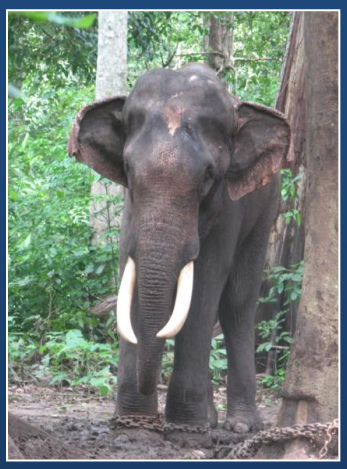
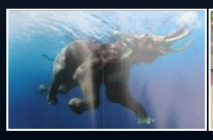
# Captive Elephants of Andaman Islands



## An investigation into the Population Status, Management and Welfare Significance

Surendra Varma, George Verghese, David Abraham, S.R. Sujata and Rajendra Hasbhavi






Elephants in Captivity – CUPA/ANCF Technical Report 11

ANF
Compassion Unlimited Plus Action
ANCF
WSPA World Society for the Protection of Animals

# Captive Elephants of Andaman Islands

## An Investigation into the Population Status, Management and Welfare Significance

Surendra Varma[1], George Verghese[2], David Abraham[3], S.R. Sujata[4] and Rajendra Hasbhavi[5]

Elephants in Captivity – CUPA/ANCF Technical Report 11


**1**: Research Scientist, Asian Nature Conservation Foundation, Innovation Centre, Indian Institute of Science, Bangalore - 560 012, Karnataka; **2**: Forest Veterinary Officer C/o Chief Wildlife Warden, Union territory of Andaman & Nicobar Islands, Vansadan, Port Blair,-741002, Andaman, **3**: Green Dale, Fathima Nagar, Thrissur – 680005, Kerala **4**: Researcher, Compassion Unlimited Plus Action (CUPA), Veterinary College Campus, Hebbal, Bangalore 560 024, & Wildlife Rescue & Rehabilitation Centre (WRRC), Bannerghatta Biological Park, Bangalore – 560083, Karnataka, **5**: Nisarga, Old. 59, New.27, 1st 'A' Main Road, West of Chord Road, Mahalakshmi Layout Entrance, Bangalore -560086, Karnataka

Published by
**Compassion Unlimited Plus Action (CUPA)**
Veterinary College Campus,
Hebbal, Bangalore 560 024
www.cupabangalore.org

In collaboration with
**Asian Nature Conservation Foundation (ANCF)**
Innovation Centre,
Indian Institute of Science,
Bangalore 560 012
www.asiannature.org

**Title:** Captive Elephants in Kerala
**Authors:** Surendra Varma, George Verghese, David Abraham, S.R. Sujata and Rajendra Hasbhavi



**Suggested citation:** Varma, S, Varghes, G., Abraham, D., Sujata, S.R., and Hasbhavi, R. 2009. Captive Elephants of Andaman Islands: An Investigation into the Population Status, Management and Welfare Significance. Elephants in Captivity: CUPA/ANCF- Technical Report. 11, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

First limited Edition 2009
Published by CUPA and ANCF



To order copy of this book; please write to

Compassion Unlimited Plus Action (CUPA),
Veterinary College Campus, Hebbal,
Bangalore 560 024
cupablr@gmail.com

or

Publications officer,
Asian Nature Conservation Foundation (ANCF)
Innovation Centre,
Indian Institute of Science,
Bangalore 560 012
Email: publications@asiannature.org

**CONTENTS**

# Preface

The Andaman Islands located in the equatorial belt, has some of the finest tropical evergreen forests of the world. The natural wealth of Andaman Islands encouraged the British to reap timber for mainland use, bringing captive elephants into the island to assist in logging operations. Until a ban on timber extraction was imposed in 2001, harvest of timber and using elephants for this purpose continued even under Indian government. A substantial population of elephants (94 individuals) exists in captivity, owned and managed by the Government as well as private owners.

The island has three distinct type of elephant ownership; the forest camps (owned by the State Forest Department) a relic of the timber-extraction operations, with the elephants within these camps continuing to be maintained and used to drag fallen logs/ for tourism/ for supervised timber extraction. The Andaman and Nicobar Islands Forest and Plantation Development Corporation (ANIFPDC) was set up for the plantation and harvesting of palm oil and rubber trees, which were developed by the corporation; initially, elephants were employed to assist in the corporation's timber related work. Private ownership of captive elephants in the Andaman Islands dates back to the period of timber harvest/ logging operations during British rule. Privately owned elephants, irrespective of the reason for their maintenance, continue to exist in the islands. Private ownership includes individuals and timber industries; three major industries in the Islands are: the Andaman Timber Industries (ATI), Jayashree Timber Products (JTP) and the Asian Woods and Polymers (AWP).

The captive elephant population has also become a source of wild or feral elephants, having been abandoned by their owner/s during the later part of 20$^{th}$ century; a consequence of a selectively sizeable captive population being left wild. In 1994, it was found that the island had about 70 elephants, using indirect methods of population estimation in Interview Islands (North Andamans); in 2002, it was felt that the feral elephant population had declined to half since the last study; the studies also found the elephants were a major threat to native plant species.

The Shekhar Singh report recommends removal of all exotic species from the island group due to its effect on the native flora and fauna. This may lead to relocation of elephants to main land. A few elephants were transferred to the state of Madhya Pradesh, to be employed by the government for tourism related activities.

There have been no scientific investigations of the existing captive elephants, their distribution, management and the welfare status; and this investigation may act as the first ever attempt at a detailed investigation on the species in captivity. Efforts were made to visit every single elephant found in the Islands, and this was achieved by traveling through close or open boats, by air, foot, vehicles or whatever possible mode available, even during peak rainy days.

The report aims to evaluate the existing welfare and management status of captive elephants. The document has four sections; section one deals with overall welfare status

of the elephants kept under all management regimes, section two covers the exclusive status of captive elephants kept under Forest Camps, managed by the Forest Department, section three refers to the elephants of the Forest Corporation and the fourth section reviews the welfare status of elephants kept under Private Ownership.

## Acknowledgments

This study was part of an all India project on the Management Regimes of Captive Elephants and Mahouts, conducted by Compassion Unlimited plus Action (CUPA) with the technical assistance received from the Asian Nature Conservation Foundation (ANCF) and with the financial assistance from the World Society for Protection of Animals (WSPA), UK.

The supports provided by the Andaman Nicobar Forest Department (The Department of Environment & Forests) to carry out this assignment are very significant and we wish to express our sincere thanks to the Divisional Forest officers, Range Forest Officers, Veterinary assistants and other associated with the department. The officials from the Andaman and Nicobar Islands Forest and Plantation Development Corporation (ANIFPDC) and a private elephant owner of the island show considerable interests in this investigation. Shiela Rao and Suparna Ganguly of Compassion Unlimited Plus Action (CUPA) provided critical input. Nirupa Rao provided editorial support.

# Section 1:
# Captive Elephants of Andaman Islands

# Executive Summary

Elephants in the Andaman Islands were initially introduced for use in forest related work. The presence of elephants in captivity in an introduced environment brings forth the interests of understanding their status and welfare.

The welfare status of captive elephants in the islands was assessed by comparing the captive environment with that of the wild: the physical/ social/psychological/ reproductive features of captive environments are compared with those observed for wild elephants.

For this investigation data was collected for ninety-nine elephants (69 females and 30 males) across three management regimes: Forest Camps (FC), The Andaman and Nicobar Islands Forest and Plantation Development Corporation (FCrp) and private owners (Pvt). A rating scale developed for different parameters of importance for the welfare of captive elephants by a team of experts, was used to assess the welfare status of elephants and mahouts/ cawadis.

