Feature Articles

RECOMMENDATIONS FOR IMPROVING THE MANAGEMENT OF CAPTIVE ELEPHANTS IN WAY KAMBAS NATIONAL PARK LAMPUNG, SUMATRA, INDONESIA

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INTRODUCTION:

The Directorate of Forest Protection and Nature Conservation (PHPA) of Indonesia has achieved considerable success in their efforts to capture crop raiding elephants in various parts of Sumatra and train them.

For this purpose, they have established an 'Elephant Training Centre' at the Way Kambas National Park (Fig. 1) in Lampung Province, where with the assistance of the mahouts from Thailand, a number of young Indonesians have been trained in the art of domesticating and training of elephants in captivity (Santiapillai, 1990).

Dr. Charles Santiapillai, Senior Scientific officer of WWF Asia Programme, at Bogor, Indonesia, suggested that I should visit this Centre and make recommendations for improving the management of elephants. The WWF Indonesia Programme, proposed a project for this purpose and invited me to undertake a visit to the Elephant Training Centre, at Way Kambas National Park with the following objectives:

a) To critically assess the current management of elephants in captivity and recommend appropriate improvements;

b) To train PHPA staff in the management of elephants, with special emphasis on provision of a balanced diet and adequate veterinary care;

c) To initiate a programme to breed elephants in captivity; and

d) To train the PHPA staff to maintain proper records for each elephant and monitor its performance.

I visited Indonesia and stayed at the Way Kambas National Park from 18 September 1991 to 12 October 1991 (25 days) and observed the prevailing management practices, health of the elephants, the training procedures and general practices.

ADMINISTRATIVE SET UP :

The Way Kambas National Park is under the Directorate of Forest Protection and Nature Conservation (PHPA) of Indonesia. Pak Kurnia Rauf was the Administrative Head of the Park, Pak Tonni Ramadhani, the Officer In-charge of the Elephant establishment and Dr. (Mrs) Anjar Buddi Susilowati was the Veterinary Surgeon in-charge of veterinary care of the elephants. Four mahouts from Thailand were engaged for organising the capture and training of the elephants. Local Indonesians were employed as mahouts (Pawang).

Elephant capturing was undertaken from 1986 onwards, concentrating mainly on pocketed herds of elephants, which were crop raiding and causing serious problems. During my visit, fifteen elephants were captured in the sugarcane belt of Karang Mulya (a transmigrant settlement) in the Sungkai Selatan District of Lampung Utara, near Kotaboomi in Sumatra.

The elephants were captured by the drug immobilisation technique (using Xylazine as the drug for darting) within a period of five days from 27 September to 1 October. I was present during the transport of these animals from the site of capture to the Elephant Training Centre at Way Kambas National Park, - a distance of 165 kms.

The elephants were transported in two batches, by trucks. The first batch of 8 elephants were transported on 1 October and the remaining 7 elephants were transported on 4 October. During the transportation, involving

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Asian elephant, the 13 countries concerned do not have even half a million dollars provided by the West to implement conservation programmes! The WWF International plans to spend over 4 million US dollars in Africa this year alone on elephant-related projects. But sadly, WWF has not extended its philanthropy to the Asian elephant. If such concerned conservation organizations as WWF and IUCN are ineffective or impotent in raising sufficient funds to conserve the Asian elephant, we shudder to think what hope is there for other less charismatic animals in the wild?

