved in recent years, a great deal of trafficking continues unabated and, of course, so does hunting to fulfil the demand of the market. Furthermore, the high profits that can be obtained for animal parts, meat and skins may represent very significant incomes in marginalized communities and hence violations remain commonplace and are even increasing in some

areas. The limited level of local awareness about wildlife conservation and law is also a considerable limitation in trying to stem current trends.

Since the 1960s, the Government of Viet Nam has issued a number of regulations and the Criminal Law has been changed several times to cover all the recent changes. Regarding protection of elephants, there are concrete regulations and instructions that are summarized below:

1. Government Instruction 143/TTG, dated 21 June 1960, on the prohibition of elephant hunting.

2. Decree No. 39/CP, dated 5 April 1963, on temporal regulations of Viet Nam for hunting forest birds and animals.

3. Law of Forest Protection and Development approved by the National Assembly of the Socialist Republic of Viet Nam on 12 August 1991.

4. Decree No. 18/HDBT, dated 17 January 1992, determining the list of rare and precious fauna and flora and regulations for their management and protection. In this Decree elephants are listed in Group IB, which means that all means of exploitation – hunting, killing, selling, etc. – are strictly prohibited. Both wild and domesticated elephants are protected by the law at the highest degree.

5. Instruction 130/TTG, dated 27 March 1993, on the management and protection of rare and precious fauna and flora.

6. Instruction 359/TTG, dated 29 May 1996, on urgent measures for wildlife protection and development, which authorized all the relevant ministries, branches and levels to prevent hunting and seriously punish those caught hunting.

7. On 1 July 200, the Criminal Law of Viet Nam came into effect. It determines concepts of tracking down the criminals responsible for illegal activities such as using and exploiting rare and precious wildlife.

8. Besides the regulations in law, elephants are listed in the Red Book of Viet Nam of group V (endangered species).

9. In April 1994, Viet Nam became a signatory to the Convention on International Trade of Endangered Species (CITES). Since then, the elephant has been included in Annex I. All means of exporting and importing elephants and their products for commercial purposes are prohibited.

Although the law of Viet Nam is very clear in its regulations prohibiting elephant hunting and trade in elephant products, hunting still occurs and hunters have become more and more deft at avoiding detection. The illegal hunters often hide their guns and equipment in the forest (a great part of this equipment remains from the Viet Nam War). They enter the forest like any other villager whose purpose is product collection. Almost all hunting incidents are discovered long after they have taken place. Thus it is very difficult to investigate the alleged offender. In many places, the illegal movement of people from other regions to forests is often associated with uncontrolled activities of hunting and exploitation.

One further constraint is that there are simply insufficient resources and capacity to effectively address the problem of hunting and wildlife trade monitoring, particularly in the face of a trade that is so large, complicated and frequently well organized. Thus, the number of offenders caught and brought to justice is very small and represents only a fraction of the problem. In addition, the fines that are applied are generally inadequate as a deterrent. The vast rewards of this kind of offence make the risk worthwhile.

A review of the preliminary statistics of incidents that led to prosecution reveals the following:

1) In 1980, in Nghe An, some elephant hunters were caught and prosecuted (there are no details of the outcome).
2) In 1983, in Ea Kar (Dak Lak province), one incident of killing elephant for ivory was punished with a two years prison sentence.
3) In 1991, in Muong Te district (Lai Chau province), one Dao man was sentenced to three months suspended sentence after being found guilty of involvement in six hunting incidents. The local FPD recovered about 250–300 kg of ivory.
4) In 1991, in Vinh Son district (Binh Dinh province), one Ba Na man (16 years old) was punished for shooting a male elephant. This was an internal commune prosecution.
5) In March 2000, in Buon Me Thuot town (Dak Lak province) Dak Lak FPD recovered 503 kg of bone, tusks, legs and skin from domesticated elephants killed in Lar and Buon Don districts.

From the above figures, it is clear that the number of incidents of illegal elephant hunting for which the offender is caught and punished reflects less than one percent of the actual thousands of incidents of elephant killing within the past 20 past years.

In the period 1990–1995, in Dak Lak province, a number of domesticated elephants were killed while feeding in the forest. For example, in a village of Buon Don district, nine domesticated elephants were killed between 1990 and 1992. Female elephants were also killed for their teeth. However, none of the offenders was prosecuted.

Hundreds of wild elephants have been caught for taming, but none of the persons involved in these incidents has been prosecuted. The trading of domesticated elephants and their products are still not, as yet, controlled. The law does need a certain amount of clarification and needs to be amended to improve regulation on this matter. Some incidents of trading elephant's products have been discovered, but confiscation of the goods was the only form of redress. This is one of the factors limiting efforts to halt the decline in the number of wild elephants in Viet Nam.

Management and registration of domesticated elephants

There is no registration of domesticated elephants at any of the four authority levels: central government, province, district and commune. Domesticated elephants are locally managed at village or family level. They are not protected from illegal hunting while feeding in the forests.

The tusks of domesticated elephants that are cut periodically (about every three years) and sold in the form of various products are still not recorded and reported to any authority. The matter is completely decided by the mahout himself.

Only the sale of elephants to other provinces in the country is managed by permission from provincial and central government. Their sale or exchange inside Dak Lak province is decided by the mahouts. The sale of domesticated elephants to Lao PDR and Cambodia is not controlled yet and elephants are stealthily transported across the border along forest trails.

Since 1990, up to now, Dak Lak FPD has surveyed the controlled movement of domesticated elephants. However, other detailed studies on breeding, nutrition, veterinary care are still very limited and have not diffused to elephant mahouts. Veterinary centres have not yet been established to care for elephants when they are sick or injured or to deal with epidemic diseases.

The capture and domestication of wild elephants is still taking place, and there is yet to be implemented an effective system of prevention, despite the fact that the law prohibits these activities. Furthermore, the awareness and education activities that have been carried out appear to have met with only very limited success.

National and international programmes and projects for elephant conservation

National programmes and projects:

The government has already established a protected area network and there are some reserves and parks that have the responsibility for elephant conservation. They include Yok Don National Park in Dak Lak province, Cat Tien National Park and Pu Mat Nature Reserve in Nghe An province, Sop Cop Nature Reserve in Son La province, Vu Quang Nature Reserve in Ha Tinh province, Song Thanh – Dak Pring Nature Reserve in Quang Nam province, and Chu Mom Ray Nature Reserve in Kon Tum province. The most important areas are Yok Don National Park, Cat Tien National Park, and Pu Mat Nature Reserve.

The protected area network plan was devised by the Forest Inventory and Planning Institute (Ministry of Agriculture and Rural Development) in 1997 for the purpose of protecting rare and endangered species in Viet Nam.

The compilation of the Red Data Book of Viet Nam (section for mammals) was sponsored by the Ministry of Science, Technology and Environment (MOSTE).

In 1991, the Ministry of Agriculture and Rural Development directed all FPDs to monitor elephant populations in each province. From 1992 to 2000, no projects focused on surveying and assessing the present national status of wild elephants. This information has been compiled over the course of many years.

Joint national and international programmes and projects:

Those programmes and projects are summarized in Table 4.

Table 4. Joint national and international programmes and projects

Year	Name of programmes, projects	Sponsoring agency	Participating agency	Financial sources
1992	Surveying wild elephants in three provinces: Dong Nai, Binh Thuan, Ba Ria-Vung Tau for planning the relocation of elephant herds	Ministry of Agriculture and Rural Development Maston Group (Singapore)	FPD and provincial FPDs, Botanical Garden of Ho Chi Minh City	Maston Group (Singapore)
1993	Relocation of elephant herds in three provinces: Dong Nai, Binh Thuan, Ba Ria-Vung Tau	Ministry of Agriculture and Rural Development Maston Group (Singapore)	FPD and provincial FPDs, Botanical Garden of Ho Chi Minh City	Maston Group (Singapore)
1992-1994	Surveying elephants in some main areas: Thanh Hoa, Nghe An, Ha Tinh, Quang Nam, Dak Lak, Dong Nai, Binh Thuan, Gai Lai, Kom Tum provinces	World Wide Fund for Nature (WWF)	Institute of Ecology & Biological Resources	World Wide Fund for Nature (WWF)
1994	Surveying human–elephant conflicts in Nghe An province	World Wide Fund for Nature (WWF)	Institute of Ecology & Biological Resources	World Wide Fund for Nature (WWF)

Year	Name of programmes, projects	Sponsoring agency	Participating agency	Financial sources
1996-1997	Continuing to assess human–elephant conflict in Nghe An and Quang Nam provinces	Fauna and Flora International (FFI)	Institute of Ecology & Biological Resources (IEBR), Forest Inventory and Planning Institute (FIPI)	Fauna and Flora International (FFI)
1999	Surveying the present status and establishing relocation programmes for elephant herds in the main conflict areas (Binh Thuan province). Implementing proposed programme for expanding Yok Don National Park (Dak Lak province) with the possibility to establish a long-term sanctuary for elephants	Fauna and Flora International (FFI), Ministry of Agriculture and Rural Development	FPD, Institute of Ecology & Biological Resources (IEBR), Forest Inventory and Planning Institute (FIPI)	Royal Embassy of Holland, Fauna and Flora International (FFI)
2000	Surveying the elephant trade and elephant's products in the three regions: North–Central–South	TRAFFIC, Hanoi University		TRAFFIC

Joint national and international workshops on elephant conservation:

1) Elephant conservation is included within the general programme for conserving the forest resources and bio-diversity of Viet Nam.
2) In 1992, a workshop on elephant conservation in Viet Nam was jointly sponsored by the Ministry of Forestry and the World Wide Fund for Nature (WWF). The participating agencies were the Institute of Ecology & Biological Resources (IEBR), Forest Inventory and Planning Institute (FIPI) as well as several national universities in Viet Nam.
3) In 1996, an international convention "Rescue of elephant species threatened with extinction in Viet Nam" was co-sponsored by Fauna and Flora International (FFI) and the Ministry of Forestry. The participating agencies were the Forest Protection Department (FPD), Provincial Forest Protection Departments (FPDs), the Institute of Ecology and Biological Resources (IEBR), and the Forest Inventory and Planning Institute (FIPI).
4) From 1995 to 1996, Viet Nam made efforts to coordinate with international organizations that aimed to give priority to elephant conservation. At the beginning of 1996, a memorandum of understanding (MoU) was signed between the Ministry of Agriculture and Rural Development and Fauna and Flora International (UK) to implement on-the-ground elephant conservation activities. A project strategy was agreed upon and then carried out between 1996-1998. The plan chose three priority sites that were considered practicable areas for elephant conservation: Dak Lak, Quang Nam, and Nghe An.
5) In 1998, an international conference on Asian Elephant Conservation in Indochina was held by Fauna and Flora International (FFI) and the Ministry of Agriculture and Rural Development. The conference was attended by research institutes, universities and organizations.

Elephants' work

Domesticated elephants have had a long-standing relationship with some ethnic people in the Tay Nguyen plateau, such as the M'Nong, Gia Rai, and E De. The practice of domesticating elephants is mainly concentrated in Buon Don and Ea Sup districts in Dak Lak province. For a long time, the

domesticated elephant have maintained an important role in the economic and cultural life, particularly within these ethnic societies.

The art of elephant hunting and taming has been practised since the eighteenth century. At the beginning of the twentieth century, Mr Y Thu was a celebrated elephant hunter and organizer of hunting, domestication and trade of elephants in Buon Don and his family possessed 100 elephants. The elephants captured and tamed in Buon Don were sold to the people in villages, communes or districts within Dak Lak province or in other provinces and to the government at that time. King Khai Dinh, King Bao Dai and President Ngo Dinh Diem were all known to have purchased elephants from Dak Lak province.

Elephants were also sold to neighbouring countries (Cambodia, Thailand and Lao PDR) and even exported to Hong Kong, Japan and France. Thus the elephant was a valuable economic asset to the ethnic minority people in the Tay Nguyen plateau.

During the Viet Nam War, elephants were employed in transporting people, food, weapons and supplies along the route through the Truong Son mountain range, where the rugged terrain prevented use of modern transportation. Eighteen elephants with more than 20 keepers were engaged in the work throughout this period.

After the war, domesticated elephants were still very useful animals in agricultural production and in other daily activities, such as transporting rice, hauling timber, making houses, and participating in celebrations and festivals. However, along with the modernization movement of the societies, such as road construction, mechanized agricultural production and industrial plantations, machinery and modern technology have gradually replaced the elephant in the working places. The role of domesticated elephants has now changed to serve the tourism industry. In Buon Don and Buon Ma Thuot City, for example, domesticated elephants are trained to run a race, play football, throw wood, and dance to the tune of a trumpet.

Among the families who bring up elephants, bulls are highly prized because a piece of ivory is harvested and sold every three years.

Health and veterinary care

Grazing:

Domesticated elephants consume from 100 kg to more than 200 kg of food per day, depending on their ages. They eat 54 species of forest vegetation [Le Vu Khoi (no date), or according to Cao Thi Ly, 1997, 62 species], and are particularly fond of Le grass (*Vietnamosasa darlacensis* and *Oxytenanthera nigrociliata*) and the tops of bamboo. They also eat Dipterocarpaceae species, such as Dau dong (*Dipterocarpus tubercutatus*), Cam lien (*Pentacme siamensis*), and Ca chit (*Shorea obtuse*). In Buon Don, families often release their elephants into the forest to find food for themselves.

People frequently move their elephants to different areas of the forest depending on food sources and seasonal changes. During the rainy season (between April and October), the elephants are usually released nearby, and the keeper will visit every three to five days. In the dry season (between November and March), food shortages often require greater distances to be travelled (up to 10 km) and the keeper will visit every one to two days to find new pastures. During the past ten years, as a result of illegal hunting levels intensifying (especially of bull elephants) and the number of wild elephants declining, domesticated elephants have become increasingly at risk from poachers when they are released far away. Consequently owners now tend to keep their elephants in pastures on average 3–5 km from their houses and check them one to two times a day. When 'released' into the forest the elephants usually have a chain 15–20 m long tied to their hind foot, near a stream. In the dry season, the elephant is bathed in a big river or stream a minimum of once a day.

When the elephants work, they often do not eat. They work all day and are then released into the pasture in the evening. The bull elephants in the estrus season (February–April and October–December) are often chained, and feeding is limited until the end of this period.

Veterinary care:

Health care for elephants has not been researched thoroughly in Viet Nam. The keepers generally treat them according to traditional methods using special leaves found in the forest. Apart from that the elephants must recover spontaneously. Elephants may frequently be afflicted by diarrhoea, typically at the end of the dry season and the beginning of the wet season (May/June) when the vegetation in the forests is developing. The methods of treatment are as follows:

a) Feed sugarcane (three to five stalks per day) or give water with salt (0.5 g of salt with 5 litres of water). Let them drink this water once or twice a day, and feed banana and cassava.

b) Use Ampixilin – ten tablets per day, putting them in sugarcane stalks for elephants to eat. Or boil the bark and heartwood of dipterocarpus trees in water and let elephants drink it.

c) Burn straws of grass to ashes, afterwards put it on a corncob.

d) Grind a horn of antelope *(Carpricornis sumatraensis)* and then put it on a sugarcane stalk or banana trunk for the elephant to eat.

Skin diseases or wounds caused by chafing when working are treated as follows:

e) Pulverize Ampixilin and directly smear on wound.

f) Mix the soil of termite nest with ammoniac solution (NH_3) and apply it to the wound.

g) Boil medicinal plants found in the forest. Cool it down, and smear it on the wound.

Conclusions

The domesticated and wild elephants are threatened with extinction in Viet Nam if urgent actions are not taken.

Almost all of the wild elephant populations are concentrated in the border areas. In North Viet Nam, the elephant population is almost certainly extirpated. The population in Central Viet Nam is very small and is largely isolated which does not bode well for its long-term survival. Some small herds exist in South Viet Nam although they are also isolated and are increasingly in conflict with humans as their range and habitat is being converted for other types of land use.

There are only two areas suitable for elephant conservation and the long-term survival of the species, if proper protection can be guaranteed. In Dak Lak province, where the largest herd in Viet Nam is found, there is hope that this may be a viable population that can be conserved in the long-term. In Nghe An province, the population estimated is approximately 17–24, which is much higher than in other provinces in Central Viet Nam. However, a number of elephants have been killed by hunters, whilst some have been killed in elephant–human conflicts. Furthermore, this population is no longer likely to be as large as the Dak Lak herd and should be re-surveyed. In spite of this, it still represents the second most important priority area for elephant conservation in Viet Nam.

Between 1990 and 1992, the elephant population status was 400–600 (Dawson *et al.*, 1993). Between 1996 and 2000, 19 areas had elephant populations with a total estimated population of 85–114 individuals. Hence the number of elephants has decreased by over 70 percent. All of the distribution areas have been and are being heavily impacted and most of the herds in Viet Nam do not exceed five to six individuals.

In Viet Nam, nine of the 19 elephant distribution areas are experiencing human-elephant conflicts, including two areas in critical status, Tra My–Tien Phuoc (Quang Nam province) and Tanh Linh district (Binh Thuan province). These conflicts are having a number of detrimental impacts on the local economy and livelihoods. In these areas, people are angry, afraid and often powerless and insufficiently supported. This has led to conflict levels heightened as the people have driven away the elephants from their croplands and in some instances have killed crop-raiding elephants out of revenge or to protect their crops. Now, no effective solutions seem to work. Almost all of the conflict mitigation measures are becoming ineffective as the elephants become habituated to them. Furthermore, these people are poorly assisted by both local, provincial and national government where there is no clearly defined policy that allows for compensation to victims of the conflicts, and there is little financial capacity to invest in more sophisticated conflict mitigation measures. It is for these reasons that those afflicted by conflicts have to deal with the situation themselves.

The population of domesticated elephants has also been in decline. Almost all originate from Buon Don district, Ea Sup district (Dak Lak province), where the tradition of wild elephant capture and domestication has been maintained. Between 1979 and 1980, the population was estimated to be 600 in Viet Nam, while Dak Lak province had 502 of those individuals. In December 2000, Viet Nam had only 165 domesticated elephants, 138 of them in Dak Lak. Thus, during the last 20 years, the domesticated elephant population has decreased by more than 70 percent.

The domesticated elephant population is decreasing for several reasons: the wild population has decreased so that capture has decreased accordingly. Also the introduction of laws and regulations prohibiting elephant hunting and domestication has meant a significant decline in hunting or at least hunting is not as visible as before. The keepers restrict production of the domesticated elephant: the number of elephants (under 20 years old) is very low (11 individuals), approximately eight percent (11/138), including four calves of domesticated elephants. Many domesticated elephants have become ill and some have died as a result of the neglect of the keepers, or food shortages in the pastures. The elephants have to work extremely hard, but there is a lack of proper veterinary care. Domesticated elephant trading and trading of their products are not closely controlled. The domesticated elephants are illegally hunted for ivory when they are in the forest.

Although the national laws and regulations prohibit anyone from hunting or catching elephants, law enforcement is weak and punitive action rare. Only one percent of the actual number of incidents has led to prosecution and punishment, whilst there has been no case of prosecution over domesticated elephant killing, hunting or trading of their body parts.

In terms of domesticated elephants, there are no regulations prohibiting trade of elephants or their products/parts at any of the four levels of governance (national, provincial, district and commune). As administrative management is regulated by the local community, trading elephants and exchanging their products in the region are not controlled yet. Selling elephants to other provinces in the country is possible simply by obtaining official permission from the provincial level to the central level. Illegal elephant sales across the country's borders have not been controlled.

Hunting of wild elephants for domestication has continued despite the amendment of the national laws and regulations and actions to promote awareness of these laws. Conservation awareness and education activities have made little contribution in real terms to solving the problem.

In the past, the domesticated elephant played an important role in economic and cultural life, particularly within the ethnic minority societies (M'nong, Gia Rai, E De). Today, the domesticated elephant is more valuable in terms of ecotourism.

In 1991, the Ministry of Forestry commissioned FPDs to keep records of the number of elephants in their localities. Between 1992 and 2000, however, there was no assessment of the population status on a national scale. The information has been compiled over the course of many years with the

financial assistance of foreign organizations, such as the embassies of the Netherlands and Switzerland. Fauna and Flora International – Indochina Programme (FFI–IP) and the World Wide Fund for Nature (WWF) have combined efforts with research institutes and universities in Viet Nam. The government has established a protected area network, including national parks with the purpose of protecting elephants.

Three international conferences have been organized in Hanoi, aimed at formulating an action plan to save the elephant from extinction in Viet Nam.

Recommendations

1. Yok Don (Dak Lak province): Priority A

    1) Expand Yok Don National Park, and establish a long-term species reserve along the boundary, including Ea Sup district, Boun Don district, Cu Jut district and one part of the remaining forest in Dak Mil. Connect this complete area with part of the forest in the southwest of Gia Lai province to create a corridor for movement of elephants. The range of this future elephant reserve needs to be surveyed before further decisions are made.
    2) Strengthen co-operation with neighbouring Cambodia for elephant conservation.
    3) Minimize human-elephant conflicts (HEC) in the area by providing support for people who are impacted, combine with conflict avoidance and conservation awareness/education.
    4) Conduct long-term planning of human development, restricting spontaneous immigration to conserve existing forest areas.
    5) Relocate the Binh Thuan herd into the area to avoid further HEC. This population should augment and strengthen the existing population in Dak Lak.

2. Pu Mat Nature Reserve (Nghe An province): Priority A

    This reserve is about 90 000 ha, and human habitation is not dense. The reserve is located along the border with Laos. The elephant population consists of two to three groups with 13 to 17 individuals.

    1) Strengthen elephant management, especially in the buffer zones. Stop hunting for ivory and timber cutting immediately.
    2) Mitigate human-elephant conflict in Anh Son, Thanh Chuong districts on the Southern part of the reserve.

3. Tra Mi – Tien Phuoc – Que Son: Priority B

    At present, there are two herds of elephants with 13 to 16 individuals. In these regions, human habitation is very dense with many rice fields. Consequently HEC levels are intensifying.

    1) Plan human habitations and cultivated areas. Population growth should be controlled and reduced to protect the forest for elephant habitation. Local awareness programme for forest protection should be conducted.
    2) Mitigate human-elephant conflict in the area. Support the local people who are suffering from conflict and crop raiding. Increase local people's awareness of elephant protection.
    3) Prevent hunting for ivory or killing for revenge when the victim of elephant-human conflicts.
    4) Elephants are now on the brink of extinction, *in situ* conservation is the best solution for elephant protection. In some cases where *in situ* conservation is impossible, relocate

elephants to Song Thanh – Dac Pring Nature Reserve. But, this requires very careful and detailed surveys to be carried out beforehand.

4. Carry out a feasibility study on how to relocate the elephants in Tanh Linh (Binh Thuan province) to the Yok Don Nature Reserve.

5. Seek the participation of all international conservation organizations, all the local relevant bodies and agents of the Ministry of Agriculture and Rural Development, the Forest Protection Department, provincial FPDs, institutes, universities, colleges in one coherent action plan for the conservation of elephants.

6. Conduct a fund-raising programme from international organizations to implement the conservation plan.

7. Strengthen the management of domesticated elephants by taking the following measures:
   - Request registration of domesticated elephants;
   - Issue policies supporting mahouts;
   - Study nutrition, breeding and veterinary care for sick and injured elephants;
   - Support mahouts using domesticated elephants for tourists to improve income levels;
   - Manage the ivory market of domesticated elephants;
   - Create measures for the protection of domesticated elephants while they are left in the forest; and
   - Strengthen law enforcement to apprehend and punish persons guilty in killing elephants.

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Question and answer session

Q1: What is the attitude of ordinary people in Viet Nam regarding elephants? Do elephants get much attention in the media?

A1: Formerly people thought they were useful animals but now there are not many jobs for them, so people do not think of them so positively.

The representative of IFF stated that he did not think that the lack of jobs for elephants was a problem in Viet Nam. Tourism companies are increasing and they are using elephants. In fact, the price of an elephant is going up and some of the tribal people are selling off their elephants to tourism companies. It is the educated Vietnamese who start the companies and buy elephants from the tribal people. Mr Kashio stated that it was important to investigate the nature of these tourism businesses because although we know they provide jobs for the elephants we don't know how well the elephants are treated and we don't know how well those involved in the business as mahouts, etc. are paid.

On the subject of tourism, one participant working in Belize in Central America stated that in Belize the government has imposed a conservation tax of 7.50 Belize dollars on all tourists that is used directly for environmental conservation. He recommended this for other countries like Indonesia. Richard Lair stated that he didn't think this would work in large countries with many government agencies as they would all squabble about who gets the money.

Q2: Do some of the elephants in Viet Nam come from Cambodia?

A2: Some of the tribal people and Chinese sell Vietnamese elephants to Cambodia and Thailand.

The domesticated Asian elephant in India

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Introduction

India harbours more than 50 percent of the wild elephant population and about 20 percent of the captive elephant population of Asia. The Asian elephant (*Elephas maximus*) enjoys a special status in the country and the elephant symbolises the Indian ethos. It has been very closely associated with the religion, myths, history and cultural heritage of India for centuries. Protecting and ensuring the survival of the elephant means much more to an Indian than protecting just another endangered species. Although the tiger has been designated as the national animal of India, for most Indians the elephant is the *de facto* national animal. It has been rightly said that one cannot imagine India without the elephant (Anon., 1993).

India has a fascinating history of domesticating wild elephants. Lahiri Choudhury (1988) has traced, on the basis of rock paintings, the history of domesticated elephants in India to about 6000 B.C. Seals of the Indus Valley civilization (2500–1500 B.C.) also suggest the presence of domesticated elephants in India at that time. Aryans, who are believed to have entered India about 1500 B.C., picked up the art of domesticating elephants in the process of assimilating the culture of the country they had adopted. Ancient literature, such as the *Rig Veda* (1500-1000 B.C.) and the *Upanishads* (900–500 B.C.), which is associated with the Aryans, contain many references to trained elephants. Vedic literature also confirms that by the sixth century B.C., the taming and catching of elephants had become quite a refined art.

The earlier literature reveals that kings and senior administrators were duly instructed about the art of handling elephants and about various aspects of the physiology and health of the elephant. Knowledge about elephants was considered as a part of '*Arthasastra'*, the science of statecraft. In the Kautilya's *Arthasastra* (300 B.C. to 300 A.D.) there is a reference to the duty of the overseer of elephants to take care of the training of elephants. It prescribes the setting up of elephant sanctuaries on the periphery of the kingdom that were to be patrolled by guards. Anyone killing an elephant within the sanctuary was to be put to death. It also prohibits the capturing of elephant calves, tuskless bulls or those with small tusks, diseased elephants and cows with suckling calves. During the reign of Emperor Ashoka (273–232 B.C.) the elephant became the symbol of Buddhism. The Ashokan edicts refer to the setting up of hospitals for the treatment of elephants and other animals.

Various methods of capturing and training elephants were evolved over a period of time in different geographical regions of the country. The 'Pit Method' was popular in southern India until recently. The *Khedda* (*i.e.* Stockade Method), with many variations, has been prevalent in different parts of the country and has also been recorded by Megasthanese, the Greek envoy to the court of the Emperor Chandra Gupta Maurya (third century B.C.). It was introduced to the Mysore Plateau in southern India by Sanderson in 1874. *Mela Shikar* (*i.e.* noosing from the back of a trained elephant) is popular in the northeastern part of the country. Sanskrit literature describes two more methods of capturing elephants: the use of female elephants as decoys and the use of nooses concealed on the ground. Indian experts have also gone to other Asian countries to teach the art of capturing and training elephants.

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This report was prepared by the above members of the working group which was constituted by the Ministry of Environment and Forests, Government of India. The views and recommendations in this report are those of the working group and do not necessarily convey any approval or endorsement by the Government of India.

Elephants were domesticated in the early days mostly for military purposes. The use of war elephants has been recorded in the military history of India, from the famous battle between Alexander the Great and King Porus, ruler of Punjab, on the banks of the Jhelum in 326 B.C. to the war of Shakkar khera in 1724 A.D. The British put elephants to use to mobilize their resources in northeastern India against the Japanese during the Second World War. In the modern era, however, elephants have been associated with state pomp, viewed as status symbols by princes and the landed gentry, used for the great *Shikar* (hunting) meets, for elephant-capturing, logging operations, tourism, temple processions, circus shows and, to a limited extent, for agricultural works.

An extensive body of literature has been produced in India on the management of domesticated elephants. The sage Palakapya (fifth or sixth century B.C.) is reputed to be the author of *Hasti ayurveda*, a treatise on the medical treatment of elephants and *Matanglila*, which is a treatise on the physical and mental characteristics of elephants, their capture and care. *Hastividyarnava*, the famous Assamese treatise on the medical treatment of elephants was authored in the 18th Century by Sukumar Borkayat on instructions from the then Ahom queen. G.P. Sanderson's *Thirteen years among the wild beasts of India* (1879), John Henry Steel's *A Manual of the Diseases of the Elephant and of his Management and Uses* (1885), G.H. Evans' *Elephants and Their Diseases* (1910), A.J.W. Milroy's *A short treatise on the management of elephants* (1922), E.O. Shebbeare's *Soondar Mooni* (1958) and P.D. Stracey's *Elephant Gold* (1963) are some of the classics on domesticated elephants in recent times.

Wild elephants

One can very well imagine that in former times, when there were fewer people, forests were plentiful, and hunting for commercial purposes was negligible, Indian forests were teeming with elephants. The Moghul Emperor Jehangir (1605–27) was said to have had about 113 000 captive elephants in his empire (Lahiri Choudhury, 1988). The number of wild elephants during that period must have been many times greater than that. Since then, wild elephants have become extirpated from many states in central and northern India. Loss of habitat coupled with hunting and capturing have considerably reduced the elephant population in India in recent times. Elephants are now found in India in four non-adjoining geographical areas of the country: the northeast, the east, the northwest and the south, totalling about 86 000 sq km.

The first ever estimate of the elephant population can perhaps be credited to F.W. Champion who in 1938 reported a maximum number of 250 elephants in the State of Uttar Pradesh (Daniel, 1998). Formal surveys and census surveys of wild elephants on a national scale started towards the end of the 1970s. The Asian Elephant Specialist Group (AESG) of the IUCN Species Survival Commission provided the first estimate of wild elephants in India in 1980 as 14 800-16 455 (Daniel, 1980). The AESG provided the next estimate in 1985 as 16 590–21 361 (Anon., 1985). Sukumar reported the elephant population in India in 1989 as between 17 635 and 24 090 (Anon., 1993). Santiapillai and Jackson (1990) have cited 17 310–22 120 as the wild elephant population in India. Daniel (1998) has quoted the elephant population in 1993 as between 22 796 and 28 346.

Detailed censuses of wild elephants have been carried out in different states in India between 1997 and 2000. The latest available estimates indicate the following distribution of wild elephants: 9 401 in the northeast (Assam, Arunachal Pradesh, Meghalaya and Nagaland), 2 772 in the east (Bihar, Jharkhand and Orissa), 1 000–1 984 in the northwest (Uttar Pradesh and Uttranchal) and 14 853 in the south (Andhra Pradesh, Karnataka, Kerala and Tamilnadu). About 114-180 wild elephants also exist in the three northeastern States of Manipur, Tripura and Mizoram as well as on the Andaman & Nicobar Islands. Hence, the present population of wild elephants in India can be said to be in the range of 28 140–29 190 [Details given in **Annex 1**].

Apparently the wild elephant population in India has been showing an increasing trend. But the situation is not really promising. Significant decline in the habitat and population of elephants has been observed in the northeastern states. Even in the southern states of Kerala, Karnataka and Tamilnadu, where elephants have increased in number, poaching of tuskers for ivory has impaired the demographic structure of elephant populations. The proportion of mature bulls in these states has declined, considerably disturbing the sex ratio. In Bandipur Tiger Reserve (Karnataka) and Madumalai Sanctuary (Tamilnadu) the ratio of adult male to adult female has been reported to be between 1:12 to 1:15, whereas in Periyar Tiger Reserve (Kerala) this ratio has been stated to be around 1:100 (Menon *et al.*, 1997). Such abnormal sex ratios do not bode well for the future growth of these populations. Elephants are also moving to new regions on account of disturbances in their original home ranges. In fact, the elephants found in Andhra Pradesh have been migrants from Tamilnadu since 1984.

Number of domesticated elephants

Past estimates of domesticated elephants are available mostly for war elephants. The army of Chandra Gupta Maurya (third century B.C.) had 9 000 elephants; other rulers in the Indian subcontinent at that time had at least another 5 000 elephants between them. The great Moghul Emperor Akbar (1556–1605 A.D.) had 32 000 elephants in his stables. His son Jehangir (1605–1627 A.D.), a great connoisseur of elephants, was stated to have 113 000 elephants in captivity: 12 000 in active army service, 1 000 to supply fodder to these animals, and another 100 000 elephants to carry courtiers, officials, attendants and baggage (Lahiri Choudhury, 1988).

Jardin put the number of elephants in captivity in 1836 at 40 000 (Anon, 1993). Some idea of the number of domesticated elephants can be had from the data on elephant captures. Sukumar (1994) estimates that during the period 1868 to 1980, 30 000–50 000 elephants might have been captured throughout the Indian subcontinent, largely in the northeast. As many as 5 564 elephants were captured in northeast India during 1961–79 (Lahiri Choudhury, 1984).

No formal census of captive elephants has ever been attempted in India. Although a livestock census has been conducted in various states in India in different years, either elephants were not covered or the information about them has not been analysed and tabulated properly. Some experts have, however, attempted to estimate the number of captive elephants in India. Jackson (1985) estimated the number as 2 910–3 110 including 750 for northern India, 700 for southern India and 1 460–1 660 for northeastern India. Santiapillai and Jackson (1990) cited a population figure of 2 260–2 760 including 500–750 for northern India, 300–350 for southern India and 1 460–1 660 for northeastern India. Lair (1997) suggests that these figures are under-estimates and the number of domesticated elephants in India should be not less than 4 000.

A quick but fairly exhaustive survey of the status of captive elephants was done by Project Elephant during November and December, 2000. The help of knowledgeable elephant owners, NGOs, the Central Zoo Authority, the Circus Federation of India, State Forest Departments and other experts was sought for this purpose. Field visits were made to some major elephant centres in the northeast. This survey yielded a minimum figure of 3 400 captive elephants in India. However, information about circuses as well as mendicants in northern India does not appear to be complete. A few elephants in the south and northeast also appear to have been missed. Hence, the present number of captive elephants in India can be put at 3 400–3 600 including 271-300 for northern India, 209–240 for eastern India, 79–92 for western India, 860–920 for southern India, 1 903–1 970 for northeastern India and 78 for the Andaman and Nicobar Islands. A breakdown by states is given in **Annex 2**. This estimate compares fairly well with the earlier estimates. The apparent increase in the northeastern region is because of improved record-keeping and intensive survey. The decrease in the northern and eastern regions is a result of the transfer of elephants to the south where the demand for elephants is still high.

Laws

The first codification of laws relating to elephants in India is found in the famous treatise on statecraft *Arthasastra* by Kautilya, Prime Minister of Emperor Chandragupta Maurya (third century B.C.). It stipulated the setting up of elephant sanctuaries on the periphery of the kingdoms and prescribed the death penalty for anyone killing an elephant within the sanctuary. The era of modern legislation was introduced in India by the East India Company in the 18th century. Some of the earlier pieces of legislation concerning elephants include: the Government Forest Act, 1865 (Act VII of 1865), the Bengal Act 2 of 1866, the Bengal Act 4 of 1866, the Bengal Regulation 5 of 1873, the Madras Wild Elephant Preservation Act, 1873 (The Madras Act No.1 of 1872), the Indian Forest Act, 1878 (Act VII of 1878), the Elephant Preservation Act, 1879 (Act VI of 1879), the Bengal Act 5 of 1898, the Mysore Games and Fish Preservation Regulations, 1901, the Wild Birds and Animals Protection Act, 1912 (Act VIII of 1912) and the Indian Forest Act, 1927 (Act XIV of 1927). The Acts of 1879, 1912 and 1927 remained the major laws for protecting elephants in most parts of the country until 1972 (Bist & Barua, 2000).

The Wildlife (Protection) Act, 1972 (No. 53 of 1972) [WPA-1972] is at present the principal legal instrument for the protection of wild animals in India. It is applicable all over India except in the State of Jammu and Kashmir that has a separate but similar Act. In view of Section 66 (Repeal and Savings), this Act has an overriding effect over all other laws concerning wild fauna in India. This Act has also led to the formation of separate Wildlife Wings headed by a Chief Wildlife Warden (CWLW) in the states and by a Director of Wildlife Preservation at the Centre to carry out the provisions of the Act.

It is interesting to note that in the original WPA-1972, the Indian (Asian) elephant was included in Schedule-II (Part I) of the Act thereby granting it the status of "Special Game" that could be killed or captured on the basis of a licence (Section 9) and commercially traded under a licence (Section 44). The domesticated elephant was included in the definition of Cattle [Section 2(6)]. Ivory was kept outside the purview of the Act. The WPA-1972 and its schedules were amended substantially in 1977, 1980, 1982, 1986 and 1991 and the amendments have special implications for the elephant. Most of these changes were influenced by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) that has the Asian elephant in Appendix I. India became a party to CITES on July 20, 1976 when it became obligatory to change the domesticated legislation and the country's import/export policy to bring its provisions into conformity with those of the CITES. The Indian elephant was transferred to Schedule-I (i.e. the most protected species) on October 5 1977. The export of the Indian elephant and its ivory from India was banned in 1978. Domestic trade in the ivory of the Indian elephant was banned in November 1986. The Act recognizes a domesticated elephant both as a 'captive animal' [Section 2(5)] and a 'wild animal' [Section 2(36)]. The term 'vehicle' as defined in the Act also includes the elephant [Section 2(33)].

A summary of the provisions of the Act having a bearing on the Asian elephant is given below (Bist and Barua, 2000):

1. Sections 9, 11 and 12: Hunting (which, by virtue of Section 2, also includes capturing) of elephants is normally prohibited. An elephant can be hunted under the orders of the CWLW if it has become a danger to human life or has become diseased or disabled beyond recovery. No elephant can, however, be hunted under this provision of the Act even if it becomes a threat to standing crops or property. The Act also permits killing or wounding in good faith of any elephant in defence of oneself or any other person. The CWLW is also authorized to issue a permit for hunting an elephant, with the previous permission of the Central Government, for the purpose of education, scientific research, scientific management or collection of specimens for zoos recognized by the Central Zoo Authority (CZA), public museums and similar institutions. Scientific management of elephants, as defined in the Act, means translocation of elephants to an alternative suitable habitat, or their population management without killing, poisoning or destroying them.

2. Sections 18-38: The Act makes special provisions for establishing new Protected Areas (*i.e.* Sanctuaries and National Parks) for the protection of all wild fauna and flora found therein and also for regularisation of the Protected Areas set up earlier [Section 66(3)]. The Act prohibits the exploitation of all wildlife and also the destruction of habitat of any wild animal within a Sanctuary or a National Park except for the purpose of improvement and better management of the wildlife living therein. Prior approval of the State Government is also needed for this purpose. The Act imposes suitable restrictions on trespass, and use of fire, injurious chemicals, poisons and weapons within a Sanctuary and a National Park. The Act bans grazing within a National Park while prior approval of the CWLW is needed for grazing within a Sanctuary. The Act enjoins on the CWLW to arrange for prophylactic inoculation of all livestock living within 5 km of a Sanctuary or a National Park against communicable diseases. All persons possessing firearms and living within 10 km of a Sanctuary or a National Park are required to register with the CWLW or the Authorized Officer (AO). Boundaries of Sanctuaries and National Parks cannot be altered without approval of the State Assembly.
3. Section 39: Any elephant captured or killed without approval of the competent authority or killed by mistake or found dead, or any trophy (cured or uncured), animal article or ivory (including imported ivory) obtained from an elephant involved in any offence under the Act is deemed to be government property. Any person who comes in possession of such government property is under legal obligation to inform the nearest police station or the AO within 48 hours.
4. Sections 38I and 38J: No zoo can acquire or transfer an elephant except with the previous permission of the CZA. Teasing and molesting captive elephants in a zoo is an offence. Recognition of Zoo Rules, 1992 framed by the Government of India under Section 63 prescribes standards and norms for keeping captive elephants and other animals subject to which the CZA may recognize or refuse to recognize a zoo.
5. Sections 40 (2) and 42: No person, without written permission of the CWLW or the AO, can keep an elephant in his control, custody or possession. The CWLW may issue an ownership certificate for this purpose.
6. Sections 40 (2) and 49: No person, without previous permission in writing from the CWLW or the AO, can acquire or receive an elephant. No person, other than a zoo recognized by the CZA, can purchase, receive or acquire an elephant otherwise than from a person authorized under the Act.
7. Section 49B (1): No person can commence or undertake business as a dealer in elephants on and after January 25, 1987.
8. Sections 43 and 49C (7): No person, who lacks a certificate of ownership, can sell or offer for sale or transfer whether by way of sale, gift or otherwise, an elephant without written permission of the CWLW or the AO. The said authorities, before granting permission, shall satisfy themselves that the elephant has been lawfully acquired and issue an ownership certificate to the applicant. Transactions between zoos recognized by the CZA are exempted from the aforesaid restrictions.
9. Section 43 (3): No person, who lacks a certificate of ownership, can transfer or transport an elephant from one state to another state without prior permission in writing from the CWLW or the AO of the destination state.
10. Section 43 (2): A person having an ownership certificate in respect of an elephant is required to inform (within 30 days) the CWLW or the AO of the destination state when he transfers or transports an elephant from one state to another.
11. Section 48A: No person can accept an elephant for transportation except after exercising due care to ascertain that permission from the CWLW or the AO has been obtained for such transportation.
12. Section 50: Any forest officer or any police officer of the rank of sub-inspector or above, or any wildlife official authorized by the State Government or the Central Government can, on the basis of reasonable suspicion, require any person to produce for inspection any captive elephant or animal article (including ivory articles) or trophy (cured or uncured) obtained from an elephant in

his control; or ownership certificate, licence or permit required to be kept by him under the Act. They can search any baggage, vehicle, vessel, premises or land for the aforementioned items and seize the same in case of violation of any provision of the Act. They can also seize any trap, tool, vehicle (including an elephant), vessel or weapon used for committing the offence. The offender may also be arrested without warrant.