The age distribution of female elephants free ranged from 0.16 to 71yrs while that of males free ranged from 3 to 90y. Fewer females aged more than 40y and fewer males aged less than 16y was observed. Comparable occurrence was seen in the other age classes for both the sexes.

Among FC elephants, both purchased and captive-born elephants were almost equal in number. Captive-born elephants contribute to 60% of the population of the forest department elephants. Occurrence of captive-born elephants was greater in the Forest Corporation. Data was available for only one elephant, with private owners, which was purchased. The percentage deviation of welfare status considering source of elephants for FC camp was 40%, for FCrp was 22% and for Pvt was 75%.

For all the FC and FCrp elephants, type of shelter was the forest itself. For the private elephants, forest was available as a shelter for all three elephants but the male elephant was tethered from 2p.m. to 6a.m. All the regimes were rated highly for their shelter as natural conditions were provided. Greater variation was observed for elephants with private owners due to the practice of chaining the male within a man-made enclosure.

Streams were the water source for FC, FCrp elephants and private owner elephants. 80% of FC elephants were bathed daily for half-hour duration, natural locally available materials were used as scrub, no harsh scrubbing was practiced; skin rashes were consequently absent; all FCrp elephants were bathed daily; in summer/ non-working days fewer baths were given per week, natural locally available materials were used as scrub. Deviation was least for FCrp elephants; variation was high for private elephants as the male had restricted access to streams during musth.

Thirty two percent of FC elephants were not given opportunity for social interaction, group size free ranged from 0- 3 and 20% of FCrp elephants had none/restricted

opportunity for interaction, group size free ranged from 0- 3. For the private elephants, the male was isolated, the two females were maintained together throughout.

Variation in welfare rating was observed for all regimes for this parameter implying overlap in the features and non-uniformity in the suitability of sub-parameters.

Ninety three per cent of FC elephants were chained, duration free ranged from 1- 24h; 85% elephants were shackled by their forelegs, 26% elephants were not allowed to free free range at night 25% FCrp elephants were not chained; shackling of forelegs was practiced, elephants were allowed to free free range at night with drag chain and/ or *bedi*. All private owner elephants were chained, male was chained by leg and body, forelegs shackled for male while ranging free, females were allowed to free free range at night. Mean rating was comparable across regimes, implying poor conditions for this parameter.

Most FC elephants were described as quiet, 16% frightened/ nervous/ undependable; 23% elephants were involved in incidents causing injury/ death of people; none exhibited stereotypy. All FCrp elephants were descibed as quiet with 20% also having a fearful nature; 10% elephants were involved in incidents of aggression towards people/ other elephants; none exhibited stereotypy. The male in Pvt ownership was described as quiet but aggressive towards people; exhibiting stereotypy of medium intensity during musth. FC and FCrp elephants showed comparable rating, while Private elephants showed greater variation and low mean rating.

Seventy percent of FC elephants were not made to work; work type involved timber related tasks─ logging/ dragging/ loading or tourism related work─ in the morning (upto 1-2p.m.); 40% of FCrp elephants were made to work; work type was dragging/ loading of timber/ logging/ tourism/ palm seed removal; except tourism duty, time of work was in the morning up to 12 noon -1p.m.

Timber extraction camps resumed activities from 2009 following clearance from the Supreme Court. Thus, management practices for FC and FCrp elephants followed when the elephants were reintroduced to work.

For the privately owned elephant, data was available for the male only: the elephant was used for tourism; from 9a.m. to 2p.m. Variation in mean rating across regimes implies overlap of working conditions with relatively better rating for FC elephants.

Most FC elephants were allowed to free free range, stall feeding was not done; no ration chart was used; nearly 60% elephants had raided crop fields. All FCrp elephants allowed to free range to graze/ browse; no stall feed given; no ration chart used; visit to crop field was reported. Food (stall-feed) was provided to working elephants and to those as prescribed by the veterinary doctor.

Both stall feed and free-ranging opportunity provided for the male elephant with private owners; visits to crop fields were not reported. Mean rating across regimes showed variation, rating for both FC and FCrp were comparably low. Low rating for both these

institutions was due to the incidence of crop raiding, no stall feeding and absence of ration chart usage.

Nearly 48% of FC male elephants were not exposed to females; all observed elephants exhibited musth, aggressive during musth and were chained during this period. The adult male FCrp elephants were reproductively active and exhibited signs of musth, one was only ten years old and exhibited musth; were chained; exposure to females not uniform for all the males.

The male elephant with private owners exhibited musth, was not exposed to females and was chained during musth. Mean rating was low across the regimes, similarly variation was observed for all the institutions. In Andamans, period of musth has been reported to be less (ranging from November to March/April) and elephants reported to be relatively less aggressive during this period.

Oestrus cycle was observed for 40% of the female FC elephants (52% elephants— unknown status or not applicable); 30% not exposed to males, 19% not given opportunity to breed. All observed FCrp elephants exhibited oestrus cycles; nearly 63% had not been given opportunity to mate. The practice of separating male and female elephants in some camps has been employed on purpose to control population of the elephants. Mean rating was comparable across the two regimes.

Twenty one per cent of FC elephants reported diseases/injuries such as abscesses/ vision problems/ leg injuries/ respiratory problems; application of oil is not practiced; elephants are dewormed; all elephants had access to veterinary doctor. Most FCrp elephants reported occurrence of Diarrhoea/ anemia; application of oil/ immunization not practiced; veterinary doctor and assistant available; dispensary was available. Immunization of elephants was not practiced as the region was free from disease outbreaks.

Under private ownership, minor wounds were reported for the male; veterinary doctor was available for all elephants; frequency of visits was monthly/ on call for the male elephant; records not maintained for the female elephants.

Mean experience for FC handlers was 15yrs ranging from 0.3-35y; mean experience with a specific elephant was 9yrs, ranging from 0- 34y; 80% handlers had opted for this profession as a means of employment; all used tools to control their elephant— wooden ankush, stick, knife. For FCrp handlers, mean experience in the profession was 22yrs, ranging from 6-35y; mean experience with a specific elephant was 7y, ranging from 0.2-27y; 89% opted as a source of employment; all used tools to control their elephant— wooden ankush, stick, knife.

Experience of handlers in the profession for male elephant privately owned was 10yrs, 1yr with a specific elephant; opted out of interest in the profession; spent 8h with elephant; tools used were wooden ankush, stick, knife to control elephant. Mean rating was comparable across regimes, variation observed for all, implying non-uniformity in

suitability across regimes. While deviation from E-R was relatively low for private handlers, it was offset by the variation in the mean rating.

None of the observed FC handlers came from a family background of handling elephants; mean annual salary was Rs.73900/-; mean number of children per family was 3, ranging from 0-9; insurance cover was available for 55% of the handlers; only 12% handlers abstained from consuming alcohol. All FCrp handlers came from a non-handler family background; mean annual salary was Rs. 70,800/-, mean number of children per family was 3; most handlers are covered by insurance; 90% did not consume alcohol.

Handler with private owner came from a family background not dealing with elephants; annual salary was Rs.36000/-; not covered by insurance; consumed alcohol. Mean rating was comparable for FC and FCrp handlers and was relatively low for private handlers with corresponding deviation from E-R.

## Recommendation

The maintenance of captive elephants in the islands should involve changes in the unsuitable features enumerated above. The Shekhar Singh report (2002), however, recommends removal of all exotic species from the island group due to its effect on the native flora and fauna. This may lead to relocation of elephants to main land, This, if done, should ensure:

- If the elephants have to be translocated, family units (both by birth and those observed through behavioural interactions) should not be disrupted.
- Translocation should not involve movement into a facility with no provision for expression of species-typical behaviours in natural conditions.
- Geriatric elephants need to be carefully evaluated for their ability to withstand any shifting; established relationships, if any, should not be disrupted
- Translocation may be avoided: measures can be taken to see that the present population does not increase in number— through the use of birth control methods.