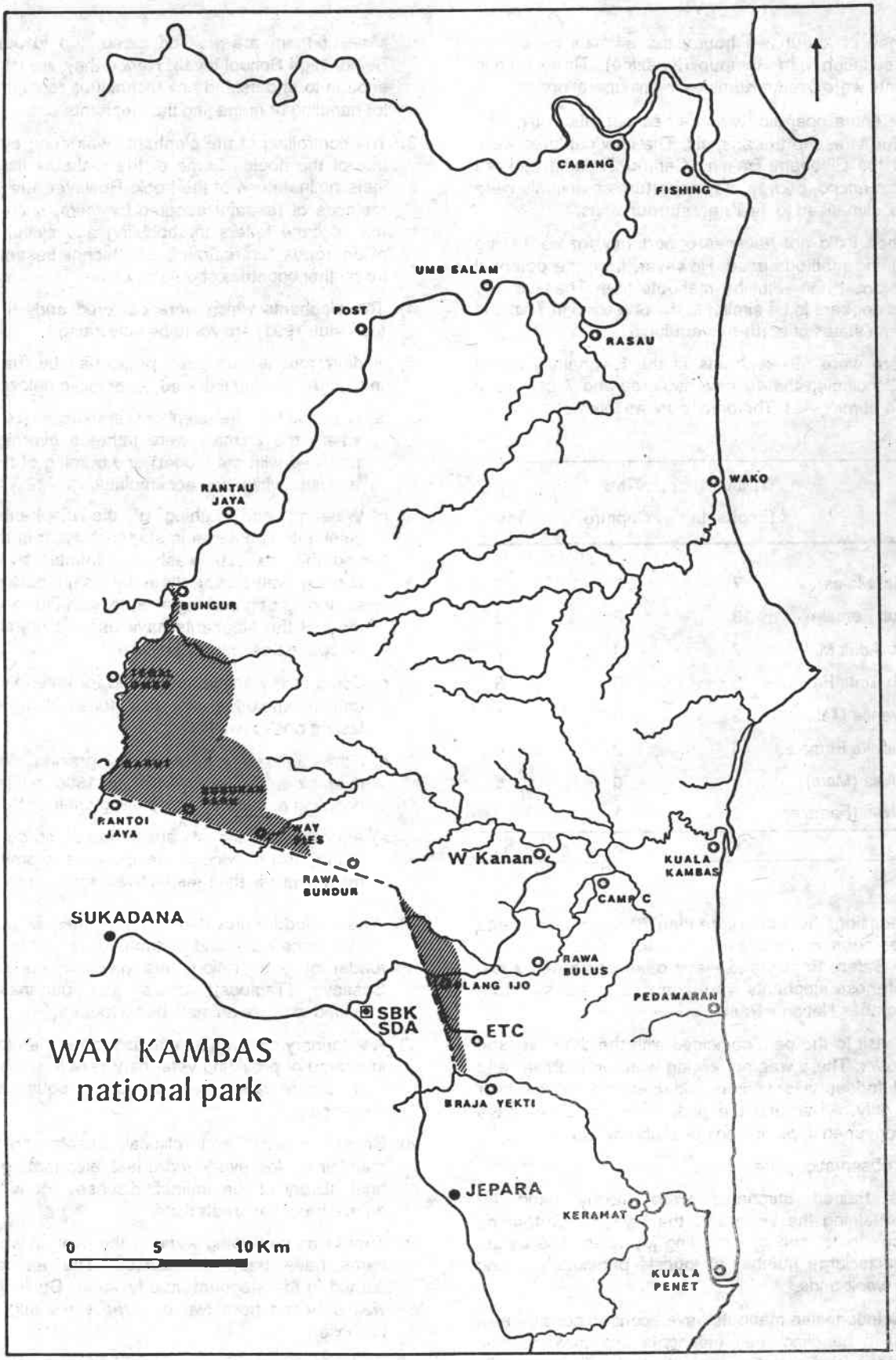


Fig. 1. *Way Kambas National Park, Sumatra*

a journey of about five hours, the animals were kept under sedation with Rompun (Xylazine). Three trained elephants were used a Kumkies in this operation.

The entire operation was carried out efficiently, with no undue stress to the animals. The new captures were kept at the Elephant Training Centre. Training had not yet commenced, prior to may departure as animals were being acclimatised to their new surroundings.

Hence I did not have an opportunity for witnessing the training methods used. However, from the personal discussions I had with the mahouts from Thailand, the method appears to be similar to the one used in Thailand and some states of north-eastern India.