13. Section 51: For any offence relating to elephants, the offender can be punished with imprisonment for a term not less than one year but extending up to six years and also with a minimum fine of five thousand rupees. The term of imprisonment can be extended up to seven years in case of offences committed by professional dealers, manufacturers and taxidermists dealing in elephants or articles made of ivory (including imported ivory) or any other product derived from elephants.

As stated earlier, many Forest Acts also contain provisions for the protection of elephants in the Reserved and Protected Forests. The Indian Forest Act, 1927 (IFA-1927) regards elephants as 'forest produce' and therefore requires a transit permit for their movement from one place to another (Section 41). Similar provisions exist for elephants in the Forest Acts in the states where the IFA-1927 is not applicable.

Domesticated elephants in India are also subject to the provisions of the Prevention of Cruelty to Animals Act, 1960 (59 of 1960) [PCA-1960]. This Act does not define 'cruelty'. However, Section 11(1) enumerates various acts of omission and commission, which constitute cruelty to animals. Barua and Bist (1996) have listed various possible forms of cruelty to elephants that include: (a) Beating, over-riding, over-loading, torturing or otherwise subjecting any elephant to unnecessary pain or suffering; (b) wilfully and unreasonably administering any injurious substance to an elephant; (c) confining an elephant in a cage that does not permit the animal a reasonable opportunity for movement; (d) conveying or carrying an elephant in such a manner as to subject it to unnecessary suffering; (e) mutilating or killing any elephant by injecting strychnine into the heart or using any other unnecessarily cruel method; (f) not providing any elephant with sufficient food, water or shelter; and (g) inciting any elephant to fight any other animal for the purpose of entertainment. Some of the rules framed under the PCA-1960 seek to regulate such activities as may constitute cruelty to all animals including elephants. The Prevention of Cruelty to Draught and Pack Animals Rules, 1965 prohibits the use of elephants for drawing any vehicle or carrying any load for more than nine hours a day. It also prohibits the use of any spiked stick or sharp equipment for driving or riding an elephant. The Performing Animals Rules, 1973 lays down necessary procedures for registration of trainers and exhibitors of performing elephants. The Prevention of Cruelty (Capture of Animals) Rules, 1972 prohibits the capture of animals except by the 'sack and loop' method, tranquilliser guns or any other method that renders the animal insensible to pain before capture.

Different sets of legal provisions exist in India to regulate the import and export of elephants and products derived from them. The Government of India announces its import/export policy from time to time and with regard to a particular species of wildlife and this is usually influenced by its status under the WPA-1972 and the CITES. According to the existing policy (1 April, 1997 to 31 March, 2002), zoological parks, recognized scientific institutions, circus companies and private individuals can import elephants on the recommendation of the CWLW subject to the provisions of the CITES. Zoological parks, in particular, are exempted from import duty under the provisions of the Customs Tariff Act, 1975. The export of elephants, including their parts and products, is prohibited. However, in exceptional circumstances, the non-commercial export of elephants is permissible for specific scientific, zoological or educational purposes on the recommendations of the Ministry of Environment & Forests, Government of India. All exports and imports of elephants are permissible only through the custom points at Delhi, Calcutta, Mumbai and Chennai and are subject to provisions of the CITES and inspection by the wildlife authorities of the central government. Any violation of the import/export policy is deemed to be an offence punishable under the Customs Act, 1962.

The Indian elephant now enjoys much more legal protection than ever before. But the enforcement of the laws leaves much to be desired. Even after 22 years of inclusion of the Indian elephant in Schedule-I of the WPA-1972, a large number of captive elephants is still not covered by ownership certificates. The sale and purchase of elephants at the Sonepur fair (Bihar) takes place every year without much regard to the provisions of the Act. Reports regarding the illegal capture of wild elephants are frequently received from the northeastern states. The poaching of elephants for ivory has been going on unabated in different parts of the country and notorious poachers are still at large. Grazing continues to be a serious problem in the Protected Areas and reports of elephants dying of anthrax and other cattle-borne diseases are not uncommon. Therefore, steps to improve the efficiency of the enforcement agencies (Bist & Barua, 2000) must urgently be implemented. Major flaws in the existing laws are as follows:

1. Some of the safeguards for the Schedule-I animals as envisaged in the WPA-1972 do not suit the nature of elephants and the management practices relevant to them. For example, of all the wild animals, elephants cause the greatest damage to crops and houses. Yet, even the known crop-raiders and house-breakers among the elephants cannot be captured unless they turn into human killers (Section 11). This causes resentment among the public and they, sometimes, take the law into their own hands by injuring or killing the elephants in question. Such a situation hardly helps the cause of elephant conservation. Similarly, although a large number of abandoned elephant calves are routinely rescued by the forest staff and made captive, this operation does not have the backing of the Act.
2. Although periodic capturing of elephants has been recognized as a management option for containing depredation and population control, this option is seldom exercised because of the very limited scope to dispose of elephants under the WPA-1972 and the export policy. The WPA-1972 is laden with too many restrictions to encourage elephant keeping in India. There is no evidence that trade in live elephants is in any way responsible for endangering Asian elephants, yet being in Schedule-I of the WPA-1972 and Appendix I of the CITES, they are precluded from trade.
3. The domesticated elephant was excluded from the definition of livestock through an amendment in the WPA-1972 in 1991. This has theoretically placed it outside the purview of the Livestock Department. Moreover, domesticated elephants are precluded from the legal requirement of the prophylactic inoculation of livestock around Protected Areas.
4. As the elephant is included in Schedule-I, offences associated with this animal attract maximum punishment under the WPA-1972. A person can get the same punishment for possessing an elephant without permission of the CWLW as for poaching a tusker**.** Even minor offences relating to elephants are not compoundable. Thus, for a large number of persons who have unwittingly violated some provision of the Act concerning captive elephants, there is no other option but to keep quiet about the violation and perhaps continue with it.
5. Domesticated elephants are used for different types of work in India. Many of these elephants are subjected to a variety of acts of cruelty (Barua & Bist, 1996). The WPA-1972 or the rules framed under it do not provide for the care and maintenance of captive elephants other than those in the custody of the zoos recognized by the CZA. The provisions of the PCA-1960 are generally not appropriate for elephants. It is necessary to frame exclusive standards and norms for elephant owners and enforce the same through the WPA-1972 (Bist, 1996).

Registration

Prior to enactment of the WPA-1972, there was no legal provision for registration of domesticated elephants. Some timber companies used to brand their elephants for identification, but it was their internal affair. In northeastern India, the British started a system (still in practice) of registration of *khoonkies* (trained elephants) engaged by the contractors for elephant capturing operations. This was meant to check the entry of unscrupulous elephant catchers inside the operational area. The

registration comprises a certificate issued by the local Divisional Forest Officer containing details of height and other identifying marks of the elephant. In recent years, photographs of the mahout and *phandi* (nooser) have also been affixed on the registration papers. The registration remains valid for the period of validity of the contract and is enforceable through the clauses of the contract. In northeastern India annual grazing permits for elephants issued by the Forest Department to the owners are also sometimes regarded as an 'identity card' for the elephant.

The WPA-1972 envisages the registration of domesticated elephants by way of ownership certificates. These certificates are issued by the CWLW or the AO to the legitimate owner of the elephant after due verification. The forms for ownership certificates have been prescribed by various state governments under the Wildlife (Protection) Rules framed under Section 64 (A sample is given in **Annex 3**). The Act provides for the issuance of ownership certificates in the following cases (Anon, 1994):

Case A: The Act stipulates that the owners of all captive animals covered under Schedules I and II (Part II) should declare the same to the CWLW or AO within 30 days from the commencement of the Act [Section 40(1)]. The Act expected the CWLW or the AO to conduct an inquiry on receipt of such declaration and affix identification marks to the animals in question (Section 41). Section 42 enabled the CWLW to issue ownership certificates for the purpose of Section 40. Most of the applications for ownership certificates for elephants are rejected on the ground that no declaration was made within the stipulated period. But the fact remains that elephants were not in Schedule I or in Schedule II (Part II) at the time of the commencement of the WPA-1972. It was included in Schedule I on 5 October 1977 and the Act contains no clear instructions as to how to deal with such late entrants. Section 40 (4) empowers the state government to require any person to declare certain items within a stipulated period. But this section does not cover captive animals. Despite this legal lacuna, some state governments have issued notifications asking owners to declare their elephants within a specified period. But not much can be achieved because of the following reasons:

1) In a vast country like India, elephants and their owners are scattered in remote locations and it is not always possible for them to have knowledge of government notifications. In north-eastern India, the Forest Department has no presence in many areas where elephants are located.
2) In some states (e.g. Assam and Nagaland) Wildlife (Protection) Rules were not framed until recently and forms for submitting declarations and issuing ownership certificates were not prescribed.
3) Section 42 empowers only the CWLW to issue ownership certificates and the power has not been delegated to the local Forest Officers. Owners generally avoid going to the state capitals to meet the CWLW for fear of harassment.
4) The fact that the Forest Department cannot take any action against the defaulters has only made elephant owners grow indifferent. Conversely, most of the circus companies, vulnerable to harassment by the forest authorities, do apply for ownership certificates.
5) Section 42 stipulates that the CWLW 'may issue' a certificate of ownership. It suggests that the issuance of ownership certificates is subject to the discretion of the CWLW. Most of the CWLWs do not take their responsibility with regard to Section 42 with the same seriousness as other provisions of the Act.
6) Many applications have been received by the CWLWs after the date stipulated by the state government. But, the CWLWs have been under the impression that this delay constitutes an offence under the Act. There is no provision in the Act to condone such delays. Ironically, even a nominal offence in respect of captive elephants cannot be compounded under the Act (Section 54, proviso) and invites severe penalty involving imprisonment of the owner and forfeiture of the elephant.

Case B: Pursuant to the prohibition on commercial trade in scheduled animals [i.e. animals covered in Schedule I and Schedule II (Part II)] in 1986, ex-licensed dealers in captive elephants were required to declare their stocks to the CWLW or AO on or before 25 January 1987. The CWLW or the AO were expected to conduct an inquiry and affix identification marks. Thereafter, the CWLW, with the prior approval of the Director, Wildlife Preservation, Government of India, could issue ownership certificates to the ex-dealers for elephants that they wished to retain for their *bona fide* personal use. This provision of the Act has not been utilized, as there were no licensed dealers in captive elephants prior to 1987. Persons dealing without a licence in captive elephants before 1987 continue to do so with impunity.

Case C: Immediately after inclusion in Schedule I, elephants have become subject to Section 40(2) that prohibits a person from possessing, acquiring, disposing of and transporting a captive elephant without written permission of the CWLW or the AO. No time limit has been given to the owners for applying for permission. The Act does not state clearly that the 'written permission' will be in the form of an ownership certificate. However, the CWLW has been empowered under Section 42 to issue ownership certificates for the purpose of applications under Section 40 (2). But neither the CWLWs nor the owners have made use of this provision of the law.

Case D: An owner of a captive elephant not having an ownership certificate is required to obtain prior permission of the CWLW or the AO in writing before disposing of or transporting his elephant. The Act prescribes that before granting such permission, the CWLW or the AO should satisfy himself that the elephant has been lawfully acquired. Section 43(5) stipulates that the CWLW or the AO shall issue a certificate of ownership after such inquiry as he may deem fit and may affix an identification mark on the elephant. This provision is superior to that of Section 42 because:

1) It suits the owners who may approach the AO (usually a local Forest Officer) instead of the CWLW for an ownership certificate;
2) Issuance of an ownership certificate is not discretionary for the CWLW or the AO;
3) The CWLW and the AO have been given discretionary powers in respect of inquiry for the purpose of ownership certificates. Hence, they need not enter into complicated inquiries.

Case D provides a very convenient way of granting ownership certificates and most of the certificates at the famous elephant fair at Sonepur are issued in this way.

In conclusion, it may be said that the provisions relating to ownership certificates are the most confusing and the least understood parts of the WPA-1972. This has resulted in a strange situation where a large number of domesticated elephants have neither been provided with ownership certificates nor confiscated by the Forest Department for violation of the law. Available information indicates that there are only about 1 300-1 400 domesticated elephants with ownership certificates in India and that accounts for about 48 percent of the eligible elephants. In Tamilnadu and Delhi, the percentage of privately owned elephants having ownership certificates is above 80 percent. Assam is reported to have issued as many as 703 (63 percent) ownership certificates but it is doubtful that all these certificates are in conformity with the provisions of the WPA-1972. Circus elephants are mostly covered under ownership certificates. There are many instances when Forest Officers, who feel more comfortable with the Forest Acts than with the WPA-1972, have issued transit permits in lieu of ownership certificates for elephants sold by them to persons, circuses or temples.

A few more points regarding registration of elephants merit attention. The form for the ownership certificate has not been designed with the elephant in mind. Hence, it may not be possible to identify the elephant on the basis of the scanty information given in the ownership certificate. The Act does not provide for periodic renewal of ownership certificates to ensure recording of the current measurements and features of the elephant. Moreover, provisions of the Act relating to affixing identification marks

on the elephant have not been followed. In fact, not much thought has been given to developing a convenient, cost effective and socially acceptable method of marking elephants.

Organizations and their major projects

State Forest Departments (SFDs) have a double role to play as regards domesticated elephants: employer and regulator. All states having wild elephants, except Mizoram and Manipur, employ captive elephants. In states like Orissa and Madhya Pradesh, almost all the domesticated elephants belong to the SFD. In some states, SFDs also own some of the zoological parks having elephants. By and large, the SFD elephants are properly looked after. There are rules and orders for maintenance and care of these elephants. Wildlife Wings of the SFDs headed by the CWLWs are responsible for enforcing the provisions of the WPA-1972 relating to domesticated elephants. Bihar Forest Department plays an important role in organising the annual elephant fair at Sonepur. The SFD in Karnataka also helps in organising an elephant procession during the world famous *Dushera* fair at Mysore. Forest staff are frequently called upon to control tuskers owned by circus or private individuals when they go berserk or come in *musth*. After the ban on the commercial capture and trade in elephants, the occasional capture of wild elephants by the SFDs is the only source of new domesticated elephants in India.

There are three authorities in the Ministry of Environment and Forests, Government of India, which deal with domesticated elephants. The Director of Wildlife Preservation is the highest legal authority for discharging the responsibilities of the central government under the WPA-1972. He is also the Management Authority for CITES in India. He plays a direct role in regulating the import and export of domesticated elephants and grants permission for capturing elephants under Section 12 of the WPA-1972. The Central Zoological Authority (CZA) oversees the implementation of standards and norms relating to the zoo elephants under the provisions of the Recognition of Zoo Rules, 1992 and also regulates the transfer of elephants between the recognized zoos. Project Elephant, the third agency, was established in February 1992 to undertake conservation activities for the long-term survival of elephants in India. One of the objectives of Project Elephant is 'to improve the welfare of elephants in domestic use, including veterinary care, training of mahouts, humane treatment of elephants, etc.'. But Project Elephant has mostly been busy in projects relating to wild elephants and it has not done much for domesticated elephants. Presently, it is in the process of gathering information about the status of domesticated elephants and their keepers. It also plans to organize a series of training programmes for mahouts, forest officers and veterinary doctors. It plans to utilize the services of NGOs and associations of elephant owners to facilitate registration of domesticated elephants.

The Ministry of Social Justice, Government of India and the Animal Welfare Board of India have undertaken many initiatives to promote the welfare of domesticated animals and to prevent cruelty to animals. The major focus of their activities is the circus animals. Various branches of the Society for Prevention of Cruelty to Animals (SPCAs) in Kerala have been particularly active in preventing cruelty to temple elephants.

The Indian Veterinary Research Institute (IVRI), Izzatnagar conducts a diploma course in wildlife health management for serving veterinary doctors. The Wildlife Institute of India (WII), Dehradun conducts training courses in wildlife management for forest officers. The WII has also been running a collaborative programme with the U.S. Fish & Wildlife Service since 1995 known as the Indian Wildlife Health Co-operative (IWHC). The IWHC consists of five veterinary colleges, one each in the east, west, north, south and central regions. Each college deals with wildlife health issues and training within its region. Two of these colleges, the College of Veterinary Science, Khanapara, Guwahati (Assam) and Madras Veterinary College, Chennai (Tamilnadu) are located in the major elephant regions in India, though they do not have any special programme relating to elephants at present. Kerala Agricultural University, Trichur, organizes workshops and training programmes related to the management of captive elephants for veterinarians, elephant keepers and other interested persons.

The Elephant Welfare Organization is a prime NGO in Kerala dedicated to the cause of captive elephants. It has organized some training courses for the mahouts and plans to set up an exclusive hospital to provide veterinary services for domesticated elephants. The Zoo Outreach Organization in Coimbatore has been providing a valuable service by disseminating information relating to the management and veterinary care of captive elephants through its journal *Zoos' Print*. There are associations of mahouts and *phandis* (noosers) in Assam, but these are not very active at present. TRAFFIC–India, a programme division of the WWF–India, has initiated a study of the trade in captive elephants. But the fact remains that there are not enough NGOs working for the welfare of domesticated elephants.

There are no foreign funded projects relating to domesticated elephants in India.

Work done by elephants

The survey conducted by Project Elephant in November and December 2000 gave the following breakdown of captive elephants in terms of ownership:

- Forest Departments = 482
- Zoos = 80
- Circuses = 106
- Temples = 192
- Private Individuals = 2 540

Elephants owned by State Forest Departments (SFDs) are used for patrols by field staff in National Parks and Sanctuaries. They are also used for carrying tourists inside forests for viewing wildlife. During floods and other natural calamities, SFD elephants are sometimes requisitioned by the civil authorities for arranging relief works. In the Andamans and Nicobar Islands, Maharashtra, Kerala and Tamilnadu, SFD elephants are occasionally used for logging operations. Karnataka Forest Department provides elephants for the *Dusshera* festival in Mysore. West Bengal Forest Department uses its elephants for driving away herds of wild elephants from croplands. SFD elephants in Karnataka and Tamilnadu are also often utilized for capturing and training wild elephants. The use of domesticated elephants in many states is disproportionate to the populations of wild elephants in the states. For example, SFDs in Orissa, Bihar (including Jharkhand) and Meghalaya possess only two captive elephants each despite wild elephant populations of 1 827 618 and 1 840, respectively. Even in Kerala, which has 5 737 wild elephants, the SFD has only 16 elephants. Manipur and Mizoram, the two northeastern states, do not have any SFD elephants at all. West Bengal Forest Department, on the other hand, makes intensive use of domesticated elephants: it has one captive elephant for every six wild elephants. There is obviously great scope for increasing the utilization of elephants by the SFDs, both in the elephant bearing states and elsewhere.

The zoo elephants are used only as exhibits. Their use for joy rides was discontinued because of criticism by animal welfare activists. There are only 27 zoos in India keeping elephants. Some of the zoos are used as rescue centres for elephants confiscated from individuals for violation of laws, or for the abandoned calves of wild elephants. The Government of India does not encourage the establishment of more zoos without adequate infrastructure. There is, therefore, not much scope to increase the number of zoo elephants.

The circus elephants are used to entertain the public. But they do not appear to have a promising future. Circus companies in India are constantly struggling for their economic survival and they have to face tremendous criticism from animal welfare activists for subjecting their animals, including elephants, to unnecessary pain and cruelty. But currently, circuses in India are one of the biggest buyers of elephants and they are continuously on the look out for replacements for their old elephants.

Temple elephants, with the exception of one in Punjab, are all in southern India. Although they are used for religious processions, most of the year they remain idle. Most of the temples possess sufficient financial resources to care for their elephants, yet many of them are often criticized for exposing their elephants to stress during processions and for not paying adequate attention to their health and hygiene. There is no indication that the demand for elephants in temples will decrease in the near future.

About 75 percent of captive elephants are owned by private individuals. Just three states, viz. Assam with 1 120, Kerala with 586 and Arunachal Pradesh with 550, account for 89 percent of the elephants privately owned. Domesticated cow elephants in northeast India get better opportunities to mate with wild bulls than their counterparts elsewhere. Almost all elephants in the northeast are used for logging operations in private or community forests or for other works in saw mills. The Assam elephants are also used to assist in the capture and training of wild elephants whenever the opportunity arises. With a prohibition on logging imposed by the Supreme Court of India in 1994, job opportunities for the northeastern elephants have decreased and many elephants have since been sold to buyers from Kerala, Bihar and Tamilnadu. But most of the elephants are still being employed in illegal logging operations in the northeast (Barua, personal communication.). The Kerala and Tamilnadu elephants are hired out to temples for religious ceremonies. Some of them are sometimes hired by the coffee planters in Kerala and Karnataka for logging operations. Private elephants in Jaipur (Rajasthan) are used for tourism purposes and they are reported to be very popular with the foreign tourists. In Delhi private elephants are in great demand for marriage processions, social functions and occasionally in political rallies. In Bihar, Jharkhand and eastern parts of Uttar Pradesh many big landlords still keep elephants as a status symbol. Some of these elephants are also used for transporting people and material in remote areas. Many elephants in Uttar Pradesh and Punjab are either owned or hired by mendicants who roam around different parts of the country during the harvesting or festival seasons and make a handsome living through begging.

One may expect a substantial reduction in the number of privately owned elephants in the northeast unless logging operations are legally resumed. A similar reduction may be expected in Uttar Pradesh and Bihar if the landlords no longer find it viable to maintain elephants without sufficient economic returns. But elsewhere in India private ownership of elephants appears to have stabilised. There is fair scope for hoteliers and tourist organizations to utilize domesticated elephants in well-known tourist locations in southern and western India as is the case in Rajasthan.

Veterinary care

Not all domesticated elephants in India get veterinary care. The zoo elephants and SFD elephants fare the best. All major zoos in India have at least one full-time veterinarian. Major National Parks and Sanctuaries in India also have full-time veterinary doctors. But most of these veterinary doctors are officers of the Veterinary (Livestock) Departments sent on deputation to the Forest Departments or the zoos for a fixed period. They join as novices, gain experience and return to their parent department before contributing anything meaningful. But some of the zoo doctors with long experience with captive elephants have contributed a lot to veterinary science and have published papers and articles relevant to elephants. Forest authorities in most of the National Parks and Sanctuaries receive help from the Veterinary Departments in arranging the immunisation of livestock in the fringe areas – a legal requirement under the WPA-1972. In many other Protected Areas, NGOs also arrange veterinary support for the immunisation of livestock.

In most of the districts having captive elephants, local veterinary doctors are called upon to treat sick elephants. They are also summoned to help the owners to control bad tempered elephants, particularly loose tuskers in *musth*. Needless to say, most of the veterinary doctors are not well prepared to deal with these cases. However, in States like Assam and Kerala, which have substantial populations of captive elephants, there are some private veterinary practitioners with sufficient

experience of dealing with elephants. Care of domesticated elephants is not covered in the syllabi of most of the veterinary colleges and only a few colleges send their students for internships in a zoo or a Protected Area having captive elephants. Two notable exceptions are Kerala Agriculture University, Trichur and the College of Veterinary Sciences, Khanapara (Guwahati) that have research and teaching programmes relevant to captive elephants. Kerala Agricultural University also organizes workshops and refresher courses on captive elephant management for veterinary doctors. Tranquillising equipment and good laboratories are not available in most district towns having elephants. This often creates complications. There have been cases in West Bengal when the local veterinary doctors identified anthrax as the cause of death of some elephants, but detailed laboratory tests showed that this was not so. There also have been cases in India when as a result of the absence of tranquillizing guns some problematic tuskers have had to be shot dead rather than simply tranquillized. In remote villages in Bihar, Uttar Pradesh and the northeastern States, veterinary help is rare and elephant keepers depend on k*aviraj* (practitioners of traditional medicine), 'quacks' or their own knowledge. In Kerala, some *kaviraj* are in great demand by elephant owners. Some practitioners also use homeopathic medicines to treat sick elephants. However, the present generation of elephant owners and mahouts in India generally shows a preference for modern rather than traditional veterinary treatment.

Summary

Despite a long and glorious tradition of domesticated elephants, there have been no systematic and conscious efforts in India to sustain this tradition. Domesticated elephants have been ignored both by the wildlife experts and the livestock experts. Most of the legal restrictions on private ownership of elephants were not intended, but are consequential to the inclusion of the Asiatic elephant in Schedule-I of the WPA-1972. Provisions of the WPA-1972, PCA-1960 and various rules made under the said Acts were never framed with the elephant in mind and, as such, they suffer from various inadequacies and flaws. Some restrictions like the requirement of ownership certificates for elephants could be utilized to improve the condition of domesticated elephants if the Forest Departments could enforce these provisions effectively.

There is also an apprehension that much of the traditional knowledge and skill available in India will be lost unless the demand for and the utilization of domesticated elephants are kept alive. It is important to understand that the management of domesticated elephants is complementary to that of wild elephants. It will be ironical if the option of capturing and utilising surplus or problematic wild elephants is given up simply because of some illogical provisions of the law. It makes better sense to take steps to stop the abuse of domesticated elephants rather than ban domestication. An elephant owner should be presumed a potential conservationist unless proved otherwise. It is desirable that the energy, experience and goodwill of thousands of elephant keepers in India is channelled into efforts designed to promote the conservation and welfare of elephants.

It is possible to utilize modern techniques and scientific knowledge to prevent unnecessary cruelty associated with the capture, training and handling of elephants. Demand for domesticated elephants will have to be created and sustained by careful planning. It is also possible to give suitable training to elephants to prepare them for new jobs and new avenues of employment. At the same time, there is an acute need for a large work force of trained mahouts and veterinarians to take proper care of the large fleet of captive elephants that currently exists.

Recommendations

1. Planners and policy makers in India should acknowledge that capturing and domesticating wild elephants is an integral part of their conservation and management.

2. A formal census of domesticated elephants should be carried out in India urgently.

3. A general amnesty should be given to all elephant owners who have failed to apply for ownership certificates. They should be given at least six months to obtain ownership certificates. The legal authority of issuing ownership certificates should be delegated to the district level forest officers. NGOs, Livestock Department and elephant owners should be involved in the exercise. Publicity and confidence building measures should precede the drive for registration.

4. Elephant owners should be encouraged to form associations, which can be involved in registration and other welfare, programmes for elephants and mahouts. Elephants having ownership certificates should be provided with free periodic vaccination. The Government of India may also initiate an insurance programme for registered elephants and their mahouts.

5. The capture of wild elephants should be done only through the SFD agencies, but ownership of and the domestic trade in domesticated elephants should be liberalized. Necessary amendments in the WPA-1972 should be introduced for this purpose.

6. Ownership certificates should be suitably designed to include all relevant information about the elephant. Affixation of an identification mark on the elephant should be made legally binding and a uniform system of marking should be adopted all over India.

7. Necessary norms and standards should be prescribed for elephant owners and enforced through the WPA-1972.

8. A review of the PCA-1960 and various rules framed thereunder should be undertaken to make them relevant to captive elephants. If necessary, a separate set of rules applicable to domesticated elephants should be promulgated under the PCA-1960.

9. A training programme for veterinarians posted in districts having wild and captive elephants should be launched. This should focus on the health management of elephants and on allied topics. Properly equipped laboratories should be set up in all such districts to assist the elephant vets. In each geographical region of India, at least one veterinary college should be identified and developed as a centre of excellence for research and training in elephant health care.

10. Suitable research should be undertaken for evolving efficient and painless methods of training and handling elephants in captivity.

11. Suitable training programmes should also be undertaken for mahouts, elephant owners and managers to increase their professional skills and to sensitize them to the requirements of humane and scientific methods of handling elephants. Possibilities for setting up a training institute for elephants, mahouts and trappers, one each in the northeast and the south, should be explored.

12. Forest Departments in the elephant bearing states and elsewhere should be encouraged to increase the use of elephants in work related to forestry and wildlife. Tourism corporations should also be encouraged to utilize domesticated elephants wherever possible. The Government of India could undertake a scheme for supplying trained elephants for use in the National Parks and Sanctuaries in the non-elephant bearing states.

13. The traditional elephant fair at Sonepur (Bihar) should be patronized by Project Elephant and utilized as a forum for promoting ideas and values about the conservation and welfare of elephants. Similar elephant fairs may be organized in other regions in India.

14. Realizing that the international trade in live specimens of the Asian elephant is not detrimental to the survival of the species (unlike the trade in ivory), the possibility of relaxing some provisions of CITES to facilitate limited (i.e. quota based) export of domesticated elephants should be examined.

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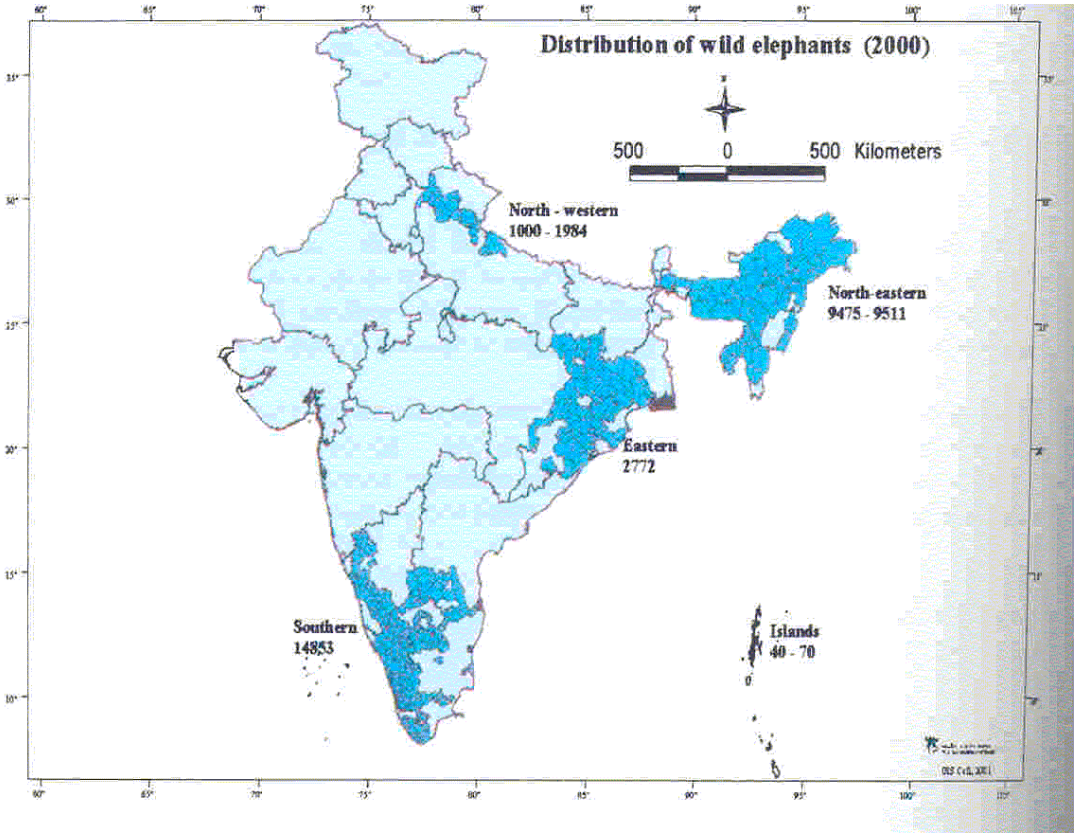
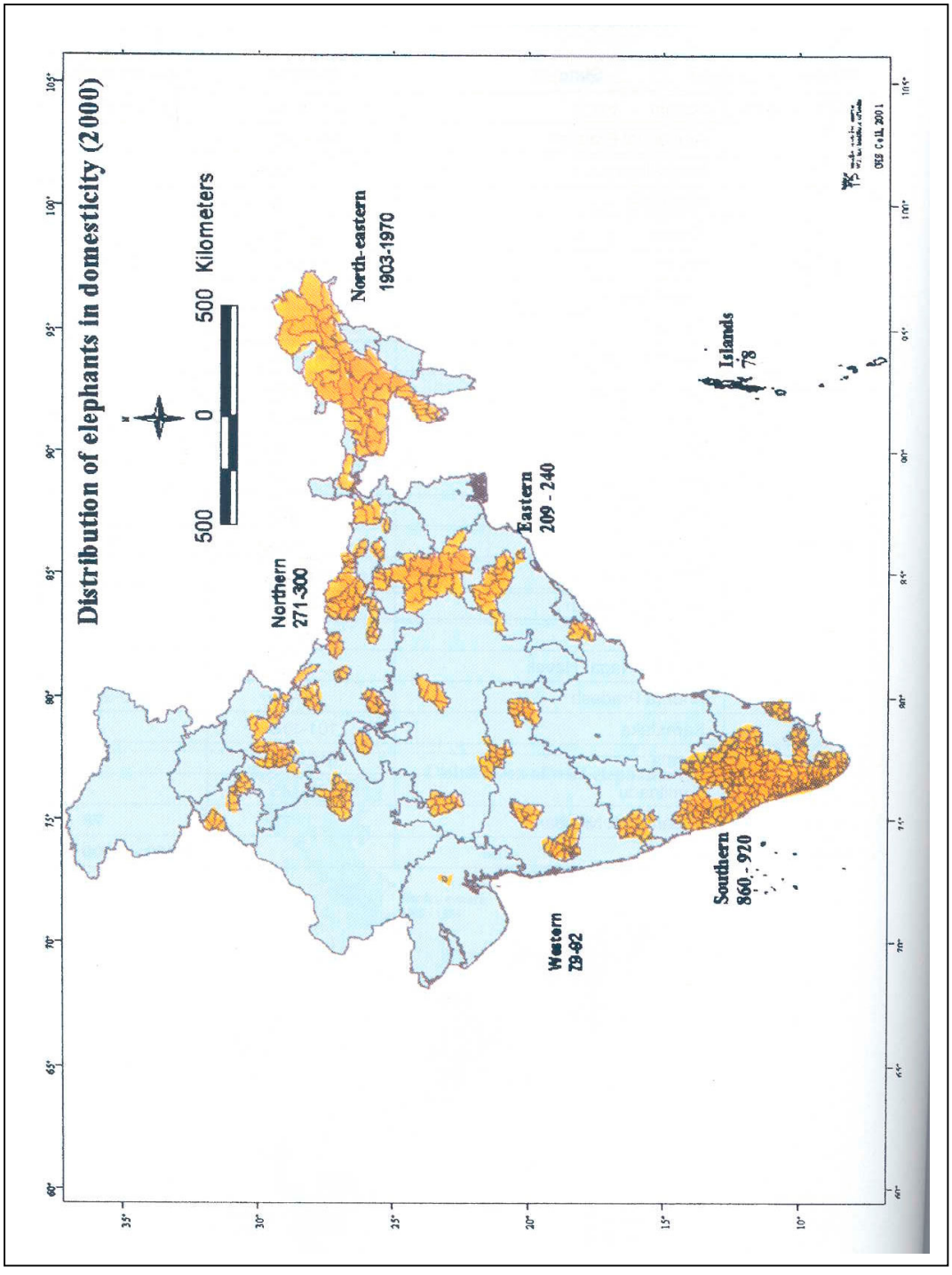
Annex 1. Wild elephants in India (2000)

Region	State	Number	Total for region
North-eastern	Assam	5 312	9 475- 9 511
	Arunachal Pradesh	2 102	
	Meghalaya	1 840	
	Nagaland	147	
	Tripura	60-85	
	Manipur	10-15	
	Mizoram	4-10	
Eastern	Bihar and Jharkhand	618	2 772
	Orissa	1 827	
	West Bengal	327	
North-western	Uttar Pradesh and Uttranchal	1 000-1 984	1 000-1 984
Southern	Andhra Pradesh	57	14 853
	Karnataka	6 088	
	Kerala	5 737	
	Tamilnadu	2 971	
Islands	Andaman & Nicobar	40-70	40-70
Total			**28 140-29 190**



Annex 2. Domesticated elephants in India (2000)

Region	State	Number	Total for region
North-eastern	Assam	1 253-1 290	1 903-1 970
	Arunachal Pradesh	564-580	
	Meghalaya	45-54	
	Nagaland	6	
	Tripura	35-40	
Eastern	Bihar	76-92	209-240
	Jharkhand	15-20	
	Orissa	8	
	West Bengal	110-120	
Northern	Uttar Pradesh	115-140	271-300
	Uttranchal	18-22	
	Delhi	31	
	Punjab	17	
	Rajasthan	90	
Western	Gujarat	2	79-92
	Maharashtra	20-26	
	Madhya Pradesh	53-60	
	Goa	2	
	Dadra – Nagar Haveli	2	
Southern	Andhra Pradesh	20-25	860-920
	Karnataka	101-115	
	Kerala	612-635	
	Tamilnadu	127-145	
Islands	Andaman & Nicobar	78	78
Total			**3 400 - 3 600**


Distribution of elephants in domesticity (2000)
500 0 500 Kilometers
North-eastern
1903-1970
Northern
271-300
Eastern
209 - 240
Islands
78
Southern
860 - 920
Western
79-92

Annex 3. A sample of an OWNERSHIP CERTIFICATE[1]

FORM 13
[*See Rule 36*]

Certificate of Ownership

Office of the _____
_____
_____

Name
Address

It is hereby certified that Sri _____ has under his control, custody or possession the following animals, animal articles, trophies, uncured trophies, specified in Schedule I or Part II of Schedule II to the Wild Life (Protection) Act, 1972.

Items including species from which derived	Dimension and description and sex if possible	Number	Place where kept	Identification marks affixed
(1)	(2)	(3)	(4)	(5)
Animals				
Animal Articles				
Trophies				
Uncured Trophies				

Date:

Seal:
Chief Wild Life Warden

[1] From Wildlife Protection (Karnataka) Rules, 1973

Question and answer session

Q1: How valid are the census figures? Increases or decreases tend to mean that earlier surveys were not as good as later ones. Is this the case in India?

A1: Later figures are better of course, but India has been doing good censuses for some time, at least since the 1970s.

Q2: How are elephants used in agriculture?

A2: They are used to plough fields, especially in Andra Pradesh.

Q3: Are elephants used for patrols in the national parks?

A3: Yes, for anti-poaching campaigns or in areas where other forms of transport are not possible. The number of elephants used could easily be doubled. Project Elephant will provide finance to purchase unemployed elephants in the areas where they will be used.

Q4: You stated that you'd like to encourage the trade in live elephants and for more troublesome wild elephants to be captured. Don't you think it would lead to more elephants in the wild being captured for sale, not just troublesome elephants? Who would monitor the trade?

A4: I don't think it would be a problem because the existing law works well, only target elephants, i.e. troublesome elephants, are captured.

The care and management of domesticated elephants in Malaysia

Mohd. Shariff Daim

Introduction

With the independence of Malaya in 1957, a paramount need to ensure livelihoods for all Malaysians led to the opening up of land throughout the country, including land that was known to be elephant habitat. Each year, thousands of hectares of elephant habitat were taken over by oil palm and rubber schemes and various infrastructure developments such as dams, highways and new settlements. This reduction in elephant habitat because of human encroachment resulted in serious conflicts between man and elephant. As the human population of the country (current population 19 million) has increased the number of man-elephant conflicts and the costs of damage caused by elephants has escalated.

From 1972 to 1978, there was a loss of RM84 125 832 because of elephant depredation in Peninsular Malaysia. In the following ten years, the losses amounted to RM300 million.

The mitigation of these conflicts must be based on a national compromise between meeting the interests of the farmers and the interests of the elephants.

The Department of Wildlife and National Parks (DWNP) established the Elephant Management Unit in 1974 to address human–elephant conflicts. One of its first tasks was to domesticate some elephants so that they could assist in relocating wild elephants. This led to the introduction of elephant mahouts in Malaysia.

Malaysia has lost its cultural heritage of keeping and using elephants in daily life, unlike in India and Sri Lanka where elephants are still used in religious ceremonies. Malaysian history tells of the Sultans of Malacca, Perak, Kelantan, Kedah and Pahang keeping elephants at their palaces for use in ceremonies, wars and as beasts of burden.