FOREST CORPORATIONS

Normal reproductive functioning of elephants is a positive indicator of welfare status. Among the three regimes, Forest Corporation owned elephants reported the highest number of captive-born elephants within it. However, there should be a policy on the future of these elephants. On the one hand, the corporation cannot continue with harvest of trees and hence, use of elephants in this form of work will be restricted. With the addition to the number of elephants, maintenance will be become an issue of concern, not only to the authorities, but also to the elephants themselves. Hence, a long-term policy of reducing the number of elephants with the corporation needs to be implemented. This does not advocate sale of elephants to other institutions. Instead, it would have to involve management practices that prevent an increase in the present population.

While the present practice of separation of male and female elephants as a population control measure in some locations is worth mentioning, it should not come at a cost to the animal's welfare, viz., dependent young males should not be separated, efforts should be made to observe reproductive signs of individual elephants in order to prevent mating and reproduction. Hence, groups need not be broken or elephants isolated permanently as a way of reducing elephant population.

**Introduction**

Elephants kept in captive conditions undergo human influence in different aspects of their lives. Human influence may be in the form of provision of natural conditions similar to those experienced in the wild or absence of such features to varying extents. Lair (1997) states elephants cannot be considered to be domesticated, as selective breeding in captivity for specific features have not been done. In conjunction with this assertion is the fact that wild caught elephants continue to form a source for captive elephants. The presence of elephants in the Andaman and Nicobar Island group is considered to be due to introduction by people (Sivaganesan and Kumar, 1994; Ali, 2004) for use in forest related work. On the one hand, a sizeable population exists in captivity, owned and managed by the Government as well as private owners. On the other, the island group is endowed with a physical environment in which feral elephants have survived, the consequence of a captive population being left wild.

**Objective**

The presence of elephants in captivity in an introduced environment brings forth issues of suitability of living (physical and biological) conditions for the animals when under human control. This report is aimed at:

- Assessing the welfare status of elephants maintained by different management regimes by reviewing the available ecological and biological features in captivity

Welfare status of handlers (mahouts/ cawadis) is integral to any captive elephant situation which involves unrestricted contact between elephant and handler. This report also involves:

- Assessing the professional experience and socio-economic status of handlers

**Method**

Data on captive elephants in the Andaman and Nicobar group of islands was collected by observation and interview of relevant personnel. This included traveling through all possible modes (Figure 1a, b, c, d, e, f, g, h,I, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z, aa, ab, ac, ad, ae, af, and ag). The welfare status of captive elephants in the islands was assessed by comparing the captive environment with that of the wild:

a

b

c

d

The physical/social/psychological/ reproductive features of captive environments are compared with those observed for wild elephants. The difference between the two environments has been rated, the closer to the wild conditions, the higher the rating.

e

f

g

h

i

j

k

l

m

n

o

Figures 1i, j, k, l, m, n, o and p by open boats (i and j) through forests (k, l, m and n) and through cultivated land (o)

p

q

r

Figure 1p,q and r: Discussion with officials (p and q) and using specific code (r) for each elephants

s

t

u


v


w


x

Figures 1s, t, u, v, w, and x: observations through official records (s), collection of data, even while in rain (t and u) and body measurements (v, w and x)

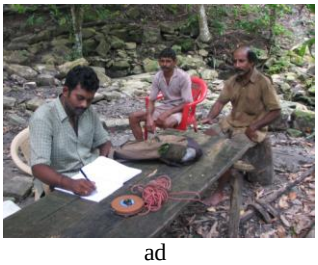

y


z


aa


ab


ac


ad


ae


af


ag

Figures 1z, aa, ab, ac, ad, ae, af, and agd : interviews with elephant handlers in different locations

**The rating method**

A rating scale from zero (unsuitable conditions) to ten (suitable conditions) was used to assess the welfare status of captive elephants and their handlers. Experts (both wild and captive elephant specialists, wildlife veterinary experts, managers from protected areas, managers responsible for both wild and captive elephants and other wildlife, personnel from welfare organisations and elephant handlers) were invited to assess the welfare based on different parameters and their significance through an exclusive workshop conducted on the subject (Varma, 2008; Varma, et al., 2008; Varma and Prasad, 2008). Experts rated a total of 114 welfare parameters covering major aspects of captivity.

- The experts, based on their concept of importance of a particular parameter to an elephant, developed a rating for each parameter. For example mean expert rating

of 8.0 (SE= 0.5, N=29) for a parameter 'floor' and 9.0 (SE=0.4, N=31) for 'source of water' was arrived at from the ratings suggested by each expert by averaging across all the experts' values.

- A mean rating for each parameter, across all the participating experts, has been used as the Experts' Rating (E-R) which represents the importance attached to a parameter i.e., for a parameter with 8.0 as the maximum value, only 2.0 (25%) deviation and parameter with maximum value 9.0 only 1.0 or 10% from the prescribed norm is considered acceptable.
- For example, if an elephant is exposed only to natural flooring, the animal receives a rating of 8 and for entirely unnatural flooring the value is 0; if animal is exposed to both natural and unnatural flooring, the value is 4 (as 8+0/2= 8/2= 4). If an elephant is exposed to a natural water source, such as a river, it receives a value of 9; if the source of water is large lakes or reservoirs, it gets 4.5. A value of 2.25 is assigned for small water bodies like tanks and ponds. Tap water (running) gets 1.125 and if only buckets, pots, and tankers are in use, then the allocated value is 0.5. This rating is then averaged across all individuals in that institution to get a Mean Rating (M-R) for that feature. Thus M-R represents the actual situation existing for the elephant/s.
- Therefore, using the maxima given by experts as a base, a rating scale starting from zero to the particular maximum value for that parameter has been used and the data for each animal was collected, in a given regime (for example, forest camp or temple).
- In this investigation, variables which represent a common feature of the captive condition have been grouped to form a parameter. The variables have been termed sub-parameters. For example, the variables shelter type, shelter size, floor type in the shelter; all represent different aspects of the physical space provided to the elephant. Hence, they are grouped together to form the parameter "Shelter" and each constituent variable is a sub-parameter. In this investigation, the E-R for a parameter (say, shelter) represents the mean of E-Rs across all related sub-parameters. The Mean Rating (M-R) for a parameter is the mean of M-Rs across related sub-parameters and denotes welfare status of existing conditions on the ground for the particular parameter.
- The number of such related parameters (sub-parameters) varies for each regime.
- Results have been presented comparing E-R and M-R as a means of comparing the extent of deviation present in the parameters observed. The difference between E-R and M-R (expressed as percentage) indicates deviations from the prescribed norm.
- For handlers, the difference between the maxima provided by experts (E-R) and existing status (M-R) have been used to indicate their professional/ socio-economic status, of value to the handler and his elephant.
- N* refers to number of observed parameters/sub-parameters; N refers to number of elephants