There were 59 elephants at the Elephant Training Centre, including the 15 new captures and 7 calves, at the time of may visit. The details are as follows:

	Trained Elephants	New Capture	Total
1) Adult Males	7	0	7
2) Adult Females	13	6	19
3) Sub Adult Males	7	0	7
4) Sub Adult Females	3	3	6
5) Juvenile Male	3	3	6
6) Juvenile Female	4	2	6
7) Calves (Male)	5	0	5
8) Calves (Female)	2	1	3
	44	15	59

In addition, there are more than 70 captive elephants in other parts of Indonesia, in places such as Aceh, Taman Safari, Bogor, and many other parks and zoos. Most of these elephants were acquired by transfer from Way Kambas National Park.

My visit to the park coincided with the driest season in the park. There was no flowing water in the river and natural fodder was scarce and confined to the river edges only. All around the park extensive areas have been converted to plantations of *Dalbergia* Sp.

My observations are:

1) The trained elephants were mostly used for entertaining the visitors to the park, by performing circus feats, and by providing joy rides. The centre attracts large number of tourists particularly during the week-ends.

2) The Indonesian mahouts have acquired considerable skill in handling their elephants and making them perform circus feats, and ride their elephants with dexterity. They have become efficient in their work. Most of them are well educated, (up to Junior or Senior High School level). Hence they are intelligent enough to understand any techniques recommended for handling or managing the elephants.

3) The controlling of the elephants was done by liberal use of the hook. Some of the mahouts indulge in indiscriminate use of the hook. However, the various methods of restraint adopted by them, such as the use of cane fetters for hobbling and skilful use of nylon ropes for restraint, are techniques mahouts from other countries should examine.

4) The elephants which were captured early this year (Jan.-Jul. 1991) are yet to be fully trained.

5) A daily routine has been prescribed by the officer in charge, is being followed, as detailed below:

   a) Cleaning of the elephant standings (i.e. place where the animals were tethered overnight and provided with cut fodder) and burning of the dung and litter which had accumulated.

   b) Watering and bathing of the elephants. The elephants submerge in stagnant water in the river and the mahouts wash the animals by merely pouring water over them by using buckets. No scrubbing or grooming is done, with the result, that most of the elephants have heavy infestations of ectoparasites, particularly lice.

   c) Some of the animals are used for entertaining the tourists, and others are taken for a training session lasting one to two hours.

   d) Other animals are let out for grazing along the river side, till about 1400 to 1500 hours, after hobbling and attaching a trailing chain to the legs.

   e) After this the animals are tethered and cut fodder in the form of coconut palm leaves is provided to the animals in their respective tethering places.

6) The cut fodder provided to the animals, is brought in trucks, once daily and distributed. No other form of fodder or grain rations are given to the animals. Cassava (Tapioca) tubers and bananas were provided to those animals being trained.

7) A veterinary surgeon is attached to the Centre and is in charge of providing veterinary care to the animals. The Centre also has a poorly equipped field dispensary.

8) Record sheets and clinical sheets are being maintained for every individual elephant, giving a brief history of the animal, diseases for which the animal has been treated etc.

9) There was no flowing water in the river, in which two dams have been constructed. The animals are bathed in the stagnant muddy water. Drinking water was provided from two or three wells dug for the purpose.

10) During may stay in the park, I trained the staff to record the body measurements of the animals such

as the height, girth and length of the body etc. Measurements were recorded for 35 elephants. The newly captured elephants and seven calves were not brought for recording measurements.

11) The elephants are not used for hauling timber and only a few of them were being trained for this puspose.

12) Considering the number of elephants kept in the Centre, the number of mahouts available is not adequate, and some of the mahouts handle more than one elephant.

13) The four mahouts from Thailand assist in the training of the Indonesian mahouts and their elephants.

14) Many of the adult elephants, both bulls and cow elephants are being used as Kumkies for escorting newly captured animals, which is a desirable practice.

15) Importantly, dogs and cattle were not seen within the park area.

RECOMMENDATIONS

Based on my observations, the following recommendations are made for improving the management of elephants in the Centre.

I. TRAINING :

I did not actually witness the breaking and training of newly captured elephants; however, from personal inquiries, I learnt that it is similar to the method followed in Thailand, as the mahouts engaged for imparting training are from Thailand.