It was reported by B.H. Weiss (The Strand Magazine Vol. IX.1895 London) that a Malay Chief of a district in Perak, a state in Peninsular Malaysia, used the services of a *pawang* (traditional spiritual medicine man with supernatural powers) to capture 12 wild elephants. The whole operation involved 50 Malays and *Sakais* (aborigines) and a few *khoonkies* (elephants trained to help in the capture or relocation of wild elephants). The wild elephants were restrained in a *kubu* (stockade) and then taken to a *chelong* (the stop where the elephants undergo training).

This record shows that the elephant catching and training method originally used in Malaysia was quite similar to the *kheddah* method that is being practised in India and Myanmar and similar to the *krals* in Sri Lanka. Traditional elephant catching in Malaysia was more influenced by Indian practices than Thai practices. Unfortunately, this tradition of catching wild elephants ended for some reason in the early nineteenth century. The tame elephants were sold as beasts of burden.

In the early nineteenth century most of the elephants were used to carry tin ore in the British Occupied Settlement. After the Second World War, there was rapid development of roads and a transportation system. Consequently, the need for the services of these elephants diminished together with the culture and tradition of mahouts. At present there is only one individual, Ibrahim Bin Yahya, from Kelantan, who can be considered a traditional elephant mahout, having acquired the skills from his forefathers. He is 70 years old and the tradition of keeping elephants will die out with him as his children are more comfortable using lorries and pick-up trucks rather than elephants.

In 1974, when the DWNP set up the Elephant Management Unit, it engaged six mahouts and four *khoonkies* from Assam, India to train the local elephant rangers to catch, ride, train and manage the elephants at the base camp. It was considered an alien skill for them to acquire and it was considered more a job than a way of life. However, the training period was too short and the local rangers could only learn how to ride, train and manage the wild elephants at the base camp.

The Indian community in Malaysia still uses elephants for their temple ceremonies. They rent the elephants from the private owners or the zoos as and when required. They are not keen on keeping the elephants at the temple or taking care of them by themselves.

Wild elephant distribution in Peninsular Malaysia

In the early nineteenth century, elephants were found in all the states of Malaysia. However, towards the close of the twentieth century elephants could be found only in seven states. The current population of elephants in Peninsular Malaysia is estimated to be 1 200 to 1 500. They are distributed in small herds within a small home range because of the limited availability of lowland forest reserves and fragmented forests. The states of Pahang, Kelantan and Terengganu have the highest densities of elephants whereas Johore, Kedah and Perak show moderate elephant densities.

Elephant distribution shows a progressive retreat from the south and west of the Peninsula. This has arisen because (a) land clearance has been earliest and most rapid in the southern and western states such as Johore, Selangor, Perak and Negeri Sembilan; and (b) elephants from places of conflict have been translocated to sites in the north and east such as Taman Negara and Terengganu.

As this process of land use change has occurred, there has been no deliberate maintenance of corridors to allow for elephant movements or to maintain viable populations. Historically, land use planning agencies such as the Town and Country Planning Department have never taken into account elephant distribution and population requirements when carrying out their work. They now have better access to information on wildlife, but the effectiveness of their planning is limited by various constraints including the separation of the planning process at Federal level from the implementation process at state level. Within states, large blocks of land have been allocated to plantation agriculture, and cleared and planted with no particular sequencing or other considerations on how best to avoid man-elephant conflicts.

Since 1991, two states, Perlis and Selangor, have lost their last elephants as they have all been translocated to Ulu Belum (northern Perak) owing to intense pressure from development. Negeri Sembilan will be the next state to follow as there is only one herd there made up of three elephants.

By the year 2000, there will be no more elephant herds on the western coastal plain of Peninsular Malaysia. Most of the elephant herds are now found on the eastern side of the Main Range in the states of Kelantan, Terengganu and Pahang, where there is a large amount of forest, some of which is protected within Taman Negara National Park. Even in these three states, however, the forest does not constitute a continuous block.

Population estimates of elephants

Wild elephants:

The elephant population of the Peninsula has been variously estimated from time to time as shown in Table 1. Early estimates tended to be based on reported village or smallholder conflicts, and to be limited by lack of accessibility to remote areas. Later estimates have been able to draw on a wider range of information and greater coverage, but have tended to add all additional findings to previous estimates, thus producing possibly inflated estimates or double counting.

Table 1. Estimated wild elephant population

Year	Estimated elephant population
1965	681*
1977	556*
1987	824*
1991	954*
1999	1 115 to 1 171**

* Mohd Khan, ** Shariff Daim

DWNP uses the footprint-count method. This method of survey is found to be very conservative. From experience, the elephant number tends to be underestimated because of the overlapping of footprints along the elephant track and also the condition of the ground where the measurement was taken. An increase of 20 percent would probably be more realistic (Khan, 1990). This leads to an estimated current total population of between 1 200 and 1 500 elephants. To get a more accurate population estimate, DWNP should develop a better technique of counting the number of elephants in the forest. In India, Sri Lanka, Thailand and Sabah, Malaysia they use the dung-count method.

Domesticated elephants:

Before the Protection of Wildlife Act 1972 (Act 76) was implemented, there was no proper registration of domesticated elephants in Peninsular Malaysia. In 1997 the number of domesticated elephants was only 20 (Daim, 1996). In the past three years the number has increased rapidly to 36 (Table 2). The sex ratio of elephants is 0.44 males to 1 female. We can expect the number of domesticated elephants to increase even further. The increase in number is because of the new government policy of using elephants in its ecotourism industry. The A'Famosa Safari Wonderland has a special permit from the Minister of Science, Technology and Environment (STE) to keep 20 elephants.

Table 2. Distribution of domesticated elephants registered under special permit with the Department of Wildlife and National Parks, Peninsular Malaysia (DWNP)

Name	Ownership	Male	Female	Total
Taiping Zoo	Taiping Town Council Perak State.	2	3	5
Johor Zoo	Johor Baru Town Council Johor State.	0	2	2
Johor Palace Mini Zoo	Sultan of Johor Johor State.	1	0	1
National Zoo	Zoological Park Society Selangor State.	1	2	3
Kuala Krai Zoo	Kuala Krai Town Council Kelantan State.	1	1	2
Kuala Gandah Elephant Training Unit	DWNP Federal Government.	1	7	8
Zoo Melaka	DWNP Federal Government.	2	5	7
Desaru Wildlife Adventure	Desaru Wildlife Adventure Sdn Bhd. Johor State.	1	0	1
A'Famosa Safari Wonderland	A'Famosa Wonderland Sdn Bhd. Melaka State.	0	5	5
Private Owner	En Ibrahim bin Yahya Kelantan State.	2	0	2
Total		**11**	**25**	**36**

Note: Compiled by the author

The DWNP is faced with the challenge of monitoring the welfare of domesticated elephants in accordance with the law. In response the Department has come up with a new guideline for zoos and safaris. All elephant owners have to follow this guideline strictly.

The DWNP wildlife inspectors from the Law Enforcement Division in each state monitor the welfare of the state's domesticated elephants. Private elephant owners have to renew their special permits annually. If the condition and the welfare of the elephants are not satisfactory the Director General of the DWNP will recommend to the Minister of STE to revoke the special permit in accordance with the law.

The population of domesticated elephants is only 2 to 3 percent of the total elephant population. There is no captive-breeding programme in Malaysia. There is no interaction between the wild elephants and the domesticated elephants unlike in Myanmar and Thailand where the domesticated female elephants are impregnated by the wild male elephants at the forest fringes. The Malaysian domesticated elephants do not contribute to the wild population.

The public and the NGOs are more sensitive towards the plight of elephants in captivity. They are the first to react if any of the elephants are mistreated and manage to attract the attention of the news media. Sometimes they act as a legal pressure group and can force the authorities to take action to improve elephant welfare.

Out of the 36 domesticated elephants in Malaysia, four have been imported from Myanmar, through a Memorandum of Understanding signed in 1997 between the DWNP Peninsular Malaysia and the Department of Forestry, Myanmar. These working elephants are used to help the DWNP Elephant Management Unit to carry out the elephant relocation programme.

Employment of domesticated elephants

In Peninsular Malaysia domesticated elephants are employed in three different ways:

1. The Kuala Gandah DWNP Elephant Training Centre

The eight elephants at the Kuala Gandah DWNP Elephant Training Centre are specially trained working elephants used as *khoonkies* to help in carrying out the elephant translocation programme. This programme has been very successful in mitigating man-elephant conflicts in Malaysia. These conches play an important role in ensuring the success of the long-term elephant management plan in Malaysia.

The working elephants are trained to restrain the wild elephants that are captured for relocation purposes. The training centre also raises public awareness of the country's elephants. The mahouts are trained to run interpretative centres where the public awareness programmes are carried out.

Because of great public demand, the DWNP has plans to utilize these elephant training centres for ecotourism. The elephants will be released in a 4.05 ha (10 acres) forest enclosed by electric fencing. The public can safely view the elephants in their natural habitat. The public can have elephant rides and watch the elephants bathing in the river. This programme is still in its infancy.

2. Zoos and safaris

The twenty-six elephants in the zoos and safaris are used for zoo exhibits, elephant rides and performances. Some of the keepers have been trained locally by Indian and Thai mahouts.

3. Privately owned elephants

There are only two elephants that are privately owned and these are in Kelantan. They are employed to work in the rubber wood industry. These elephants have been trained to pull rubber wood logs from the plantation to be loaded onto a lorry. They are owned by the last traditional mahout in the country.

Mahoutship

The elephant rangers working for the Department of Wildlife and National Parks, Malaysia were trained by elephant mahouts from Assam, India. These rangers were specially trained for the elephant relocation programme. Since 1974, they have captured and relocated more than 400 elephants from fragmented forests to protected forest. These rangers are extremely competent at handling wild elephants and the *koonkies* during the relocation operations.

As there are fewer elephant problems for the Elephant Relocation Unit to handle the DWNP plans to convert the Kuala Gandah DWNP Elephant Training Centre into an ecotourism area. The elephant rangers must now be trained to handle elephants for tourism proposes. They will receive their training either from Thailand or India as these countries already have very successful programmes using elephants in tourism.

All the mahouts are trained and self-taught. They are not from traditional elephant keeping families like in Thailand, India or Sri Lanka. All zoo keepers too are trained like the elephant rangers. Most of them have received only lower school education. With this background, they are keener on using physical control rather than the psychological method while handling the elephants.

Unlike in the West, zoo keepers and rangers still practise the hands-on method using chains and hooks to control the elephant. This seems to be very cruel by Western standards, where the hands-off method and hydraulic doors are used to manage elephants in *musth*. The A'Famosa Safari Wonderland hires all their mahouts and trainers from Thailand as it is quite difficult to get locals to work with the elephants.

Laws and registration

The Department of Wildlife and National Parks, Peninsular Malaysia (DWNP) is a federal department under the Ministry of Science Technology and Environment. Elephants are protected by the Protection of Wildlife Act 1972 (Act 76). The Act is enforced by the DWNP throughout the Peninsula. Under the Act it is an offence to kill or injure a wild elephant or to possess or trade in any elephant part or product.

They can only be shot and killed by sanction of the DWNP when there is reason to believe that if the elephant is not shot and killed it may cause loss of human life.

Moreover, if any person provokes or wounds an elephant that consequently becomes an immediate danger to human life, the person, when found guilty can be fined, imprisoned or both.

Any person who unlawfully shoots, kills, takes or unlawfully possesses an elephant or part of it or its trophy is guilty of an offence. He shall on conviction be liable to a fine, imprisonment or both. The penalty is higher if the elephant is a female or immature.

An elephant is deemed to be immature if the two tusks together weigh less than thirty pounds or its forefoot measures less than seventeen inches in diameter.

There are general exceptions and presumptions in the Act. The law permits the domestication of elephants in zoos, safaris and by individuals. The Minister, on the advice of the DWNP, may grant not more than one special permit to each applicant to catch, confine, breed, keep, import or export any elephant or part thereof. In Malaysia, the catching of elephants is only done by the DWNP.

The person or zoo should satisfy the conditions prescribed in the permit. The Minister of STE may attach any condition to the special permit, not contrary to the provisions of the Act. Any person or zoo that contravenes any of the conditions attached is liable to have the permit revoked and on conviction be liable to a fine, imprisonment or both.

Cruelty to elephants is also prohibited by the Act. Any person who injures, mistreats, starves, or confines in an enclosure or cage that is not conducive to the comfort or health of the elephant is guilty of an offence and shall on conviction be liable to a fine or imprisonment or to both.

The Act covers the need for the protection of elephants in their natural habitat as well as the needs of those in constant conflict with elephants, i.e. persons from the agricultural and tourism sectors. For conservation purposes, DWNP prefers capturing and relocating problem elephants to killing them.

Veterinary care and help

According to the latest Zoo Guidelines, drawn up by the DWNP, all zoos, safaris and private elephant owners are compelled to have their own resident veterinarian to take care of the health and welfare of the elephants. If they are unable to afford to employ their own veterinarian, they must engage an external veterinarian from a recognized establishment at least once a month to monitor the health and welfare of the elephants in their care. This is to ensure that the health and welfare of the elephants are properly maintained. If there is any outbreak of an endemic disease, they have to report it to DWNP and also to the Veterinary Department for further action. The veterinarian can also get assistance from the Veterinary Faculty of the University Putra Malaysia.

Summary and recommendations

In Malaysia, the domesticated elephant is treated differently from those in other countries such as India, Sri Lanka, Myanmar and Thailand. The DWNP uses elephants as a tool in assisting the rangers to carry out its translocation programme. There is minimal personal interaction or bond between the elephants and the rangers. In India the mahouts grow up together with the elephants and the bond between them is very strong.

Compared with the traditional mahouts, the rangers are more educated and are more exposed to modern drugs, medicine and techniques in handling and managing the elephants. They do not acquire the cultural and traditional practices of using ceremonies, rituals and superstitions in managing the elephant. These rangers are government servants who can be transferred anywhere and to different units within the Department. There is no tradition whereby their children will grow up with the elephants and become mahouts at the training centre.

The DWNP should set up a special programme with the help of other countries with deep-rooted elephant traditions to create a stronger bond between the elephants and rangers. Admittedly, it is quite difficult to revive the elephant keeping culture and traditions of a country that is economically and socially advanced.

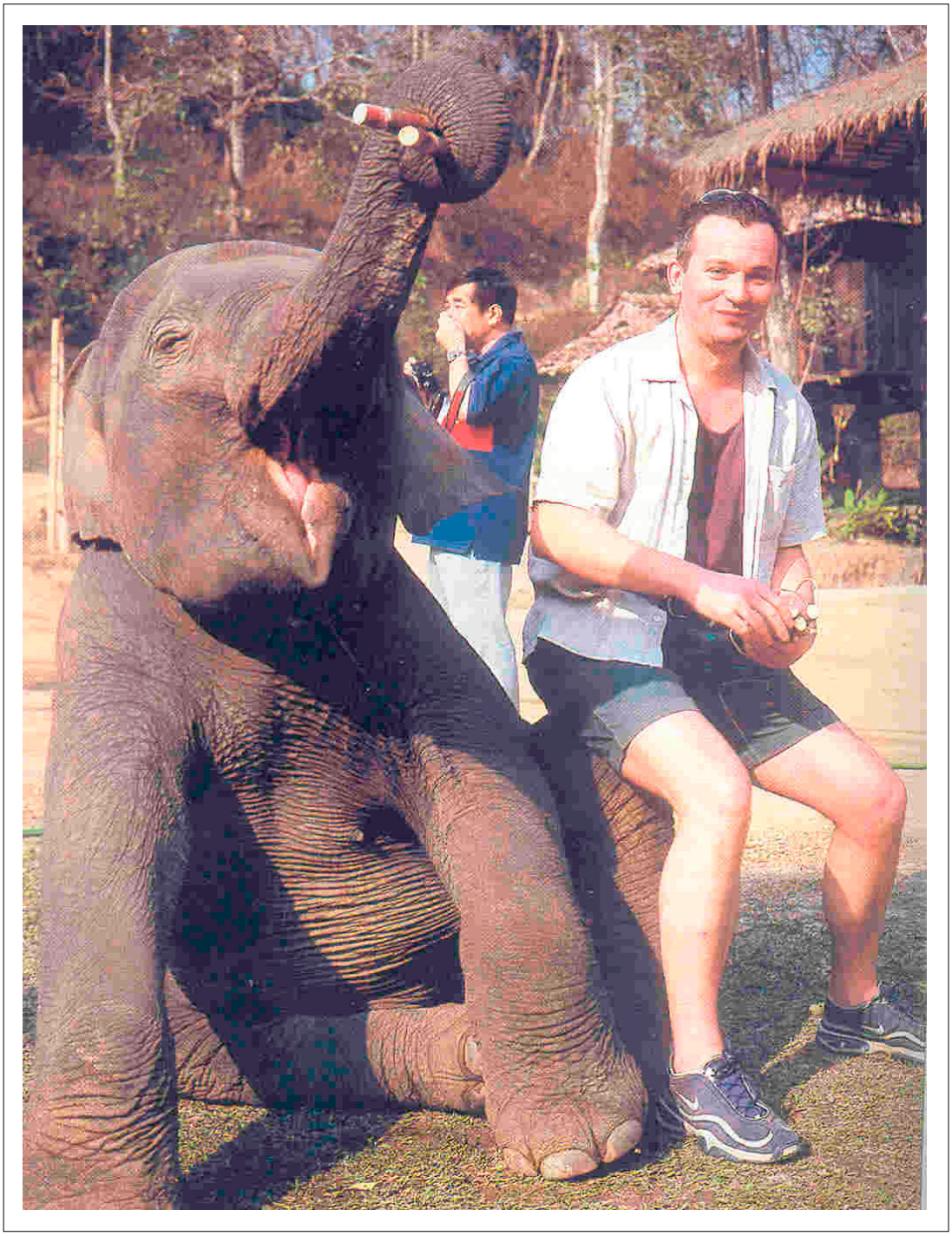
Question and answer session

Q1: The problem of a declining number of mahouts will be faced by all countries at some time, one solution is to give them dignity – perhaps a licence or badge of recognition similar to a tourism guide. What do you think?

A1: I agree. I think they would need training first and then we could do something like this.

A participant from Indonesia stated that such a system would be good in Indonesia too. There could be different grades of mahout such as novice, junior and senior. There could be training courses that would deal with elephant health care and other important topics. Perhaps as a first step there should be a training of the trainers course.

Richard Lair stated that the Elephant Conservation Center in Thailand was opening a mahout training school and they would like to have students from all over the region, especially Indonesia. They are thinking of overcoming the language barrier by hiring trainers from the South of Thailand who speak jawi as this is close to bahasa Indonesia. Those involved in the tourism industry don't know enough English to teach in the language, they only know pidjin English.



A happy elephant with sugarcane fed by a visitor, the Maesa Elephant Camp, Chiang Mai, Thailand.

Elephants and ecotourism in Thailand

Prasob Tipprasert

Introduction

One hundred years ago there were about 100 000 domesticated elephants in Thailand, almost all of them employed in the logging industry. In 1965, the Department of Livestock Development (DLD) reported a figure of 11 192. This number had decreased to 3 381 in 1985 and to 2 257 in 1998. Thus, the population appears to be decreasing at a rate of about 3 percent per year.

In 1989, a government logging ban to preserve the existing forestland – which amounts to only about 25 percent of the country – caused 70 percent of domesticated elephants to become unemployed.

Many elephants have been forced to stray into big cities in order to earn a living for themselves and their mahouts thus posing a danger to the general public. Most of these elephants receive insufficient food and water and are sometimes seriously injured in traffic accidents.

Developing ecotourism sites in the various regions of the country might offer more suitable employment opportunities for the elephants and their mahouts, but an appropriate and comprehensive ecotourism development plan should first be formulated.

Existing elephant-related tourist activities and working conditions

Because of the logging ban, and as a result of increasing interest in ecotourism, elephants and their mahouts can be found working in the tourism industry in all regions of the country, usually in elephant camps. Tables 1 to 5 present the results of the first nationwide field survey of elephant-related ecotourism sites in Thailand.

Problems associated with using elephants in ecotourism

The biggest problems for elephant owners are providing them with sufficient food each day, meeting the high cost of the large amount needed and removing the dung. Elephants can only digest 40 percent of what they eat, so this means that if you provide 200 kg of food per day there is a significant amount of dung to remove.

There are also land use conflicts that pit elephant owners against other members of the community, including government agencies.

Northern Thailand:

There are 14 elephant camps with 536 elephants in four provinces.

As almost all of the feeding areas and trekking routes are in forest reserve lands, there are conflicts between the camp owners and the Forestry Department. The use of these lands has to be certified by the Royal Forest Department. This is a slow process, but meanwhile the tourism business is growing rapidly. Conflicts are still going on and are very serious.

Table 1. Northern Thailand

Province and camp	No. of elephants	Status of elephants	Activities	Working conditions and welfare
1. Chiang Mai				
1.1 Maesa (private)	85	All belong to the camp.	- Show (circus) - Trekking - Elephant nursery - Restaurant - Elephant painting	- 90 mahouts provided with food and room - half Karen/half local people. - Trekking is the main activity. - Good private management. - Charge: 350 baht for an hour of elephant riding and a ride in an oxcart. - 1 resident vet.
1.2 Maetaman (private)	35	All belong to the camp.	- Local museum - Trekking - Pulling an oxcart - Rafting	- 40 mahouts provided with free rice and shelter: half Karen & half Thai. - No resident vet. but under the supervision of the Mobile Elephant Clinic (MEC) run by FIO/RSPCA and the local vet. - Charge: About 300 baht per hour.
1.3 Taeng Dao (private)	40	All belong to the camp.	- Elephant show - Logging demonstration - Trekking - Restaurant - Local goods outlet	- 40 local mahouts receive rice and room. - Good management with great environment. - Good pollution management. - Local food. - Appropriate working hours (show only in the morning). - Charge: 300 baht/hour for a package consisting of elephant trekking/oxcart ride and bamboo rafting.
1.4 Mae Taeng (private)	35	25 belong to the camp and 10 are hired.	- Show (circus) - Trekking - Pulling an oxcart - Rafting	- 40 local and Karen mahouts receive room and rice. - No resident vet. but under supervision and care of EMC and local vet. - Charge: 300 baht/hour.
1.5 Jungle Raft (private)	25	3 belong to the camp and 22 are hired.	- Show (circus) - Trekking - Pulling an oxcart - Rafting	- 25 local and Karen mahouts receive rice and room. - No resident vet. but EMC and local vet. - Charge: 300-350 baht/hour.
1.6 Pong Yaeng Nai	45	10 belong to the camp and 35 are hired.	- Elephant show - Pulling an oxcart - Restaurant - Trekking	- 45 local and Karen mahouts receive rice and room. - No resident vet. but EMC and local vet. - Charge: 300-350 baht/hour.
1.7 Mae Ping	45	All hired.	- Pulling an oxcart - Bamboo rafting - Trekking	- 45 local and Karen mahouts receive rice and room. - No resident vet. but EMC and local vet. - Charge: 300-350 baht/hour.
1.8 Mae Wang	50	Gathered from local owners and Karens.	- Trekking	- This camp is different. There is no owner but it is managed by the local elephant owners. They share the benefits according to the number of hours worked. - Charge: 270-350 baht/hour.
1.9 Others (private)	30	3-5 animals in potential tourist site.	- Trekking	- Owners feed and work with their own elephant. - Charge: 300-400 baht/hour.

Province and camp	No. of elephants	Status of elephants	Activities	Working conditions and welfare
2. Lampang				
2.1 Thai Elephant Conservation Center (TECC) (Government agency, FIO)	48	All belong to FIO.	- Show and demo - Homestay - Mahout school - Elephant painting - Trekking - Elephant orchestra - Sale of souvenirs - Exhibition	- 110 experienced and certified mahouts. - Free housing/medical care and educational support provided. - Government standard salary (starts from 5 000 baht/month) and fringe benefits. - 4 elephant doctors. - 2 special teams responsible for managing aggressive elephants. - Charges: 50 baht for show; 400 baht/hour for riding; 150 baht/night for room.
3. Chaing Rai				
3.1 Karen Ruam Mitra (Private)	30	Belong to the different owners who have formed an informal co-operative (Karen owners).	- Trekking	- Each owner has 1-5 elephants. - Owners care for the elephants themselves. - Charge: 300 baht/hour for riding.
3.2 Mae Yao (Private)	18	Belong to the different owners who have joined together, especially Yao businessmen.	- Camping - Trekking	- In this case the owners are not 'elephant men' but businessmen from one of the hill tribes who hire Lisor people as mahouts. - Not interested in elephants' welfare. - No clear charges.
4. Maehongsorn				
4.1 Ban Pha Bong (Private)	30	Separated into small groups.	- Homestay - Trekking	- The elephants are used in association with a home stay programme. - 30 local mahouts. - Mahouts take care of the elephants by themselves. - Charges: 300 baht/hour.
4.2 Pai (District) (Private)	20	Separated into small groups.	- Homestay - Trekking	- The elephants are used in association with a home stay programme. - 30 local mahouts. - Mahouts take care of the elephants by themselves. - Charges: 300 baht/hour.

Notes

- The Maesa elephant camp is the biggest and probably the best organized one in Thailand.
- In April, the Karen elephant owners who are known as natural elephant experts go back home with their elephants to participate in the "Mud Mir Chang" or the "Elephant Homecoming Celebration". Sometimes, they do not return to their elephant camps afterwards.
- The rate for hiring one elephant is 7 000-8 000 baht per month in the high tourist season and 3 500-4 000 in the low season.
- The monthly salary of a mahout (except for the TECC Lampang) is about 1 500 baht with accommodation, food and medical care.
- The average charge is 270-350 baht/hour.

Table 2. Central Thailand

Province and camp	No. of elephants	Status of elephants	Activities	Working conditions and welfare
1. Ayutthaya 1.1 Pang Chang Lai Panait (or Ayutthaya Elephant Camp) (Private)	35	16 belong to the camp and 19 are hired.	- Elephant sightseeing - Mini show - Painting	- 35-40 mahouts Swe (Surin elephant men) and Karen provided with accommodation, food and medical care. - Local vet available. - Activities focused on way of life of elephant and mahout.
2. Nakorn Pathom 2.1 Rose Garden (Private)	9	All are hired.	- Elephant riding - Mini show	- 14 mahouts provided with accommodation, food and medical care. - Local vets available. - Activities focused on way of life of elephant and mahout.
3. Samut Prakan 3.1 Crocodile Farm (Private)	9	All belong to the farm.	- Mini show (7) - Elephant riding (2)	- 9 mahouts plus 3 assistant mahouts provided with accommodation. - 2 staff vets available. - Elephants are released for free grazing outside the farm in the evening. - Charge: 20 baht per person for 3 minutes riding.

Notes

- The Ayutthaya Elephant Camp, established in 1997, holds an additional 45 elephants in camps in Kanchanaburi, Phuket, and Chaiyaphum provinces.
- The Rose Garden, a country resort established in 1965, started the Thai Village Cultural Show using elephants as early as in 1969. They have recorded three generations of elephants.
- The elephant show at the Crocodile Farm started about 35 years ago.

Table 3. Eastern Thailand

Province and camp	No. of elephants	Status of elephants	Activities	Working conditions and welfare
1. Chonburi				
1.1 Khao Kaew Open Zoo (Government)	8	All are hired.	- Show rides	- 8 mahouts under the supervision of zoo management. - 3 vets available for zoo animals. - Charge: about 400 baht/hour.
1.2 Sriraja Zoo (Private)	15	2 belong to zoo and 13 are hired.	- Short rides	- 15 mahouts provided with room. - Medical care from local vet. - Charge: 250 baht/hour. - Camping area is small. - No feeding area.
1.3 Paniat Chang	30	22 belong to the camp and 8 are hired.	- Trekking - Short rides - Show and demo	- 30 mahouts provided with food and room. - Most mahouts come from Northern Thailand. - Well organized and good management. - Adequate food supply. - Charge: 250-300 baht/hour. - Local vet and MEC available.
1.4 Suan Nong Nuch	18	All belong to the camp.	- Show - Play ground - Zoo garden for children	- 18 mahouts from Surin provided with room and food. - Local vet and MEC available.
1.5 Moo Ban Chang Pattaya	30	20 belong to the camp and 10 are hired.	- Short rides and mini show	- 30 mahouts provided with room. - Local vet and MEC available. - Charge: 300 baht/hour.
1.6 Suan Chang Pattaya	28	5 belong to the camp and 23 are hired.	- Short rides - Restaurant - Local goods outlet	- 28 mahouts provided with room. - Local vet available. - Charge: 250-300 baht/hour.

Notes

- In the eastern part of Thailand, almost all of the tourists who visit the elephant camps come from East Asian countries such as Korea, Taiwan, and China (except Paniat Chang that has a great number of European tourists). They are generally interested in short rides.
- Most camps do not have feeding areas large enough for elephants. Only a few have wide feeding areas.
- Only the Paniat Chang camp uses northern mahouts because the owner's wife is from northern Thailand. The mahouts in other camps come from Surin.
- The rate for short rides is on an average 300 baht/hour. In popular tourist areas it increases to 3 000 baht/hour.
- The monthly rate for hiring an elephant is about 7 000-8 000 baht.

Table 4. Western Thailand

Province and camp	No. of Elephants	Status of elephants	Activities	Working Condition and Welfare
1. Kanchanaburi				
1.1 Maesah (private)	30	16 belong to the camp and 14 are hired.	- Trekking - Rafting	- 30 Karen mahouts provided with housing. - The oldest camp in town. - Charge: 250-300 baht/hour. - Medical care from EMC and local vet.
1.2 Pu Tong	26	6 belong to camp and 19 are hired.	- Trekking - Rafting	- 26 Karen mahouts provided with housing. - The oldest camp in town. - Charge: 250-300baht/hour. - Medical care from EMC and local vet.
1.3 Sai Yoke	25	8 belong to camp and 17 are hired.	- Trekking - Rafting	- 25 Surin and Karen mahouts provided with housing. - The oldest camp in town. - Charge: 250-300 baht/hour. - Medical care from EMC and local vet.
1.4 Ban Mai Pattana	12	They belong to different Karen owners.	- Trekking - Rafting	- 12 Karen mahouts. - Each owner feeds his own elephants. - Vet care from local vet and Kasetsart University. - Charge: 250-300 baht/hour.
1.5 Som Nerk	5	All hired.	- Trekking - Rafting	- 5 Karen mahouts. - The oldest camp in town. - Charge: 250-300 baht/hour. - Medical care from EMC and local vet.
1.6 Sang Kla	18	All hired.	- Trekking - Rafting	- 18 Karen mahouts. - The oldest camp in town. - Charge: 250-300 baht/hour. - Medical care from EMC and local vet.

Notes

- All of them are located at good tourist sites and have feeding areas.
- Average charge: 230-300 baht/hour.
- Elephant hire rate: 8 000 baht/month.
- Medical care is provided by the local vet and Kasetsart University and there are also frequent visits from MEC.

Table 5. Southern Thailand

Province and camp	No. of elephants	Status of elephants	Activities	Working conditions and welfare
1. Phuket				
1.1 Siam Safari	35	All hired.	- Show and demonstrations - Trekking - Homestay - Sightseeing package - Restaurant - Pulling an oxcart	- 35 mahouts and supporting staff provided with housing and medical care. - Well organized and clear information. - Environmentally sound management. - Charge: 500-1 000 baht/hour. - Local vet available. - Elephant hire rate: 9 000-12 000 baht/month.
1.2 Phuket Fantasy Company	35	All belong to the company.	- Indoor show - Restaurant - Additional tourist facilities	- 35 mahouts and supporting staff provided with first class housing. - Outside elephant food supply. - Well organized and clear information. - 1 vet - Charge: 1 500 baht/person/show.
1.3 Karen Lagoon Elephant Trekking Club	28	All hired.	- Trekking	- 28 local and Surin mahouts provided with housing. - Local vet available. - Charge: 500-900 baht/hour.
1.4 Elephant Safari Trekking	15	All hired.	- Trekking	- 15 local and Surin mahouts provided with housing. - Local vet available. - Charge: 500-900 baht/hour.
1.5 Tour Chang Pathong	5	All hired.	- Trekking	- 5 local and Surin mahouts provided with housing. - Local vet available. - Charge: 500-900 baht/hour.
1.6 Phuket Water Ski	5	All hired.	- Trekking	- 5 local and Surin mahouts provided with housing. - Local vet available. - Charge: 500-900 baht/hour.
1.7 Sun Nature Tour Company	13	All hired.	- Trekking	- 13 local and Surin mahouts provided with housing. - Local vet available. - Charge: 500-900 baht/hour.
1.8 Viking Food Center	8	All hired.	- Short rides	- 8 local and Surin mahouts with housing. - Local vet available. - Charge: 500-900 baht/hour.
1.9 Phuket Snake Farm	5	All hired.	- Short rides	- 5 local and Surin mahouts provided with housing. - Local vet available. - Charge: 500-900 baht/hour.

Province and camp	No. of elephants	Status of elephants	Activities	Working conditions and welfare
1.10 Island Safari	25	All hired.	- Short rides - Trekking	- 25 local and Surin mahouts provided with housing. - Local vet available. - Charge: 500-900 baht/hour.

Notes

- Southern Thailand is the highest income tourist site for elephants, but a lack of feeding areas is its weak point.
- Almost all of the elephants and mahouts come from the northeast region of Thailand.
- Mahouts get a bonus of 1 baht for every minute of riding and are given a room to stay in and an allotment of rice.
- Working hours are 07.00–9.00 hours.
- Rate of hiring an elephant is 9 000–12 000 baht/month.
- Elephant care mostly comes from local vets.
- Short rides are 10 minutes, 15 minutes, 30 minutes, and trekking is 60 minutes or more.

Central Thailand:

The problem is somewhat different from that in the north, but it also involves conflicts of interest.

There is an ongoing conflict between the owner of the Ayutthaya Elephant Camp, which has 35 elephants, and the Fine Arts Department as the camp is in the middle of the World Heritage site of Ayuthaya, the ancient capital of the country.

Another conflict is related to water pollution: although the camp's owner has made a serious attempt to clear the elephants' dung, numerous nearby waterways and reservoirs have been adversely effected.

Eastern Thailand:

There are six elephant camps in Chonburi province with 129 elephants.

The number of tourists visiting these elephant camps is increasing but competition is very fierce. The only way to attract tourists is to reduce the riding fee to a reasonable rate. This then makes it necessary for the elephant to work five to six hours a day to reach the desired income of 400 baht a day. This condition has forced some mahouts and elephants to leave the camps and go to the big cities.

Western Thailand:

There are six elephant camps in Kanchanaburi with a total of 116 elephants. This region is an appropriate site for ecotourism. It is an excellent tourist destination with an adequate feeding area and tourism is growing in the province. However, there still are some conflicts between the camps' owners and the Forestry Offices or the Local Administrative Organization.

Southern Thailand:

There are ten elephant camps in Phuket province with 174 elephants. Although the camp owners have a high, regular income there are too many elephants considering the number of tourism sites and feeding areas. A good solution would be to limit the number of elephants on the island.

Future perspective

The domesticated elephants in Thailand can be categorized into three groups as follows:

- Unemployed elephants;
- Tourism elephants; and
- Street wandering elephants.

The largest group is the unemployed elephants that are estimated to number between 1 200 and 1 400. The second largest group is the tourism elephants that number over 1 000 animals, and the smallest group consists of wandering elephants that amount to about 100 in various cities. There are also an undetermined number of domesticated elephants being used in illegal logging operations.

To solve the overall problem, we should concentrate on all of these groups of elephants as the elephants move between these three groups. But the tourism industry should be the main source of permanent jobs for domesticated elephants in Thailand. A model multi-component, multi-site tourism-related project currently being planned by the FIO is described in the following paragraphs.

Thai elephants' New World Project

Concept:

The Thai elephants' New World Project is designed to provide a suitable natural habitat for elephants, and to provide them with excellent health care and a good quality of life. Essentially, the project consists of the construction of elephant conservation centers and associated facilities. The project will fully conform with all relevant Thai laws.

Thai Elephant Conservation Centers (TECC):

The centers will comprise two types of area: a forest area for growing the elephants' food and the Elephant Conservation Area. The Elephant Conservation Area needs to be fertile so elephants can live there naturally. The land has to be improved to provide them with water and food sources. Measures to prevent elephants from disturbing and destroying cultivated areas and surrounding communities need to be decided. The Thai Elephant Conservation Centers will comprise:

1) Provincial Center

   The provincial center will coordinate the task of helping the elephants in each province and will provide elephant-related information and spread knowledge about elephants throughout the region. Each provincial center will not only co-operate with each other, but also with other foundations to help straying elephants, out-of-work elephants, unwanted and donated elephants, handicapped elephants, etc. The provincial center will send all these types of elephants to the Elephant Preparation Center to be classified.

2) Elephant Preparation Center

   The center's duty is to take initial care of the elephants' health, and classify them into the following categories before sending them to the Conservation Center:

   - suitable for returning to their natural habitat;
   - bulls or cows suitable for breeding;
   - old or handicapped elephants;
   - elephants with a record of killing people; and
   - elephants with suitable temperaments for participating in shows and the like.

3) Curing Center

   This center will have highly trained staff and modern equipment and will treat those elephants in need of serious medical care. The responsibilities and duties of the curing center are:

   - curing and nursing both inbound and outbound elephants;
   - developing elephant health;
   - taking care of elephants that have been cured but cannot work any more or cannot go back to live in the forest alone (handicapped elephants);
   - training and providing knowledge to the owners or mahouts, the Conservation Center's staff, the private sector, and the general public; and
   - co-operating with the government sector and other sectors involved in controlling rampaging elephants and elephants in *musth*, notifying communities about any dangers.

4) Elephant and Mahout Training School

   Elephants and mahouts will be given training certificates certifying that they have been trained to acceptable standards. The training school will have the following duties:

   - to train and increase the knowledge and skills of existing mahouts;

- to train new mahouts;
- to train those elephants of suitable age for work;
- to classify the mature elephants and provide them suitable work to do;
- to determine the criteria and issue the certificates to certify the quality of elephants and mahouts; and
- to design the school curriculum.

5) Elephant Research and Development Center

This center will conduct research concerning the elephants' food, health and illnesses. It will help to strengthen elephant breeding programmes and act as a resource center to co-operate, exchange technical knowledge and elephant news both inside and outside the country.

6) Elephant Museum

The elephant museum will comprise exhibition halls divided into permanent, temporary, and open-air exhibition areas, a lecture room or auditorium, data center and library. Its purpose is to strengthen Thai elephant conservation among the Thai people. It will collect data and spread knowledge and basic understanding about the biology and nature of Thai elephants to the youth, students and general public. Besides supporting tourism, it will create new jobs and this will spread income to the locals employed in the elephant museum.

7) Nature Study Center

The activities in the center will comprise youth camps, overnight camps, white nature camps (against drug addiction), nature conservation camps with study activities, trekking to admire nature, the promotion of local cultures and souvenir development on elephant motif. It will act as a center for exchanging knowledge in the international arena. The purpose of the center is to promote nature study without altering the ecology of any area and to educate the youth and tourists to behave properly in the forest.

The center will provide learning materials, such as nature study manuals.

8) Tourism Development and Service Center

The center will provide the tourists with knowledge, understanding and comfort when traveling to various tourism sites. Besides, it will be the point where tourists can rest or call for help in case of difficulties. It will also develop and maintain the natural resources and this will result in an increase in the number of tourists staying overnight in the Thai Elephant Conservation Centers that will add more income to the mahouts and local communities.

The number of elephants in FIO's Thai Elephant New World Project

The elephants managed by this Project will be allowed to live as natural as possible in an expected density: one elephant per 50 rai (8 ha). The total number of elephants in each center is calculated as shown in Table 6.

Development and improvement of the area:

The project management should:

1) Maintain and promote the outstanding natural characteristics of each project area and only permit activities that are in harmony with these.
2) Determine the carrying capacity of the area and ensure that the number of people and animals using the area does not exceed this.
3) Provide appropriate facilities and ensure that they harmonise with the natural surroundings.

Table 6. Expected numbers of elephants in the project centers and camps

Geographical area	Area (rai)	Number of elephants		
		Permanent	Temporary	Total
Elephant Conservation Center, Lampang	18 393	100	300	400
Elephant Conservation Center, Surin	23 318	200	300	500
Elephant Conservation Center, Krabi	2 000	30	20	50
Elephant Camp at Jed Kod Forest Plantation, Saraburi	2 000	30	20	50
Elephant Camp at Thong Pha Phum Forest Plantation, Kanchanaburi	2 000	30	20	50
Total	47 711	390	660	1 050

Note: 6.25 rai is equal to 1 ha.