**Result**

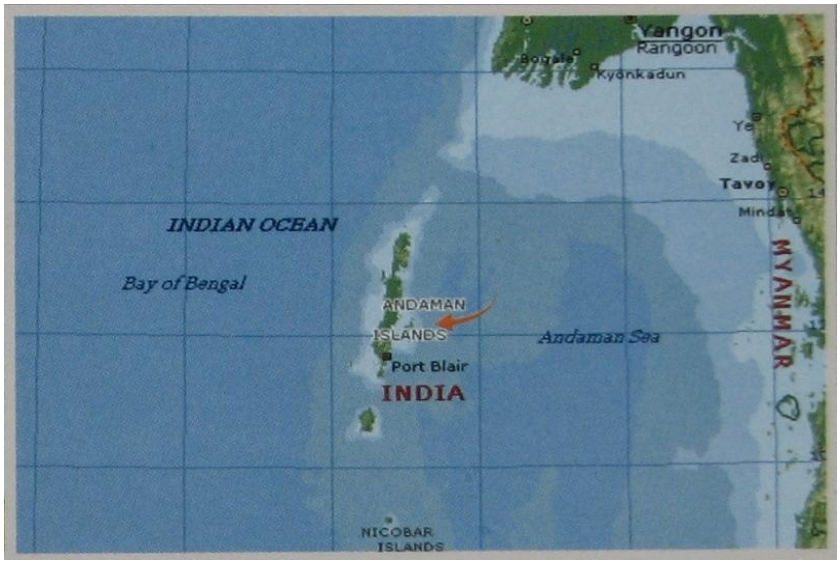
Data was collected on ninety-nine elephants (69 females and 30 males) across three management regimes: Forest Camps (FC), The Andaman and Nicobar Islands Forest and

Plantation Development Corporation (FCrp) and private owners (Pvt). Among these, FC and FCrp were government run institutions (Figures 2a and b examples of elephants from government run institutions). The distribution of number of elephants (see appendix 1) observed among the regimes was: Forest Camp: 76, Forest Corporation (ANIFPDC): 20 and Private owners: 3. See figures 3a and b for location of Andaman Island and figures and figures 4a,b,c,d and e showing different regions of Andaman Islands and distribution of captive elephants. Figures 5a, b, c and d show the forested habitat available for the captive elephants in this island.

a

b

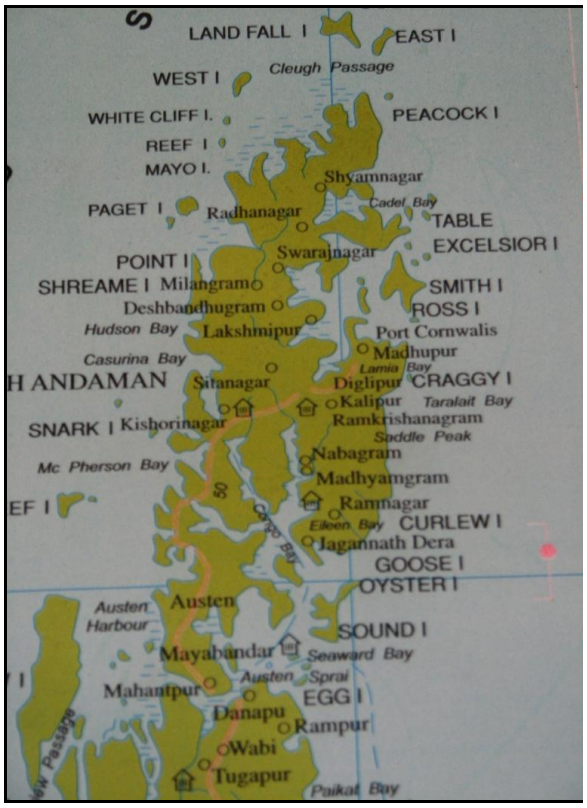
Figures 2a and b examples of elephants from government run institutions




a

b

Figure 3a and b: showing location of Andaman Islands


LAND FALL I
EAST I
WEST I
Cleugh Passage
WHITE CLIFF I.
PEACOCK I
REEF I
MAYO I.
Shyamnagar
PAGET I
Radhanagar
Cadel Bay
TABLE
EXCELSIOR I
POINT I
Swarajnagar
SHREAME I
Milangram
SMITH I
Deshbandhugram
ROSS I
Hudson Bay
Lakshmipur
Port Cornwalis
Madhupur
Casurina Bay
Lamia Bay
H ANDAMAN
Sitanagar
Diglipur
CRAGGY I
Kalipur
Taralait Bay
SNARK I
Kishorinagar
Ramkrishanagram
Saddle Peak
Nabagram
Mc Pherson Bay
Madhyamgram
Rammagar
CURLEW I
Eileen Bay
Jagannath Dera
GOOSE I
OYSTER I
Austen
Austen Harbour
SOUND I
Mayabandar
Seaward Bay
Austen Sprai
Mahantpur
EGG I
Danapu
Rampur
Wabi
Tugapur
Paikat Bay

a


Eileen Bay
CURLEW I
Jagannath Dera
GOOSE I
OYSTER I
Austen
Austen Harbour
SOUND I
Mayabandar
Seaward Bay
INTERVIEW I
Mahantpur
Austen Sprai
EGG I
Danapu
Rampur
Wabi
Tugapur
Interview Passage
Paikat Bay
Mt Diavolo
SOUTH REEF I
Pudyrnadurai
505
TUFI I
ANDERSON I
Cuthbert Bay
Rangat Bay
HUMP I
Tricanchikkulam
Padmanabpuram
LE ANDAMAN
Panchvati
Kalsi
Cuthbert Bay
FLAT I
Rangat
TURTLE SANCTUARY
Sabri
Amkunj
Nimbutala
JARWA RESERVES
Jetty Rangat Bay
PARKINSON I
LONG I
Bongaor
Lalaji Bay
Kadamtala
PARLOB I.
Kadamtala Beach
Shentam
Homfray's Strait
NORTH
Uttra Jetty
North Passage
SPIKE I
OUTRAM I
BLUFF I
Udaygarh
Horsford Bay
COLEBROOK I.
Rawlines Bay
Nilampur
Deligent Strait
Breakfast Bay
STRAIT I
RANI JHANSI MARINE PARK
Hajatgarh
BARATANG I

b

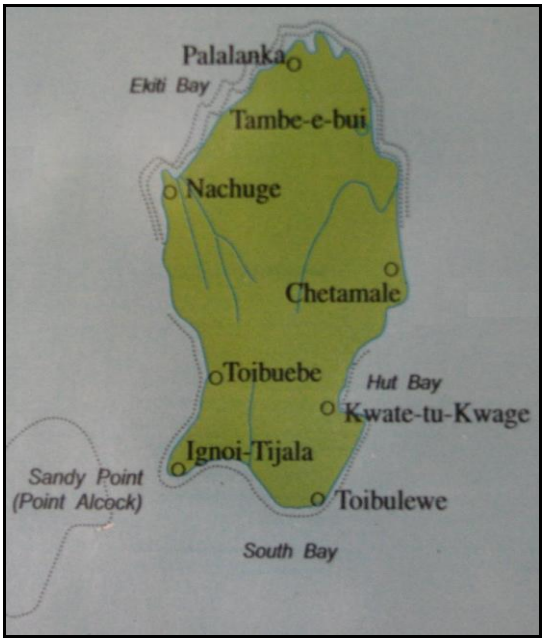

BLUFF I
Udaygarh
Horsford Bay
COLEBROOK I.
Rawlines Bay
Nilampur
Deligent Strait
Breakfast Bay
STRAIT I
Hajatgarh
BARATANG I
Wrufiers Creek
NICOHOLSON I.
PEEL I.
Andaman (Middle) Strait
Bilap Bay
Tedma Bay
Lacam Harbour
JARWA RESERVES
Radhanagar
Napier Bay
PETRIE I
PETMAN I.
DEFENCE I
KYD I.
Shoal Bay
FUSILIER CHANN
ANDAMAN
Mount Harriet
Madhuban
ARTHUR CHANNE
SANDY I.
Bamboo Flat
Ferrarganj
Constance Bay
VIPER CHATAM ROSS I
LOHABARRACK
ROCODILE SANCTUARY
PORT BLAIR
TARMUGLI I
Portmount
SNOB I
Homfraygan
RED SKIN I.
Calicut
BOAT I.
Manglutan
Bumliton
JOLLY BUOY I.
WANDOOR
Rangachang
MACPHER
CORBYNS COVE
LABYRINTH I.
CHIDIYATTAPU
Chiriyatapu
RUTLAND
Son Strait
Woodmanson Bay
TWINS I.
Portman Bay
Manners Strait