There are about 14 elephants which were captured during early 1990-91 (from Jan. to July.). I found that most of them still need more intensive training. Many of them appear unsettled and nervous. The mahouts resort to harsh methods, while training these animals, which is not desirable. A nervous or timid animal is unreliable and may cause accidents. From my experience of training of new captures in the states of Tamil Nadu and Kerala, in South India, where the Kraal method of training is adopted, the animals were trained using much gentler methods, and they also settle down for training much faster. Even the largest animal can be made to obey at least 20 to 25 words of command before they are taken out of the Kraal, a period of about 2 months. The hook is never used while training, and only a stick is used for controlling the animal. In this way the mahout stays close to the animal.

Hence, I recommend some of the senior mahouts and the officers in-charge of the Elephant Training Centre, be sent to a training establishment using the Kraal method, so that they will be convinced of the greater efficiency of this gentler method of training. This should stop the traumatic experience which the elephants undergo due to the current method of training.

Even on well trained elephants, hooks are used by most of the mahouts at the Centre. This is not necessary. The mahouts should gradually be weaned from the practice of using hooks and instead learn to control their wards by using sticks only. I was happy to see some of them have already replaced the use of hooks with sticks while handling their wards.

Hence I am confident that the other mahouts can also be persuaded to practice using the gentler method of controlling the elephants and avoid using hooks at least on already trained elephants and for training the juveniles.

Elephants which are over 2 metres in height may be trained for hauling timber. The use of elephant power in forestry production areas will be more economical than mechanisation and cause little damage to the undergrowth in the forests.

Training of calves:

There are 7 calves, three are without their mothers. It is easy to train calves with gentler methods. In my experience, weaning the calves from their mothers, at one year of age, and training them is easier than training the older calves which tend to be more aggressive. Captive born calves have no fear for man, and unless they are weaned and trained early, they may become a problem at a later stage. Early weaning has not been observed to affect their rate of growth, provided they are managed properly and given a balanced diet.

II. MANAGEMENT

1) Mahouts :

The number of mahouts employed is far less than the number of elephants kept in the Centre. As more and more elephants are captured and brought to the Centre for training, the problem will become more acute. In India and many Asian countries all elephants over 2 metres in height have two attendants each, i.e. one mahout and one assistant, commonly known as the grass cutter. It is easy to manage larger animals with two people, as the assistant shares the work load, such as bathing and cleaning the stalls. This system enables better management of the animal.

The assistant can be a novice, and by experience, can learn to handle the elephant and assist the mahout in the day to day management of the animal. Selection of a mahout should be from among the assistants who have become capable of handling the elephants independently.

In a park like Way Kambas, which attracts many tourists, accidents may happen if an elephant suddenly goes out of control. In such cases the presence of an assistant to the mahout will help in controlling the animal.

2) Bath :

My stay in the park concided with the driest spell of the season. There was no flow of water in the river near

the Elephant Training Centre. Two dams have been constructed across the river in which stagnant, muddy water has collected. These were used for bathing the animals. Drinking water has provided from 2-3 wells dug for this purpose.

However, the current practice of giving bath to the animal by merely pouring water over them, without scrubbing, is not enough. It is desirable that more attention is paid to this important work. The elephants must be made to lie down in the water in a lateral position, and scrubbed vigorously to remove dirt from the folds of the skin. Special attention should be given to scrubbing around the base of the tusks/tushes, behind the ears, axilla, abdomen, base of tail etc., areas which are likely to harbour ectoparasites and egg packets of oestrid flies.

The use of coconut husk for scrubbing is found helpful. Every part of the body must be scrubbed and washed, desirable in flowing water. Good scrubbing improves the health of the skin, by increasing cutaneous circulation and keeping it free of ectoparasite and fungal infections. At least once a day, 75-90 minutes needs to be spent on this important job.

After bathing, fly repellent oil should be applied around the base of tusks/tushes and around the nails, to prevent infestation by oestrid larvae. This practice in particularly beneficial for those elephants maintained in forest areas.