Zoning scheme:

The area used is classified into three zones:

1) ***Public Zone:*** This zone is for project buildings and to support the visitors to the center and the staff of the Thai Elephant Conservation Center. The area can be used to its full potential. The activities at this zone are Tourist Information Center. Elephant Exhibition Center and Art and Culture in Elephant Village, Elephant Museum, Training and Research Services, etc.
2) ***Semi-Public Zone:*** This is a restricted zone that will have some buildings and landscape improvements to support the centers' staff. Part of it can be utilized by visitors. This area is used more sparsely than the Public Zone. The Elephant Preparation Center, Elephant Curing Center, Elephant and Mahout Training School and the Research and Development Center, etc will be located here.
3) ***Reserved Zone:*** This is part of the original forest that will be planted with supplementary crops, especially for elephant food. It will also be the location for the centers' water resources. The zone will be used for feeding both tethered and free elephants and will also support trekking for the tourists.

Basic infrastructures:

Basic infrastructures will consist of:

- transportation routes;
- drainage system;
- water sources;
- municipal water system;
- waste collection and disposal system;
- water collection and treatment system; and
- power and electrical system.

Marketing and personnel development:

When the Elephant Conservation Centers are ready to open tourism marketing, activities will be carried out so as to attract visitors and gain incomes for the elephants and centers. Elephant trekking will be offered as well as elephant riding, bird watching, nature study activities, bicycling and others. Besides having the tourism routes between the centers and resorts both in and outside the provinces, the communities around the centers will benefit from the increase in tourism.

Some of the profit will be used to give the youth a chance to be trained and for marketing scholarships. As for the locals, they will be supported to develop handicrafts such as cloth weaving, making souvenirs related to elephants, and to cultivate mixed crops, especially crops for elephant food or quick growing plants such as mulberry, together with rice farming. The straw and elephant food will be sold to the Thai Elephant Conservation Centers.

Preliminary environmental impact assessment:

The development of the Thai Elephant Conservation Center will involve some transformation of the natural environment and there may be some unintended adverse environmental impacts, including impacts on local communities. During the construction and implementation phases the following measures are proposed:

1) Construction phase
   a) Locate all buildings on a plain or an area where there is little slope.
   b) Locate the buildings some distance from the natural water sources and institute measures to prevent the soil sediment from the construction area flowing into the water sources.
   c) Start construction in the dry season
   d) Give preference to the locals when hiring workers.

2) Implementation phase
   a) Provide tourists/visitors with a sufficient number of litter boxes in all areas of the Thai Elephant Conservation Center. Collect and dispose of refuse daily.
   b) Provide water treatment for the staff and the tourist service areas. The wastewater from the Elephant Health and Nursing Center and the Research Center should be treated before being discharged into natural water sources.
   c) Make the elephants drink before bathing as they will excrete immediately after drinking. To conserve water elephants should only be bathed twice a day. A new pond will be constructed away from the natural water sources especially for the enjoyment of the elephant.
   d) Improve the water quality both in the reservoir and the pond by planting only those plants that fish eat, and regularly drain the water.
   e) Take very strong measures to stop the elephants trespassing into nearby plantations. In case of trespassing, suitable compensation should be paid to the landowner.
   f) Separate the rampaging elephants and the ones in *musth*. They need to be under control at all times. Clear notices in English and Thai should inform the tourists of the potential danger.

Preliminary cost estimation:

The construction of the Thai Elephant Centers in five areas will cost a total of 1 056 053 000 baht. This comprises 1 005 765 000 baht for the construction cost and growing elephant food and 50 288 000 baht for survey and design work.

Economic feasibility analysis:

To develop each Thai Elephant Conservation Center, a huge investment will be needed, but when the project is implemented it will greatly profit the economy.

1) The Thai Elephant Conservation Center, Lampang

   Using a discount rate of 12 percent, the net present value (NPV) is 139.86 million baht, the benefit cost ratio (B/C Ratio) is 1.38 and the economic internal rate of return (EIRR) is 16.85. Thus the project is economically feasible. In the worst case scenario, the cost will increase by 10 percent while the total benefit will be reduced by 10 percent. However, the project is still suitable for investment as it has a great chance of being successful.

2) The Thai Elephant Conservation Center, Surin

   Using a discount rate of 12 percent, the net present value (NPV) is 60.42 million baht, the benefit cost ratio (B/C Ratio) is 1.24 and the economic internal rate of return (EIRR) is 15.62. Thus is economically feasible. In the worst case scenario, the cost will increase by 10 percent while the total benefit will be reduced by 10 percent. However, the project is still suitable for investment as it has a great chance of being successful.

3) The Thai Elephant Conservation Center, Krabi

   Using a discount rate of 12 percent, the net present value (NPV) is 64.66 million baht, the benefit cost ratio (B/C Ratio) is 1.52 and the economic internal rate of return (EIRR) is 19.04. Thus the project is economically feasible. In the worst case scenario, the cost will increase by 10 percent while the total benefit will be reduced by 10 percent. However, the project is still suitable for investment as it has a great chance of being successful.

4) The Elephant Camp at Jed Kod Forest Plantation, Saraburi

   Using a discount rate of 12 percent, the net present value (NPV) is 48.58 million baht, the benefit cost ratio (B/C Ratio) is 1.56 and the economic internal rate of return (EIRR) is 19.18. Thus the project is economically feasible. In the worst case scenario, the cost will increase by 10 percent while the total benefit will be reduced by 10 percent. However, the project is still suitable for investment as it has a great chance of being successful.

5) The Elephant Camp at Thong Pha Phum Forest Plantation, Kanchanaburi

   Using a discount rate of 12 percent, the net present value (NPV) is 48.58 million baht, the benefit cost ratio (B/C Ratio) is 1.56 and the economic internal rate of return (EIRR) is 19.18. Thus the project is economically feasible. In the worst case scenario, the cost will increase by 10 percent while the total benefit will be reduced by 10 percent. However, the project is still suitable for investment as it has a great chance of being successful.

Administration of the Project:

Legally, the New World for Thai Elephants Foundation will have the status of a juridical person and can raise funds or receive donations for project implementation.

Project administration will be the main duty of the National Elephant Conservation Institute (NECI), which is a semi-autonomous body under the Ministry of Agriculture and Co-operatives approved by the Cabinet. At present, this institute is under the New World for Thai Elephants Foundation, operated by the Director-General under the control of the institute committee. The organization chart comprises four Deputy Director Generals, who are responsible for programme execution and management, technical subjects, fund raising and special activities, and the management of regional centers.

Recommendations

1. Change the legal status of the domesticated elephant from a transport animal (as defined by the Beast of Burden Act) to an animal “Reflecting the Unique Identity of Thailand”. This could help

to guarantee the quality of life of elephants in terms of prevention from cruelty and the standard of care.

2. Establish permanent and appropriate jobs for elephants and mahouts:

   2.1. Use five to ten elephants and mahouts in every national park (there are more than 150 parks in Thailand) for patrolling, transport and tourist services.

   2.2. Set up new elephant-related ecotourism sites in:

   - FIO forest plantations
   - Provincial public areas
   - Regional Thai Elephant Conservation Centers.

3. Establish quality standards for elephant and mahouts working in the tourism industry by:

   3.1. Creating an elephant and mahout training school in each region. Make the TECC a center for training and certify both elephants' and mahouts' qualifications.

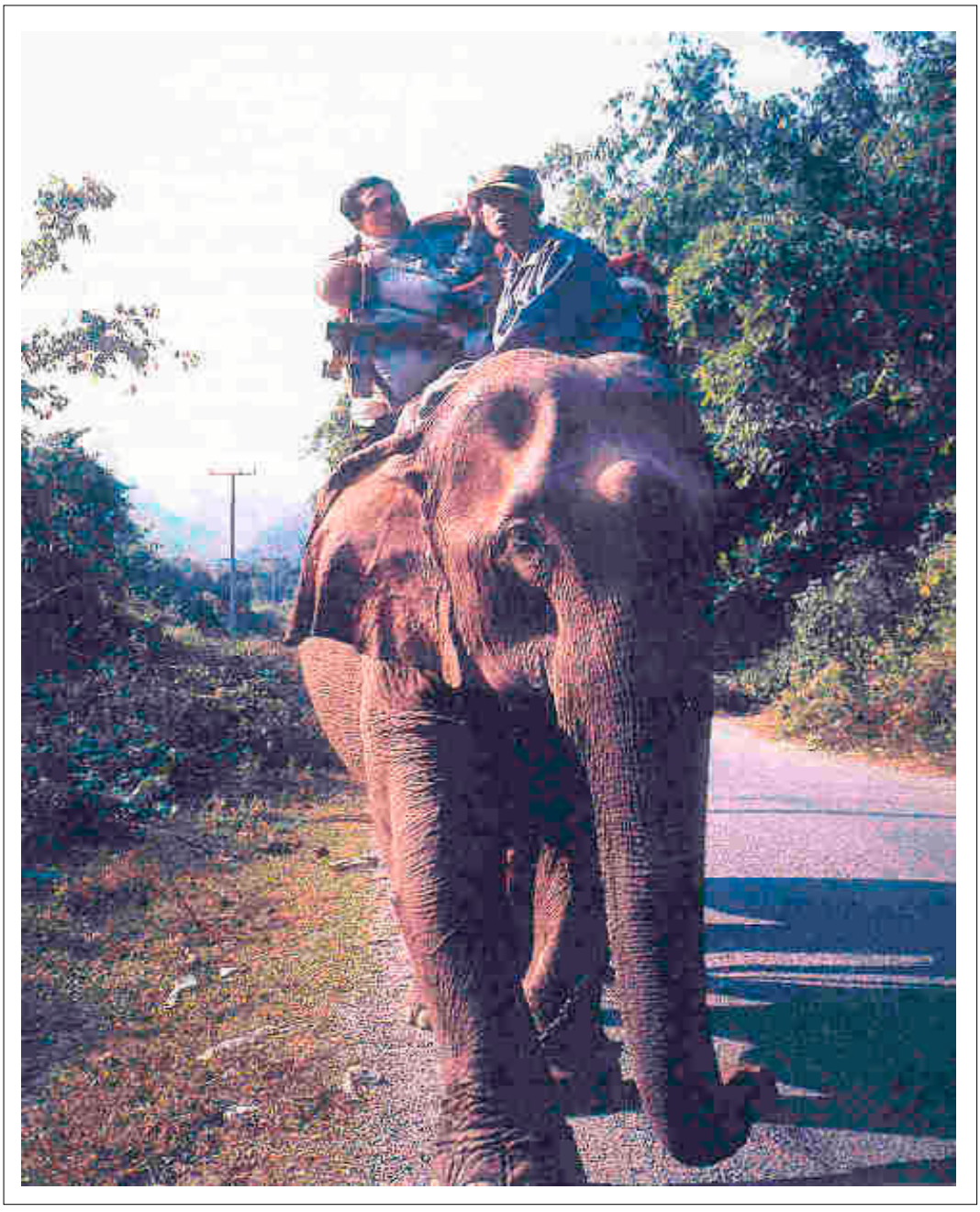
   3.2. Setting up an Identification Card system for elephants and mahouts in each field of work.

4. Negotiate with tourism organizations and fix appropriate income and working hours for elephants and mahouts.

5. The government should support elephant conservation activities. In particular elephants that are less capable of working or are disabled should be helped by government support for the establishment of a nursing center in each regional TECC.

6. Promote and protect the traditional mahout ways-of-life, especially those of the Swe people in Surin province and other major elephant men. This will benefit elephant-related ecotourism.

7. Set up a specific institution for elephant medical care, research and development and establish proper living standards for the elephants at the veterinarian school.



A domesticated elephant carrying agricultural products, Nam Bak district,
Luang Prabang province, Lao PDR (December 1999)

The care and management of domesticated Asian elephants in Lao PDR

Bounleuam Norachack

Introduction

Domesticated elephants have played an important role in the socio-economic life of rural Laotians for centuries. They have used them for work, in religious and cultural ceremonies, and for carrying goods. Elephants have been (and still are) a main source of cash income for minority ethnic groups in Laos – a sort of living bank.

Domesticated elephants (*Elephas maximus*) have always been highly respected by the people and in former times the king officially assigned the elephant as the national animal. The king frequently donated elephants to neighbouring countries as a sign of friendship and friendly relations and to cement political ties.

Because of the loss of elephant habitats and a decline in food resources, the country's elephant population seems to have declined rapidly. The use of agricultural machinery for land clearing and land preparation and vehicles for transportation has made these tasks much quicker to carry out and more convenient than using elephants. But it has also meant a decreasing role for the domesticated elephant.

Forests are the habitats and food resources of Asian elephants and their well-being depends on there being sufficient forest cover. The forests of Lao PDR account for about 47 percent of the total area of the country, or approximately 11 000 000 ha, and are found especially in the northern part of Lao PDR and in the Southeast Region, "The Annamite range". Large areas of forests were destroyed by the application of herbicide during the Viet Nam War. Trees have been cut down for rice cultivation, for crop production and other human needs. After the Viet Nam War, the government focused on the agriculture and forestry sectors and there was a national programme to expand their contribution to 60 percent of the Gross Domestic Product.

The government also focused on infrastructure building up such as hydropower to meet the regional demand for electricity, road networks (interprovincial and interdistrict) to transport goods both for export and within the country, to facilitate commercial logging, to promote international investment and so on.

All of these activities caused the forests to decrease, resulting in elephant habitat loss and fewer food sources. Consequently, both wild and domesticated elephants are endangered. Moreover, domesticated elephant owners now have to take care of their own elephants without support from the government. This means they are rarely receiving sufficient food or medical treatment.

Wild elephants

As mentioned earlier, the forest cover of Lao PDR amounts to 47 percent of the country's land area, mostly in the northern part. Wild elephants are concentrated in Sayaboury province bordering Nan province of Thailand, in the southern part of country (Champasak and Attapeu provinces) and along the Annamite range, bordering Viet Nam (Salter, 1993).

Because of insufficient national funds and the absence of international funding, Lao PDR has never conducted a census of wild elephants, therefore what information on wild elephants there is very unreliable. Besides that, the number of staff specializing in this work is very small and the technical

knowledge of how to conduct a systematic wildlife survey is very limited, therefore little data of any kind has been collected.

Until recently, many elephants were taken from the wild for use as draught animals, although this practice has waned recently. Hunting and habitat loss have caused the wild elephant population to shrink severely. The threats to wild elephants are still ongoing and conservation measures are required to ensure their long-term survival. The number of wild elephants in Lao PDR has recently been estimated as 200 to 500 [Lair, (1997), citing A. Rabinowitz's estimate provided by C. Santiapillai (personal communication, 1996)]. However, this number is much lower than Vongphet's (1988) estimate of approximately 2 100 to 3 300, and is considered to be conservative (Duckworth *et al*., 1999). Vongphet's figure was used by Santiapillai and Jackson (1990) and Salter (1993).

The Government of Lao PDR is aware that the population of wild elephants is very small and is committed to their conservation, but it requires international assistance to carry out a meaningful conservation programme.

As elephant habitats are shrinking and human population is increasing, human–elephant conflicts over competition for resources are likely to become more frequent. Typically, wild elephants destroy crops and houses and the elephants are shot. Hunting for ivory is a serious problem, particularly on the Thai and Vietnamese borders. Salter (1993) reported that 42 wild elephants were killed between 1991 and 1992 in the Nakai Plateau/Nam Theun area.

Table 1 shows the number of wild elephants killed between 1980 and 1996.

Table 1. Number of elephants killed between 1980 and 1996

Reported Location	Number of deaths	Year
Nam Et	5	1980–90
Nam Xam	4	1980–95
Phou Phanang	1	1996
Nakai/Nam Theun	45	1990–96
Hin Nam No	2	1990–95
Nam Phui	2	1995–96
Total	**59**	

Domesticated elephants

Lao PDR was once known as "Pathetlao Lanexang", which means the land of a million elephants.

The total number of domesticated elephants in Lao PDR was recently estimated to be about 1 020 (Lair, 1997). Since 1995 the Livestock and Fisheries Division in the provinces has collected data on domesticated elephants. In 1996 the number of domesticated elephants was estimated to be 922 and about 864 in 2000. They are concentrated in Sayaboury and Champassak provinces that border Thailand. These numbers are not complete as some provinces did not provide the required data (Department of Livestock and Fisheries, 2000).

Three elephants are kept in the zoo at Ban Keun district, Vientiane province. This zoo was established in 1994 with financial support from the private sector and is the first zoo in Lao PDR. The owners have limited experience of taking care of large animals. These elephants used to work hauling timber from the forests. They were captured in the forest in Sayaboury when they were eight years old. The animals have been trained to work with other elephants. They were placed in the zoo in 1997.

The distribution of domesticated elephants is shown in Table 2 and in Fig. 1.

Table 2. Domesticated elephants in Lao PDR

No.	Provinces	1995–96	1996–97	1997–98	1998–99	1999–2000
1	Sayaboury	*	*	698	712	712
2	Champasak	*	*	143	*	98
3	Vientiane	*	*	22	*	22
4	Vientiane Muni.	*	*	2	*	*
5	Borikhamxay	*	*	2	*	3
6	Khammouane	*	*	2	1	1
7	Saravan	*	*	2	*	3
8	Attapeu	*	*	15	*	15
9	Bokeo	*	*	22	10	*
10	Luang Prabang	*	*	12	*	10
Total		**922**[1]	**929**[1]	**920**	**723**	**864**

***** Data not available
[1] Estimates
Source: Department of Livestock and Fisheries

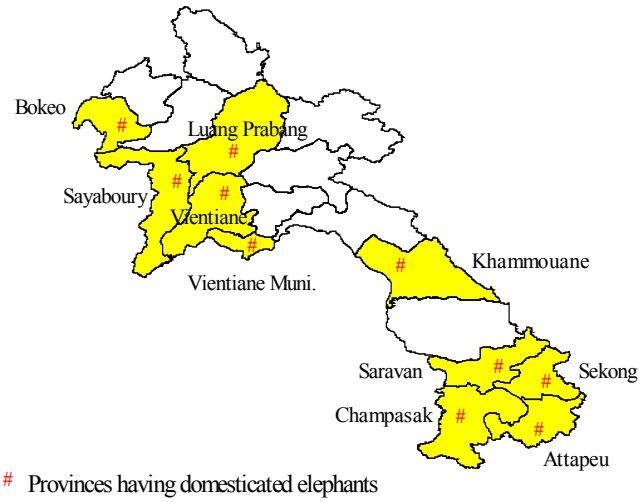


Fig. 1. Distribution of domesticated elephants in Lao PDR

Law and government policy

Approximately 95 percent of the Lao people are farmers, living in rural areas and subsisting on fish and wildlife meat. To conserve and offer long-term protection to the country's wildlife and its habitat, the government, with the technical assistance of IUNC (through the Lao-Swedish Forestry Co-operation Programme) and other international agencies, has been developing a National Protected Areas System (Salter and Phanthavong, 1989; Salter *et al.*, 1991; Berkmuller *et al.*, 1993, 1995a, 1995b). So far, 10 percent of the land area of the country has been decreed National Biodiversity Conservation Areas (NBCA).

A number of arrests (with subsequent prosecutions) have been made for killing dolphins, tigers, elephants and gaur and for trafficking in bears (KPL, 1991a-c; Baird, 1993).

On 13 July 1997, the first official National Wildlife Conservation and Fish Release Day took place, based on the Forestry Law of 1996. The principal constraints on further wildlife conservation activities are the limited number of staff and training courses on this specific matter.

In addition, the existing legislation needs to be reviewed and revised, for example:

- The existing national legislation with respect to wildlife, habitat, protected areas and wildlife trade.
- Existing laws need to be strengthened to incorporate development in the protected area network. The law relating to wetlands needs to be revised to prevent their degradation, and a law to reduce pollution threats and promote sustainable resources use needs to be drafted.
- Policy relating to conservation of wildlife and habitat needs to be formulated and promoted.
- A strategy to address the issue of crop and livestock damaged by wildlife needs to be devised.
- In 1996 a major government initiative was launched to reduce the number of guns in civilian hands and notable progress is being made. But such efforts must be strengthened and continued.
- Regulations on animal technical management and animal products control need to be strengthened.

On 21 October 1986, the first Decree was launched by the Council of Ministers, prohibiting the wildlife trade. This and subsequent Decrees do not focus specifically on wild elephants but cover all wildlife. The principal decrees and declarations are listed in Table 3.

Table 3. Principal legal instruments addressing wildlife protection in Lao PDR

Legal instrument	Key provisions
Decree of the Council of Ministers No 185/CCM - Concerning the Prohibition of Wildlife Trade. 21 October 1986	• Prohibits export of all wildlife
Decree of the Council of Ministers No 47/CCM - On the state tax system. 26 June 1989	• Lists types of natural resources, including various species of wildlife, aquatic animals, and parts thereof and their associated resources, tax rates and special fees: 67 species and species groups of wild animals are listed. • subsistence level users of natural resources are exempted from resources taxes. • New tax law of 1996 does not mention natural resources tax.
Decree of the Council of Ministers No 118/CCM - On the Management and Protection of Aquatic Animals and Wildlife from Hunting and Fishing, 5 October 1989	• Defines “wildlife” as state property and mandates MAF to manage it (including through public awareness programmes) and local people to use it pursuant to the regulations. • Allows import /export of wildlife with specified authorization. • Prohibits hunting of protected or endangered species (unspecified) except where human life is endangered. • Prohibits hunting by means that lead to mass destruction (explosives, poisons, etc.).
Decree of the Prime Minister No 164, 29 October 1993	• Established NBCAs and declared chasing, hunting or fishing any species within them to be illegal. • Explosives, chemicals, poisons, and others substances harmful to wildlife are banned in NBCAs. • MAF may warn or fine anyone who disobeys the decree, and may confiscate illegal items.

Legal instrument	Key provisions
Decree on Animal Management in Lao PDR No. 85/PM on 31 May 1993	• Confirms that all domesticated animals in Lao PDR are the property of Lao people. • Domesticated animals must be registered. • May warn and fine anyone who disobeys this decree. • MAF is responsible for this decree.
Order 54/MAF on the Customary Rights and the Use of Forest Resources, 7 March 1996; followed by recommendation 377/MAF on the Customary Use of Forestry Resources	• Secures legal right for local people to use forest resources for subsistence, including the hunting and fishing of non-protected species. • Customary right may be recognized by signed agreement or by law, and local people should be compensated for loss of customary means of livelihoods.
Decree 1074 of the Ministry of Agriculture and Forestry, 11 September 1996	• Prohibits wildlife trade. • Prohibits hunting of protected species such as Asian elephant, Banteng, Saola, Douc langur, etc. • Prohibits hunting during the closed season (breeding season) and/or by dangerous methods, and/or by the use of weapons, in NBCAs, protected areas and towns. • Bans wildlife trade, except for research and/or conservation. • Bans exporting wildlife used for food. • Confers on PAFO responsibility to coordinate with other agencies to collect and register weapons used for hunting.
Declaration of the President No 125/PO on the Forestry Law approved by the National Assembly No. 04NA on 11 October 1996	• Grants state ownership and authority to manage wildlife. • Prohibits possession of wildlife without permission. • Mandates state to define two categories of protected wildlife. • Prohibits hunting during closed season (unspecified) and/or by means of mass destruction. • Prohibits hunting of and trade in protected species, with certain exceptions. • States that all guns and hunting equipment must be registered with certificates. • Article 46, Part 5 establishes by law a Wildlife Day on 13 July annually.
Regulation on Animal Management in Lao PDR MAF No, 04 and 05/MAF, 2 January 1997	• Addresses the issue of domesticated animal production and animal products. • Animal movement in and out of Lao PDR must be controlled and certified by DAFO.

Registration

Animal registration in Lao PDR is in its infancy, although the regional government has carried out a general animal census. The census recorded population data for all animals belonging to farmers in the region. It focused on domesticated animals, and included wild animals that had been captured and trained for work. Lao farmers show little interest in animal registration. They have limited technical knowledge about livestock production. As yet there is no standard form for registering animals. In order to make sure all Decrees, specifically Decree No. 85/PM, and the regulations pertaining to animal movement and animal products are obeyed, the Department of Livestock and Fisheries has drawn up a declaration giving the Department of Livestock officials at provincial level authority to implement them closely and has requested them to pursue and prosecute offenders. The declaration was signed by the Director General of the Department of Livestock and Fisheries, Ministry of Agriculture and Forestry.

In January 2001, the Department of Livestock and Fisheries co-operated with the European Union to establish a programme of animal registration by testing in five provinces in the northern part of Lao PDR. This focused on cattle and buffaloes only, and completely neglected elephants. Thus, the knowledge and experience of the Lao staff in this matter remains limited.

Organizations and their responsibilities

In Lao PDR, two Departments under the Ministry of Agriculture and Forestry are responsible for wildlife and domesticated animals:

- The Department of Forestry in Vientiane is strictly responsible for wildlife conservation and protection in the country. With the co-operation of NGOs and GOs, the central office of the Department in Vientiane has created various laws and regulations relating to the protection and conservation of wildlife, their habitats and food resources. Regional governments and the Provincial Agriculture and Forestry Offices (PAFO) have to expand their activities to enforce wildlife conservation and carry out forest renovation, to collect hunting guns from civilians, and to pursue and penalize those who do not respect the laws and regulations.
- The Department of Forestry's Center for Protected Areas and Watershed Management (CPAWM) is responsible for management of protected areas and other biodiversity related matters. It supervises the management of the 20 declared National Biodiversity Conservation Areas (NBCAs).
- The Department of Livestock and Fisheries, with the co-operation of its Livestock and Fisheries Division, is responsible for domesticated animals, including animals captured for work. The Department's activities are undertaken with the co-operation of 18 provincial level Livestock and Fisheries offices.

Elephants' work

Almost all Lao people live in rural areas and are engaged in farming. Farmers use animals for draught as the rugged topography of the country and its poor economic conditions make the use of machinery more or less impossible. They use cattle, buffaloes, horses and elephant for work. All elephants are privately owned.

Elephants are trained to:

- carry logs and timber from the forests;
- clear land for crop cultivation;
- provide rides for tourists (e.g. at the zoo);
- transport goods in the rural and upland areas, mostly in the northern part of the country.

Veterinary care

Elephant health care is very rare because of the limited number of qualified staff, lack of veterinary extension workers, lack of veterinary kits, and a shortage of vaccines and medicines in the provinces. Many animal diseases are still widespread in Lao PDR. The main diseases are haemorrhage septicaemia, foot and mouth disease, and anthrax. The diseases have led to the deaths of a huge number of domesticated and wild elephants. In previous years a regular vaccination programme for elephants was not carried out. Vaccination campaigns on cattle, buffaloes and pigs have been conducted more regularly but even these are hard to implement in remote areas.

Veterinary staff have limited knowledge of elephant diseases and very little experience of dealing with them. Moreover, there is lack of national and international assistance to carry out an animal health care programme or to train staff to diagnose infectious and non-infectious diseases.

Conclusions

The data and information on wild and domesticated elephants has so far been very poor in Lao PDR. Registration of domesticated elephants is a new requirement of the government and so far has been a failure. The Department of Livestock and Fisheries is responsible for carrying out elephant population surveys and ensuring that elephants are registered, but because of lack of knowledgeable and experienced staff these tasks are proving to be difficult to implement. The general absence of national and international assistance, especially funding, is a major constraint.

Recommendations

1. A national elephant population census should be conducted. Without good data on the elephant population it is difficult to persuade international donor agencies to offer assistance in this area.

2. Efforts related to animal registration need to be strengthened.

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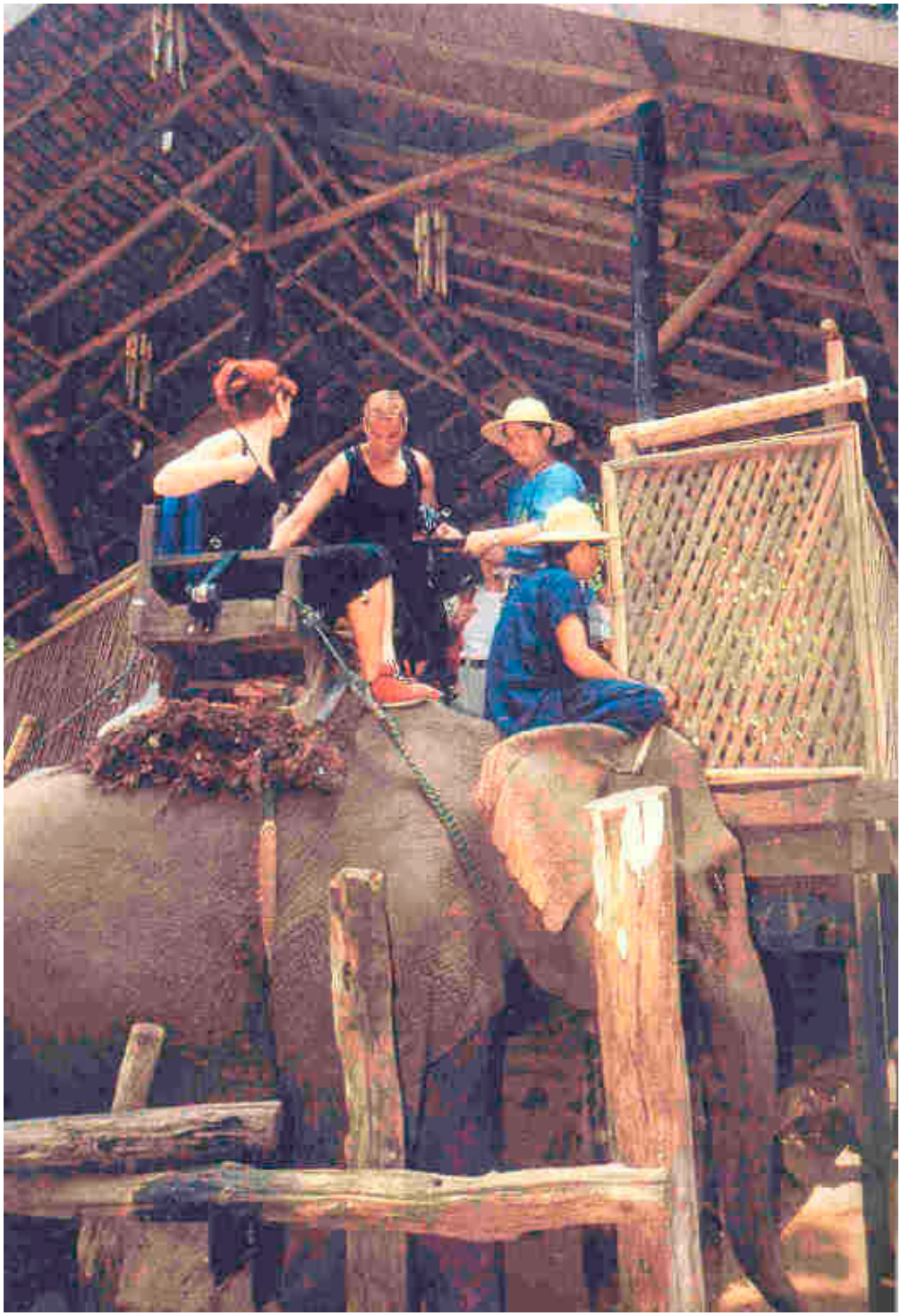
Part III: Thematic papers



Trekking on elephant back is a very popular activity with foreign tourists in Thailand. It provides incomes and job opportunities to tour organizers, mahouts and elephants.

Management of Sumatran elephants in Indonesia: Problems and challenges

Bambang Suprayogi, Jito Sugardjito and Ronald P.H. Lilley

Abstract

In the 1980s, the Indonesian Directorate General of Nature Protection and Conservation (PHPA) found it necessary to consider capturing wild elephants in an attempt to ease the conflicts between humans and elephants. Between 1986 and the end of 1995, 520 elephants were captured and a five year plan was formulated to catch up to 900 elephants between 1996 and 2001. Six Elephant Training Centres (ETCs) have been established throughout Sumatra since 1986. These are located in the provinces of Aceh, North Sumatra, Riau, Bengkulu, South Sumatra and Lampung. The management and care of these captive elephants has become less and less sustainable as habitat loss has continued, a factor not considered in the 1990 Action Plan. Wild elephant capture was discontinued in 1999.

Elephants brought into the centres were basically trained for riding and simple tasks. Only a few were specifically trained for logging duties. Early hopes that there would be a great demand for trained elephants to work in Indonesian production forests have not been realized. Since their inception, ETCs have been under-resourced and their veterinary care has been subject to severe financial constraints. Long-term funding for the centres has still to be assured.

The key issues, which are critical for conservation of the Sumatran elephant, include:

1) Protected areas cannot alone conserve viable elephant populations. Funding for protected areas is limited and only a few externally funded projects addressing conservation in the wider landscape are in operation.
2) Current economic difficulties have increased human pressure on elephants and elephant habitat. Illegal incursions into protected areas and poaching of natural living resources have continued to increase. Habitat fragmentation and increasing human populations are the main threats to the dwindling elephant populations.
3) The elephants in the ETCs are under-utilized, the centres are under-resourced, have few clear functions, and will not be sustainable unless provided with permanent and substantial long-tem support.
4) Other problems at the ETCs include inadequate land area and facilities, poor health and husbandry of elephants, poor management and coordination, and welfare problems of elephants, mahouts and veterinarians. Various recommendations are proposed to address these problems.
5) The establishment of an Indonesian Elephant Trust, which can coordinate efforts for elephant conservation in Indonesia, is an urgent priority if the remaining elephants, both captive and wild, are to be saved.

Introduction

Historically, wild elephants in Indonesia have been captured for domestication for hundreds of years. For centuries, the northern part of Sumatra had a tradition of elephant domestication for reasons of court and ceremony (Lair, 1997). The traditional tale of "Biram Sattany" shows humans and elephants coexisting in peace during the time of the Aceh kingdom (Djamil, 1958). In Acehnese society, the domesticated elephant had several local names, including *pomeurah*, *pobeuransah*, *teuku-rayek* and *tanoh mayong*, which were traditionally used as a part of daily speech, as a mark of respect towards elephants. In 1265, King Malikus Saleh had 300 fully decorated and armed elephants as part of his armed forces. The greatest period of this human-elephant relationship in Aceh was during the time of

Sultan Iskandar Muda (1608–1636). Based on a note by the French Admiral De Beaulieu when visiting Aceh in 1621, the Sultan had 900 trained elephant armed forces. When the Sultan attacked the King of Deli in North Sumatra, he used 100 elephant troops that were transported there by ships. In addition, during the Dutch colonial period, the Fourth Division of the Marechaussee Corps of the Dutch army used elephants to transport weapons and equipment in their attempt to attack the Acehnese fighters in places that could not be reached by vehicles (Basry and Alfian, 1997). Under colonial management, the elephants did not only serve the Dutch army, but also helped clear the forests for agriculture (Groning and Saller, 1998). Unfortunately, in the late nineteenth century the tradition of domesticating elephants in Sumatra declined, and then at the end of Dutch colonial rule, finally disappeared (Santiapillai, 1992).

Elephant domestication in recent times

The largest meta-population of Sumatran elephants (*Elephas maximus sumatranus)*, left in Indonesia has been under increasing pressure from continuing unsustainable logging practices, conversion of forests to agriculture and commercial plantations, forest fires, and illegal deforestation and settlement, both outside and within protection forest and conservation areas. Elephant numbers in Sumatra, though in some areas still viable, are widely declining as forest habitat disappears and is fragmented. Their migration routes have also been progressively cut. The effect on elephants has been the division of populations into smaller units, some of which are at risk of being lost from stochastic events and the effects of inbreeding depression. It is of great concern that this trend of fragmentation into even smaller, more vulnerable populations will lead to their eventual extinction in Sumatra in the not-too-distant future.

The problems of human–elephant conflicts are particularly acute in Asian countries where elephants live in areas with high human population densities (Suprayogi *et al.*, 2000). An increase in human population and economic demand is placing more pressure on natural resources, and the massive human transmigration programme throughout Sumatra has led to an increased frequency of human–elephant conflicts. Most of the conflict areas are in parts of the traditional home ranges of elephants, because these have been opened up for settlement and cultivation. The elephants have still continued to use their home ranges, especially where areas offer a better quality of food (Suprayogi *et al.*, 2000). In addition, the availability of highly palatable elephant foods such as paddy, sugar cane and other crops is too great a temptation for elephants, encouraging them to come frequently to the villages. In some areas, elephants have not only raided crops and destroyed properties, but also killed and injured people. This escalation of human–elephant conflicts has led to public protests in many places, to regular and critical press coverage, and to some hostility towards conservation agencies. Elephants have increasingly become the targets of negative attitudes towards conservation.

In the 1980s the art of elephant domestication returned to Sumatra, although this time they were not being trained for war. Instead, capture and training of elephants began again as a result of the escalating number of human–elephant conflicts throughout the island. As an alternative to culling, the Government of Indonesia promoted the capture of "problem" elephants, which were then trained in the Elephant Training Centres (ETCs) for riding and simple logging work. The first ETC was established in Way Kambas, Lampung province, south Sumatra in 1986. However, since then, the use of domesticated elephants for work on logging sites has been negligible (Groning and Saller, 1998).

According to the 1990 IUCN Asian Elephant Conservation Action Plan, the existence of ETCs was expected to provide an ideal basis for mobilising a greater local and regional respect for "problem" elephants, and to generate a better climate for their conservation. From then until 1998, capturing elephants was considered to be the most suitable and satisfactory way to solve human–elephant conflicts, and gained great support from local communities and government officers. These captures in fact only transferred the problems from the conflict areas to the ETCs. However, demands for the removal of "problem" elephants have been politically difficult to ignore, although this action

has ultimately led to the depletion of elephant populations throughout Sumatra. The capture of wild elephants by the government was discontinued in 1999.

It is important to note that, although logging companies were required by the government to take on elephants to help with their forest clearance work as part of their contractual obligations, all recorded transfers of elephants (apart from ten) appear to have been on paper only. The fees were paid in order to secure the concessions, but no elephants were actually sent to the logging sites. The companies did not want what they saw as an extra burden of having to look after elephants, and in any case, Sumatran elephants are considerably smaller and therefore not as strong as their Indian and Thai counterparts. Thus, the logging companies preferred to use mechanical logging machinery instead, deeming it to be faster and more efficient, regardless of environmental impacts.

A number of facilities (including veterinary facilities, bathing pools, training frames) that were built at some of the ETCs were badly designed, and later found to be unsuitable for the purpose. Some of these were never used. This indicates a lack of planning and prior consultation, leading to a loss of funds that could have been allocated more usefully.

Current status and distribution of captive elephants

The legal status of captive Sumatran elephants in Indonesia is that they are the property of the Government of Indonesia, and cannot be privately owned. Under Indonesian law, captive elephants, as with other captive protected species, are treated in law as if they were wild. Therefore, the Directorate General of Nature Protection and Conservation (PKA) requires official registration of all captive elephants, and yearly updated records (including transfers, births, deaths, etc.).

A further 900 elephants were planned to be caught by the year 2001. If this had happened, elephant numbers in the ETCs were predicted to have risen to 1 500 (Lair, 1997). Because of the recent economic collapse in Indonesia, captive elephants in the ETCs are an added financial burden to the government, and thought to be too expensive to maintain. They have not generated sufficient income, and have not managed to become self-financing, as was previously hoped. The government was finally advised by the (then) Director-General. of Forest Protection and Nature Conservation (PHPA) that the most pragmatic policy would be to discontinue the capture of wild elephants.

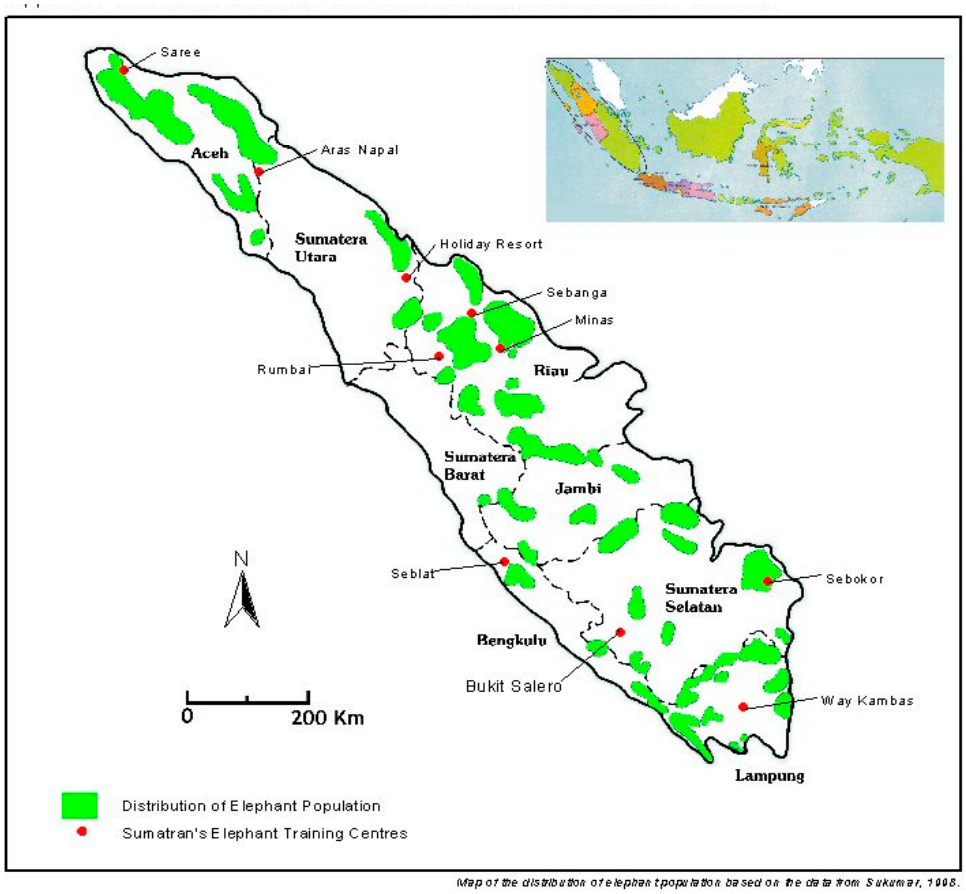
In April 2000, the Elephant Training Centres (ETCs) were renamed 'Elephant Conservation Centres' (ECCs), although the official management structure has yet to be implemented. Thus, the purpose of the centres was broadened to support *in situ* elephant conservation. Captive elephants have now occasionally been used to chase away troublesome elephants from conflict areas. Any elephant for which there is no alternative but capture is relocated to a protected area. For example, in Aceh Besar, two elephants were relocated, and in Jambi Baru (Aceh Selatan), five animals were relocated. In all cases, none have so far been reported to have been returned to their original areas.