c


Rangat
TURTLE SANCTUARY
Sabri
Amkunj
Nimbutala
Jetty Rangat Bay
PARKINSON I
LONG I
Lalaji Bay
PARLOB I.
NORTH BUTTON
Homfray's Strait
North Passage
OUTRAM I
Outram Harbour
MIDDLE BUTTON
Udaygarh
Horsford Bay
COLEBROOK I.
SOUTH BUTTON I
Nilampur
Rawlines Bay
HENRY LAWRENCE I
Deligent Strait
STRAIT I
RANI JHANSI MARINE PARK
EAST OR INGLIS I
BARATANG I
RITCHIE'S ARCHIPEIA
NICOHOLSON I.
Kwangtung Strait
PEEL I.
JOHN LAWRENCE
Andaman (Middle) Strait
Tedma Bay
Lacam Harbour
Radhanagar
Napier Bay
HAVELOCK I
PETMAN I.
KYD I.
Shoal Bay
FUSILIER CHANNEL
NEIL KENDRA
NEIL I
Mount Harriet
Sitapur Beach
ARTHUR CHANNEL
SIR HUGH ROSS I

d

Figures 4a,b,c, d and e: Map showing different regions of Andaman Islands and distribution of captive elephants




e

a

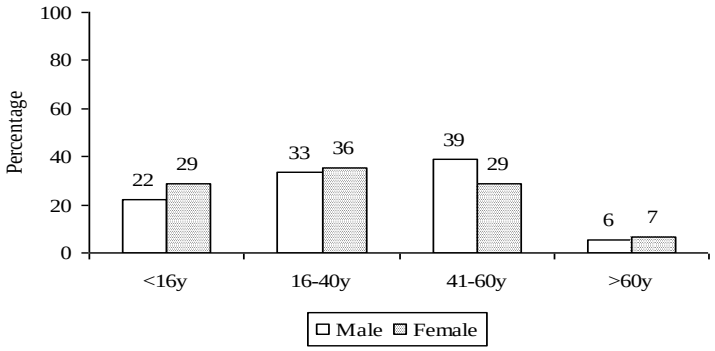
b

c

d

Figure 5a,b,c, and d showing habitat available for the elephants in captivity

Age of female elephants free ranged from 0.16 to 71yrs while that of males free ranged from 3 to 90yrs. Figure 6 gives percentage occurrence of age-class across the regimes; fewer females aged more than 40y and fewer males aged less than 16yrs was observed. Comparable occurrence was seen in the other age classes for both the sexes.




N= 45 (female) N= 18 (male)

Figure 6: Percentage occurrence of male and female elephants based on age

**Source**

Elephants experience drastic change when they are wild-caught and then maintained in captivity. Change to varying extent is also experienced when shifted across facilities. This alteration of location/ management can affect the well-being of the animal through a difference in daily management schedules/ breakage of established kinship bonds with elephants/ handlers.

- Among FC elephants, both purchased and captive born elephants were almost equal in number (Figure 7)
- Occurrence of captive born elephants was greater in the Forest corporation
- Data was available for only one elephant, with private owners, which was purchased.

Data on the number of elephants sold from these regimes was not available or poorly available. In the forest corporation, ten elephants were sold, most of them males and most to Kerala. There was no data for the other two regimes.

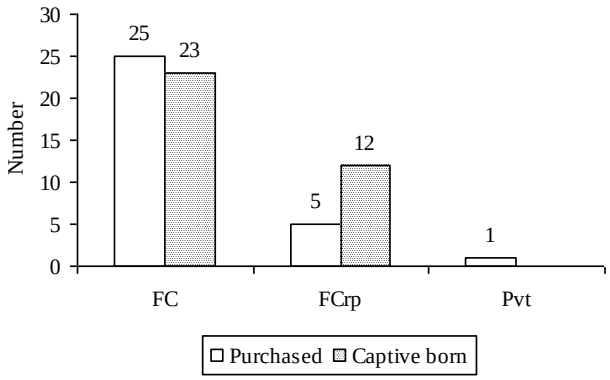



Figure 7: Distribution of source of elephants across regimes

Mean rating for each regime and the deviations from E-R is given in the Figures 7a and b.

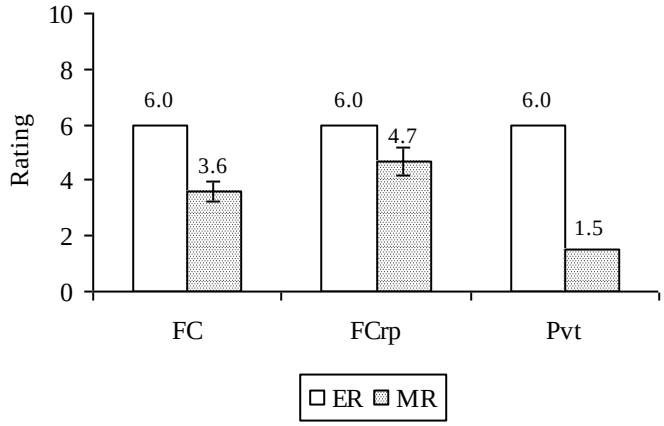



Figure 7a: Comparison of ratings for source of elephants across regimes

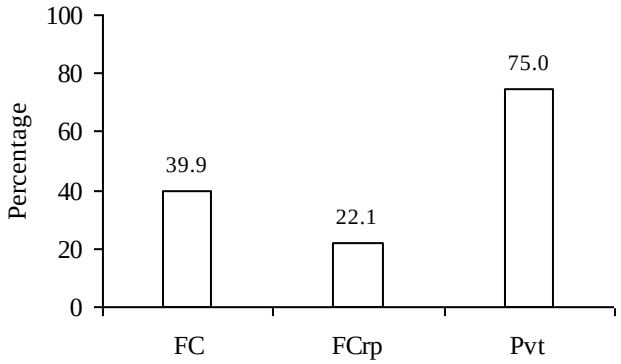



Figure 7b: Percentage wise deviation for source of elephants across regimes

**Shelter**

'People induced' factors such as confining within a restricted space/ not giving opportunity to move around freely within their enclosure are considered unsuitable for captive elephants as wild elephants are known to free free range across areas of 100-300 $km^2$ (Sukumar, 1991) depending on availability of food and water. Maintenance of hygiene needs to be rated since prolonged durations of confinement and poor hygiene can be detrimental.

- For all the FC and FCrp elephants, type of shelter was the forest itself (Figures 8a,b,c and d)

a

b

c

d

Figure 8a, b, c, and d: Shelter available for FC and FCrp elephants

e

f

Figure 8 e and f: Private elephant tied near its shelter and the animal also exposed to natural forest (f)

- For the private elephants, forest was available as a shelter for all three but the male elephant was tethered from 2p.m. to 6a.m.

All the regimes were rated highly for their shelter (Figure 9a and b) as natural conditions were provided. Greater variation was observed for elephants with private owners due to the practice of chaining the male within a man-made enclosure.