3) Feeding :

Elephants, like any other animal, need a balanced diet, particularly working animals, as they expend a great deal of energy.

A free ranging elephant spends about 15-18 hours a day grazing. Being a bulk feeder, the animal consumes at least 5% of its body weight as green fodder. A working elephant has less time for grazing. An animal still growing needs adequate protein. In Way Kambas, the captive elephants spend only about 6-7 hours grazing during the day, and are restricted to the river banks only. Later in the evening, they are tethered and given cut fodder in the form of coconut palm, for the night.

Apart from the monotony of eating monoculture fodder like coconut palm, the elephants do not get any grain rations, so their nutrition is inadequate. It is essential to include grain rations in their food. These should be given in cooked form as it improves digestion and palatability. Cereals like rice, wheat, finger millet, maize or any other millet, will help meet the elephant's energy needs as they are rich in carbohydrates. To meet the protein needs and to give a balanced diet, protein rich legumes such as greengram (Kacang hijou), horsegram or any other variety of kacang can be included in the diet.

On a dry matter basis, the grain ration requirement is about 0.5% of the body weight. Thus the daily requirements of elephants of various age groups are as follows:

Animal Height (cm.)	Grain ration quantity (kg.)	Salt (gm.)	Mineral mixture (gm.)
250	15	150	100
210-250	12	150	100
180-210	8	100	75
150-180	6	75	60
120-150	4	50	50

Two-thirds of the grain ration should consist of cereal grains and one-third in the form of kacang. Additions of salt and mineral mixture with the diet will be beneficial.

The animals must be trained to accept food placed directly in their mouth, and the mahouts instructed to give it this way. This will greatly increase the contact between elephant and mahout. It also facilitates easy administration of oral medication such as de-working powder or antibiotics as they can be combined with the cooked food.

It will be advantageous to allow the elephants to graze at night, with adequate precautions. This will improve the contact between the animals and thereby the increase the prospects of reproduction.

If practical difficulties prevent allowing the elephants to graze at night, raising fodder crops such as Napier grass, Guinea grass, hybrid varieties of grasses, and legumes as Alfa alfa etc., will be helpful in meeting the needs of the elephants. A mixed diet of fodder is preferred to a monoculture diet.

4) Work :

Apart from entertaining visitors to the Centre, the captive elephants do not perform any other work. In several parts of Indonesia large quantities of timber are being extracted from forestry production areas. Areas are allotted to private logging companies who use mechanical contraptions for hauling timber.

As more and more elephants are captured every year, a substantial amount of elephant power will be available which should be gainfully employed for timber hauling work. Otherwise, it will become uneconomical to maintain elephants with insufficient work. With the global oil crisis, and high cost of mechanisation, the use of readily available elephant power will prove much more economical than mechanisation. In addition, the elephants involved in timber hauling do not damage or churn up the forest. Hence, it is necessary to train the adult and sub-adult captive elephants for dragging timber.

A well managed elephant can be used for timber hauling for a period of 30 to 40 years, according to the experience of countries such as India, Myanmar, and several other South East Asian countries, where more

than 10,000 elephants are used for timber extraction work.

Additional use of the elephants could be made by offering a much wider range of nature oriented tours of the park which have proven to be very popular in other countries.

5) Camp site :

The present Elephant Training Centre at Way Kambas may not be able to support a large number of captive elephants, throughout the year, as the fodder available around the site is confined to the river side and some tall grass areas around the plantations.

Continuous use by captive elephants may deplete the fodder resources, and also become a reservoir for many gastro-intestinal and ectoparasites.

Hence to facilitate regeneration of fodder around the Centre and also to prevent recycling of parasites, it is necessary to shift the elephants to an alternate site at least for three months of every year, particularly during the drier seasons. The selected site should have running water as well as adequate fodder facilities. This will enable long term use of the Centre at Way Kambas.