However, except for a few elephants held in tourist areas, safari parks and zoos, by far the majority of the captive elephants are still kept at the ECCs. They are occasionally loaned out with their mahouts on a short-term basis, to take part in parades and other events in Sumatra and Java. There are six ECCs in Sumatra, with a total population of 391 elephants (at the end of 2000).

Table 1 shows that the additional elephant numbers in the ECCs over the years have been entirely a result of capture. Some elephants have been moved from the ECCs after training to zoos, safari parks, and other islands for tourism activities. Many adult elephants and newly born animals have also died in the ECCs for various reasons, but detailed records about these deaths are lacking. Apart from the few relocations from conflict areas mentioned above, there have so far been no releases of captive elephants back to their wild habitat. Fig. 1 shows the distribution of the ECCs and wild elephant population habitat in Sumatra.

Table 1. Captive elephants in Elephant Conservation Centres, Sumatra

Province	Centre	Number of elephants			Remarks
		1996	1998	2000	
Aceh	Saree	39	38	15	Because of the social unrest in Aceh, the ECC in Lhok Seumawe (Aceh Utara) has been closed down. The 29 animals were moved to elephant refugee camps in Saree, Aceh Besar, (15 elephants), and in Aras Napal, N.Sumatra (14 elephants) (see below)
North Sumatra	Holiday Resort	11	21	18	The area of the ECC has been seriously encroached by farmers for crops.
	Aras Napal			19 (14 +5)	14 animals from Lhokseumawe, and 5 more used by the Leuser Development Project (LDP) for patrols.
Riau	Sebanga	32	49	69	Illegal logging has seriously threatened the existence of the ECC. Only 44 animals have stayed in Sebanga. The others have been moved to Minas (5 elephants) and Dumai (20 elephants).
Bengkulu	Seblat	32	30	31	Land encroachment is a serious problem.
South Sumatra	Bukit Salero & Sebokor	80	107	127	Problems of overcrowding have made management very difficult. Sebokor has many untrained elephants.
Lampung	Way Kambas	142	117	112	Problems of overcrowding have made management very difficult.
Total		**336**	**362**	**391**	



Map of the distribution of elephant population based on the data from Sukumar, 1998.

Fig. 1. The distribution on wild elephant population and Elephant Conservation Centres in Sumatra

Some of the trained elephants have since been transferred to locations outside Sumatra. For example, in 1995, 15 elephants were sent from Aceh to Taman Safari, a safari park near Bogor, west Java. In 1999, 12 elephants were lent by the government, using the regulations on the loan of protected animals, *Satwa titipan*, to a private elephant-trekking enterprise in Bali. This appears to have been a financial success, while the welfare of the elephants has remained a priority. Furthermore, funds are being raised here to support *in situ* Sumatran elephant conservation. The elephants are used to carry tourists through the villages and rice fields, except during the hottest periods of the day.

Births and young elephants

Very few babies have been born or have survived in the ECCs. The reason is said to be that the mahouts did not want to take a risk in allowing a bull in *musth* to mate with a female during the breeding season, because of potential injury. Also the mahouts preferred not to have the extra responsibility of having to look after a pregnant elephant. Social and physiological factors (e.g. not allowing elephants to mix together), can lead to psychological isolation, and may also have contributed to the low birth rate among the captive elephants (Sukumar, 1989). In addition, many calves born from elephants who were pregnant at the time of capture, died because they were rejected by their mother after she gave birth, and could not be successfully fostered or hand-reared (Lilley, 1998).

Carrying capacity of the ECCs

Based on individual carrying capacity and facilities, overall the centres have been filled to over-capacity and have become overcrowded (Lilley and Saleh, 1998). In order to solve the problem of too many trained but unused elephants in the centres, it was recommended to transfer them to logging sites, safari parks, zoos and tourism parks. Occasionally, elephants have been used to help local communities living around the centres in farming and plantation activities. The economics and technical aspects of this kind of use need to be explored further.

Physical and psychological stress factors

Most of the elephants in the centres are juveniles, sub-adults and young adults. It has been suggested that this is because these young animals were easier to catch than older, larger adult elephants. Most of the trained animals are in reasonable condition, although a few are noticeably thin. Workloads for trained elephants are very low, and so the animals are not stressed by long hours of heavy labour. Instead, they are stressed perhaps by under-activity, boredom, and lack of stimulation and contact with other elephants.

These problems were particularly evident when wild elephants were still being caught. The initial period of capture, and then the long journey to the centres by truck were very stressful, especially when the sedated elephants woke up during transit and had to be re-sedated. The new arrivals at the centres were then often tethered for months while they waited for their training to begin. Training was sometimes delayed for up to several months because of the lack of water, which is needed during training. During this period, they had very little opportunity for movement, or to find food or water by themselves. Consequently their condition deteriorated, they lost weight and became malnourished. This, combined with the overcrowded conditions and poor hygiene, increased the risk of infection (notably by internal parasites) and was evidenced by the presence of oedemas. This state of affairs continued until they were trained well enough to be taken further afield by their mahouts for self-feeding during the day.

Many captive elephants have suffered stress from inactivity, spending most days in drag chains and hobbles, and from inadequate access to food. The chaining or tethering of captive elephants is an

acceptable procedure, especially during the night to prevent fighting, and as a valuable tool in the management of captive elephants. Continuous chaining should however be avoided, and the mahouts should provide as much time off chains as possible (Olson, 1999). Up to the time of writing, due largely to the poor management system, substandard diets, and a lack of veterinary medicines, a number of elephants in the ECCs are still in poor condition.

Record keeping

Although basic animal records are kept at each centre, they are far from comprehensive. Each centre uses a different format; and very little biological or behaviour data is recorded. Diagnostic or therapeutic notes are often limited to a single word, no record of work performance is kept, and no dietary notes are included. Moreover, the actual numbers of elephants that were caught, or that died during capture or in the centres, or had been transferred to other centres or to tourism sites is uncertain (Lilley and Saleh, 1998). In a culture where mistakes and failures are thought to be shameful, this strongly influences the tone and contents of (e.g. monthly) reports. While providing ample opportunities for production of problem-free reports, errors become difficult to track and correct, and the same mistakes tend to be made over and over again. This has serious implications both where finances are limited, and for the welfare of the elephants.

Diet and nutrition

During the recent economic crisis in Indonesia it has become increasingly hard for the government to maintain these centres, let alone to develop them to their full potential. The budget for the food supplement for domesticated elephants at all centres is very low, approximately US$1.50 per elephant per day. Food supplements vary from one centre to the other, and may include coconut leaves, bananas, banana stems, sugar cane, pineapple, papaya and king grass. There is no possibility of increasing the quantity and quality of supplementary food during the dry season to offset the reduction in natural vegetation. Because of the low food budget and rising food prices, this situation cannot be improved by simply buying in more food. Better management of natural resources could alleviate the problem considerably. The captive elephants are led out to graze during the day in land surrounding the centres, but all too often, these food sources become depleted, necessitating long walks to the next nearest food source.

Because of the limited supplemental diet presented to the elephants, it has become increasingly difficult to find certain foods (e.g. palm leaves) within a reasonable distance from the centres. Great distances need to be travelled by truck to find adequate daily supplies of food. Presently, local villagers are being paid to supply one of the centres with bananas, banana stalks, cassava roots, and sometimes pineapples. This is vastly more efficient in terms of reduced transportation costs, while at the same time providing the villagers living near to the centre with a financial incentive, thereby encouraging a more positive attitude towards the centre.

Water availability and quality

Poor water quality and lack of permanent water supplies are also problematic at each of the centres. Regular supplies of fresh water in some centres, especially for drinking and bathing during the dry season, have always been a problem (Lilley and Saleh, 1998). Again, elephants and their mahouts are often forced to travel considerable distances to find water. In addition, the quality of the water supply at some ECCs is also very poor. At the Sebanga site in Riau, for example, the Caltex laboratory examined the water quality of elephant's drinking areas, and found it to contain high concentrations of iron (Fe), cadmium (Cd) and lead (Pb). The high levels of lead in elephant blood may be related to the condition of the water sources surrounding the ECC. The Riau elephants exhibited high levels of lead

(0.365–0.453 ppm) in their blood (Mikota *et al.*, 2000). As a reference, the normal lead content for healthy elephants should be 0.000–0.3000 ppm. Continuous lead toxicity may cause anaemia in the animals.

Two of the centres are situated next to clear, fast flowing rivers, where the elephants can bathe and drink throughout the year. At most of the other sites, water availability is a serious problem, especially during the dry season. Small areas of stagnant, muddy water can easily lead to health problems, and in one case, pesticides from the surrounding farms had contaminated the stream adjacent to the site. The many problems caused by poor water quality and availability should be a major consideration when choosing future captive elephant sites.

Other health problems

Other common health problems for captive elephants in the centres are oedema, bloat, worm infections and wound infections (Lilley, 1998). Foot problems of captive elephants that are usually caused by injury, trauma or arthritic conditions have occurred at some ECCs. When an abscess develops and the elephant receives inadequate care, the infection reaches the toe digits and very few of these cases survive (Oosterhuis *et al.*, 1997). Standing water is often contaminated with faeces, and a build-up of elephant dung around the sites has also contributed to the health problems, although at some sites some of the dung is scraped into piles and burned when it is dry enough (Lilley and Saleh, 1998). Because of relatively low understanding and poor hygiene awareness among the staff, there is a further risk of disease transfer from other animals (chickens, goats, cattle) kept at or near the centres, to mahouts and their elephants. It is possible that TB and certain worm species may be transferred from elephants to humans, and vice versa.

According to Lewis (1998), the main clinical problems that all centres face can be summarized as:

1) marginal nutrition, especially for juveniles and elephants under training, and to a variable degree for all animals during the dry season;
2) intestinal parasitism;
3) Superficial wounds arising out of training, most of which become infected. Incorrect *ka* (neck halter) design and use cause some serious neck injuries.

Many other clinical problems do occur of course, but if these three main problems are solved, the majority of animals should remain healthy and the financial demands on the veterinary budget will be substantially reduced. Even though the effects on the elephants' health are not critical, 40 percent of the captive elephants living in Bengkulu, Riau and Aceh are positively contaminated with blood parasites such as *Babesia, Anaplasma* and *Theileria* (Mikota *et al.*, 2000).

Veterinary support

Most of the centres have inadequate supplies of veterinary drugs, consumables or equipment. None of the ECCs has even rudimentary veterinary rooms or facilities. Records, a meagre stock of veterinary medicines, equipment, and very limited laboratory facilities are housed wherever there is shelter. As a result, regular treatments for parasites are not possible. Some centres lack a reliable electricity supply or adequate backup generators, and there are almost no refrigeration facilities. The budget for veterinary supplies from the government is woefully inadequate, less than US$ 5.00 per elephant per month, especially given that most drugs are imported. In some cases, most of the centres hold insufficient injectable antibiotics to treat even a single adult elephant correctly. Vaccinations are very rare, syringes and needles are sometimes constantly reused, and supplies of anaesthetic and sedatives are erratic. Visits by the International Elephant Foundation and the FFI team have provided

emergency aid to some ECCs in Aceh, Riau and Bengkulu, through provision of expertise, veterinary supplies and simple equipment.

ECC veterinarians

Most of the veterinarians are young and lack training in veterinary management of elephants, although most of them are keen to learn. Veterinary literature related to elephants is very limited, and there is a little contact or communication between vets at different centres. Vets have expressed a feeling of isolation, and a strong desire to meet others, including other ECC vets, and zoo vets working in their field (Lilley and Saleh, 1998). Veterinarians from zoos, safari parks and universities in the region could be invited to these meetings to share their expertise. There is a tendency for veterinarians to leave their field posts after two to three years because of professional isolation, low salary and no career structure, and then to be replaced by another inexperienced veterinarian. Information transfer between these old and new veterinarians is extremely rare. More recently, some fruitful collaboration has begun with veterinarians from overseas.

Mahouts

In general, the mahouts are relatively sympathetic to their charges and there is no hard evidence of wilful cruelty to the animals. The current economic crisis in Indonesia has meant that many of the mahouts have been unable to continue to work at the ECCs because their salaries (approximately US$35 per month) do not cover even the costs of basic needs such as food for themselves and their families. The position of some of the mahouts has become vulnerable because of local hostility towards them. A critical part of the ECCs is the development of a bond between mahout and elephant. These bonds, because of financial and security problems, are now being broken as some experienced mahouts move away in search of other work, or because their lives are being threatened.

Conclusions and recommendations

In general, all centers experience problems with encroachment on ECC land, lack of funds for day-to-day management, and low salaries for mahouts and veterinarians. Development of a management system and policy, and capacity building for staff are all urgently needed to improve the chances of long-term sustainability. Without greater links between *in situ* and *ex situ* programmes, and a failure to ensure that both wild and captive elephants are seen as an important resource, there will be continuing welfare problems at the ECCs. As a consequence, the essential genetic resource that these animals represent, as a potentially high percentage of the only valid subspecies of the Asian elephant, will be lost. Because of unique historical and cultural associations, both wild and captive elephants are an ideal flagship and indicator species for the conservation of forest and associated biodiversity in Sumatra and every effort should be made to protect them.

Although elephants are no longer being removed from the wild, the centers have important roles to play in regional elephant conservation, including:

1. Mitigation of “problem” elephants from conflict areas without culling. The centers should not only train “problem” elephants, but also support local communities to respond to and mitigate human-elephant conflicts that arise in problem areas. They learn to drive away “problem” wild elephant herds from areas of conflict to the forest by using captive elephants. The ECC elephants could be used to drive and relocate (if necessary) wild elephants, when they cause problems in legitimate agricultural areas.

2. Maintenance of traditional skills of elephant use and husbandry. A review of currently used training methods and equipment (largely from Thai trainers) and augmentation with training models from other range states would both enhance mahout skills and help to correct any bad habits that have developed in the training methods.
3. Conservation of important reservoirs of elephant genes. DNA profiles of all captive elephants will facilitate the choice of parent stock for captive breeding and for potential release of elephants into new areas.
4. Demonstration that elephants can be used humanely and productively. The centers could conduct wild elephant surveys, regulate elephant movements, train local communities to effectively deal with crop-raiding elephants, and develop a bioregional plan for forest and elephant conservation in Sumatra.
5. Captive elephants could be mobilized to patrol protected areas, and staff trained to monitor illegal forest encroachment from elephant back. Appropriate action could then be taken to bring the poachers to justice, and in the long term, help to save elephant habitat.
6. The centers could promote awareness about elephant behaviour and the plight of elephants in the wild. Being highly mobile, the centre staff and their elephants are in an ideal position to promote a positive profile of elephants through their physical presence in communities. This will generate a positive attitude among the wider public towards elephants. The centers can also function as education centres where general conservation issues can be introduced to various target groups.
7. Local communities should be encouraged to grow supplemental foods (e.g. rice husks (*dedak*), sweet corn husks (*kulit jagung*), bananas, yams/cassava (*ubi*), and others) for elephants, and then the centre can buy these from them at local market prices. The nutritional value, cost, and local availability of alternative supplemental foods need to be explored further. The provision of simple devices to make pellets could help to facilitate measurement of amounts given.
8. From the available information in existing ECCs, it should be possible to ascertain the carrying capacity of each proposed new ECC, in order to avoid future overcrowding. Factors include land area, availability of shade, drinking and bathing water, natural and supplemental food availability, status of surrounding land (chances of escaped elephants damaging crops), distance from other food and water sources, and accessibility for transport, electricity and communications.
9. A rotating land use system can be developed so that the vegetation in one area can recover while elephants feed in another area. This would also help to reduce soil compaction in heavily used areas.
10. Development of alternative permanent or semi-permanent posts to which elephants can be tethered. This would reduce the threat of strain and damage to shade trees to which elephants are currently tethered.
11. ECC veterinarians should be supported in order to have more frequent contact with other vets, and attend regular meetings where they can share their problems and experiences. A clearer career and wage structure would help to retain skilled vets at the centres.
12. Regular training for all ECC staff on basic elephant nutrition, basic foot and mouth care, clinical examination of elephants, basic therapeutics, wound management, clinical recording, basic laboratory and post mortem techniques;
13. Collaborative development of veterinary protocols in preventive medicine schedules (parasite control strategy, vaccinations, regular examination of animals, wound prevention, staff TB screening, etc), site hygiene – including the exclusion of domestic livestock, improved management of natural food resources and standardised animal records.
14. Review mahout training needs, career prospects and improve perception of their status as mahouts. Ensure regular payment of a fair wage, plus incentives and bonuses to encourage mahouts to stay at the centers longer. Improve the mahouts' living conditions, on-site living

quarters, and transportation. Improve assistance for mahout families through development of co-operatives, savings and insurance schemes, and alternative income generation projects for mahouts and their wives living on site. Encourage greater use of mahouts in data collection for captive elephants.

15. Rational development of the centers should be based on scientific, educational and tourist potential.
16. Development of captive breeding programmes. A model for successful captive breeding is still not available for the ECCs, but there is a possibility of developing one through investigations into the reproductive biology of captive elephants.

In order to resolve the problem of overcrowded captive elephant populations, another option is to disband the existing centres, and/or redistribute the elephants in smaller groups to a number of new areas throughout the island. These could perhaps be named Conservation Response Units (CRUs), where the elephants are allowed to range more freely, and find their own food and water, while still under the watchful eyes of their mahouts. This would considerably reduce the costs of feeding, reduce the risks of disease through poor nutrition and overcrowding, and thereby reduce veterinary costs. Bearing in mind that human–elephant conflicts are still likely to occur in many places, strategically located centers would allow a more rapid response with reduced transport costs when using the trained elephants to deal with wild problem elephants. Worked-out, abandoned timber concessions that are mainly scrub and secondary forest would seem to be ideal locations for this purpose. The elephants from the CRUs could be mobilized to patrol, and staff trained to monitor illegal forest encroachment from elephant-back.

Moreover, if carefully designed and well managed, the new CRUs could become interesting places with great educational value for local people, tourists and school children to visit, and then truly merit the title "Elephant Conservation Centers". Ideally, the centers would be self-financing, without the need for further exploitation of elephants as mere circus freaks. It is high time that elephants are again given the respect they once had, rather than being forced to earn their keep by helping to destroy their own diminishing wild habitats in logging concessions.

In addition, a number of privately run enterprises similar to the Bali Trekking venture could be established and run, provided that strict criteria for elephant welfare were met and then regularly monitored. Ways of encouraging investment in the use of elephants by tour operators, hoteliers and tourist resorts should be explored. The dignity and welfare of the animals should always be a prime consideration. It is still necessary to design saddles or *howdah* that are suitable, safe and comfortable for both elephants and riders. The same applies to the platforms from which riders can mount and descend from the elephants.

The Sumatran Elephant Trust

It should be clear from this paper that many of the problems faced by elephants in Indonesia are due largely to mismanagement and lack of support and coordination among the various authorities and organizations responsible for elephant welfare. Thus, to integrate all efforts for Sumatran elephant conservation once and for all, the establishment of an International Sumatran Elephant Trust is being proposed. The Trust will act as an umbrella organization, overseeing all activities concerned with Sumatran elephants, while ensuring that the responsibility for day-to-day management remains firmly with the various Trust members and their respective projects. Ongoing monitoring and feedback systems will be developed to ensure that standards are maintained, support is promptly given, and that problems are identified and addressed at an early stage.

The Trust will provide support to all field projects related to elephant conservation (*in situ* and *ex situ* programmes), and technical assistance. The legal status will be that the Trust belongs to Indonesia,

and may have branches that in law are non-profit organizations. The Trust will be responsible for management and distribution of trust funds, revenue generation via accumulation of interest, and fund raising. Several potential donors have already expressed their commitment to supporting the Trust. The Trust will be financially fully accountable to all the stakeholders, and show transparency in the management of funds. All information regarding the activities of the Fund and projects supported by the Fund will be regularly shared with all stakeholders. The stakeholders will appoint the initial board of trustees.

The organizational structure will be developed from organizations or institutions that have a vested interest in conservation and the potential to lend technical or financial support to elephant conservation, e.g. NGOs, zoos, universities and research institutes. The Trust will develop and maintain links with all relevant international elephant conservation bodies, and aims to become the main initial point of contact for those interested in elephant conservation in Indonesia.

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Conservation organizations working on elephant conservation in Sumatra:

1. Fauna and Flora International – Indonesia Programme (FFI-IP): *in situ* programmes – landscapes, policy development, education and awareness, conflict mitigation, community participation, and genetic sampling in Aceh and North Sumatra provinces, and for *ex situ* programmes in Aceh, Riau and Bengkulu provinces.

2. World Wide Fund for Nature – Indonesia Programme (WWF–IP): focussing on policy and conflict mitigation in Riau and Lampung provinces.

3. World Conservation Society – Indonesia Programme (WCS–IP): focussing on population research and conflict mitigation in Lampung province.

4. IEF in collaboration with FFI–SECP to support *ex situ* elephant programmes (captive elephant healthcare) in ECC's in Aceh, Bengkulu and Riau.

Question and answer session

Q1: Are the ETCs now formally called Elephant Conservation Centers? How have their functions changed?
A1: Yes, since 1999. They no longer capture wild elephants, but have more of a research and educational function. Training elephants stopped in 1998.

Q2: Why is it not possible to use domesticated elephants in ecotourism?
A2: It is possible, but there are financial constraints on ecotourism development. ECCs depend on government funds that are limited.

The studbook of timber elephants of Myanmar with special reference to survivorship analysis

Khyne U Mar

Abstract

The purpose of the demographic analyses in this study was to calculate the basic life tables to determine the effects of the long-term captivity of Asian elephants (*Elephas maximus*), which are utilized extensively as draught animals, on survival, fecundity and viability. The studbook data were collected from the elephant log books and the annual reports of the Extraction Department, Myanma Timber Enterprise of the Union of Myanmar. We had access to a near-total of the records (n ≈ 9600) of elephants captured or born after the year 1875, including 3 070 calving records. It was documented that 32.5 percent of calves born in captivity failed to reach the age of five years. Life table analysis revealed that most mortality occurred before the age of five. Survivorship analysis of adults and sub-adults (more than five years) showed that wild caught elephants and female elephants had significantly higher survival rates ($P < 0.001$) than captive born and male elephants, respectively. A similar analysis was conducted for calves (under five years) and comparisons were made between dam origins and sex. It was revealed that calves born from wild caught (WC) dams had higher survival rates than those born from captive born (CB) dams ($P < 0.001$), while survivorship and sex showed no correlation.

Introduction

The Asian elephant (*Elephas maximus*) once ranged from the Euphrates–Tigris river systems in the west across Asia, from south of the Himalayas to the Yangtse–Kiang River in the east (Oliver, 1978; McKay, 1973; Goa, 1981; Dobias 1987; Lair, 1988; Sukumar, 1989 and Daniel, 1992). Having been extirpated from approximately 85 percent of its historical range, it now exists in 13 Asian countries: Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Myanmar (Burma), Nepal, Sri Lanka, Thailand and Viet Nam (Oliver, 1978; Lair, 1988; Sukumar, 1989 and Daniel, 1992). Although the elephant's present range still extends from the Indian sub-continent in the west to the rim of the Indo-Chinese peninsula, the total wild habitat available in Asia amounts to only about 500 000 km^2 (or about the size of Thailand) and is declining at an average rate of 4 000 km^2 per annum (Santiapillai, 2000). It is therefore one of the world's most seriously endangered species of large mammals (Oliver, 1978; Sukumar, 1989). Indiscriminate hunting and forest clearance are the principal causes of the decline in the number of elephants in Asia (Santiapillai, 2000). Indo-China's tropical rain forests, which are the home of Asian elephants, were seriously damaged during 30 years of constant warfare, particularly by the use of chemical defoliants, napalm and massive bombing during the US/Vietnamese conflict (Keele and Dimie-Ediger, 1999). The current population of Asian elephants is estimated at 35 000–50 000 individuals (Oliver, 1978; Sukumar, 1989 and Santiapillai and Jackson, 1990) inclusive of 15 000 elephants in captivity, mainly in India, Thailand, Myanmar and Sri Lanka (Hanks, 1979; Blower, 1985; Santiapillai and Jackson, 1990; de Alwis and Santiapillai, 1992; and Sukumar and Santiapillai, 1993).

Myanmar is home to the second largest Asian elephant population after India, with approximate 6 000 elephants in the wild and 6 000 elephants in captivity. The single largest remaining population of captive Asian elephants is found in the timber camps of the Union of Myanmar (Yin, 1967; Gale, 1971; Blower, 1985 and Krishnamurthy and Wemmer, 1995). The elephants play a crucial role in the forestry sector of the Union of Myanmar and the benefits from using them are far-reaching (Blower, 1985; Sukumar and Santiapillai, 1993 and Santiapillai and Ramono, 1992). Gale (1971) praised the timber elephants of Burma as Nature's greatest gift to Burma. Santiapillai and Ramono (1992) and Santiapillai (2000) likened the Asian elephant to an amphibious, weatherproof, multipurpose, four-legged machine that is the jungle's perfect cross-country vehicle. There is a growing recognition of this merit, particularly

in the forest industry where the animal can extract timber with much less incidental damage to the environment than rapid but highly destructive machines.

The working elephants of Myanmar

The Union of Myanmar, with an area of 676 553 sq km, is one of the largest of the mainland Southeast Asian countries, with a rapidly growing population of 47.3 million. Myanmar has a well-established tradition of tree harvesting, based on the Myanmar Selective Felling System, which ensures the sustainable production of the country's timber resources. Timber extraction is dependent to a large extent on the draft power of working elephants (Mar, 1996 and Mar and Win, 1997).

Elephants are totally protected in Myanmar (Yin, 1967 and Blower, 1985). The Wildlife Protection (Amendment) Act 1956 forbids hunting, capture, possession, sale, or purchase of live or dead elephants or their products without proper permission. The term 'government owned elephants' denotes those elephants employed at the Myanma Timber Enterprise (MTE) and the Forest Department, which are under the control of the Ministry of Forestry. According to the Elephant Regulation Act of 1951, all domesticated elephants – government owned and private owned elephants – should be registered by the Forest Department at the age of three months with the primary intention being to prevent the illegal trade and the illegal capture of elephants (Working People's Settlement Board, 1982). Myanmar has been a signatory to CITES since 1997.

The timber elephants used by colonial and post- independence governments have been derived from two different sources. The majority of elephants have always been born in the wild and are referred to as wild captured (WC), while a smaller number have been captive born (CB) elephants (Evans, 1910; Gale, 1971; Mar and Win, 1997). Traditionally, sub-adult elephants (around four to five years of age) are captured from the wild as these elephants are easily tamed in a short period. All calves born in captivity, reaching the age of four years, WC calves of at least 1.40 m (4.6 ft) (measured at shoulder height) and recently captured sub-adult elephants are systematically weaned and tamed/trained during the cool season of Myanmar that is between November and January (Gale, 1971). After the completion of taming/training, each individual elephant is given a registration number and a log book (known as Form J) in which the complete biodata of each animal, i.e. sex, name, age at time of acquisition, or date of birth (if captive born), age at taming/ training, date of mating and calving, temperament of the animal, veterinary inspections and treatments, reproductive history, prescribed work load and nature of work, *musth* condition, etc. are recorded. The traditional elephant log books are equivalent to the 'studbooks' kept in Western zoos. Trained elephants between 5 and 17 years are used as baggage elephants and classified as trained calves (TC). The training of these elephants is continued until they get used to the verbal commands, logging/baggage harnesses and fettering chains. Elephants over the age of 17 are classified as full-grown (FG) elephants and put into the work force until they reach the retirement age of 55. After retirement, elephants spend most of their time roaming and foraging and one mahout is assigned to each retired elephant to take care of its well-being. Some bull elephants sire calves after retirement. Two mahouts generally handle each individual elephant in the work force. Any bull in *musth* condition and some elephants with aggressive/unreliable temperaments are assigned an extra man armed with a spear (spear-man) (Myanma Timber Enterprise, 1998).

The elephants work a five to eight hours/day, five days/week, seven working months/year. Working elephants have 12 to 16 hours of foraging time at night during working months (June to January), enabling them to socialize not only with the camp elephants but also with wild elephants, because most timber camps are situated in the vicinity of forests where wild elephants roam. The elephants have more free-ranging time during non-working periods (February to May), which coincide with summer and the highest annual temperature of approximately 45 degrees Celsius. The working elephants are maintained as mixed herds consisting of adult males and females and calves of various ages, thus mimicking the social structure of wild elephant herds. Cows with suckling calves are allowed to stay out of work until the calf reaches one year old (Myanma Timber Enterprise, 1998).

Demographic analysis

Although Myanmar is home to the second largest population of Asian elephants after India, the demography of the captive elephant population has never been studied before in any detail. A life history analysis of captive elephants would provide in-depth knowledge of the factors influencing natality and mortality and thus provide an important tool for the management of this and other captive populations.

The study of life history strategies originated in the late 1940s and the early 1950s from the combination of animal demography and evolutionary theory (Sibley and Calow, 1986 and Caswell, 1989). That analysis was based on age-specific rates of mortality and reproduction, and ecologists were well aware that those rates varied in interesting ways both within and among species (Caughley, 1966; Caswell, 1989 and Caughley and Gunn, 1996). The most important task in the development of a captive propagation plan is the compilation of basic data required for population analysis and management (Ballou and Foose, 1996). The best source of such data is a studbook, which is a chronology of a captive population listing vital information on animal identities, sexes, parentage, birth and death dates and ages. To construct age- or sex-specific life tables, cohorts of individuals are followed from birth under one or more sets of conditions and their age-specific survivorship and fecundity are recorded throughout their lives (Ballou and Foose 1996 and Gutierrez, 1996). The tabulation of birth rates for females of different ages in a population is called a fecundity schedule or table, which lists the mean fecundity of animals in each age class and is a measure of the number of live offspring produced over an interval of age (Caughley, 1977 and Gutierrez, 1966). Fecundity tables are used to estimate the net reproductive rate per generation (R_0), the number of females born (per female) and the intrinsic rate of population increase or per capita increase (r) that is the measure of the contribution of the different ages to the ancestry of the future generations (Deevey, 1947; Ballou and Foose, 1996; Gutierrez, 1996 and Collett *et al.*, 1997). If the net reproductive rate R_0, is less than 1, the mothers in the study population are not producing well enough for offspring to replace themselves (Caughley, 1977 and Gutierrez, 1996). For a stable population, population growth is zero or R_0 is 1, which means that each animal exactly replaces itself in the population in every generation. R_0 is used to calculate the animal lifetime reproductive objective in captive population management (Ballou and Foose, 1996; Caughley, 1977 and Gutierrez, 1996).

The life tables include the following components:

f_x = the frequency/number of cohorts still surviving at age x out of the total number born
d_x = the probability of dying in each age interval x, x+1, calculated as f_x / $\sum f_x$ (age-specific mortality)
l_x = the probability at birth of surviving to age x, is calculated as 1-$\sum d_x$ (age-specific survival)
q_x = the proportion of animals alive at age x that die before age x+1 or simply mortality rate, which was calculated as d_x divided by l_x (age-specific mortality rate)
p_x = the survival rate, calculated as 1- q_x (age-specific survival rate).

Generation time (T), which is the average age at which a parent produces young (age at first calving in this study, in which T is calculated as $\Sigma x l_x m_x$ divided by R_0, where x is age in years) (Caughley, 1977). Knowing R_0 and T allow us to estimate the net per capita rate of increase for a population (r), which is calculated as $\ln R_0$ divided by T, where 1n is the base of the natural logarithms. The net per capita rate of increase for a population (r) can be interpreted as birth rate minus death rate or $r = B – D$. The negative value of r indicates that birth rates are lower than death rates and the population is declining. A value greater than 0 (zero) would indicate a stable population (Gutierrez, 1996).

Objectives of the study

The demographic analyses in this study were designed to demonstrate the effect of the long-term captivity of Asian elephants of Myanmar on survival, fecundity and viability.

In this study, we provide information on:

1) the basic life tables and population dynamics for captive elephants of Myanmar;
2) the age- and sex-specific fecundity and mortality rates of the working elephants of Myanmar to compare between captive born and wild caught elephants;
3) the net reproductive rate per generation (R_0), or the number of females born per female, and the intrinsic rate of population increase or per capita increase (r) in the working elephants of Myanmar to determine whether the captive domesticated elephants of Myanmar were declining or increasing through time.

Materials and methods

The life history biodata used in this study came from the working or logging elephants owned by the state-owned Myanma Timber Enterprise. The studbook data were collected from the elephant log books and the annual reports of the Extraction Department of the Myanma Timber Enterprise. These were later transferred to a computer spread sheet, using version 7.5 of MS Excel with the following fields:

1) Registration number;
2) Name;
3) Origin (wild caught or captive born);
4) Date of birth;
5) Place of birth;
6) Method of capture;
7) Year of capture;
8) Place of capture;
9) Year or age of taming;
10) Total no. of calves, followed by date of calving (month/day/year), sex of calf, dam name, dam registration number and birth origins of mother (wild caught or captive born);
11) Date of death;
12) Cause of death.

We had access to a near total of records (n ≈ 9 600) of elephants captured or born after the year 1875. Approximately 900 elephants, which were born between 1950 and 1960, were in captivity continuously for approximately 50 years and it is possible to trace their third generation offspring, making this database one of the most comprehensive documents for any captive elephant population in the world. Those elephants caught from the wild were aged by comparing the size, height, and body condition of captive born elephants with known age. Some records (n ≈ 600) did not have complete data on date of birth or death and those elephants that were impossible to trace because of escape or as a result of being taken/stolen by insurgents, sale etc., were excluded from the analysis as it was meaningless to include them.

The practice of 'censoring' was used in the data analysis. Censoring was used when we did not want to know the time of death for all of the individuals. This idea was based principally on some individuals/animals that were lost/hidden from the study (i.e. impossible to trace), but contributed something to our knowledge of the survivor function but nothing to our knowledge of the age of death (Crawley, 1993).

The original (pooled) data set included ≈ 9 600 records. The data were stored in two major files, consisting of elephants of age five years and over and calves less than five years. The number of

elephants used in this study was 6 246 (M = 2 689 and F = 3 557), between 5 and 45 years. Among 6 246 elephants, 1 421 elephants (M = 691 and F = 730) died before they reached the censored age of 45 years and the life history analysis was constructed on the basis of these elephants. The term "birth origins" was used in elephants (5-45 years) in order to differentiate WC and CB elephants.

All calves (n = 3 070) born from CB and WC working elephants between 08/12/1942 and 17/03/1999 were included in this study. In pooled data, calves born in captivity were categorized as captive born (CB) whether they were born from CB or WC dams, because their dates of birth were known and each individual elephant had a registration number. In order to access the effect of mother on longevity of calves, the birth origins of dams were specially categorized as "dam origins" in calving records. The survival analysis for calves was based on mortality records (n = 660, CB = 232, WC = 428, M = 358, F = 296, unknown sex = 6).

The calculations of life table statistics of captive working elephants of Myanmar in this paper were based on the principles described by Caughley, 1966 and 1977, Pielou, 1977; Avis *et al.*, 1995; Ballou and Foose, 1996 and Gutiérrez, 1996. Statistical analysis was made using the Statistical Package for Social Studies (SPSS) Release 7.5.1 (SPSS Inc., Illinois).

Results

1. Life table and survivorship curves

All age classes of elephants were used to construct the life table (Table 1). In most studies, survivorship curves plotted the cohort's age between 0 and time *t*. We decided to calculate two different survivorship analyses for elephants less than five years and over five years. In Myanmar, elephants with an estimated age of 5 years are captured from the wild to become working elephants, as at this age they are easy to tame. After taming, systematic recording of their life histories is made in the log books assigned to all elephants. So, it was virtually impossible to get data for wild caught elephants before their captivity. The comparisons of survivorship between birth origins and sexes revealed that the survival rate of WC elephants (5–45 years) was higher than CB cohorts (Fig. 1) while female elephants had a higher survival rate than male elephants (Fig. 2).

The survival analysis was separately conducted for calves (<5 years) and a comparison was made between dam origins and sex to understand the effect of the mother on the longevity of the calves. It was revealed that the survival rate was declining with age with the sharpest decline occurring at the first half year of life (0.5 year), as shown in Fig. 3. Calves born from CB dams had significantly higher survival rates than WC dams, while survivorship rates for males and females showed no difference (Fig. 4).

2. Seasonality of mortality in working elephants

The death dates of calves (<5 years) and working elephants (5-45 years) were charted and compared monthly (Fig. 5). The mortality pattern of elephants (5–45 years) revealed that the highest death rate occurred in April and May, the hottest period of Myanmar, while the death rate for calves (<5 years) peaked in January, which coincides with the taming period, followed by a second wave of deaths in April and May.

3. Seasonality of births

When the total births (n = 3 070) were charted month-wise (Table 5), the peak number of births occurred in January and the lowest number of births occurred in August, which coincided with the monsoon season.

4. Live births and stillbirths

A total of 738 calves died before the age of five years, inclusive of 96 stillbirths. That is, 32.5 percent of calves born in captivity failed to reach the age of 5. The number of calves that died between age 0.5 and 5 years is displayed in Table 6. The overall data of calves born in captivity (n = 3 070) show that Myanmar cow elephants gave birth to 2 971 (96.72 percent) live offspring at birth with 96 (3.13 percent) delivered as stillbirths/abortions. It is apparent that the highest number of stillbirths was produced by dams between 25–35 years (Table 3).

5. Fecundity analysis

The total number of calving records used in this study was 3 070, inclusive of 17 pairs of twins; the number of calves born to primiparous mothers (those dams that dropped their first offspring) was 1 276 (CB = 408 and WC = 868). The prime reproductive age is the age of a cow, where the maximum number of calvings occurs. Among the total records of 3 070 calvings, peak calving (n = 562) was noticed in the age group 25-30 years followed by cows in the 25-30 years age group with 539 calvings (Table 4). The age classes in which maximum number of calving occurred in WC and CB dams were 25-30 vs. 20-25 years (332 vs. 272 calvings) respectively. The number of calves born to primiparous mothers in the whole calving data set was 1 276. The earliest age at which a female gave birth was at 6.48 years (to a cow named Mya Yee) (registration no.= 2 577). This cow was herself born in captivity and thus her exact age is known. It was the first documented case of a working Asian elephant being sexually mature by the age ≅ 5 years in Myanmar. This recorded youngest known age of a primiparous cow was, however, exceptional as no other captive cow in Myanmar had calved before the age of seven years. There were 12 cows (CB = 7 and WC = 5) that gave birth before the age of ten years. The oldest authenticated age at which a CB cow dropped its first calf in this data set was 45.50 years. The maximum number of calves that a cow could give birth to in her life time was ten. The mean age ± standard deviations (SD) of the primiparous CB and WC cows were 19.69 ± 6.22 and 29.77 ± 9.99 years respectively. Age at first calving in CB dams was significantly earlier than WC cows ($P < 0.001$). The highest number of calvings occurred at 18 years (n = 43 calves) and 24 years (n = 52 calves) in primiparous CB and WC cows, respectively. The comparison of age-specific calving potential, which was the number of calves that a cohort cow produced at a particular age (calves/ cohort cow) between CB and WC cows demonstrated that CB cows had lower calving potential than WC cows ($P < 0.001$) (Fig. 6).

Discussion

The life table that contains information on birth, reproduction and mortality rates is the central focus of attention in population biology (Caughley, 1977; Begon *et al.*, 1990 and Collett *et al.*, 1997).

The behaviour studies of Asian elephants in Sri Lanka documented that in the wild, in a matriarchal elephant society, the oldest cows were dominant, leading the herd and maintaining discipline among the young and sharing the responsibilities of taking care of juveniles (Eltringham, 1982 and Poole *et al.*, 1997). In this study, we expected that WC cows would be better mothers as they grew up in a natural environment, which was basically governed by matriarch cows. However, the survivorship analysis revealed that calves born from CB dams possessed significantly higher survival rates than those born from WC dams. The survivorship of calves seems to be related with (i) parity or rank order of a calf born from an individual mother (ii) mothering ability of allocated dam and its age, origin and experience of the birthing process and (iii) period of bonding or the duration that calves stayed with their blood and allocated mothers before weaning. More studies are needed to verify these factors.