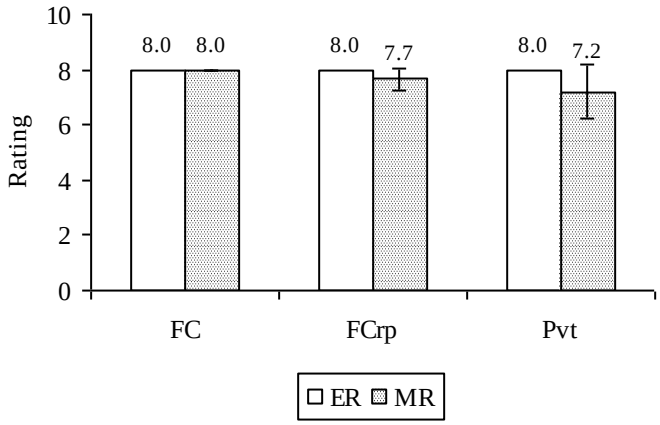



Figure 9a: Comparison of E-R and M-R for shelter across regimes

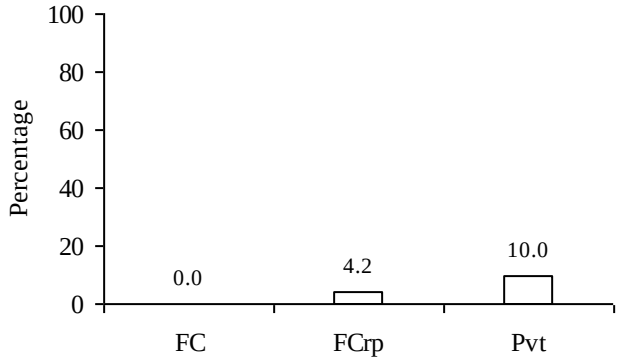



Figure 9b: Percentage wise deviation from E-R for shelter across regimes

**Water**

Access to running water sources for captive elephants is important as they may be restricted in their movements due to human controlled factors. In captivity, bathing the animal is done by the handler, hence, materials used for bathing has been rated.

- Streams were the water source for FC, FCrp elephants and private owner elephants (Figures 10a)
- 80% of FC elephants were bathed daily, natural locally available materials were used as scrub

- All FCrp elephants were bathed (Figures 10b, c and d) daily; in summer/ non-working days fewer baths were given per week, natural locally available materials were used as scrub

a

b

c

d

Figures 10a, b, c and d: Water source and examples of bathing of elephants

Deviation was least for FCrp elephants (Figure 11a and b), variation was high for private elephants as the male had restricted access to streams during musth.

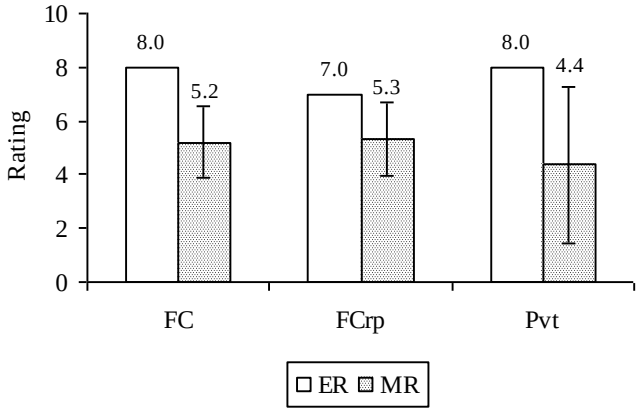



Figure 11a: Comparison of E-R and M-R for water across regimes

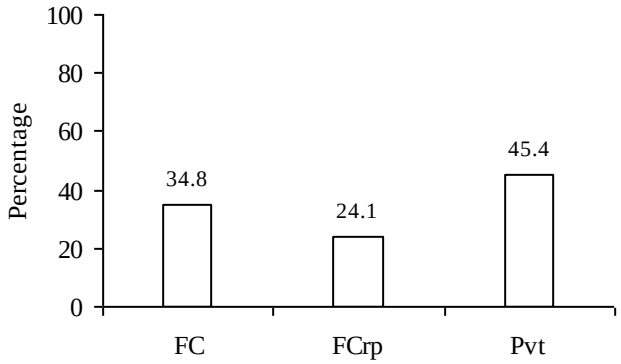



Figure 11b: Percentage wise deviation from E-R for water across regimes

**Social interaction**

Social relationships in elephant herds may last across generations (Poole and Moss, 2008), males need to interact to know the strengths and weaknesses of other males (Poole and Granli, 2009) and have been observed to exhibit non-aggressive behaviours with conspecifics (McKay, 1973). Species-typical social behaviours maybe curtailed in captivity whether due to non-availability of elephants or due to human induced constraints. Figures 12a, b, c, d, e f and g show the scope of social interactions among elephants

a

b

c

d

e

f

Figures 12a, b, c, d, e and f: Sources and scopes for social interactions among FC and FCrp elephants

- Thirty two percentages of FC elephants were not given opportunity for social interaction, group size free ranged from 0- 3
- Twenty percentage of FCrp elephants had none/restricted opportunity for interaction, group size free ranged from 0- 3
- For the private elephants, the male was isolated, the two females were together 24h

Figure 12g: Private elephant kept alone

Variation was observed for all regimes (Figure 13a and b) for this parameter implying overlap in the features and non-uniformity in the suitability of sub-parameters.

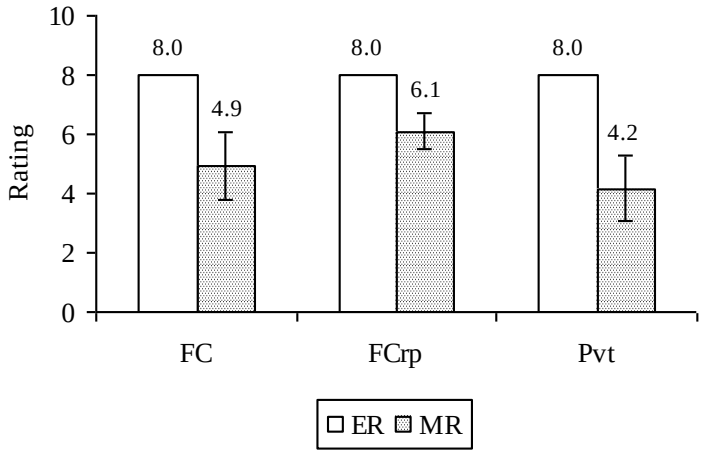



Figure 13a: Comparison of E-R and M-R for social interaction across regimes

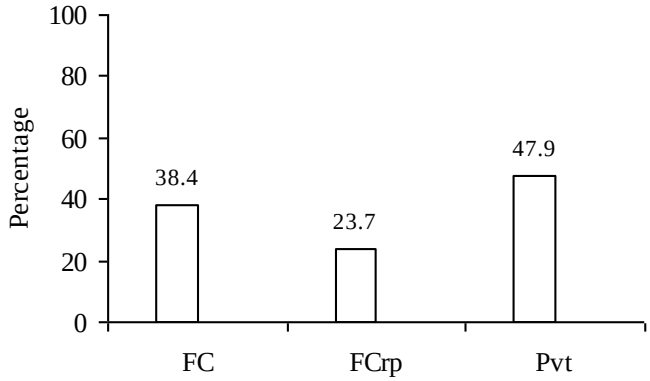



Figure 13b: Percentage wise deviation from E-R for social interaction across regimes

**Chaining**

Captivity imposes practices such as use of chains (Figures 14a, b, c, d, e and f), on the elephants which can result in poor welfare due to constraints on movement and physical injury from abrasion related injuries.