6) Joy Ride Facilities :

Visiting tourists are taken to elephant back rides around the Park. This is very popular. No riding kits are used and instead, the tourists are allowed to ride bare back, which is not only uncomfortable but also unsafe. Many types of elephant riding kits are in use in other countries. The designs of such kits can be obtained, and produced locally from available material. Provision of such kits will ensure comfort and safety to the people using them.

7) Disposal of Litter and Dung :

The accumulated dung and litter around the tethering area, are heaped in the same place and burnt. This is a wasteful method. Instead, this material should be carted away to a suitable place for composting. Such decayed material can be profitably used as a farm yard manure, either in raising plantation crops, or for agriculture. Provision of a tractor with a trailer will be helpful for this purpose. This tractor can be made use of for other purposes such as transporting fodder, calves, etc.

8) Veterinary care :

The veterinary dispensary needs to be suitably equipped with adequate medicines and surgical stores. The veterinary surgeon is responsible for the health of the elephants and should also be involved in their management, since proper management will also help in keeping the elephants healthy and prevent the occurrence of many diseases. Hence specific duties must be assigned to the veterinary surgeon such as :

1. Treatment of sick elephants,
2. Detection of outbreaks of communicable diseases and use of preventive vaccinations,
3. Maintenance of camp hygiene,
4. Prescription of diet for the elephants,
5. Fixing of work loads,
6. Recording of Biometrical Data,
7. Post-mortem examination of dead captive or wild elephants and other forms of wildlife.

Considering the occurrence of various types of gastro-intestinal parasites, a de-worming schedule must be planned for the elephants. Similarly, preventive vaccinations against serious diseases like Anthrax and Pasturellosis must be undertaken at regular intervals.

The veterinary surgeon should be sent for training periodically to improve her knowledge in the latest techniques adopted in other countries. Initially the veterinarian should visit various elephant establishments in India, and other countries, where elephants are well managed, so as to gain first hand knowledge about proper elephant management.

BREEDING

Breeding of the elephants in the Park is not difficult. The Park has seven bulls and 19 cow elephants - an ideal sex ratio for captive breeding. Two cow elephants; "Umrih" dan "Karsih" are pregnant-sired by "Tong Byi" - a makhna acquired from Thailand. One of the newly captured cow elephants was observed to have mated with "Sengtong" - a young tusker on 7 October 1991.

The elephants in the camp are maintained as a group in their natural environment and let out for grazing. The mature bulls have access to the female elephants in the group, and matings have been observed to take place.

If the animals are let out for grazing during nights also, the cow elephants stand a better chance of mating with the wild elephants which are frequently observed near the Centre at night.

A stud book should be maintained and details of matings, the identity of the sire, the gestation period, the sex and name of the calf etc. should be recorded. An experienced mahout will be able to detect whether mating has occurred.

Care of pregnant elephants will help ensure a healthy calf. Once the signs of pregnancy are noticed, the pregnant elephant should not work and should be given complete rest. She must never be used as a Kumki or for riding. Transportation in a truck should be avoided. A supplementary diet containing coconuts, minerals and vitamins will help in the development of a healthy calf, as well as the provision of an adequate milk supply for the new born calf.

Calf mortalitiy can be avoided with adequate care of both mother elephant and the calf. The calf should have sufficient mother's milk for its normal growth. Over working of the mother will affect the growth of the calf, as it is dependent on its mothers's milk for the first six months, even though it is capable of browsing by the third month. The calf's growth rate should be at least 2 cms per month. Once the calf reaches the age of six

months, it can be given suitable concentrate rations and de-wormed at regular intervals. If the calf has shown a normal rate of growth, it can be weaned from its mother when twelve months old. Timely weaning will reduce the strain on the mother and make her fit for work again. The weaned calf is capable of leading an independent life and it will continue to be among its own clan.

MAINTENANCE OF RECORDS

I. SERVICE REGISTER :

A service register for each elephant may be opened from the day of its acquisition, either by capture, birth or transfer, and should be posted with all relevant details. The Register can be kept in a well bound pocketbook (20 cm x 10 cm), having a minimum of 200 pages so that it can be used for over a period of nearly 30-40 years.