The earliest age of calving among Burmese timber elephants recorded by Burne (1942) was 16 years. The youngest age of calving in our data set was 6.8 years. The mean age ± standard deviation

(SD) of the primiparous CB cows with a known date of birth was 19.69 ± 6.22 years. Taking into account the gestation period of Asian elephants, which lasts 20.61 ± 0.49 months (Poole *et al.*, 1997), the majority of CB cows will become sexually mature at ≈18 years. Regarding age at sexual maturity in Asian elephants in India, Sukumar (1989) stated that the age of puberty of cow elephants was very plastic and he assumed that the mean age at first calving might be as late as 18-20 years. Quoting reports of Evans (1910), Flower (1943) and Robinson (1934), Mikota *et al.* (1994) suggested that the age at which a female Asian elephant attained sexual maturity ranged from 6 to 12 years, but most of the data were based on exhibiting elephants in the North American zoos. According to Schmidt (1986 and 1993), the earliest known onset of sexually mature age for an Asian cow elephant was 6 years. Comparatively, the age of puberty in African elephants was estimated at 12-14 years (Smith and Buss, 1973 and Lee, 1991). The same authors commented that cows less than ten years may be capable of ovulation but less likely to become pregnant. Lee (1991) stated that the range of fecundity was dependent on the local environmental conditions (rainfall, food supply, etc.), the presence of a suckling calf and its sex, and the age of the cow, and that those 15 to 50 years old were most likely to conceive while young and fertility was reduced by age. This agreed well with our findings that the calving potential of CB cows declined after the reproductive prime age at 21. Work-related stress and the continuous burden of rearing calves could be the main cause of decreasing fertility in later life.

The captive born (CB) reached puberty before the WC cows, which might be because of the higher level of nutrition and/or less stressful life in captivity. Schmidt (1993), based on his experience with Asian elephants in zoological parks, reported that captive elephants generally became sexually mature earlier than free-ranging elephants. Delayed puberty in WC cows might be because of the physiologically and psychologically stressful conditions after capture, but they regained their calving vigour between 31 and 44 years. This was striking evidence that captured elephants were able to cope with the stress of being in captivity without losing reproductive vigour, especially later in life.

The calving records of 3 070 elephants during the period of 1942 and 1999 showed that peak calving for working cow elephants occurred in January. Based on the birth records of 261 cow elephants, Sukumar (1989) reported that the Asian elephants of South India had a similar calving pattern with the peak number of births in January. This indicated that conceptions peaked during September/October (assuming a mean gestation period of 20-21 months), which was three to four months after the onset of the southwest monsoon (Sukumar *et al.*, 1997). The total number of calves (n = 3 070) born between 1942 and 1999 demonstrated the mean calving rate in captive elephants as 53.9 calves per year. The value of the net reproduction rate *Ro* (0.50) in this study confirmed the fact that, overall, the cow elephants were not producing enough daughters to replace themselves, which means the population was declining. The mean per capita rate of increase (*r*) was 0.017 calves/year indicating an intercalving interval of 58.8 years. The resulting generation time (*T*) of 28.93 years was much longer than the mean age at first calving (26.54 ± 10.11 years) based on the pooled data.

The maximum age-specific fecundity rate ($m_x = 0.027$) was noticed at age 27 (23 calves from 4 355 cohort cow elephants). The maximum calving of CB and WC dams was 272 and 332, which took place at the age of 20–25 and 25–30 years, respectively. It was apparent that WC cows produced more offspring than CB cows (537 and 1 175) in the latter part of their lives, beyond these ages of peak production of calves. According to the Master Plan of the American Zoological Association (1997-2002), *Ro, T, r* of the Asian Elephants (M = 20, F = 115) in North America were 1.15, 26.27 and 0.005 respectively, during the period of 1980 and 1998, which indicates that the Asian elephants in American zoos are increasing in number, but the mean per capita rate of increase (*r*) is too low to maintain the captive herd in sustainable condition (Keele and Dimeo-Ediger, 1999). One of the main reasons was that over 30 percent of the animals conceived were stillborn, aborted, rejected by the mother, or killed by the mother and some neonates failed to survive the first 30 days following birth as a result of unknown causes (Kurt and Mar, 1996 and Keele and Dimeo-Ediger, 1999). According to Taylor and Poole (1998), 55 percent of stillbirths (11 out of 20) were recorded in member zoos of the

European Endangered Species Programme (EEP) and the Species Survival Plan (SSP) of North America.

Agalactia (lack of or deficient milk formation) in working cow elephants was one of the major causes that lead to neonatal deaths. Agalactia was pronounced in multiparous cows. Similar reports on deficient lactation in Asian cow elephants were noticed in the exhibiting Asian elephants kept in North America (Mikota *et al.*, 1994). The calving records of the Myanmar Asian Elephant Studbook documented that the shorter intercalving interval in working cow elephants was not a desirable characteristic as it provoked higher neonatal mortality in younger calves as a result of there being less opportunity to get enough milk during the first few months of age. The heavy burden of lactating two calves at the same time would lead to a longer interbirth interval in later pregnancies. Among a total of 738 mortality records in calves, death because of general weakness as the result of agalactia ranked the highest (27.1 percent), followed by deaths as a result of snake bite (14 percent), and accidents, such as falling, drowning, strangulation by their own chains etc. (8.2 percent).

The high death rate at the age of four to five years might be a result of taming-related causes. Taming was traditionally conducted at the approximate age of four years or in the case of some sub-adults (four to seven years olds), immediately after capture. Male calves generally resisted taming and breaking procedures and often sustained more injuries than female calves during taming processes. It was generally agreed that the older the calf at the time of taming or the stronger/bigger body configuration, the longer it took time to finish the taming processes. Taming procedures would not last more than two to four weeks for captive born calves. Further research needs to be carried out to identify the relationship between stress, age and temperament of calves and the method/duration of taming.

The survivorship curves of CB and WC elephants showed that WC cohorts had higher survival chances than CB elephants until the age of 39. WC elephants lost their survival vigour after this age (l_x = 0.80 at age 39 vs. l_x = 0.76 at age 45) while CB elephants showed stable lx (l_x = 0.78 at age 39 and. l_x = 0.77 at age 45) (Table 1). Different patterns of survivorship were seen in elephants less than five years, notably WC calves retained their survival vigour until they reached the age of five.

Continuous decline of survival by age reflected the expanding workload per elephant by year, which in turn reflected the increase in yearly timber production by Myanmar to meet the ever-growing demand of timber products in the world's markets. At the same time, loss of habitat together with reduced quality forage led to nutritional imbalance or insufficient food intake, which were the major causes of mortality in working elephants.

Conclusions

The life table analysis of working elephants of Myanmar documented that:

1) The population trend of the government-owned captive working elephants in Myanmar was not sustainable (R_0 = 0.50) as, overall, cow elephants were not producing enough calves to replace themselves. This might primarily be a result of the high mortality rate (32.5 percent) of calves under five years and the low calving rate that was insufficient to replace the deaths.
2) Survivorship analysis showed that wild caught and female elephants had significantly higher survival rates than captive born and male elephants (0-45 years), respectively.
3) Survivorship analysis for calves (less than five years) showed that calves born from CB dams had significantly higher survival rates than those born from WC dams, but the survival rate and sex of calves were found to show no correlation.

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Table 1. Life table analysis of working elephants from pooled data

Age (x)	Total died	lx	dx	qx	px
0	96	1	0.026282	0.026282	0.973718
1	245	0.973718	0.015984	0.016415	0.983585
2	149	0.957734	0.006329	0.006608	0.993392
3	59	0.951405	0.004827	0.005074	0.994926
4	45	0.946578	0.015447	0.016319	0.983681
5	144	0.931131	0.017593	0.018894	0.981106
6	164	0.913538	0.009333	0.010216	0.989784
7	87	0.904205	0.005149	0.005695	0.994305
8	48	0.899056	0.005042	0.005608	0.994392
9	47	0.894014	0.00354	0.00396	0.99604
10	33	0.890474	0.003433	0.003855	0.996145
11	32	0.887041	0.001502	0.001693	0.998307
12	14	0.88554	0.002789	0.00315	0.99685
13	26	0.88275	0.003111	0.003524	0.996476
14	29	0.87964	0.001395	0.001585	0.998415
15	13	0.878245	0.003647	0.004153	0.995847
16	34	0.874598	0.002896	0.003312	0.996688
17	27	0.871701	0.003862	0.00443	0.99557
18	36	0.86784	0.002038	0.002349	0.997651
19	19	0.865801	0.003111	0.003593	0.996407
20	29	0.86269	0.003755	0.004352	0.995648
21	35	0.858936	0.003755	0.004371	0.995629
22	35	0.855181	0.003647	0.004265	0.995735
23	34	0.851534	0.00236	0.002771	0.997229
24	22	0.849174	0.003325	0.003916	0.996084
25	31	0.845849	0.002789	0.003297	0.996703
26	26	0.843059	0.003647	0.004326	0.995674
27	34	0.839412	0.003111	0.003706	0.996294
28	29	0.836301	0.003433	0.004105	0.995895
29	32	0.832868	0.00354	0.00425	0.99575
30	33	0.829328	0.004184	0.005045	0.994955
31	39	0.825145	0.004935	0.00598	0.99402

Age (x)	Total died	lx	dx	qx	px
32	46	0.82021	0.003433	0.004185	0.995815
33	32	0.816778	0.001931	0.002364	0.997636
34	18	0.814847	0.003755	0.004608	0.995392
35	35	0.811092	0.003862	0.004761	0.995239
36	36	0.80723	0.005471	0.006777	0.993223
37	51	0.801759	0.003647	0.004549	0.995451
38	34	0.798112	0.004613	0.00578	0.99422
39	43	0.793499	0.00472	0.005948	0.994052
40	44	0.788779	0.004935	0.006256	0.993744
41	46	0.783845	0.004076	0.0052	0.9948
42	38	0.779768	0.003969	0.00509	0.99491
43	37	0.775799	0.003969	0.005116	0.994884
44	37	0.77183	0.005042	0.006532	0.993468
45	47	0.766788	0.099335	0.129547	0.870453
>45	926	0.667453	0.054066	0.081003	0.918997

Table 2. Percent mortality of calves (<5yr) and overall elephants (5-45yr) by months

	% total mortality (<5yr)	**% total mortality** (5-45yr)
January	11.25	8.81
February	9.49	7.44
March	9.21	8.88
April	10.57	13.05
May	10.30	14.03
June	6.78	9.20
July	6.64	6.98
August	7.59	6.79
September	6.37	6.46
October	5.96	6.53
November	6.50	5.22
December	9.35	6.59
Total	**100.00**	**100.00**

Table 3. Age-specific calving potential in CB and WC cows, showing number and percent of calves born alive and dead at the time of parturition

Dam age	Total calves born	No. of live Births	No. of stillborn/ abortion	% total stillborn/ abortion
under 10 yr	12	12	0	0
10-15 yr	105	100	5	5.21
15-20 yr	347	336	11	11.46
20-25 yr	539	522	17	17.71
25-30 yr	562	542	20	20.83
30-35 yr	453	440	13	13.54
35-40 yr	382	369	13	13.54
40-45 yr	294	287	7	7.29
45-50 yr	209	203	6	6.25
50-55 yr	112	108	4	4.17
55-60 yr	32	32	0	0.00
0ver 60 yr	20	20	0	0.00
Total	**3 067** (excluding 3 calves born from dams with unknown dob)	**2 971** (96.72 % total)	**96** (3.13 % total births)	

Table 4. Prime reproductive age and dam age at the first calving

Dam age	Total calves born	Total calves born from CB cows	Total calves born from WC cows	No. of calves born from primiparous CB cows	No. of calves born from primiparous WC cows
Under 10 yr	12	7	5	6	5
10-15 yr	105	73	32	66	25
15-20 yr	347	239	108	175	96
20-25 yr	539	272	267	102	190
25-30 yr	562	230	332	39	174
30-35 yr	453	143	310	13	132
35-40 yr	382	95	287	3	97
40-45 yr	294	50	244	3	75
45-50 yr	209	17	192	1	42
50-55 yr	112	2	110	0	23
55-60 yr	32	0	32	0	6
over 60 yr	23		23	0	3
Total	**3 070**	**1 128**	**1 942**	**408**	**868**

Table 5. Births by month

Month	Births	% sub-total
January	350	11.41
February	318	10.37
March	334	10.89
April	263	8.58
May	204	6.65
June	185	6.03
July	187	6.10
August	180	5.87
September	232	7.56
October	266	8.67
November	235	7.66
December	313	10.21
Sub-total	3 067	100.00
Unknown dates of births	3	
Total	**3 070**	

Table 6. Calf mortality by sex* and by dam origins

Death age	Total deaths	% total deaths	Calves born from CB dam	Calves born from WC dams	Female calves	Male calves
Stillbirths	96	13.01	96	0	43	53
Under 0.5 yr	187	25.34	186	1	91	96
0.5-1 yr	58	7.86	57	1	28	30
1-1.5 yr	74	10.03	74	0	29	45
1.5-2 yr	75	10.16	75	0	29	46
2-2.5 yr	39	5.28	38	1	15	24
2.5-3 yr	20	2.71	20	0	11	9
3-3.5 yr	21	2.85	18	3	10	11
3.5-4 yr	24	3.25	19	5	10	14
4-4.5 yr	60	8.13	56	4	25	35
Over 5 yr	84	11.38	75	9	31	51
Total	**738**	**100.00**	**714**	**24**	**322**	**414**

* Two calves were of unknown sex.

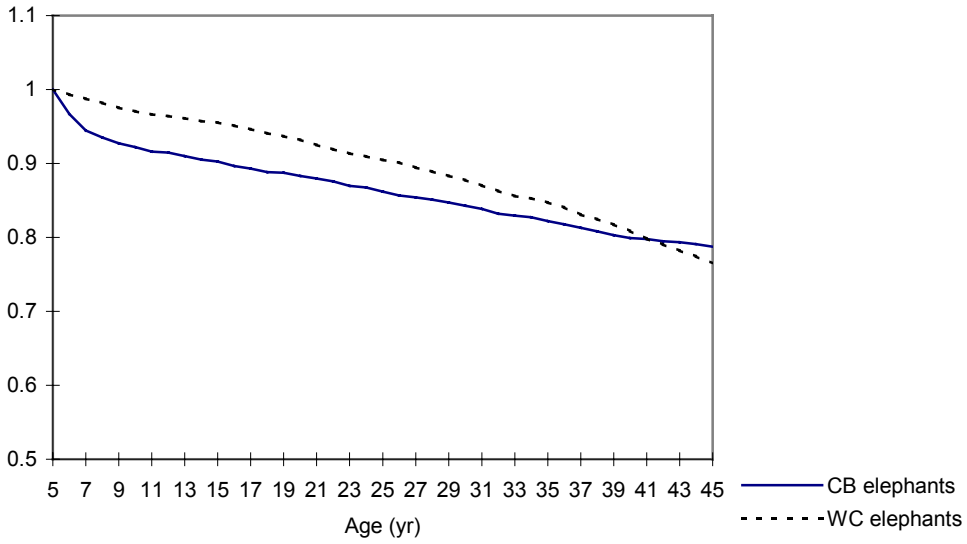

Fig. 1. Survivorship curve for WC and CB elephants (5-45) yr)

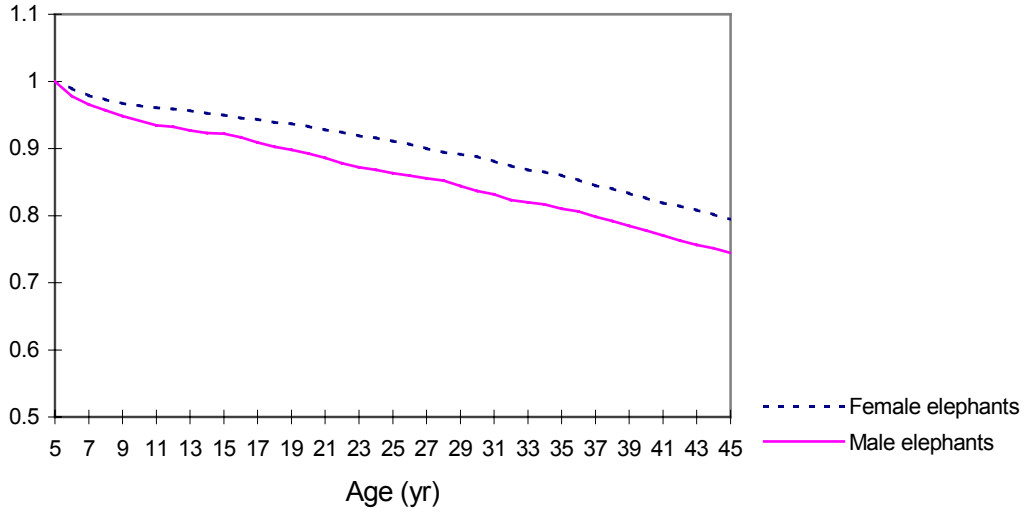

Fig. 2. Survivorship curve for male and female elephants (5-45 yr)

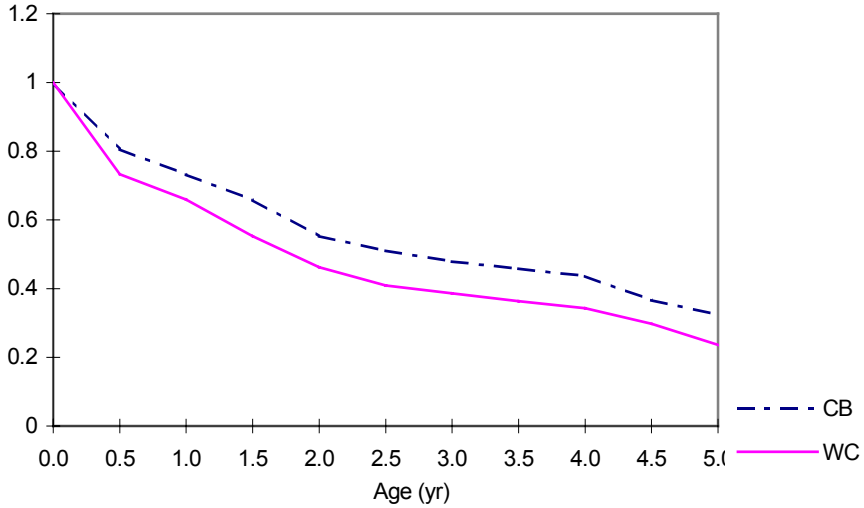

Fig. 3. Survivorship curve for calves (<5yr) born from WC and CB dams

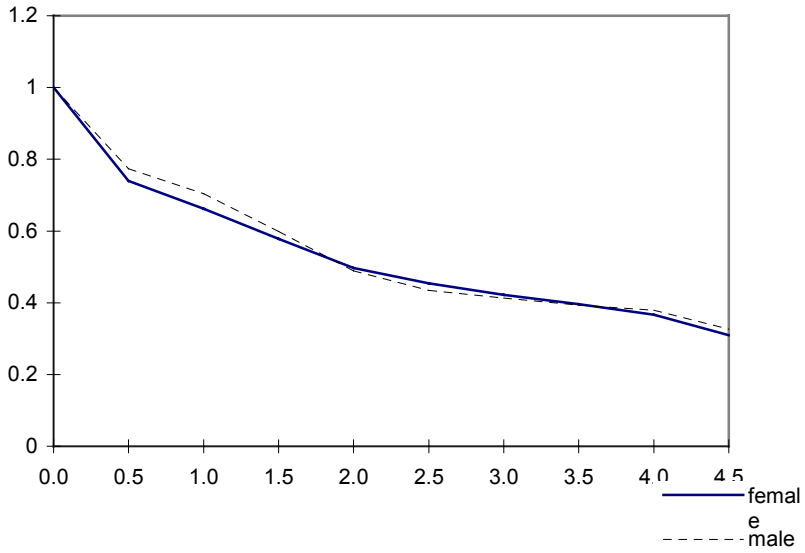

Fig. 4. Survivorship curve for male and female calves

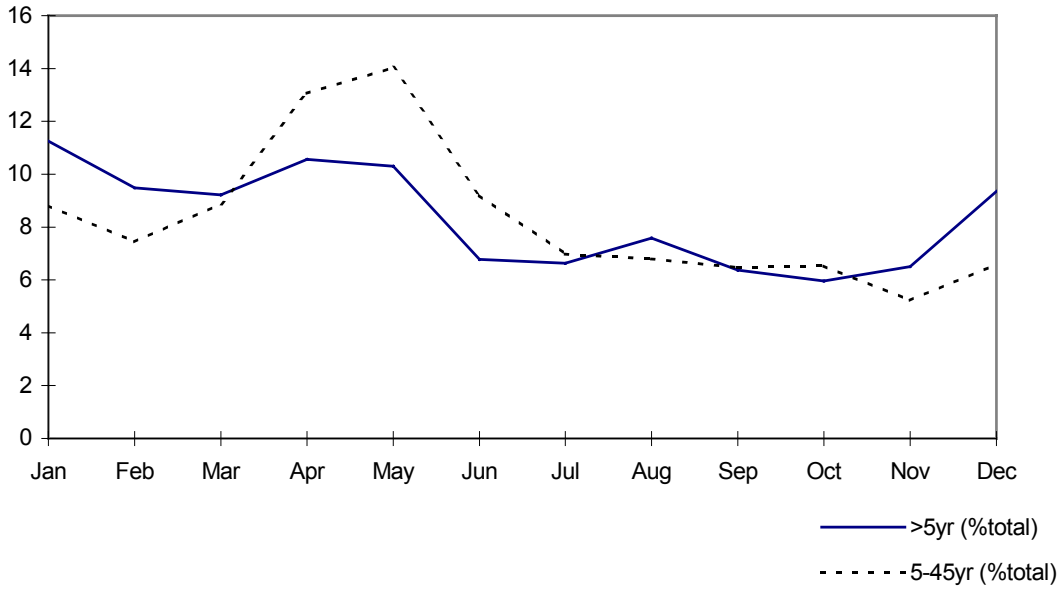

Fig. 5. Seasonal mortality of calves (<5 yr) and elephants (5-45 yr)

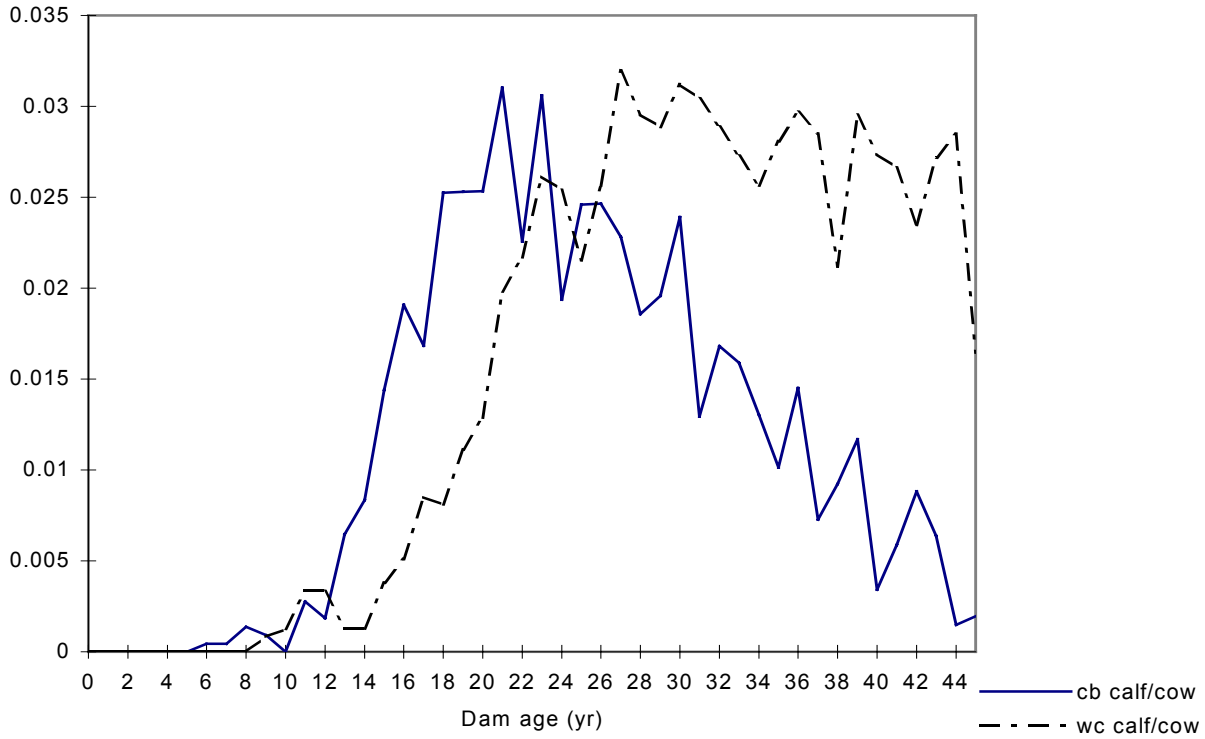

Fig. 6. Calving potential of WC and CB dams

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Comparison of serum chemistry values and serum mineral values between captive and free-ranging elephants in Thailand

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Abstract

Blood samples of Thai elephants (*Elephas maximus indicus*) were collected for the study of serum chemistry values and serum mineral values in October 1999. The elephants studied comprised twenty-seven captive elephants (8-55 years old) who were raised in Ayutthaya province (Group 1), and twenty free-ranging elephants (21-60 years old) in Tung Gwean Reforestation Station, Lampang province (Group 2). The mean values of SGOT, ALP, TP and BUN of the elephants in Group 1 were 10.36 ± 2.51 U/l, 24.99 ± 13.33 U/l, 7.78 ± 1.04 g/dl and 7.27 ± 2.85 mg/dl, respectively, whereas the mean values of SGOT, ALP, TP and BUN of the elephants in Group 2 were 13.32 ± 5.91 U/l, 14.07 ± 4.01 U/l, 8.24 ± 0.9 g/dl and 13.46 ± 2.33 mg/dl, respectively. The mean values of SGOT, ALP and BUN of the elephants in Group 1 and Group 2 were significantly different ($p<0.05$), but the mean value of TP was not different ($p>0.05$). Moreover, the mean percent PCV of the elephants in Groups 1 and 2 were significantly different ($p<0.05$) but they were not different in the case of male and female elephants raised in the same environment.

The mean values of phosphorus (P), calcium (Ca), magnesium (Mg), sodium (Na) and potassium (K) in the serum of the elephants in Group 1 were 5.74 ± 0.96 mg/dl, 8.83 ± 0.99 mg/dl, 1.96 ± 0.26 mg/dl, 113.28 ± 24.42 mEq/l and 4.66 ± 0.83 mEq/l, respectively. The mean values of P, Ca, Mg, Na and K of the elephants in Group 2 were 6.53 ± 1.16 mg/dl, 10.52 ± 0.33 mg/dl, 2.58 ± 0.44 mg/dl, 89.04 ± 10.67 mEq/l and 4.76 ± 0.54 mEq/l, respectively. The mean values of P, Ca, Mg and Na of the elephants in Group 1 and 2 were significantly different ($p<0.05$), but the mean values of K were not different ($p>0.05$). In Group 2 the mean values of Mg, Na and K in the male elephants were higher than those in the female elephants ($p<0.05$). However, the P and Ca values for males and females in Groups 1 and 2 were not different ($p>0.05$). The age of the elephants influenced the levels of Mg and P, but not the levels of Ca, Na and K.

Introduction

In the past, captive Thai elephants (*Elephas maximus indicus*) were used in the forest industry and usually fed in natural forests. Those traditional jobs have been lost, and most elephants now work in the tourism industry (in shows and tours). Because they are raised in urban areas where their conventional foods are not available, it is assumed that the health of the elephants is likely to be affected by the changed diet. One of the diagnostic tools used for determining health status in animals is serum chemistry values, such as serum enzyme. In addition, minerals play an important role in maintaining the water balance and distribution in the body. The major mineral elements include phosphorus (P), calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), sulfur (S) and chloride (Cl). Ca is mostly found in bones and teeth and both Ca and P play important roles in blood clotting and muscle contraction. Mg is found in tissues and blood cells and Na plays an important role in controlling water volume in the body and pH balance (Kaneko, 1989).

The objectives of this study were: (1) to investigate the standard values of serum chemistry and serum minerals of elephants; (2) to compare these values between captive elephants raised in urban

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areas and free-ranging elephants in forests; and (3) to compare the selected serum chemistry values and serum mineral values of males and females in both groups.

Materials and method

1. Elephant blood samples

Blood samples were collected from the ear veins of two groups of captive Thai elephants in October 1999. These consisted of 27 captive elephants (8 to 55 years old) who were raised in Ayutthaya City, Ayutthaya province (Group 1) and from 20 free-ranging elephants (21 to 60 years old) in Tung Gwean Reforestation Station, Lampang province (Group 2) (see Table 1). The elephant blood was analyzed to determine hematocrit volumes (percent PCV), and selected serum chemistry and mineral values.

Table 1. Number, age and sex of the elephants studied

Elephants	Sex	Age range (years old)	Age group (years old)	No. of samples
Group 1	Female	8–55	< 12	3
	(24*)		12–20	8
			21–46	9
			> 46	4
	Male	14–25	12–20	2
	(3*)		21–46	1
Group 2	Female	25–60	21–46	12
	(15*)		> 46	3
	Male	21–53	21–46	3
	(5*)		> 46	2

* = Number of elephants

2. Determination of sera

Sera were determined for serum chemistry values and serum minerals. The selected serum chemistry values to be determined were: (1) aspartate aminotransferase (SGOT) value by Reitman and Frankel method; (2) alkaline phosphatase (ALP) value by p-nitrophenyl phosphate method; (3) total protein (TP) value by hand refractometer; and (4) blood urea nitrogen (BUN) by diacetyl monoxime method (BMLab, 1987). The selected serum mineral values to be determined were P value by Taussky method (Motoi, 1988) using Beckman spectrophotometer DU-64 and Ca, Mg, Na and K values by atomic absorption spectrophotometry (AOAC, 1984). The mean serum chemistry values and serum mineral values of Groups 1 and 2 were compared using students' t test.

Results

By gross examination, most of the elephants in Group 2 were larger and looked healthier than those in Group 1. The mean values of SGOT, ALP, BUN and percent PCV for Group 1 and 2 were significantly different ($p<0.05$). But the mean values of TP were not different ($p>0.05$). The mean values of SGOT, BUN and percent PCV of the female elephants in Group 2 were significantly higher than those in Group 1. In contrast, the mean ALP value of the male elephants in Group 1 was significantly higher than that of the male elephants in Group 2 ($p<0.05$). There was no significant difference in BUN, ALP and TP values for male and female elephants ($p>0.05$). While the mean percent PCV of Groups 1 and 2 were significantly different ($p<0.05$), there was no difference in the male and female elephants that were raised in the same environment (Table 2).

Table 2. Serum chemistry values and %PCV of the elephants studied

Elephants	**SGOT** (U/l)	**ALP** (U/l)	**TP** (g/dl)	**BUN** (mg/dl)	**%PCV**
Group 1					
Female	10.36 ± 2.61* (15.8 – 5.8)	23.43 ± 11.85 (57.8 – 12.4)	7.91 ± 1.03 (11.0 – 6.9)	7.48 ± 2.88 (16.1 – 3.9)	29.3 ± 3.02 (35 – 24)
Male	10.40 ± 2.0 (12.0 – 8.2)	37.42 ± 20.8 (55.5 – 14.7)	6.7 ± 0.3 (7.0 – 6.4)	5.61 ± 2.37 (7.7 – 3.0)	27.3 ± 4.62 (30 – 22)
Total	10.36 ± 2.51 (15.8 – 5.8)	24.99 ± 13.33 (57.8 – 12.4)	7.78 ± 1.04 (11.0 – 6.4)	7.27 ± 2.85 (16.1 – 3.0)	29.1 ± 3.18 (35 – 22)
Group 2					
Female	13.31 ± 5.48 (22.1 – 5.3)	13.96 ± 3.85 (22.2 – 7.7)	8.33 ± 0.97 (10.0 – 6.5)	13.31 ± 2.43 (16.9 – 8.5)	33.6 ± 4.55 (40 – 25)
Male	13.88 ± 7.79 (24.5 – 5.8)	14.38 ± 4.93 (21.6 – 8.4)	7.94 ± 0.69 (8.6 – 6.9)	13.91 ± 2.18 (17.3 – 11.7)	30.4 ± 5.73 (38 – 23)
Total	13.32 ± 5.91 (24.5 – 5.3)	14.07 ± 4.01 (22.2 – 7.7)	8.24 ± 0.9 (10.0 – 6.5)	13.46 ± 2.33 (17.3 – 8.5)	32.8 ± 4.92 (40 – 23)
Group 1 & 2	11.62 ± 4.49 (24.5 – 5.3)	20.34 ± 11.70 (57.8 – 7.7)	7.97 ± 1.0 (11.0 – 6.4)	9.90 ± 4.05 (17.3 – 3.0)	31.7 ± 4.37 (40 – 22)

* = Mean ± SD, ( ) = Maximum value and minimum value

In this study, it was found that the mean values of P, Ca, Mg and Na in the free-ranging elephants were significantly higher than those of the captive elephants ($p<0.05$), but the mean value of K showed no difference ($p>0.05$). In Group 2, the mean values of Mg, Na and K in the male elephants were higher than those of the female elephants ($p<0.05$). However, the P and Ca values between the male and female elephants in Group 1 and 2 had no difference ($p>0.05$) (Table 3). In addition the age of the elephants influenced Mg and P levels, but did not influence Ca, Na and K levels. The mean Mg value of the elephants in Group 1 (12–20 years old) was the highest. This Mg value, however, declined in older elephants, and the same tendency was observed for the P value (Table 4).

Table 3. The values of P, Ca, Mg, Na and K in the serum of the male and female elephants

Elephants	**P** (mg/dl)	**Ca** (mg/dl)	**Mg** (mg/dl)	**Na** (mEq/l)	**K** (mEq/l)
Group 1					
Female	5.64 ± 0.84* (7.39 – 3.97)	8.75 ± 1.0 (11.16 – 7.03)	1.96 ± 0.27 (2.45 – 1.51)	112.09 ± 24.75 (191.3 – 77.5)	4.64 ± 0.87 (7.74 – 3.44)
Male	5.50 ± 1.28 (6.94 – 4.48)	9.25 ± 0.58 (9.79 – 8.63)	1.83 ± 0.16 (1.94 – 1.65)	104.57 ± 9.10 (115 – 98.3)	4.63 ± 0.64 (5.36 – 4.13)
Total	5.74 ± 0.96 (7.99 – 3.97)	8.83 ± 0.99 (11.16 – 7.03)	1.96 ± 0.26 (2.45 – 1.51)	113.28 ± 24.42 (191.3 – 77.5)	4.66 ± 0.83 (7.74 – 3.44)
Group 2					
Female	6.36 ± 1.25 (9.48 – 4.67)	10.45 ± 0.24 (10.98 – 10.13)	2.44 ± 0.20 (2.91 – 2.09)	87.10 ± 9.29 (111.29 – 73.56)	4.58 ± 0.50 (5.3 – 3.81)
Male	7.01 ± 0.77 (7.56 – 5.73)	10.79 ± 0.50 (11.38 – 10.23)	3.08 ± 0.72 (3.67 – 2.21)	94.56 ± 13.43 (117.08 – 81.56)	5.26 ± 0.28 (5.41 – 4.77)
Total	6.53 ± 1.16 (9.48 – 4.67)	10.52 ± 0.33 (11.38 – 10.13)	2.58 ± 0.44 (3.67 – 2.09)	89.04 ± 10.67 (117.08 – 73.67)	4.76 ± 0.54 (5.41 – 3.81)
Group 1 & 2	6.10 ± 1.10 (9.48 – 3.97)	9.52 ± 1.15 (11.38 – 7.03)	2.21 ± 0.47 (3.67 – 1.51)	103.06 ± 23.34 (191.30 – 73.56)	4.68 ± 0.72 (7.74 – 3.44)

* = mean ± SD, ( ) = maximum value and minimum value

Table 4. The values of P, Ca, Mg, Na and K of the elephants in various age groups

Minerals	<12 years old	12 – 20 years old	21 – 46 years old	>46 years old
P (mg/dl)	6.15 ± 2.01	5.31 ± 0.98	5.68 ± 1.11	5.61 ± 0.15
Ca (mg/dl)	9.05 ± 3.23	8.47 ± 0.71	8.9 ± 1.27	8.8 ± 1.1
Mg (mg/dl)	2.34 ± 0.77	1.99 ± 0.28	1.93 ± 0.18	1.75 ± 0.15
Na (mEq/l)	85.83 ± 31.46	110.6 ± 10.9	122.8 ± 34.7	92.8 ± 12.76
K (mEq/l)	4.63 ± 1.81	4.7 ± 0.60	4.43 ± 0.41	4.11 ± 0.68

Discussions

The mean values of SGOT, ALP and BUN of the elephants in Groups 1 and 2 showed significant differences ($p<0.05$), perhaps as a result of different living environments and management conditions. This can be explained as follows. Firstly, the elephants in Group 2 could feed whenever they wanted. Usually elephants spend about 12-19 hours per day on eating (Guy, 1975; Vancuylenberg, 1977). Second, the food sources that the elephants of Group 2 had access to were bamboo (*Gigantochloa* sp., *Bambusa* sp.), banana (*Musa* sp.), mountain grass (*Capillipedium* sp.), etc. The elephants in Group 1 were fed with banana, cucumber, sugar cane (*Saccharum* sp.), and long bean (*Vigna* sp.). Lastly, the Group 1 elephants had less opportunity for physical movement than the Group 2 elephants.

The higher mean values of ALP in some Group 1 elephants indicated an infection caused by *Fasciola* species.

The findings of this study differed from those of Silvar and Kuruwita (1993). They reported that there were no differences in serum chemistry values in sexes as well as between captive and free-ranging elephants in Sri Lanka. This could have resulted from different examination techniques for serum analysis and also from different elephant samples. The serum chemistry values and percent PCV of the elephants in this study were compared with the studies of Limpoka *et al.* (1990), Mikota *et al.* (1998) and Siruntawineti *et al.* (1995) in Table 5. All their serum samples were collected from captive elephants.

Table 5. The SGOT, ALP, TP, BUN and %PCV values of elephants from various studies

	Mean	SD	Max	Min	Authors
SGOT	11.62	4.49	24.48	5.28	Tuntasuvan *et al.,* 2001
(U/l)	8.13	2.47	15.36	4.95	Limpoka *et al.,* 1990
	21.38	-	-	-	Mikota *et al.,* 1998
ALP	20.34	11.7	57.78	7.69	Tuntasuvan *et al.,* 2001
(U/l)	18.64	5.41	33.50	10.50	Limpoka *et al.,* 1990
	157.8	-	-	-	Mikota *et al*., 1998
TP	7.97	1.0	11.0	6.4	Tuntasuvan *et al.,* 2001
(g/dl)	9.74	0.76	11.8	8.40	Limpoka *et al*., 1990
	8.04	-	-	-	Mikota *et al*., 1998
BUN	9.90	4.05	17.29	3.04	Tuntasuvan *et al.,* 2001
(mg/dl)	9.49	2.63	15.50	6.14	Limpoka *et al*., 1990
	12.69	-	-	-	Mikota *et al*., 1998
%PCV	31.7	4.37	40	22	Tuntasuvan *et al.,* 2001
	29.1	2.48	37	26	Limpoka *et al*., 1990
	38.8	-	-	-	Mikota *et al*., 1998
	34.0	3.9	-	-	Siruntawineti *et al.,* 1995

The serum mineral values of captive Thai elephants were first studied by Suthammapinan *et al.* (1990). Pemayothin *et al.* (1998a,b) reported that the K and Mg values decreased as the elephants' ages increased. The mean values of P, Ca, Mg and K (except Na) in Group 1 were similar to the values reported by Limpoka *et al.* (1990) and Pemayothin *et al.* (1998a,b), who studied captive Thai elephants in the Elephant Conservation Centre, Lampang province. In addition, the mean values of Mg, Na and K in male elephants were significantly higher than female elephants. Pemayothin *et al.* (1998a, 1998b), Mikota *et al.* (1998), and Nirmalan and Nair (1969) also reported the same trend as shown in Table 6.