- Ninety three percentages of FC elephants were chained. Duration free ranged from 1- 24h; 85% elephants were shackled by their forelegs, 26% elephants were not allowed to free free range at night
- Twenty five percentages of FCrp elephants were not chained; shackling of forelegs was practiced, elephants were allowed to free free range at night with drag chain and/ or *bedi*

- All private owner elephants were chained, male was chained by leg and body, forelegs shackled for male while free ranging, females allowed to free range at night

a

b

c

d

e

f

g h

Figures 14a, b, c, d, e, f,g and h: types of chains used for elephants in the islands (note to the regions of chain also)

Mean rating was comparable across regimes (Figure 15a and b), implying poor conditions for this parameter.

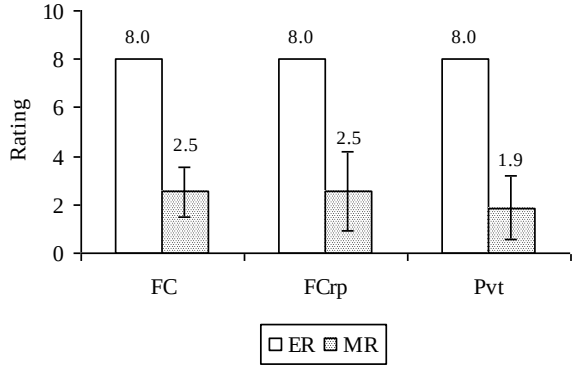



Figure 15a: Comparison of E-R and M-R for chaining across regimes

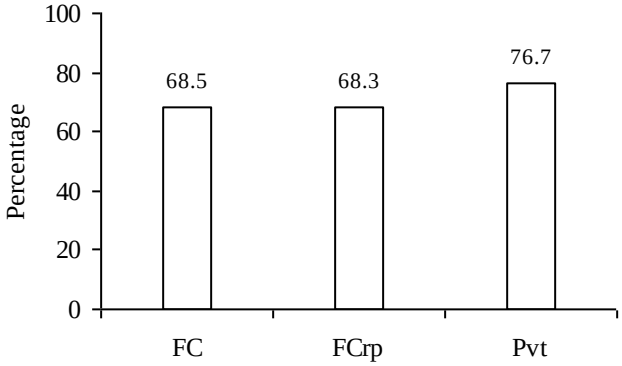



Figure 15b: Percentage wise deviation from E-R for chaining across regimes

**Observed behaviour**

Ease of handling can be associated with a quiet temperament of the animal. Incidents of aggression towards people/ other elephants may indicate an underlying cause associated with captivity.

- Most FC elephants were described as quiet, 16% were said to be frightened/ nervous/ undependable; 23% elephants were involved in incidents causing injury/ death of people; none exhibited stereotypy
- All FCrp elephants were described as quiet with 20% also said to be of a fearful nature; 10% elephants were involved in incidents of aggression towards people/ other elephants; none exhibited stereotypy
- Data was available for the male only— described as quiet but aggressive towards people; exhibiting stereotypy of medium intensity during musth

FC and FCrp elephants showed comparable rating, while Private elephants showed greater variation and low mean rating (Figure 16a and b).

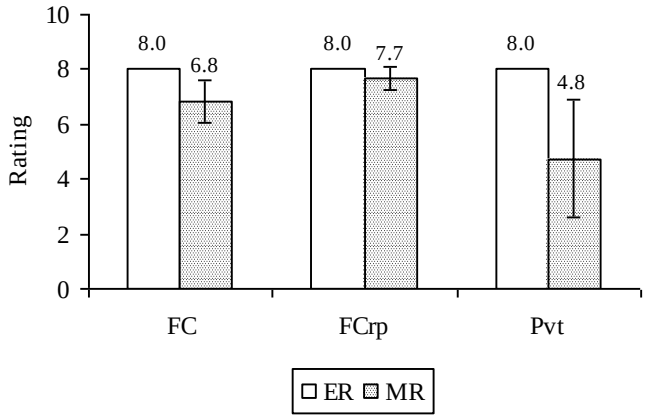



Figure 16a: Comparison of E-R and M-R for observed behaviour across regimes

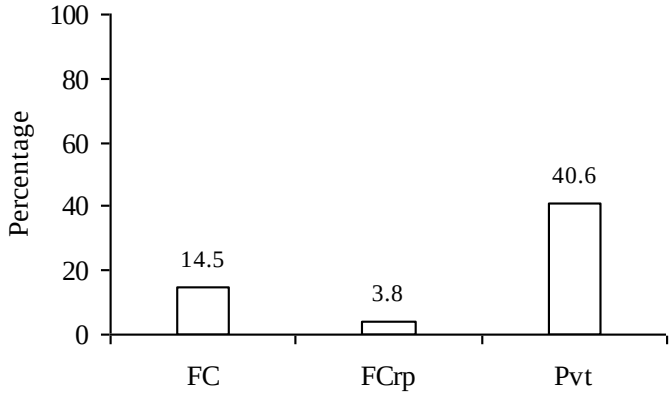



Figure 16b: Percentage wise deviation from E-R for observed behaviour across regimes

**Work**

The nature of work and working conditions determine the living conditions for elephants maintained exclusively for work.

Data was available for the male elephant only.

- 70% of FC elephants were not made to work; work type involved timber related tasks─ logging/ dragging/ loading or tourism (Figures 17a, b, c, d, e and f) related work─ in the morning (up to 1-2p.m.)

a

b

c

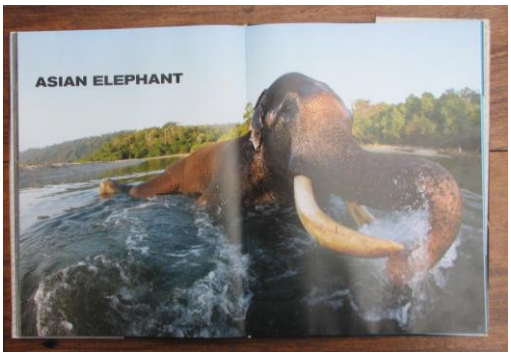
d

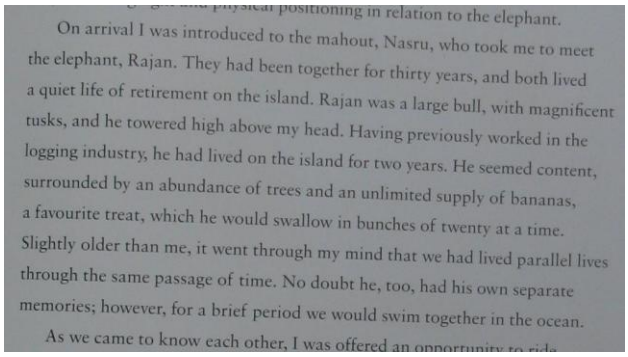
e f

Figures 17a, b, c and d showing logging and dragging. e and f showing loading for tourism

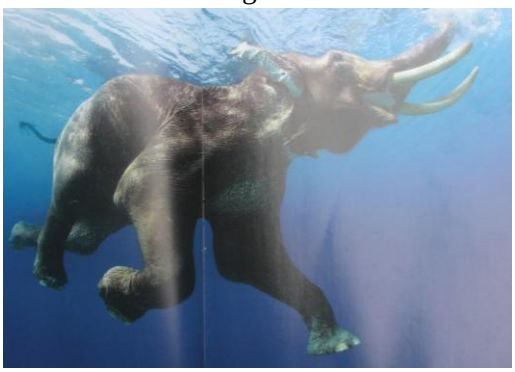
- 40% of FCrp elephants were made to work; work type was dragging/ loading of timber/ logging/ tourism/ palm seed removal; except tourism duty, time of work was in the morning upto 12-1p.m.