The details to be noted are as follows:

1. Index

- 1 page

2. Origin:
   a) How acquired - capture/birth/purchase
   b) Date of capture or birth
   c) Place of capture or birth
   d) Age at the time of capture
   e) Height at the time of capture
   f) Indentification particulars - sex, number of nails, conformation of ears, tail, colour of eyes, scars or blemishes, and shape of the back etc.

-2 pages

3. Training particulars:
   a) Date of commencement of training
   b) Date of completion of training
   c) Particulars of training given

- 2-3 pages

4. Mahout and Attendants
   a) Name
   b) Pay particulars

- 5 pages

5. Temperament of the Animal:

(Recording of observation about temperament should be done only after the animal has been well trained)

Disposition of the animal - calm/predictable/aggressive/ unreliable, obedient to mahout, and other details

- 5-10 pages

6. Age, Height and Girth particulars :

To be recorded at least once a year for adult elephants. For calves, measurements at frequent intervals (monthly/quarterly) will be of immense help in observing the growth rate. This should be outlined as follows:

Date of Record	Age	Height	Girth	Circumference of front foot	Weight	Signature of the person recording

- 10 pages

7. Condition and Health:

This should be periodically recorded by a competent authority, such as the veterinarian or officer in charge of administration, to certify as to the general condition of the animal.

- 10 pages

8. Prophylactics & Nature of Vaccinations:

The date and de-worming schedule should be recorded by the veterinarian as and when done. (the drug used may be recorded).

9. Diseases: (particularly sickness) - outlined under the following collumns
   a. Date noticed
   b. Diagnosis
   c. Date of recovery

- 20-25 pages

10. Diet:
   a. Quantity of fodder prescribed
   b. Quantity of grain rations, with details
   c. Name of the authority prescribing the diet

- 15-20 pages

11. Working Capacity:

Nature of work prescribed, and if used of timber hauling - the quantity, (m^3), or load prescribed per trip, hours of work etc.

- 10 pages

12. Work performed:

This should be recorded quarterly. If timber is hauled - the quantity of timber dragged, no. of days worked, no. of days rest, and other details recorded.

- 20-25 pages

13. Cost of Maintenance:

This should be recorded at least quarterly and include cost of feed, pay of mahout, and other expenses incurred for the animal.

- 15-20 pages

14. Breeding particulars:

A) If the animal is a bull, the following details should be recorded

- Name and age of the elephant mated
- Dates of mating (dates on which mating took place)
- Whether he was in Musth or normal
- Result of the mating - details of the calf born
- Date of subsequent matings, if any

B) If the animal is a cow, the following details should be recorded

- Name of the bull (if wild, indicate whether it was wild elephant)
- Dates of mating (if observed)
- Details of mating behaviour, frequency/etc.
- Date of calving
- Sex and birth, weight and height of the calf
- Gestation period
- Calving interval (No. of days between two successive calving)

- 10-15 pages

15. Musth particulars:

To be recorded for the Bulls

1) Date of onset of Musth
2) Duration of Musth (days)
3) Date of waning of the Musth
4) Age at the time of Musth
5) General disposition during Musth

- 10 pages

16. Transfers:

If the animal is temporarily transferred, the details may be noted. If permanently transferred, the service register should also be transferred to the new station for continuing recordings.

- 10 pages

17. Inspection Remarks : by PHPA officials

- 10 pages

18. Inspection Remarks : by Veterinarian

- 10 pages

19. Annual Valuation:

The value of the animal may be revised annually by a competent authority.

- 10 pages

20. If the animal dies, the cause of death, post-mortem findings, method of disposal of carcass, tusk measurements and weight should be recorded. If disposed of by sale, the price obtrained may be recorded, the Register closed and kept as a permanent record for safe keeping.

The details in the service register are valuable data regarding the animal and will help researchers and others determine the performance of the animal.