Table 6. The mean values of P, Ca, Mg, Na and K of the elephants from various studies

	P (mg/dl)	**Ca** (mg/dl)	**Mg** (mg/dl)	**Na** (mEq/l)	**K** (mEq/l)
Female[1]	4.98 ± 0.77 (7.3 – 2.6)	10.88 ± 0.64 (12.8 – 8.40)	1.98 ± 0.34 (2.60 – 1.50)	128.7 ± 3.73 (142.0 – 118.0)	4.62 ± 0.43 (6.20 – 3.30)
Male[1]	5.25 ± 1.01 (8.2 – 2.8)	11.01 ± 0.60 (12.9 – 9.80)	3.10 ± 0.00 (3.10 – 3.10)	130.0 ± 4.39 (141.0 – 118.0)	4.79 ± 0.46 (6.9 – 3.9)
Female & male[2]	4.25 ± 0.84 (6.59 – 2.18)	8.52 ± 1.73 (12.4 – 5.9)	2.04 ± 0.70 (3.30 – 0.53)	50.76 ± 4.63 (61.97 – 43.89)	3.10 ± 0.32 NR
Female			2.22 ± 0.36[3]		4.92 ± 0.88[4]
Male			2.23 ± 0.40[3]		5.12 ± 1.14[4]

[1] = Mikota *et al.*, 1998, [2] = Suthammapinan *et al.*, 1990, [3] = Pemayothin *et al.*, 1998a,
[4] = Pemayothin *et al.*, 1998b, NR = no report

Conclusions

The mean values of SGOT, BUN and percent PCV in the free-ranging female elephants were higher than the female captive elephants. In the captive elephants serum Mg, Na, and K values of the males were higher than those of the females. An elephant's age influenced the serum Mg and P values in both groups, but did not influence Ca, Na and K values. The different feeding and management systems for elephants influenced SGOT, ALP, BUN, percent PCV, P, Ca, Mg and Na values. The sex factor had no influence on BUN, ALP and TP values. Thus the range and mean values of SGOT, BUN, ALP, TP, percent PCV, P, Ca, Mg, Na and K on the free-ranging elephants should be considered as standard values for either sex.

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Tranquillization and translocation of captive bulls

Jacob V. Cheeran, K.C. Panicker, R.K. Kaimal and P.B. Giridas

Introduction

Kerala is a small coastal state located in the south of India. It enjoys a tropical climate with heavy rainfall, has an area of 39 000 km^2 and a captive elephant population of approximately 600. Nearly 500 hundred of these elephants are bulls (tuskers). Temple, church and mosque festivals are a common occurrence in Kerala and it is common to see 50 to 60 tuskers at these festivals. Only tuskers are used on such occasions.

During the last two decades more than 400 (418, as of 29 January 2001) bulls in *musth* have been tranquillized and translocated. Table 1 gives the seasonal distribution of tranquillized elephants up to June 2000.

Tranquillization

Tranquillization is done either at the festivals, in villages, towns, and timber yards or occasionally in forests where lumbering operations are carried out. No *kunkies* (monitor elephants) have been used. Darting is done invariably on foot, except on rare occasions when it is done from the top of a building or from a tree. After sedation the animal has to be translocated to a safe tethering site a short distance away until it is amenable to safe handling by the mahout. Occasionally an elephant will have to be darted with the mahout still on the top of the elephant when it does not allow the mahout to climb down. Initially, nicotine was used but was later discontinued. On one occasion, Xylazine (@100 mg/MT of body weight) with Ketamine was used to tranquillize bulls and once Gallamine was used.

Ketamine and Xylazine together did not produce as much synergism as has been observed in carnivores. Ketamine produced photo-sensitization. When the animal is left to stand in the hot sun a triangular 'burn' patch beginning from the neck to the thoracic portion on the back is produced. A large number of animals have been controlled using an Acepromazine (40 to 60 mg/MT body weight) - Xylazine combination. The sedation was good and manipulation was easy. But some of the elephants that were exposed to the direct sunlight developed photo-sensitization on the dorsal aspect. The area, which suffered the sunburn, was triangular in shape with the dimension of 45 x 90 x 90 cm, approximately with the base beginning from the neck. To prevent the sunburn, as well as to arouse the animal from sedation, water was poured over the animal. However, to avoid the occurrence of photo sensitization the Acepromazine, which is a Phenothiazine derivative, was later avoided and only Xylazine (@100 mg/MT of body weight) was used. The equipment used was a Palmer's Cap-chur gun or a Dist Inject using a detonating mechanism (syringe charge) for the drug injection. Any disturbance during the injection prolongs the induction period for a considerable time. Because most of the darting takes place in crowded areas it is very difficult to contain the excitement of the crowd so some disturbance is perhaps inevitable.

The initial symptoms of induction will be noticed by the relaxation of the penis, which will be seen within five to eight minutes after darting if there is there is no disturbance. Gradually, movements of tail, ears and the trunk reduce and the animal remains almost motionless. At times the animal may snore. This is no indication of the depth of sedation and the animal can be aroused explosively if handled. The peak result is obtained about 40–45 minutes after the onset of the symptoms described here. Thus the animal should be handled only after this time. No rise in body temperature is ordinarily noticed. If the animal is feeding at the time of injection the fodder will be kept in the mouth rather than swallowed or dropped. The animal will remain in a standing position, and any attempt to lie down,

which is rare, should be discouraged. A certain amount of ambulatory property is to be retained by the animal to enable translocation on foot.

The level of sedation is tested by touching the area at the base of the tail of the standing animal with a long pole. If the response is very mild or nil, the translocation operation can be started. If the animal is not under proper sedation an additional dose can be given one hour after of the first darting. After achieving a satisfactory level of sedation the noosing can be started. Injection by subcutaneous route or haematoma at the injection site can slow down the action.

Noosing

Four ropes (preferably polypropylene) of 2 cm diameter and 8 m length are used. An iron ring of 8-10 cm in diameter is tied at one end. If this is not available on the spot a loose knot can be made at one end of the rope. The rope is thrown from behind between the two hind limbs, and then using a long hook the ringed end is taken and placed round one of the hind limbs. While lifting and pulling the ringed end it should be lifted as high as possible as the animal is likely to lift the leg and avoid noosing. The loose end of the rope is threaded raising the rope as high and quickly as possible. The rope is tied on to a tree or a good peg, as close to the ground as possible. Then the opposite foreleg is noosed in the same fashion.

While noosing the forelimb the rope may be thrown between the forelimb from the side of the elephant instead of standing in front of the elephant as this is a safer place to stand. This rope is also tied as safely as that on the hind limb. Any attempt made by the elephant to meddle with this rope with its trunk should be discouraged by giving commands and/or simultaneously by the hitting the trunk with a short stick.

Then noosing is undertaken with the remaining hind and fore limbs. When all the four limbs are noosed, translocation can be attempted. Ten to fifteen persons hold all the four ropes and the elephant is coaxed to move. Oral, percussive or mild prodding commands are given. This is supplemented by pulling the rope attached to the limb concerned. If enough coaxing is done the animal will move forward or even backward. The animal's subconscious mind works and obeys the command as if in a hypnotic trance. The mahout with whom the animal is angry should not be employed. His voice or even smell can provoke the animal. Even calling out for the chain or the sound of the chain will be experienced as unpleasant stimuli. The chain is carried in a gunny bag to avoid any sound.

By coaxing the animal, translocation to a distance of 100–200 m can be easily covered. For greater distances a mahout can mount on the animal and can give toe commands. This is also useful if the terrain is uneven or undulating.

The hind limb is first tied at the tethering site and then the forelimb is extended and tied to a tree. Then these ropes are replaced by chains. A distance of 60 cm should be left between the tree and the leg. A standard ball and socket joint chain is used to tie the hind limb to provide freedom to move and lie down if necessary. Water is poured all over the body to reverse the sedation. However, the animal should not be allowed to lie down and sleep immediately. Make sure that the ground surface is even and level to avoid difficulty when the elephant lies down. Reversal with Yohimbine or Yohimbine Plus 4-Aminopyridine is rarely done.

The festival season and the *musth* season often coincide resulting in more elephants bolting and a greater need, consequently, for darting. The majority of darting takes place during the pre *musth* or post *musth* period and rarely within the full *musth* period itself. On certain other occasions the owners start making use of the animal before the symptoms of full *musth* subsides. This leads to refusal of the animal to obey commands and resulting problems. The elephant immobilization team generally carries with it the necessary ropes with ring and detachable long hook along with an immobilization kit.

Table 1. Seasonal Distribution of Elephant Immobilization (April 1979 - June 2000)

Month	Number of Elephants Immobilized
January	55
February	62
March	49
April	42
May	33
June	22
July	14
August	08
September	24
October	25
November	31
December	37
Total	**402**

Question and answer session

Q1: What experience do you have of the drugs zolazapam, midazolam, detomidine and medetomiline?

A1: None. They are not available in India.

An out of control domesticated bull elephant in *musth* has been sedated. Note a dart on the left rump of the elephant. The mahout is trying to noose the hind limb.

The role of private organizations in elephant conservation

Soraida Salwala

Introduction

A number of private organizations have been founded with the objective of helping to conserve Thai elephants. Some of these organizations are operated in the form of registered charities, others are not. In any case, each NGO has its own capabilities and expertise, and its own specific goals. Unfortunately, these organizations rarely exchange ideas, share successful strategies and solutions to common problems, or engage in joint actions. If collaboration among the NGOs were to be strengthened it is highly likely that elephant welfare would be significantly improved.

Problems of Thai elephants

The problems of Thai elephants (and their mahouts) can be understood in terms of the elephants' work situations. We an identify four groups of elephants:

1) Working elephants
2) Elephants in tourism
3) Roaming elephants
4) Zoo and domesticated elephants.

Specific problems associated with each group are identified below.

Working elephants

Approximately 1 500 elephants are classified in this group. Although the government banned logging in 1989, some mahouts are still employed illegally and use their elephants to haul logs in the forest. Some elephants are abused by overwork. Some are fed addictive drugs to make them work harder and to speed up their work. Some are injured while working. Some are taken to work in neighbouring countries because of the decrease of forest land in Thailand. If the animals become sick, no proper treatment and care are provided. The services of professional veterinarians are never used.

In October 1994, in Lampang's Hang Chat district, Friends of the Asian Elephant (FAE) founded its first elephant hospital, which provides shelter for sick elephants. The hospital staff practice veterinary medicine and surgery not only in the surrounding regions, but also in the upper northern villages.

Limitations:

Some private organizations such as Friends of the Asian Elephant face certain restrictions in dealing with the elephant situation such as a lack of budget and personnel. Difficulty in commuting from one place to another is another limitation, especially in short time frames.

Suggestions:

1) A careful selection of working elephants for retraining in tourism is required. However, some working elephants cannot be trained to entertain tourists.
2) Some working elephants should be trained for boundary patrol duty in national parks and other wildlife conservation reserves. At present, there are 100 national parks in the country. If four elephants are assigned to patrol in each park, 400 will be utilized.

Elephants in the tourism business

There are approximately 700 elephants in this group. Most are working in the tourism industry transporting tourists to view forests and wilderness areas, or employed in elephant shows.

Limitations:

Some elephant camps provide low-standard services such as inadequate nutrition, unclean conditions, and insufficient water. Some mahouts' wages are too low or are even withheld and contracts are not respected.

Suggestions:

1) Standardize the commercial relationships between the business owners and the elephant mahouts. The operation should bring fair benefits to all parties involved.
2) Conduct a general training programme for elephant caretakers and mahouts and formulate some procedures for elephant selection.

Roaming elephants

This group comprises 300 elephants that mostly come from the Northeast of Thailand. FAE has discerned some special problems of rural areas and thus has put efforts into alleviating both short and long-term problems since 1994.

For the short term: The four corners of the city are equipped with clean water and forested surroundings in order to enhance the well-being of the elephants and their mahouts. Interested, sympathetic tourists and people from the general public are able to visit elephants at the centre nearest them.

For the long term: FAE has been supporting legal reform pertaining to elephants. It encourages other non-profit organizations to participate in programmes offering mahouts alternative careers. This would help them avoid leaving their hometown for long periods of time and their elephants can have a better quality of life.

Some other specific proposals launched through the media since 1993 and presented at the seminar *Surin Elephants: Crisis and Survival* (1996) can be listed as follows:

1) Establish a permanent elephant centre at Baan Taklang, Tumbon Krapoe, Amphur Thatoom district, Surin province. Interested groups can view elephants' habitat and their way of life throughout the year, instead of only during the two days of the annual Surin Elephant Festival (the third week of November), the traditional practice up to now.
2) Designate land surrounding elephant villages as public common areas for raising elephants.
3) Reserve unpolluted water sources passing through villages for villagers and their elephants.
4) Maintain, with the support of the government, good roads to the villages.
5) Seek funds for medicine and food to help the mahouts.
6) Assist in vocational training to supplement the mahouts' incomes such as through cropping or fabric weaving.
7) Promote the elephant villages as historical villages of the Gui people in order to preserve their culture and traditions. Gui people introduced Thais to their training methods for wild elephants, so they could be employed in war, logging, transportation, and so forth. The Tourism Authority of Thailand is urged to assist in the public relations aspects.

Finally, the problem of roaming elephants coming into Bangkok streets is the result of various complex, multilateral difficulties that have not yet been overcome. Broad collaboration from diverse organizations is therefore essential.

Zoo elephants and domesticated elephants

Approximately 100 elephants are categorized in this group. Some have been kept chained for long periods of time, years in some cases. They struggle against their confinement, and suffer constant high levels of stress. However, some are fortunate to be well taken care of.

Conclusions and recommendations

From the above, it can be seen that the elephants in each of the categories need different kinds of help, though any assistance is difficult to provide. For instance, the ultimate solution to alleviating the problems of working elephants is the creation of more jobs in logging; this is likely an impossible task though, given the Thai logging ban and the continuing deforestation of Thailand's neighbouring countries.

Because private organizations have contributed a great deal to the welfare of the country's elephants, the concerned government agencies should give them greater recognition. The government should neither devalue nor underestimate the contributions of private groups working to protect elephants. Private organizations have been responsible for the discovery of a number of facts critical to the elephants' welfare. Consequently, full support from the government is requested in the effort to enhance the elephants' conservation.

The following actions to enhance the ability of private conservation organizations are proposed:

1) All private organizations working for elephants should be exempted from taxes.
2) Field staff for private organizations should be allowed to carry tranquillizer guns in order to control elephants in *musth*.
3) Some regulations should be modified, such as: all baby elephants should be registered when they reach a certain age. The head of the village must be informed of the birth in order to avoid elephant smuggling.
4) In order to reduce the slaughter of elephants, especially for ivory sales, elephants should be reclassified as an endangered animal.
5) The export of elephants in the form of national gifts should be stopped.
6) The government should allocate funds to the private organizations to carry out their elephant conservation mission.
7) Law enforcement against people who destroy elephant habitat should be pursued aggressively.
8) More regular and frequent collaboration among public and private organizations should be conducted.

Friends of the Asian Elephant continues to work closely with the elephants at all times and hopes that all organizations who work for elephants can work jointly without bias or friction. If this happens, the elephants' welfare will be more assured.

Question and answer session

Q1: Are you working towards controlling reproduction of captive elephants?
A1: No.

One participant remarked that the priority should be on habitat conservation.

Q2: Mr Bambang from Indonesia said that his institution was interested in sending someone to observe the mobile clinics that treat elephants, he asked if this would this be possible?
A2: You should ask Dr Parnthep directly as he is responsible for this.

The role of NGOs in the management of domesticated elephants in Thailand

Parntep Ratanakorn

Abstract

The problems of domesticated elephants in Thailand such as being hit by cars, being fed addictive drugs to make them work harder and longer, and infectious diseases and malnutrition have a great impact on Thai society. People are becoming more aware of the threats to elephant welfare and are asking the responsible government authorities to provide better protection and assistance to elephants and to help meet their basic needs. In Thailand, responsibility for domesticated elephants lies with the Ministry of Interior, which takes care of registration, and the Department of Livestock Development, which looks after elephant health care. Yet the problems persist because of the lack of trained personnel, equipment and funding. A number of NGOs dealing directly with elephant welfare have been established in order to address these problems and to improve the welfare of the country's elephants. NGO activities include providing grants, equipment and medical supplies to government authorities, arranging seminars and workshops to strengthen the capabilities of government personnel in the field of elephant health care and management, setting up veterinary mobile units to rescue and treat elephants throughout the country, raising public awareness of elephant welfare and conservation issues through various media, etc. However, most NGO activities are constrained by lack of funding and the fact that they have no legal authorization to carry out certain activities. Therefore, it is impossible to adequately address all the problems faced by domesticated elephants. Currently there is no national committee that could act as an umbrella organization to coordinate the work of both GOs and NGOs. Nevertheless, the situation of domesticated elephants in Thailand has improved to some extent and it is hoped that further improvements will be made in the near future.

Introduction

Domesticated elephants in Thailand are now facing many threats such as unemployment, poor health conditions, and a lack of health care services, etc. Formerly, Thailand was renowned as a haven for elephants. Now, in most big cities, it is common to see exhausted and malnourished elephants wandering the streets with their mahouts begging for food and money. Some elephants are hit by cars or injured as a result of falling into open sewage drains. Many efforts to protect and assist the country's domesticated elephants have been initiated by NGOs, and GOs have followed suit. Most efforts to solve the problems of domesticated elephants have originated from the private sector. Some groups concerned with elephant welfare have been established in order to provide a direct service to elephants and their mahouts. These groups have generally made an effort to support the government authorities responsible for elephant welfare.

The management of domesticated elephants in Thailand is the responsibility of two government agencies, namely the Department of Livestock Development (DLD), Ministry of Agriculture and Co-operatives, which is responsible for the health care of domesticated elephant through their livestock veterinary service networks, and the Division of Registration (DOR), Ministry of Interior, which is responsible for the registration of domesticated elephants through their local offices.

The management of elephants in captivity by GOs has a long history in Thailand, but problems persist, including an ineffective registration system for domesticated elephants. Unfortunately, illegal licensing and registration can be performed easily because of the improper technique for permanent animal identification used by GOs. This usually involves identifying an individual elephant by natural markings such as scars on the ears and tail, the shape of the back, etc. These methods have been used for centuries and, unfortunately, they are still in use making effective registration impossible.

Domesticated elephants are not the top priority for the nation's policy makers and thus veterinary services for domesticated elephant provided through the DLD network have generally been, and remain, insufficient because DLD lacks sufficient funding and skilled personnel. Veterinary officers from DLD inevitably have to work within severe constraints.

The role of NGOs

The main role of NGOs is to assist GOs to improve the welfare of elephants and to solve their problems. NGOs have designed and implemented a wide variety of projects. Some of these are as follows:

1) Nationwide registration of domesticated elephants

The use of transponder injection as a permanent identification technique was introduced by the Asian Elephant Foundation of Thailand (AEFT) in 1996. Around 1 300 domesticated elephants are now registered in the AEFT database. This has stimulated DLD and the DOR to adopt a modern and more effective registration protocol. In the future, it is hoped to merge both the NGO database and the GO database to create a national domesticated elephant database.

2) Health problems and veterinary service

In the rural areas both routine health care and emergency treatment are conducted by a small number of veterinary extension services that take care of livestock and elephants. Most of DLD's veterinarians have no experience of elephant diseases or captive management, so few services are provided to sick elephants. In critical cases of poisoning and severe injuries from car accidents, elephants need immediate treatment, but none of the GOs consider themselves to be responsible in such cases. A "Mobile Veterinary Service Unit" was set up by various NGOs in order serve these needs as well as to undertake preventive medicine, regular health care and treatment, general emergency medicine, etc. With financial support from a number of international organizations, especially the International Fund for Animal Welfare (IFAW), the mobile unit assists many domesticated elephants throughout Thailand. The DLD has now established an "Elephant Health Mobile Team" in Surin province, in the Northeast, which is the biggest hometown of domesticated elephants in Thailand. This team provides a service in Surin and it collaborates with the NGO unit that has now moved its base to another part of the country. We hope that the number of mobile units provided by the DLD will be substantially increased in the near future.

3) Technology transfer for the conservation and advanced health care for domesticated elephants

NGOs are able to transfer technology to the local DLD's veterinarians through various seminars and workshops, for example: a regional workshop on Asian elephant health care, which resulted in the establishment of "The Minimum Requirement for Health Status and Management of Asian Elephants in South East Asia"; a workshop on "Diagnostic Ultrasonography of Reproductive Tract in the Asian Elephant"; and a seminar on "Reproduction Biology of the Asian Elephant", which resulted in a published proceeding titled "Assessment and Management of the Reproductive System in Asian Elephants"; etc. These activities have been carried out to strengthen the ability and understanding of the veterinarians who are in charge of the health care of elephants and the related services.

4) Raising of public awareness on "Elephant Welfare"

This has been a major focus of NGO efforts. A very successful campaign convinced the government to establish a new national day, "Thai Elephant Day", on the 13 March of each year and this is now observed throughout almost every province in the country with appropriate activities. The purpose is to pay respect to the country's elephants and promote recognition of the important role this species plays in the Thai natural environment, religion, history and culture. Campaigns, elephant

poster contests, seminars, workshops are also regularly conducted to raise public awareness of elephant welfare issues.

5) Fund raising

Since the economic crisis in 1997, the government's budget has been very severely constrained. Elephants and their mahouts have suffered from this crisis. NGOs have made efforts to raise funds to purchase food for both elephants and mahouts, to provide free medicines and health care services, to support government activities concerning elephant issues, etc.

Conclusions

NGOs have been actively engaged in a large number of efforts to improve the welfare of the country's elephants, as mentioned above. These activities are designed to support or supplement the activities of government agencies as we are well aware of their financial limitations. Moral and economic support has also been provided to the responsible government agencies to strengthen their capability and make them more effective managers of domesticated elephants. We hope that services designed to improve elephant welfare will continue to improve.

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Question and answer session

Mr Roger Lohanan stated that he would like to see NGOs give a priority to:

- Mahout training and status reform
- Investigation into smuggling of Thai elephants
- Tackling cruelty and work exploitation.

These photographs illustrate the activities of the Mobile Service Unit jointly set up by various NGOs. They include preventive medication, routine health care and emergency treatment services for the welfare of the domesticated elephants living in rural areas in Thailand.

The elephant situation in Thailand and a plea for co-operation

Roger Lohanan

Introduction

Thai elephants have been highly praised and nationally proclaimed throughout history, but very little has been done to protect them. The threats against Thai elephants come only from human exploitation. Direct threats include poaching for ivory and elephant calves, and illegal logging or roaming the city streets for money. Indirect threats involve mismanagement and shortsighted policies, such as deforestation for agriculture, industrial plantations, dams or road constructions and commercialization of the forest reserve areas.

One question often raised by observers is, "Why can't Thailand solve its elephant problem?" The answers vary. Some officials reply, "There are complications involved, the laws, the culture, the diminishing forest land, people's livelihoods, national revenue, etc." Others reply, "Responsible organizations dare not do anything decisive for fear of conflicts." There are even rumours about conflicts of interest surrounding elephant welfare. For the Thai Animal Guardians Association (AGA), the answer is, 'Lack of unity'.

Many studies have been completed and many solutions have been proposed since 1991, but none of these have been implemented. Many committees have been formed and countless discussions have taken place but, so far, there has been no firm action. The obstacle is not the diversity of proposals. It is the lack of decisiveness and consistency of effort to solve the problem that has resulted in deteriorating conditions for the country's elephants. And success does not lie in following any particular path.

The Thai AGA has studied the situation thoroughly and concluded that there are two factors to consider:

1) The Government along with the animal welfare and environmental NGOs should form a National Committee with full authority to collaborate with any other agency or institution to formulate effective measures to protect the elephant.
2) These measures, embedded in practical plans, should be delivered for approval and enforcement on a national scale. Any outdated legislation should be amended, and new regulations necessary for implementing the plans should be adopted.

Wild elephants

Legal status:

Elephants are listed as Protected Animals under the Conservation Act 1992. But, considering the present situation, they should now be listed as endangered.

Population:

In 1991 the number of wild elephants was reported as 1 900. There has been no official record since. It was estimated in 1997 that the number dropped to 1 700, and these consisting mainly of females and young males without tusks. This estimate is, however, said to be inaccurate. Judging from the number of elephants sighted and the number of elephants killed or found dead between 1991 and 1999, there should be less than 1 000 elephants in the nation's forests. Nevertheless, a complete survey and record of the actual number of elephants in the wild should be a high priority if proper protection is to be a national commitment.

Problems:

The forest area in Thailand has reduced from 80 percent in 1957 to approximately less than 20 percent in 1992, largely because of deforestation associated with inappropriate developments. Although logging was banned in 1989, 70 percent of the forest area had already disappeared, and illegal logging continues. Shifting cultivation by tribal villagers, dam and road constructions, even gas pipelines, eucalyptus and pineapple plantations, as well as resort developments in forest reserve areas, have all added to the devastation. These inappropriate developments continue to deprive elephants of their natural habitat and feeding grounds, force them to migrate into dangerous areas, and lead to conflicts between elephants seeking food and plantation owners – such conflicts usually end with more elephants being poisoned or killed.

Illegal poaching for elephant tusks and elephant calves distorts sex ratios in the population and effects reproduction. Males are hunted for tusks, and females are killed for their calves. It has been said that to capture an elephant calf, three or more female elephants fostering the calf must die.

In general, elephant populations in the wild continue to decrease, while the domesticated elephant population increases.

Solutions:

Put all wild elephants on the endangered species list rather than just consider them a protected species. This will empower related authorities to prevent the commercial exploitation of elephant parts.

Prohibit all products made out of elephant parts, including ivory, skin, bone and all organs from both live and dead elephants regardless of elephant origin and the cause of death. This is to prevent fraudulent claims that parts are derived from domesticated elephants in and outside of the country. It is impossible to tell the difference between ivory derived from a wild elephant and a domesticated one.

Totally reform domesticated elephant registration from birth to death, with accurate identification – microchip plus DNA recording – to prevent registration fraud, especially with elephant calves. The conspicuous increase in domesticated elephants suggests there could be a number of wild elephant calves being posed as domestically born. For every fraudulent calf, there could have been as many as four foster mothers killed.

Declare all remaining forest land reserve forest and prohibit any unsustainable use of forest resources. Restrict further development in forest land. Any project that would effect the ecosystem must be prevented or revoked. There must exist the resolve to stop giving in to financial interests, local or national, when conservation is at risk.

Educate local populations about elephant conservation, the problems involved and the related laws. Wild elephants are sometime killed by villagers seeking valuable forest products or by plantation farmers on former elephant feeding grounds.

Strengthen law enforcement and forest rangers with authority to investigate conservation related cases and suppress crimes involving forest resources.

Domesticated elephants

Legal status:

Domesticated elephants are considered to be commercial animals under the Beast of Burden Act 1939. The owner has the right to trade and use the animal at will.

Population:

There are about 3 000 domesticated elephants in 41 provinces and three regions, approximately 2 500 in the North, over 400 in the Northeast or E-sarn area, and about 100 in Central Thailand and in zoos around the country. The Western region's elephant population consists mainly of wild elephants.

Work status:

After logging was banned in 1989, most elephants became unemployed or were forced to engage in illegal logging near or over the border in Burma. Some elephants have been crippled or have died falling from cliffs, while others have been crippled as a result of stepping on landmines. Some elephants are given amphetamine and other drugs to enable them to work long hours.

Other types of work Thai domesticated elephants do are patrolling the jungle with forest rangers, in the tourism industry (either as an exhibit or giving rides to tourists in many Northern resorts and elephant parks in Central Thailand), and in local ceremonies in the Northeast. There is an Elephant Festival in Surin northeast of Bangkok, which takes place only once a year. Some Thai elephants have been exported for employment overseas, but frequently return as casualties.

Since mid 1999, there have been a few arrangements to recruit elephants into entertainment places such as circuses and cinemas. Unfortunately, most elephant owners or mahouts prefer to bring their elephants to roam the streets of Bangkok and other large cities for money.

Unemployment and starvation are the root of all domesticated elephant problems in Thailand. After logging was banned, all northern elephants became unemployed. Many of the elephants are not tame enough to work in resorts or entertainment places, and end up engaged in illegal logging. Deforestation by government projects and industrial plantations worsens the situation by depriving the elephants of their natural food sources.

E-sarn elephants are better adapted for employment in entertainment places, but the Elephant Festival in Surin happens only once a year and local ceremonies using elephants are becoming rarer. Most forest land has been converted into eucalyptus plantations. Elephant owners cannot afford to feed their animals. A majority of Surin mahouts now bring their elephants to the city, taking them on what are plainly begging rounds.

Problems:

Laws and regulations involving domesticated elephants are ineffective and outdated. The Beast of Burden Act 1939 has been in use since the time elephants were still a means of transport in Thailand. The elephant identification paper is just as outdated. No personal description is included, and no positive ID can be made. The time required to report a new born elephant used to be eight years and was recently changed to three. Ideally, it should be as early as possible after birth.

Transfers by purchase of domesticated elephants cause these smart and sentimental animals considerable stress and difficulty in adjusting from one new owner to the next. Many mahouts riding the elephants are neither the original or real owners—just keepers. These keepers have no emotional ties to the elephants, tend to mistreat the animals and cannot control them during an emergency. This sometime results in tragedy, e.g. when an elephant is in *musth* or becomes enraged.

Improper handling and employment such as abusive training, excessive use of force for punishment, use of drugs, lack of proper care, animal exploitation, illegal logging, wandering the streets for money, etc. lead to many animal welfare problems and sometimes threaten public safety.

1) Thai elephant trainers still believe in excessive force like tight cuffs on all four legs to discipline young calves and the use of a spike hammer for punishment.

2) Elephants are ordered to stand on two front legs or on a small box to entertain tourists and locals. These elephants will likely have bone disorders when older. When not performing, elephants are confined in short chains for the rest of the day. This results in long term neurotic behaviour, observable when an elephant sways its head side to side all the time like it's dancing.

3) Baby elephants are forced to perform on the street for money. Most of them are separated from their mothers and fed with beer and amphetamines for the entertainment of tourists. More and more baby elephants are now found roaming the city streets. Some of these could have been smuggled in from the wild. If so, it means that as many as four adult females (foster mothers) may have been killed in the process.

4) Elephants engaged in illegal logging are often drugged with amphetamines to enable them to work long hours. Many elephants step on landmines and are crippled for life or die. Once an elephant is crippled, it is of no use to the owner and likely to be killed for its meat.

5) Most elephant resorts pay little or no attention to animal welfare. Elephants have to work long hours with not enough to eat or time to rest. House vets are virtually unheard of. Medical attention is given only when the animal is already sick.

6) Other incidents involving mistreated elephants and threats to public safety include elephants going on the rampage in the city, attacks on owners and villagers, traffic accidents, etc. For example, 'Petch,' a male elephant that had been chained in a temple for 17 years and suffered from a neurotic disorder, had to be gunned down by the police during a five hours rampage on New Year's eve 1995. In 1999, an elephant attacked a group of tourists during a performance. In 1997, 'Boon Choo,' a 72 years old elephant, fell into an open sewer and died. Elephants drowning in city swamps or getting hit by cars have become common news items.

Deforestation effects both wild and domesticated elephants. A full-grown elephant consumes about 200 kg a day, which is more than an ordinary farmer can afford. Owners usually let their elephants feed on natural vegetation in the jungle and bathe in a nearby canal. Deforestation has taken away all these, especially in the Eastern part of Thailand.

1) Eucalyptus plantations have replaced bamboo bushes that elephants used to feed on. Many rivers are now running low, and the now ubiquitous irrigation systems do not accommodate elephants.

2) In the north, food and water are still available in the mountains. But, even here, there are problems. Domesticated elephants are accused of damaging the forests and polluting the streams. Elephant owners claim that Thai villagers have made these accusations because they do not wish to share the forest resource (bamboo shoots) with elephants. Local councils and forest authorities make life difficult for elephant owners who have no citizenship. Elephants are prevented from entering forest reserve areas.

Unfair or exploitative business practices.

1) Unfair employment practices make appropriate careers very unattractive and the problems of domesticated elephants very difficult to solve. The mahouts are underpaid and without legal contract. If there is one, it is usually to the employer's advantage and often breached without compensation. The annual Elephant Festival in Surin is a multi-million baht affair, but the mahouts are paid less than 3 000 baht for their participation.

2) Businessmen recruit elephants from poor owners – sometime as part of a loan arrangement – and then rent the elephants back to them or to any mahout for street roaming. Surin mahouts prefer bringing elephants to beg in major cities like Bangkok, Chiang Mai, Pattaya, and Phuket. An average income of 15 000–30 000 baht per month from the streets makes this controversial career very attractive, despite the high competition. Problems involving elephants roaming city streets are discussed in Thai AGA's No City Elephant campaign presented in Annex 1.

3) Elephant welfare is seriously threatened by claims of poverty and starvation. The mahout's poor economic status and the threat of elephants starving are always used to get public sympathy. This

has created a vacuum in solving the problems. Authorities and animals activists consider the issue to be highly sensitive and hesitate to act. Some activists end up protecting business interests instead of animal welfare.

4) Dozens of committees have been formed, but no solution has been fully implemented. Every time the word poverty or starvation is brought up, any corrective action is compromised. Animal welfare is sacrificed for human short-term interests. Authorities and owners are willing to risk elephant lives to address the issue of unemployment. Elephants are still allowed to cross the border into Burma, where logging is still legal, for employment. Many elephants have stepped on landmines and have become crippled or have died. 'No City Elephant' has been the policy of Bangkok Metropolitan Authority and the Police since 1992, and is frequently reiterated. But more elephants are coming to the city every year to be crippled or to die in traffic accidents or in the city's swamps.

5) In the case of city elephants, it is a case of poverty turned to profit. Many proposals have been formulated and budgets spent without real improvement. Hardship has also struck many northern elephants, but beggary is not encouraged. Northern mahouts are also poor, and their elephants starving, but they do not roam the streets. Only mahouts from Surin insist on roaming the streets and refuse to accept alternative careers claiming that the income is too low. When the public is alerted and the authorities are firm, someone will claim that, "*the mahouts are not ready*" and ask for more time. This has been going on for ten years. The likelihood is that the mahouts will never be ready if excuses are always accepted.

6) Elephant organizations in Thailand are very prominent and strong. And, for the same reason, collaboration is sometimes difficult. Each organization has its own solution and methods, which do not necessarily coincide with those of others. Authorities and the public are sometime confused and do not know which to follow. There are rumours about discordance among elephant activists. The public is sad to hear reports about conflicts over elephant custody.

Solutions:

Remove domesticated elephants from the Beast of Burden Act and place them under the Protection of Wildlife Conservation Act 1992. Owners can continue to care and work the elephants through a permit. Transfer of ownership or the permit should be firmly restricted. In cases of violations, the permits can be revoked, and the animal can then be confiscated. All elephants born after confiscation should become government property.

Provide elephant medicare and food to owners and organizations with elephants under their care. Veterinary visits should be provided for all domesticated elephants in the country. This will help minimize expenditure for those who care for elephants.

Totally revise the registration method for positive identification of all domesticated elephants. Birth records, transfer of title deeds, breeding and death reports should be regulated to prevent registration fraud between wild and domesticated elephants. Newborn elephants should be reported and registered soon after birth.

Bring forth the Animal Welfare Legislation as a preventive measure against any loophole of the existing Conservation Act.

Ban elephants roaming the streets and provide appropriate careers for the mahouts. Regulate elephant businesses to ensure a fair contract for the mahouts. This will eliminate the elephant loaning business for beggary, and protect elephant welfare and public safety.

Upgrade the status and expertise of mahouts to a professional level. Anyone seeking benefit from their elephants should pay a fair price. Thai mahouts should receive professional recognition and a fair income.

Consider the possibility of a rehabilitation process. Third or fourth generation domesticated elephants may be released together, in a suitable area, for rehabilitation in the wild.

Conclusions

Problems surrounding Thai elephants can be readily solved. It is not necessarily a dead end, but could become a never-ending story. Unity and determination will ensure success.

Wild elephants have to be conserved along with their habitat – the forest. If rehabilitation of domesticated elephants is not possible, work in the tourism and entertainment industry appears to be the only choice. Nevertheless, one should not allow human interest or personal differences to get in the way of conservation efforts.

Any activity or development that threatens elephant welfare or their habitat should not be allowed. Mahouts who bring elephants to the city for money, villagers who exploit the forest resources, gift shops that sell ivory, businessmen who turn forest land into plantations, officials with ideas to commercialize the forest reserves, or politicians who like to propose budgets for more dams must be stopped.

Annex 1. Why an elephant resort should not be in Bangkok

1) Bangkok is crowded with buildings, houses, markets and business places. The empty spaces found in different corners of the city are either privately or government owned properties waiting for investment. They are usually surrounded by buildings, thus, may be good for a hideout but not for a resort. Even the outskirts of the city cannot accommodate 400 elephants waiting to march to Bangkok.

2) Bangkok's climate is always hot and humid, and the air is badly polluted. Every leaf and greenery is coated with toxic deposits. Medical records show that elephants on the street suffer respiratory and intestinal infections. An appropriate elephant resort should be in natural surroundings.

3) Unlike elephants in natural resorts, those in the city will have no room for free exercise. They will be chained up after work, and will develop mental disorders.

4) An elephant resort requires a vast space to accommodate tourist activities and to shelter all the elephants and the mahouts and their families. Each elephant requires a large amount of food and water for drinking and bathing. They also leave a large amount of dung that needs to be disposed of. The resort would require a huge budget for landscaping, administration, and maintenance.

5) Elephant resorts around the country are already struggling to survive. A Bangkok resort would adversely affect those in other regions. Elephant tourism in the north and in Surin could collapse. More elephants would be forced to come to the city. Neither Bangkok nor any major city is large enough to accommodate 3 000 unemployed elephants.

6) An elephant resort in Bangkok, or in any city nearby, would become an excuse for elephants from all over the country to migrate to Bangkok. It is unlikely that the authorities would be able to control the migration.

7) Any attention or interest a city resort may receive in the beginning is unlikely to be sustained. When the profits are down, disputes would follow, and the mahouts will take to the streets. The city would not be able to control the situation. Neither can it absorb or compensate the financial loss in case of business failure.

8) All authorities in Bangkok know that enforcement is difficult once elephants are in the city. There is not enough manpower to deal with runaway mahouts and their elephants.

One baby elephant in a garbage-dump hideout.

A number of elephants living among stray dog in one of the city hideouts.

A busy business district is one of the popular begging sites.

An assessment of the work of the mobile elephant clinic based in Lampang, Thailand

Bjarne Clausen

Introduction

The project concept was triggered by the sad sight of a street elephant in Bangkok.

Initially, two surveys were carried out to confirm that there are problems associated with the domesticated elephants, and to identify possible solutions.

It was decided that although the health and other problems of unemployed domesticated elephants are not a responsibility of the Royal Society for the Prevention of Cruelty to Animals (RSPCA). RSPCA may, in co-operation with the Forest Industry Organization (FIO), help the elephants until permanent solutions are implemented. It was decided to establish a Mobile Elephant Clinic (MEC), for which the FIO would supply the local facilities and the RSPCA would supply the funding.

The idea behind the clinic is that it is easier to move the veterinarian than the elephant. Moreover, there are already hospitals for elephants in Thailand. The model for the MEC is taken from large animal practice in Europe.

Animal welfare aspects

The MEC treats as many domesticated elephants as possible, at no cost to the owner.

Conservation aspects

Like the working horse in Europe, the domesticated elephants may disappear. Although the MEC cannot change that, there may, because of the veterinary service, be more healthy elephants for possible release into the wild.

Working arrangements

The FIO veterinarian performs a daily veterinary service. The European consultant contributes advice and suggestions and stays with the MEC one to two months every six months. Both veterinarians have a veto right, and the motto is: There is always a better way.

Recording

Mostly, the daily work can be done with only a little writing. But good recording is crucial if experience is to be shared with others. Moreover, most overseas donors require good recording.

Veterinary experience

Most of the problems treated are a result of the way elephants are managed, therefore advice seems just as relevant as treatment. However, there are also cases involving poor eyesight and babies taken from their mothers too early. Not many contagious diseases are recorded.

Achievements

About 250 elephants (10 percent of the domesticated elephants) have been given curative or preventive medicine in the first two years of the project. Advice has been given to the same number of mahouts and owners.

Other duties

Taking veterinary students along to gain experience, and informing unemployed mahouts about the need for elephants in various tourist camps.

Assessment

Things could be better, but they could also be much worse.

Learning from experience

Asian as well the European veterinarians can learn a lot from each other. It seems important for the Thais and the NGOs to identify what kind of veterinary service is of most benefit to the elephants. It is important to have an open exchange of information, good working plans and the sharing of ideas among the many parties involved in supplying veterinary and other welfare services to the elephants. Apart from the veterinary challenge in such a project, the administrative challenge should not be underestimated.

Present goals

- To improve the knowledge of the personnel involved and the services of the MEC.
- To continue to offer RSPCA support to the MEC, until such support is no longer needed.

The MEC could become a model for other countries, so feel free to contact the RSPCA at <*international@rspca.org.uk*> or Bjarne Clausen <*clausnar@get2net.dk*> for further information.