II. LIVE STOCK REGISTER :

This would be a useful addition for the Centre, and the following facts can be recorded annually in the Register:

1) Sl. No.
2) Date of Acquisition
3) How acquired (Capture/birth)
4) Name of the animal and sex
5) Annual valuation
6) Annual age, weight, girth particulars
7) Diet prescribed
8) Work load
9) Cost of maintenance
10) Remarks (if disposed - nature of disposal)

The register may by posted and revised annually.

III. CLINICAL SHEETS :

Clinical sheets for each animal should be maintained by a veterinarian in-charge and filed in separate files, one for each animal. The following facts should be kept:

Name of animal : -
Sex : -
Age : -
Date of acquisition : -
Mahout : -

Date of Admission	Anamnesis	Symptoms (Clinical Symptoms)	Diagnosis	Treatment Given	Result	Remarks

GENERAL

A) The Asian elephant is considered an endangered species mainly because of the threat to its habitat. This is true in Indonesia where the elephants are found mainly in Sumatra and Kalimantan.

Due to the settling of a large population of transmigrants from Java and other islands amidst the elephant habitats in South Sumatra, particularly in the Lampung province, the elephant habitat has become fragmented. Crop raiding by elephants has become a common feature. Due to this isolated existence, these herds of elephants will die out. Hence the PHPA authorities have undertaken the commendable job of capturing such herds and maintaining them in captivity.

But this cannot be a permanent solution. Alternate methods of saving these doomed herds should be explored, such as:

a) Maintaining the quality of the habitat and creating viable corridors between the pockets.

b) Isolated populations which have no future, should be translocated to suitable areas.

c) Protection of crops from marauding elephants, using effective elephant proof barriers, such as electric fencing, and provision of proper maintenance for the barriers.

d) Educating the people around the belt areas to raise crops such as sunflower, peanuts, sesame seeds which will not attract elephants.

e) Introduction of a crop insurance scheme, as well as provision for payment of compensation for loss of life. This will pave the way for building up the confidence of the people living around elephant areas, and there by preventing them from resorting to extreme measures.

B) Fire Protection: During my visit, the forests around Way Kambas were subjected to severe fires. Large patches of grasslands were burnt. Reports from other areas in the country revealed the occurrence of forest fires on large scale.

Effective fire protection methods such as maintaining fire lines in and around the forests, and fire tracing these lines as needed together with other similar measures are necessary to save the valuable forests.

Training of the forest staff in the latest techniques of fire control and fire management is an immediate necessity. Provision of adequate funds for fire protection work should be given priority.

C) Training of Elephant Managers: My presence in Way Kambas for a period of 25 days could have in a limited way helped in improving some of the management practices. As a follow up action, the person involved in the management of elephants, the decision makers and some of the mahouts should be sent to various elephant camps in other countries such as India for a few days at a time to help them become familiar with sound management practices which can be adopted easily here. The Mudumalai Wildlife Sanctuary in Tamilnadu and other areas in the neighboring states of Kerala and Karnataka have a reputation for maintaining elephants using particularly sound management practices. A visit to these areas, will convince these people of the efficiency of such methods. This is particularly essential since the art of elephant management in Indonesia is of recent origin and needs to be improved.

D) Use of Elephant Power: The PHPA has built up a seizable population of trained elephants. Their number is bound to increase if the present policy of capturing pocketed herds of elephants and training them continues. Unless these elephants are put to proper use, it will prove to be uneconomical to maintain such as large number of elephants in captivity. These animals must be trained for hauling timber, and utilised in the production forestry areas. Effective use of elephant power in such operations will prove to be more economical than mechanisation.

The AESG and the Government of India are keen to enforce the condition that wherever captive elephants are available, mechanisation should be avoided in timber operations and elephants utilised for the purpose of timber hauling. A similar policy decision on the part of the Indonesian Government will go a long way in conserving this noble animal.

ACKNOWLEDGEMENTS

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At Way Kambas, Pak Kurnia Rauf, the Administrator of the Park, with his cheerful disposition and willing help, not only made my stay meaningful, but also was a source of encouragement. He looked after my welfare during my stay in the Park, and helped me carry out my work smoothly. I wish to express my sincere thanks for his love and affection.

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