The Asian Elephant Conservation Act, the Asian Elephant Conservation Fund, and the conservation of the wild and the domesticated Asian elephant

Karl A. K. Stromayer

Background

With recent awareness of the increasing threat to the welfare of the Asian elephant, already an endangered species, a bill entitled the "Asian Elephant Conservation Act of 1997" was introduced into the United States House of Representatives 4 June, 1997. Passed by the House on 21 October and by the United States Senate on 8 November, it was signed into law by President Clinton on 19 November, 1997. The Act is designed to assist in the conservation of Asian elephants by supporting and providing financial resources for the conservation programmes of nations within the range of Asian elephants and projects of persons with demonstrated expertise in the conservation of Asian elephants. A grants programme, the Asian Elephant Conservation Fund (AsECF), was established for awarding proposals that fulfil the purpose described by the Act. In the first two years of operation, the AsECF has supported 26 projects in nine countries (see Annex 1). Instructions for requesting funding and a grant proposal form are supplied in Annex 2.

Purpose

The mission of the AsECF is to assist in the conservation of Asian elephants by enhancing the following: protection of at-risk elephant populations; habitat/ecosystem conservation and management; applied research on elephant populations and habitat including surveys and monitoring; conservation education; protected area/reserve management in important elephant ranges; development and execution of elephant conservation action plans; efforts to decrease elephant–human conflict and cross-border elephant issues. A specific limitation of the Act is that grants may not be used for captive breeding of Asian elephants other than for release in the wild.

The challenge: the wild and the domesticated Asian elephant

The long-term conservation of viable populations of wild Asian elephants is an enormous challenge. Historically, the capture and domestication of elephants has meant a siphoning off of the extant wild population. While the mandate of the Asian Elephant Conservation Act is to promote and assist the persistence of the Asian elephant in the wild, we believe that it is appropriate and timely to address the management of the some 16 000 domesticated Asian elephants. We are particularly interested in the possible interface between the domesticated Asian elephant and the conservation of the wild elephant and its habitat. We suggest that the domesticated Asian elephants can be used to support broad conservation objectives through use in ecotourism, sustainable forestry/green logging, crop protection/mitigation of elephant–human conflict, law enforcement, buffer zone management, and ecological monitoring. We are supportive of actions such as standardizing the registration of domesticated Asian elephants and the development of appropriate national legislation to improve the management of the domesticated elephants in the range states. Such actions will improve the management of the domesticated Asian elephant and in turn benefit the survival of the species as a whole.

Annex 1. U.S. Fish And Wildlife Service Asian Elephant Conservation Fund (Asecf) Grants, FY 1999-2000

Project title and country, recipient organization, support from ASECF and matching funds are shown.

1) *School Education to Support Asian Elephant Conservation, India.* Centre for Environment Education US$44 500 + US$16 250 (Applicant).

2) *A Proposal to Determine the Movement Patterns of Elephants in South Sri Lanka and Provide Recommendations for Conservation Management, Sri Lanka.* Biodiversity and Elephant Conservation Trust US$15 085 + US$1 028 (Applicant).

3) *Conservation Assessment for Sumatran Elephants in Lampung Province, Sumatra, Indonesia.* Wildlife Conservation Society US$61 750 + US$53 580 (Applicant).

4) *To Trace the Mobility Patterns, Population Dynamics, and Feeding Patterns of Sri Lankan Elephants in a Select National Reserve of Sri Lanka.* Mr S. Miththapala US$26 176 + US$18 110 (Applicant).

5) *Identification of a Managed Elephant Range for Inclusion in Riau Province's 2000-2004 Five-Year Land-Use Plan, and Provision of Emergency Aid to Riau's Elephant Management Unit, Indonesia.* World Wide Fund for Nature, Indonesia US$54 590 + US$58 531 (US$49 531 = WWF U.S.; US$9 000 = Riau Government).

6) *Identification of a Suitable Managed Elephant Range, and Establishment of an Elephant Conflict Mitigation Training Program, Malaysia.* World Wide Fund for Nature, Malaysia US$49 973 + US$42 434 (Sabah Wildlife Department).

7) *The Old Elephant Route, Myanmar and India.* The Aane Mane Foundation. $49 212 + $37 770 (Applicant = US$20 000; Governments of India and Myanmar = US $17 770).

8) *Aceh Elephant Project: Elephant Conservation and Response Units, Indonesia.* Fauna and Flora International US$49 550 + US$140 025 (US$105 625 = Global Environment Facility; US$34 400 = Private Donation; Additional in-kind contributions by the Aceh Province Directorate for Conservation [KSDA]).

9) *Support to Prevention of and Investigation into Poaching of the Asian Elephant and Illegal Trade in Ivory, India.* Wildlife Protection Society of India US$32 740 + US$30,410 (Applicant).

10) *Molecular Tools for the Local Population Assessment of Asian Elephants, U.S.A.* Columbia University US$35 390 + US$51 088 (US$26 392 = Applicant; US$24 696 = WWF U.S.).

11) *Promotion of Elephant Conservation in Asia (Publication of GAJAH), Sri Lanka.* Deputy Chair, Asian Elephant Specialists Group US$9 000 + $.

12) *Elephants in Crisis, Conservation of the Asian Elephant in a Human Dominated Landscape in Vietnam.* Fauna and Flora International US$56 610 + US$77 209 (US$63 359 = Dutch; US$13 850 = Applicant).

13) *Support for Improved Health and Health Care Management of Captive Populations of Sumatran Asian Elephants, Indonesia.* International Elephant Foundation US$50 000 + US$143 200 (Applicant).

14) *Pheromones as Aids to Prevention of Crop Raiding by Asian Elephants in Range States.* The Oregon Institute of Science and Technology, U.S.A. US$6 500 + $.

15) *Managing Three Critical Elephant Ranges in Myanmar.* Smithsonian Institution US$49 292 + $91 190 (Myanmar Ministry of Forestry).

16) *Construction of Anti-Poaching Camps in Sonai Rupa Sanctuary, India.* Forest Department of Assam US$35 085 + US$64 609 (Applicant).

17) *Investigating the Status of Asian Elephants in the Cat Tien National Park and its Management Implications, Vietnam.* WWF Indochina Program US$40 150 + US$9 350 (Applicant).

18) *Elephant Conservation in Cambodia: National Capacity Building and Initial Surveys.* WWF Cambodia Project and the Wildlife Conservation Society US$52 362 + US$31 500 (US$20 000 = WWF; $11 500 = WCS).

19) *Assessment of the Conservation Status of the Asian Elephant in Cambodia and Capacity Building of Cambodian Conservation Authorities to Protect the Asian Elephant.* Fauna and Flora International US$56 970 + US$57 080 (US$46 080 = Applicant; US$11 000 = Asian Elephant Specialist Group).

20) *Resettlement of the Gujjars of the Rajaji National Park.* The Friends of the Doon Society US$37 006 + US$10,500 (Applicant).

21) *Resolving Elephant-Human Conflicts in Asia: Field Testing of Deterrents and Community Participation in the Mitigation of Conflicts in Southern India.* Wildlife Preservation Trust International US$35 400 + US$31 080 (US$18 000 = Claiborne/Ortenberg Foundation; US$7 080 = Applicant; US$6 000 = Asian Elephant Research and Conservation Centre, Bangalore, India).

22) *Equipping Protected Area Field Staff Within Project Elephant Reserves in India with Anti-poaching Kits.* Wildlife Trust of India US$50,790 + US$31 276 (Applicant).

23) *Asian Elephant Conservation Project in the Nanguhne Nature Reserve (national level).* Yunnan Provincial Forestry Department, China US$49 540 + US$14 400 (Applicant).

24) *Management of Elephant Reserves with Special Reference to Corridors by Community Participatory Programme in the Nilgiri Biosphere Reserve, Southern India, India.* The Salim Ali Centre for Ornithology and Natural History, US$44 982 + US$7 020 (Applicant).

25) *Developing an Elephant Conservation Strategy in Sri Lanka: Field Research, Community Based Problem Solving, and Training for Local Conservation Scientists.* Wildlife Preservation Trust International, US$28 200 + US$60,636 (US$33 700 = Liz Claiborne Art Ortenberg Foundation, US$26 936 = Applicant).

26) *Conservation of Asian Elephant and its Habitat in Rajaji National Park, Dehra Dun.* Wild Life Preservation Organization, Forest Department, Uttar Pradesh, India, US$39 264 + US$36 934 (Applicant).

Annex 2. Asian Elephant Conservation Fund request for proposals – 2001

The United States Fish and Wildlife Service (FWS) invites submission of grant proposals for the conservation of the Asian elephant throughout its range. This programme will support projects that develop local ability to manage, conserve, research, or protect the Asian elephant through provision of funding, training and equipment.

Background

With recent awareness of the increasing threat to the welfare of the Asian elephant, already an endangered species, a bill entitled "Asian Elephant Conservation Act of 1997" was introduced into the House of Representatives 4 June, 1997. Passed by the House on 21 October and by the Senate on 8 November, it was signed into law by the President on 19 November, 1997. The Act is designed to assist in the conservation of Asian elephants by supporting and providing financial resources for the conservation programmes of nations within the range of Asian elephants and projects of persons with demonstrated expertise in the conservation of Asian elephants. A grants programme was established for awarding proposals that fulfil the purpose described by the Act.

Purpose

The purpose of the grant programme is to assist in the conservation of Asian elephants by enhancing the following:

- protection of at-risk elephant populations;
- habitat/ecosystem conservation and management;
- applied research on elephant populations and habitat including surveys and monitoring;
- efforts to decrease human-elephant conflict;
- conservation education; protected area/reserve management in important elephant range;
- development and execution of elephant conservation action plans; and
- cross-border elephant management.

Who may apply?

Proposals may be submitted by any Asian government agency responsible for Asian elephant conservation and protection, the CITES Secretariat, or any organization or individual with experience in Asian elephant conservation.

Requirements

Proposals must be submitted in English. An original and three copies could be accompanied by a cover letter. Documentation must demonstrate the participation and/or endorsement of the local government(s). Projects with matching funds (cash) or in-kind support (salaries, equipment, etc.) equal to or exceeding the amount requested from the FWS are preferred.

Award amount

Because of the limited funding available, preference will be given to proposals requesting US$50 000 or less; but higher amounts may be requested.

Project duration

Funding is for one year or less. Projects that require more than one year of funding will be required to compete on an annual basis through submission of additional proposals.

Reporting

Each grant recipient is required to submit regular progress and accounting reports. A final report that evaluates the success of meeting goals is required within six months of the project's completion.

Date for proposal submission

Proposals should be submitted as soon as possible but not later than 1 June, 2001. Proposals submitted after 1 June will likely be considered during the 2002 funding cycle. Proposal review and processing may require up to six months. Recipients are advised to specify a particular start date bearing in mind the necessary processing and administrative time.

How to apply

Review the attached checklist and suggestions, use the following outline to prepare your proposal.

A. COVER PAGE: Use the attached cover page format.

B. NARRATIVE: This section should contain the following:

1) **Justification:** A succinct statement of the need for the project. Discuss why it is important that this project be implemented.

2) **Objectives**: State the specific objectives to be achieved by the project. Discuss how they will lead to achievement of the goal of the conservation of the Asian Elephant and fulfil the needs stated in the Justification.

3) **Methodology and work plan**: Describe the methods to be used in carrying out the project. The work plan must describe in sufficient detail how the work will be implemented, including the participation of other partners.

4) **Schedule of accomplishments**: The proposal must provide a timetable for accomplishment of tasks.

5) **Anticipated benefits and outputs**: Identify the products, information or services to be provided

6) **Monitoring and evaluation procedures**: Discuss monitoring and evaluation procedures to be used to ensure the project goals and objectives are met.

7) **Personnel and organizations involved**: Provide the name of the person responsible for conducting the project and describe the organization's personnel and resources that will carry out the project. Include their experience/qualifications and capacity to meet the project objectives.

C. BUDGET:

A budget table must be presented with an itemized list of costs (i.e. salaries, travel, equipment, supplies, etc.) in United States Dollars. This table must include a column for costs requested from the FWS and columns for costs covered by matching funds (cash) or in-kind support (salaries, equipment, etc.), to be provided by the grant recipient or other partners (if applicable). Assistance to cover salaries for personnel must be well documented and generally will be given a low priority unless the entities involved make a commitment to eventually absorb these costs. However, salaries may be used as in-kind contributions to the project by the recipient. Budget line items titled miscellaneous or contingencies are not acceptable.

D. SUBMIT PROPOSALS TO:

Office of International Affairs, Asian Elephant Conservation Fund, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, ARLSQ 730, Arlington, VA 22203-1622 USA; (Telephone: 703-358-1754; Fax: 703-358-2849). Questions regarding the Asian Elephant Conservation Fund may be addressed to Dr Karl A. K. Stromayer at the above mailing address and fax, telephone number 703-358-1764 and/or email*:* Karl_Stromayer@fws.gov

ASIAN ELEPHANT CONSERVATION FUND
(Cover Page/Grant Application)

Project Title:_____

_____

Name And Title Of Project Officer:_____

Organization: _____

Street Address: _____

City:_____State/Province_____Country_____

Mailing Address: _____

City:_____State/Province_____Country_____

Telephone: _____Fax: _____E-mail Address_____

Name And Title Of Person Who Will Be The Point Of Contact:_____

Organization: _____

Street Address: _____

_

City:_____State/Province_____Country_____

Mailing Address: _____

City: _____State_____Country_____

Telephone: _____Fax: _____E-mail Address_____

Signature of Applicant

_____ _____
(Signature) (Title and Organization)

_____ _____
(Printed or Typed Name) (Date)

Partner organizations Amount contributed Contributing Funds to Proposals Budget

ASIAN ELEPHANT CONSERVATION FUND
Check List For Applicants

Use this checklist to ensure that your proposal is complete and appropriate for this programme.

Submit a copy of your completed checklist with your proposal.

Check one or more of the following areas of Asian elephant conservation addressed by your proposal:

___ protection of at-risk elephant populations; ___ habitat/ecosystem conservation and management; ___ applied research on elephant populations and habitats including surveys and monitoring; ___ conservation education; ___ protected area/reserve management in important elephant range; ___ development and implementation of elephant conservation action plans; ___ efforts to decrease human–elephant conflict.

Use the following checklist of items to see if they are fulfilled by your proposal.

___ The proposed work addresses a high priority of the conservation and management of the Asian Elephant and/or its habitat.

___ The project, where appropriate, involves the local wildlife agency in project planning, implementation, and follow-up.

___ Training is included, to the appropriate degree, that strengthens in-country elephant conservation efforts.

___ The goals and objectives are well defined and can be achieved by carrying out the proposed activities given the capabilities of the staff, the time available, and the proposed project funding level.

___ The methodology and work plan are well developed and lead to practical and attainable outputs (products, information or services).

___ The schedule of activities is well organized and can be accomplished within the available time and proposed project funding level.

___ The proposal includes monitoring and evaluation procedures that may be used to measure the success of the project.

___ The description of the personnel and organization undertaking the project discusses the experience of the staff and their capacity to effectively carry out the project.

___ Support for the project by the host country's government is documented in the proposal or accompanying letters.

___ The proposal explains how information developed in the project will be efficiently distributed to resource managers, researchers, and other interested parties.

___ The proposal discusses the potential for sustaining the project activities beyond the life of the project.

___ The proposal includes a budget table with an itemized list of costs in U.S. Dollars. This table must include a column for costs requested from the AsECF and columns for costs to be covered by matching funds (cash) or in-kind support (salaries, equipment, etc.) to be provided by the grant recipient or other partners.

General care and reproductive management of pregnant and infant elephants at the Ayutthaya Elephant Camp

Puttipong Khawnual and Brian Clarke

Introduction

The Ayutthaya Elephant Camp was founded in 1997 for the purpose of providing mahouts and working elephants with stable jobs in Thailand's growing tourist industry. By offering the highest standard of care to its elephants, the Camp strives to set an example for similar facilities throughout Thailand.

Elephants require an enormous amount of food and water, as well as specialized medical attention. The money needed to secure these necessities is earned by the elephants' work at the Camp, giving rides to 10 000 visitors per annum in Ayutthaya Historical Park, a UNESCO World Heritage Site. The animals are, in effect, self-supporting.

With a population of 80 elephants (7 males and 73 females), the Camp is able to provide a rotation of working days for each elephant. Fresh water, for bathing and drinking, is offered several times throughout the work day. A light mist, from water outlets adjacent to the guest loading area, provides constant relief to the animals on hot days. The walkway along the elephants' route through the Park is also sprayed to reduce heat. Walking helps wear the foot pads and toenails to prevent overgrowth, and exercise supports the overall health of the elephants.

The system of one-on-one care at the Camp assures that individuals with "time off" graze in nearby woods or grasslands, swim, socialize, or spend quality time with their mahouts (caretakers). The mahout steers his elephant using his voice, feet, and hook. The elephant hook can be compared with a dog leash, or reigns on a horse. It is used for steering and to correct the elephant.

Some of the Camp's elephants have been taught to paint, and have received international media attention for their work. These paintings, a favourite with guests, are available for purchase at the Camp. Meanwhile, the recognition and enthusiasm generated by projects such as this help call attention to the Camp's mission, its goals, and the critical situation facing Thailand's elephants today.

The Ayutthaya elephants live at the ancient Royal Elephant Corral, about 2 km from the Camp. The Corral is home to the elephants, mahouts and staff, and a full-time veterinarian. The animals are given routine veterinary examinations and medical treatments each morning and evening. Formerly employed in Thailand's now-defunct tropical hardwood industry, many of the elephants here were rescued from ivory and meat processors, or illegal loggers, or were rescued after being abandoned before weaning age, or because of injury or disease. Others came from private owners who were unwilling or financially unable to maintain and care for them.

Both the Camp and the Corral are managed by the Elephant Care Assembly (ECA), Thailand's foremost domesticated elephant advocacy group. The ECA also encourages the dissemination of traditional knowledge and scientific research among the elephant care facilities of Thailand and the rest of the world.

For the price of an elephant ride, guests can support the work of the Camp and help to ensure the survival of Thai elephants.

General management of the mothers

Our management system is modelled on small-scale agricultural enterprises, such as the traditional single-family farm. This allows us to provide individualized care to many animals efficiently.

1. Nutrition and Feeding – We obtain large quantities of vegetable- and grain-based foods from a variety of sources. Intake of each food type is balanced to produce an optimal diet.

    1) Primary Food – The main component of our elephants' diet is fresh vegetation, purchased in a total quantity of approximately three four-ton truckloads per day. Some variation in the actual type of vegetation is necessary because of seasonal availability, but this is seen as a benefit because the animals are susceptible to both nutritional deficits and boredom when only one plant species is offered. Specific examples of foods in this category include banana, pineapple, and tamarind tree branches, and corn stalks. To supplement these items and maintain the elephants' feeding schedule in the event of supply shortages, the Camp has secured 400 rai of nearby farmland. This land can provide large quantities of elephant grass, corn stalks, and other plant matter when necessary. Our elephants are offered these foods continuously throughout the day, with the last feeding at 8:00 PM, and the weight of each elephant's daily intake is monitored and recorded.

    2) Secondary Food – Fresh produce, including bananas, sugarcane, pineapples, and water chestnuts, is purchased in a total quantity of two seven-ton truckloads per week. These items stimulate the elephants' appetite and alleviate boredom; they are offered in small quantities throughout the day by Camp staff and visitors.

    3) Supplemental Food – To make up for any vitamin and mineral deficiencies, a commercial feed consisting of pelleted rice bran chaff and trace elements is mixed with iodized salt (NaCl) and a vitamin premix, and offered twice per day. Each adult elephant may consume this mixture at-will for approximately fifteen minutes, both before and after work.

    4) Water – Two separate sources of water are employed to ensure maximum daily intake. The elephants will drink from the Lopburi River, which runs adjacent to the Royal Elephant Corral, at their morning and evening baths there. Unlimited quantities of treated water are also provided, as needed, from a trough at the Camp during working hours.

2. Waste Management – Disposal of waste products, which consist of faeces, urine, and uneaten food, is conducted in a conscientious manner that minimizes environmental impact and utilizes biological controls.

    1) Faeces and Food Waste – These are collected by truck each morning and evening, and composted to produce a nutritious and effective plant fertilizer.

    2) EM Spraying – To reduce offensive odours, expedite the breakdown of solid and liquid waste by-products, and control the spread of pathogens, especially during Thailand's rainy season, we treat all resting and walking areas with Effective Micro-organisms (EM), a commercial preparation of enzymes and beneficial bacteria.

3. Veterinary Care – In the interest of creating a flexible, sustainable system of health management, we developed and implemented a comprehensive annual veterinary care plan that could be easily and effectively duplicated in a variety of settings. Our efforts will culminate in the opening of an elephant health and breeding centre and teaching hospital at the Royal Elephant Corral.

1) Outline of the Annual Care Plan – A clearly defined list of daily, weekly, monthly, and annual action items is provided for each individual directly involved in caring for the elephants and administered by the staff veterinarian. If a specific component is found to be redundant or unnecessary, or fails to produce the desired outcome, it can be adjusted or eliminated. To minimize the possibility of this, the plan was developed in conjunction with the mahouts, whose daily experiences and wealth of practical and traditional knowledge are an invaluable, but much neglected, resource. Modern scientific and pharmacological knowledge, acquired at the Faculty of Veterinary Science, Chulalongkorn University, further enhanced the plan's scope. Consultations with senior faculty there, as well as many colleagues, have been instrumental throughout the development and implementation process. The maxim that, "an ounce of prevention is worth a pound of cure" effectively summarizes the plan's central principle, and we have attempted to create a system that heavily emphasizes routine preventative medicine and keeps the necessity of critical treatment to an absolute minimum.

   a) Daily Plan – A routine physical examination of every elephant is conducted each morning and evening. This will reveal external or internal injuries, limping, and ear, eye, foot, nail etc. abnormalities. Any unusual symptoms or behaviour, as noted by each mahout, are evaluated. Necessary treatments can be performed immediately, and an appropriate period of rest is prescribed.

   b) Weekly Plan – The most common injuries among our working elephants are abrasions. These occur along the back, where they are caused by the shifting of the bench used during elephant rides, and across the chest, caused by the belt that holds the bench in place. Any signs of swelling, inflammation, or skin irritation are checked visually and by palpation. If such signs are revealed, treatment and rest begin immediately. Tamarind, which acts as a mild laxative, is administered weekly, in addition to the dietary components iodized salt and vitamin premix; these duplicate the foraging for minerals and medicinal herbs that has been observed in wild elephants. During the rainy season, Gentian Violet is applied weekly to all elephants' feet, which helps reduce the possibility of fungal and bacterial infection. This is sometimes mixed with coconut oil to prevent drying of the skin.

   c) Monthly Plan – Tail dipping, with insecticide, is conducted for two seconds each month to control ectoparasites such as fleas, ticks, and lice. To control endoparasites, a one milligram per kg of body weight dosage of Mebenazole 500 mg is also administered for routine deworming.

   d) Every Three Months – Broad-spectrum deworming is provided by a one percent solution of Ivermectin, administered by subcutaneous injection in an approximate dosage of one cc to each 500 kg of body weight. Random faecal examinations are also conducted, using fresh smear and sedimentation techniques.

   e) Every Four Months – Each female elephant is given an intramuscular injection of AD_3E, in a dosage of one cc per 100 kg of body weight, to promote reproductive health.

   f) Every Six Months – The elephants' weights are measured using a scale at a nearby rice mill, and recorded. Each elephant is also vaccinated against Haemorrhagic Septicaemia.

   g) Annually – Blood samples are collected from all elephants and screened by machine at Ayutthaya Hospital, which performs this yearly service without charge. The screening can predict and reveal what may not be observable in other ways. Routine work-ups include CBC and blood chemistry, to check kidney and liver function, etc. [BUN, Creatinine, SGPT (ALT), total protein, AP].

The annual plan schedule for 2001–2002 is reproduced in Table 1.

Table 1. Annual plan schedule for 2000–2001

Month	Scheduled procedures
April	Deworming P/O, Tail Dipping, Weight Check, Faecal Exam
May	Deworming P/O, Tail Dipping, Deworming S/C, HS Vaccination
June	Deworming P/O, Tail Dipping, AD_3E
July	Deworming P/O, Tail Dipping
August	Deworming P/O, Tail Dipping, Faecal Exam
September	Deworming P/O, Tail Dipping, Deworming S/C
October	Deworming P/O, Tail Dipping
November	Deworming P/O, Tail Dipping, Weight Check, AD_3E
December	Deworming P/O, Tail Dipping
January	Deworming P/O, Tail Dipping, Blood Collection, Faecal Exam, HS Vaccination
February	Deworming P/O, Tail Dipping, Deworming S/C
March	Deworming P/O, Tail Dipping, AD_3E

2) Veterinary Area Restraint – For safety reasons, physical restraint at the vet station is provided by a "Ben-Ja-Pat", a set of metal posts and inclined crossbars to which chains can be affixed at various points.

Special management of pregnant females

A total of four elephants have delivered calves at the Camp since its founding. Of these, two were mated here and two were pregnant when they were purchased by the Camp (see Table 2). Our management programme allows for natural interaction between bulls and female elephants, and strives to encourage mating and promote reproductive health.

Table 2. Vital statistics for mothers and camp-born infants

Mother No.	Age	Mating date	Parturition date	Gestation period
1	17	May 1998	February 2000	22 months
2	27	Not known	October 2000	Not known
3	24	Not known	November 2000	Not known
4	16	March 1999	December 2000	22 months

1. Estrus Detection – Observable factors, well-known among mahouts, signal the onset of heat in female elephants and can be described broadly as follows.

1) In the female:

a) Behaviour changes, such as sudden decreased responsiveness to mahouts' commands and presenting rearward in the presence of bulls.

b) Sticky, translucent vaginal discharge, white in colour (resembles the spinbakyte in cattle).

c) Unusually frequent attempts to smell reproductive organs of other elephants.

2) The bulls' behaviour also provides clues and can even predict the onset of heat or signal "silent" (symptomless) heat.

   a) The bull will sniff the vagina of a particular female more often than usual.

   b) The bull's penis will begin to protrude while sniffing.

3) Finally, the female will exhibit certain behaviours when the bull approaches as above:

   a) Increased tolerance of and attentiveness to this interest.

   b) Again, turning to present rearward.

   c) The hind legs will widen slightly during the act of sniffing.

2. Semen Evaluation – These services are contracted with other facilities, such as Kasetsart University, that use the analytical data in their fertility research and share the results with us.

3. Mating Programme Management – After the onset of heat is observed, an initial attempt will be made to mate the female in two to three days. In the event that the advances of the first bull are unsuccessful, additional attempts may be made with other bulls. Our expectation is that the female will demonstrate a preference for one bull over the others, not unusual in an animal with the social complexity of elephants. The mahouts of both the male elephant and the female elephant stand by during courtship and mating to prevent accidents.

4. Pregnancy Check – No test for early pregnancy has yet proven to be both reliable and practical, so we have incorporated both traditional knowledge and recently developed laboratory techniques in our efforts to determine pregnancy.

1) Traditional Knowledge – An experienced mahout can recognize the signs of pregnancy after five to six months of gestation. Subtle changes in behaviour and responsiveness can be observed, and a hardening of the breast tissue can be felt.

2) Laboratory Facilities – Serum progesterone levels in radio-immunoassay (RIA) are analyzed in co-operation with researchers from Chulalongkorn University, who periodically collect blood samples from our females. This procedure is relatively new in Thailand and is prohibitively expensive. Progesterone levels can indicate pregnancy as soon as two or three months after a successful mating. Efforts are underway to contract RIA sampling with Ayutthaya Hospital.

5. Medication – Once pregnancy is determined, 5 000 mg of phosphorus-buffered calcium is administered three times per week, and more frequently as pregnancy progresses, to aid in foetal bone formation.

Three stages of the parturition process

This outline was developed in consultation with mahouts and elephant researchers by the Ayutthaya Elephant Camp Staff Veterinarian, Dr Puttipong Khawnual, who has personally guided three births here. It describes the three distinct steps of the parturition process.

1. **Stage One** (Parturition preparation stage): Labour contractions are internal and cannot be determined by observation. However the period of one to three days before parturition is generally marked by the appearance of some or all of the following signs:

1) Moderate changes in behaviour, again including decreased response to mahout commands.

2) Decreased appetite and increased anxiety in familiar situations.

3) A clear or yellowish vaginal discharge that accompanies the release of the mucous plug covering the opening of the cervix.

2. **Stage Two** (Foetal expulsion stage): Actual parturition rarely lasts more than ten seconds and normally occurs at night.

1) Emergence of the foetus from the cervix is indicated by distension at the posterior of the vagina, which is observable until the foetus is completely discharged.

2) This is immediately preceded by loud vocalizations, extreme agitation, and an erect tail.

3) Birth is normally in the dorsal longitudinal anterior position (the trunk, head, and forefeet appear first). As the foetus emerges, however, it curls into the ventral position.

4) The mother's behaviour at this point depends upon her individual experience of births, either her own or other females' whose deliveries she may have witnessed. Some elephants will prod the infant with their trunk or forelegs to release the infant from the amniotic sac or as a circulatory and respiratory stimulant. Females without previous birth experience may initially attack the infant or display exaggerated versions of these behaviours as a result of stress and shock.

5) The infant can stand up by itself in an average time of 10-30 minutes.

3. **Stage Three** (Placental expulsion stage): This stage usually occurs within 24 hours of the end of Stage Two. In one birth at the Camp, release of the placenta did not occur until the 96 hours mark, and a case of retained placenta was suspected. See Table 3.

Table 3. Placental expulsion stages and times

Mother No.	Stage 1 (hrs)	Stage 2 (sec)	Stage 3 (hrs)	Standing time (min)	Remark
2	48	5	96	60	Retained placenta
3	Not observed	5	8	20	-
4	Not observed	5	6	15	-

Parturition checklist

1. Prepartum management

1) Regular treated water bathing, and washing around the vagina with one percent solution of povidone-iodine once per day.

2) Thorough cleaning of the nursery area and treatment with EM.

3) Decrease food intake to prevent constipation.

2. Parturient management

1) If necessary, brief staff on the potential need for intervention in a crisis situation, such as an attack on the infant by the mother.

2) Ensure that mahout and staff with spears or other instruments are in attendance in case of emergency.

3. Postpartum management

1) Day One After Parturition (D1): Intramuscular injection of Oxytocin 100 IU to increase milk-letdown and prevent postpartum haemorrhage.

2) D2 and D5: To prevent and treat diseases similar to mastitis metritis and agalactia (MMA) in swine, and other infections by bacteria sensitive to penicillin, penicillin and streptomycin long acting (LA) is administered intramuscularly in a dosage of 3 000 IU per kg of body weight.

3) D1 through D15: To prevent postpartum haemorrhage and uterine bleeding, Methylergometrin maleate 0.2 mg is injected daily in a dosage of 0.001 mg per kg of body weight for 15 days after parturition.

4) D7 and D30: Blood is collected for a routine postpartum check.

5) To prevent disease similar to milk fever in cattle, Calcium gluconate 500 mg is administered orally in a quantity of 20 tablets per day until weaning.

6) Nursery area is cleaned and sprayed with EM every day.

4. Neonatal management

1) D1: The infant should begin nursing, with assistance if necessary, and drink as much colostrum as possible.

2) D1: Two stitches, with black silk No. 2 and 1 cm apart, tie off the umbilical cord at a distance of about one inch from the abdomen.

3) D1 through D7: The cord is sprayed with a ten percent povidone-iodine solution, two times a day, to prevent bacterial infection (especially *Clostridium spp*.).

4) D1 and D4: To prevent and treat tetanus and other bacterial infections with sensitivity to penicillin, penicillin and streptomycin long acting (LA) is given in a dosage of 3 000 IU per kg of body weight by intramuscular injection.

5) D2 and D14: To prevent iron deficiency, Iron dextran is injected in a dosage of 1.5 mg per kg of body weight. This is administered with Vitamin C 500 mg in a dosage of 10 mg per kg of body weight, which promotes Iron dextran absorption.

6) D2, D3, and D17: Deworming with Pyrantel pamoate suspension 50 mg in an oral dosage of 5 mg per kg of body weight. This is repeated each month.

7) Random faecal examinations are conducted one week after each deworming.

Conclusions

Many people believe that the Asian elephant is already extinct in the wild; they just do not know the fact. That is to say, an expanding human population precludes the continued viability of any wild elephant population. African elephants may well find themselves in the same dire predicament in 25-50 years. If people want elephants in the world, some level of managed contact with humans will be a necessary component of all elephants' lives in the coming decades. We believe that this relationship

can be vastly improved by co-operation among the elephant facilities of Thailand, and the rest of the world, on health and management issues.

The Elephant Managers Association, an international nonprofit organization of professional elephant handlers, recently stated that "elephants may be chained at night to prevent fighting, as a viable alternative to single stall accommodation. Continuous chaining should be limited, and every effort should be made to provide as much time off chains as possible." This has been the policy of Thai elephant keepers for nearly 5 000 years! The *kochakam*, the traditional Thai system of elephant keeping – one man, one elephant, together for life – is well alive. We believe that it is the best. For our young elephants, and for every elephant who comes to live with us (whatever their origin) we will honour that system and the lifelong responsibility it carries with it.

We would like to take an active role in defining "the management system of the future," and will conclude with our goals:

- Published and enforced standards of care for working elephants in the tourist industry, which take into account the needs of mahouts and their families.
- Providing concerned citizens with a forum to encourage, and assist in the development of government initiatives for the protection of working elephants.
- A reassessment of elephant management systems worldwide, and co-operation in determining the best possible compromise between human and elephant needs.

Figures 1 and 2 show some baby elephants at the Ayutthaya Elephant Camp.

Question and answer session

Dr Daranee commented that the blood samples from group one in her study (that showed nutritional deficiency) came from Ayutthaya Camp elephants. This showed that even if you gave the elephants excellent care there was still a danger of nutritional deficiency.

Dr Puttipong, Staff Veterinarian at the Camp, said that he was very disappointed with these results and was taking steps to improve the nutrition of the elephants under his care.

Figures 1 and 2. Baby elephants at Ayutthaya Elephant Camp

Part IV: Annexes

Annex 1: Agenda and timetable

International Workshop on the Domesticated Asian Elephant

5-10 February 2001
Bangkok and Lampang/Chiang Mai, Thailand

4 February (Sunday): Arrival of participants in Bangkok

5 February (Monday):

0800–0845: Registration at the FAO Regional Office

0845–0930: Opening Ceremony

Opening Address by Dr R.B. Singh, Assistant Director-General and Regional Representative for Asia and the Pacific, FAO

Welcome Address by Mr Toshihiro Arai, President, Thai Sekisui Foam Co. Ltd., on behalf of Keidanren, Japan

Welcome Address by Manoonsak Tuntiwiwut, Deputy Managing Director, Forest Industry Organization, Thailand

Opening Remarks by Mr M. Kashio, Forest Resources Officer, FAO

0930–1000: Coffee/Tea Break

1000–1040: Introduction of the participants and the Workshop Secretariat, FAO Regional Office

1040-1130: Keynote presentation "A Regional Overview on the Need for Registration of Domesticated Asian Elephants", by Mr R. Lair, Domesticated Asian Elephant expert and FAO consultant

Session I: Presentation of Country Reports

1130–1200: Street wandering elephants in Bangkok
by Dr Viroj Pimmanrojnagool, and Mr Sawai Wanghongsa, Royal Forest Department, Thailand

1200–1230: Domesticated elephants in Sri Lanka
by Mr Jayantha Jayewardene

1230–1400: Lunch

1400–1430: Domesticated elephants in Indonesia
by Mr Baringin Hutadjulu and Mr Ramon Janis

1430–1500: Domesticated elephants in Bangladesh
by Prof. Md. Anwarul Islam, University of Dhaka

1500–1530: Coffee/Tea Break

1530–1600: Domesticated elephants in Cambodia
by Mr Chheang Dany

1600–1630: Domesticated elephants in Myanmar
by U Tun Aung and U Thoung Nyunt, Myanmar Timber Enterprise

1630–1700: Domesticated elephants in Nepal
by Mr Fanindra R. Kharel, Department of National Parks & Wildlife Conservation (DNPWC)

1700–1800: Open Forum

1800–1930: Welcome reception at the FAO Regional Office

6 February (Tuesday):

Session I: Presentation of Country Reports (continued)

0800–0830: Domesticated elephants in Viet Nam
by Mr Tran The Lien and Mr Trinh Viet Cuong

0830–0900: Domesticated elephants in India
by Mr S.S. Bist, Project Elephant

0900–0930: Domesticated elephants in Malaysia
by Mr Mohd. Shariff Daim, Department of Wildlife and National Parks

0930–1000: Domesticated elephants and ecotourism in Thailand
by Mr Prasob Thipprasert, Forest Industry Organization

10001015: Coffee/Tea Break

Session II: Presentation of Thematic Papers

1015–1035: Problems and challenges of Sumatran elephant *ex situ* management in Indonesia
by Mr Bambang Suprayogi and Dr Jito Sugardjito, Fauna and Flora International – Indonesia Program

1035–1110: Captive breeding of elephants
by Dr Khyne U Mar, Myanma Timber Enterprise, Myanmar

1100–1125: Comparison of blood chemistry values between captive elephants and free-ranging elephants in Thailand
by Dr Darunee Tuntasuvan, National Institute of Animal Health, Bangkok

1125–1145: Tranquillization and translocation of captive bulls
by Dr Jacob V. Cheeran, India

1145–1205: The role of private organizations in elephant conservation
by Ms Soraida Salwala, the Friends of Asian Elephants, Thailand

1205–1230: Management of domesticated elephant in Thailand: How NGOs can help?
by Dr Parntep Patanakorn, Faculty of Veterinary Science, Mahidol University, Thailand

1230–1330: Lunch

1330–1355: Solutions to help domesticated elephants in Thailand
by Mr Roger Lohanan, Thai Animal Guardians Association

1355–1415: Captive Asian elephants and the conservation of the species
by Dr Michael Stuewe, Smithsonian Institution, USA

1415–1430: Using a database to help manage captive elephants
by Dr J. Andrew Teare, Jacksonville Zoo, USA

1430–1445: Introduction of elephant programmes in the International Fund for Animal Welfare (IFAW)
by Dr Joanne Fielder, Belgium

1445–1505: Introduction of the Mobile Clinic Programme in Thailand
by Dr Bjarne Clausen

1505–1530: Coffee/Tea Break

1530–1550: Introduction to the Asian Elephant Conservation Fund and its activities
by Dr Karl A. K. Stromayer, U.S. Fish and Wildlife Service, U.S.A.

1550–1605: Introduction of the Nagao Natural Environment Foundation (NEF)
Dr M. Komoda, Director, NEF

1605–1625: Introduction of the Ayutthaya Elephant Camp
by Dr Puttipong Khawnual, The Ayutthaya Elephant Camp, Thailand

1625–1700: Elephants' plight and a ray of hope (slides presentation)
by Mr Sam Fang, Travel photo-journalist, Singapore & Thailand

Session III: Identification of Major Issues and Priority Areas of Work

1700–1900: Discussions on potential group topics

1) Socio-economic and cultural issues
2) Laws, rules and regulations
3) Registration and management (database and information exchange)
4) Framework for co-operation and networking

7 February (Wednesday):

Session IV: Group Discussions on Each Identified Priority Area of Work

0800–0830: Formation of groups and explanation of their tasks

0830–1230: Group discussions

1230–1400: Lunch

1400–1500: Group discussions (continued)

1500–1530: Coffee/Tea Break

1530–1700: Group discussions (continued) and report writing

8 February (Thursday): (National holiday in Thailand)

Session V: Presentation of Group Reports

0830–0930: Group 1: Socio-economic and cultural issues

0930–1035: Group 2: Laws, rules and regulations

1035–1100: Coffee/Tea Break

1100–1200: Group 3: Registration and management (database and information exchange)

1200–1300: Group 4: Framework for co-operation and networking

1300–1345: Lunch

1345–1500: Group Discussions: Suggestions for improving the final group reports

1500–1530: Coffee/Tea Break

1530–1600: Group report presentations

Session VI: Conclusions and Recommendations

1600–1645: Conclusions and recommendations

1940: Departure to Lampang by night train (sleeper)

Field Visit Programme: 9–10 February 2001

9 February (Friday):

0700: Arrival of the participants at the Lampang Railway Station
- Received by FIO staff with two buses

0730–0830: Take breakfast at a hotel

0845–1115: Visit the Thai Elephant Conservation Center (TECC), FIO
- Briefing on the FIO elephant programmes
- Observe facilities and elephant show

1115–1215: Visit to the FAE Elephant Hospital
- Observe the facilities and activities

1215–1315: Lunch

1330–1520: Visit to Mahout Training School

1520: Departure to Chiang Mai

1620: Check in the Chiang Mai Hills Hotel
Free time for enjoying Chiang Mai

10 February (Saturday):

0700–0800: Breakfast

0800-1200: Field visit to observe the Mae Sa Elephant Camp

1200–1330: Lunch at the Chiang Mai Hills Hotel

1330–1430: Overall summary of the Workshop and closing ceremony at the hotel

1430: Departure of the participants from Chiang Mai International Airport

1900–2100: Workshop Organizing Committee Meeting for discussions on the outcome of the Workshop and follow-up activities (WOC Members only)

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Annex 2: List of participants

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