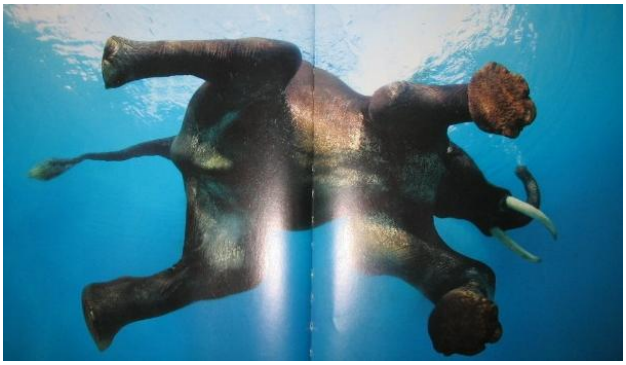
- Data was available for the male only: the elephant was used for tourism (Figures 17g, h, i and j) from 9a.m. to 2p.m.; food was given while working




g h





i j

Figures 17g, h, i and j: Private elephant used for tourism related activities

Variation in mean rating across regimes (Figure 18a and b) implies overlap of working conditions with relatively better rating for FC elephants.

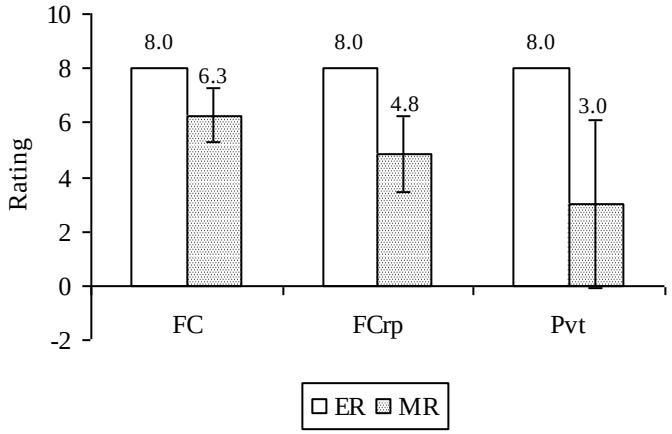



Figure 18a: Comparison of E-R and M-R for work across regimes

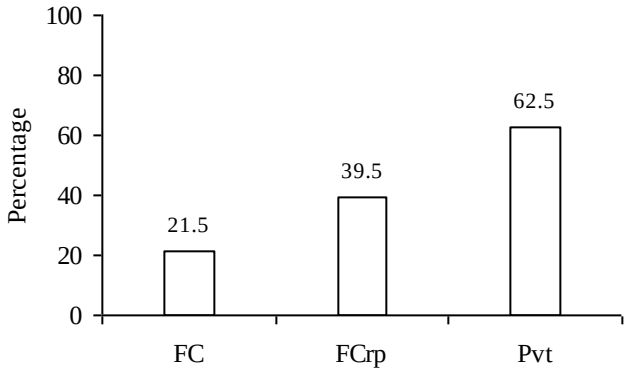



Figure 18b: percentage wise deviation from E-R for work across regimes

**Food provisioning**

Providing opportunity to forage in forest conditions will give captive elephants a chance to engage in species-typical activity as foraging forms a major portion of wild elephants' activity. More than 50 species of food plants were reported to be eaten by wild elephants (Sukumar, 1991), this cannot be matched by providing only stall feed. Instances of crop raiding by captive elephants, when allowed to forage, can affect their welfare indirectly.

- All elephants were allowed to free range (Figures 19a,b,c, d, e, and f), for Forest Camp elephants, stall feeding was not done; no ration chart was used; nearly 60% elephants had raided crop fields (Figures g and h)
- All FCrp elephants were allowed to free range to graze/ browse; no stall feed was given; no ration chart was used; visit to crop field was reported
- Both types of food provisioning were given for FC and FCrp elephants depending on work performed and as prescribed by the veterinarian.
- Both stall feed and free-ranging opportunity was provided for the male elephant with private owners; visit to crop fields was not reported

a

b

c

d

e

f

g

h

Figures 19a, b, c, d, e, f, g, and h: Types and scope of food available for elephants

Mean rating across regimes showed variation (Figure 20a and b), rating for both FC and FCrp were comparably low. Low rating for both these institutions was due to the incidence of crop raiding and absence of ration chart usage.

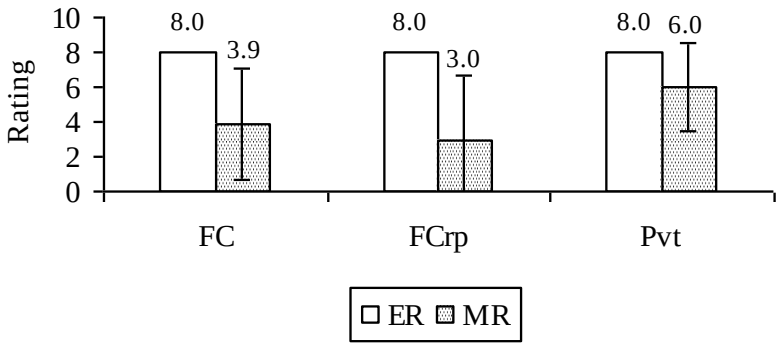



Figure 20a: Comparison of E-R and M-R for food across regimes

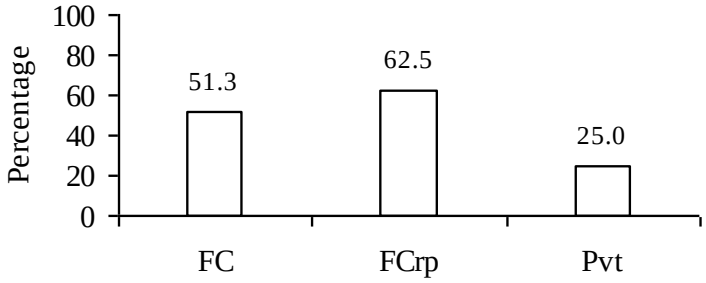



Figure 20b: percentage wise deviation from E-R for food across regimes

**Reproductive status**

Reproductive functioning among adult elephants in captivity may deviate from the norm either due to physiological problems or absence of members of opposite sex.

Male reproductive status:

- Nearly 48% of FC male elephants (Figures 21a and b) were not exposed to females; all observed elephants were said to exhibit musth, aggressive during musth and were chained during this period.

a

b

Figures 21a and b: Reproductively active males from FC

- The adult male FCrp elephants were said to be reproductively active and exhibited signs of musth, one was only ten years old and exhibited musth; all were aggressive during musth and were chained; exposure to females was not uniform for all the males

- The male elephant with private owners exhibited musth, was not exposed to females and was chained during musth

Mean rating was low across the regimes, similarly variation was observed for all the institutions implying non-uniformity in the sub-parameters observed (Figure 22a and b).

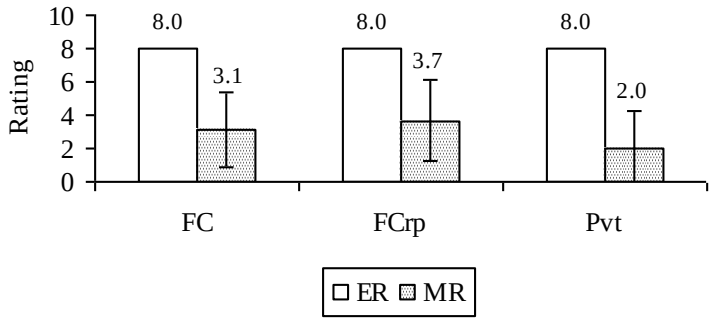



Figure 22a: Comparison of E-R and M-R for reproductive status of male elephants across regimes

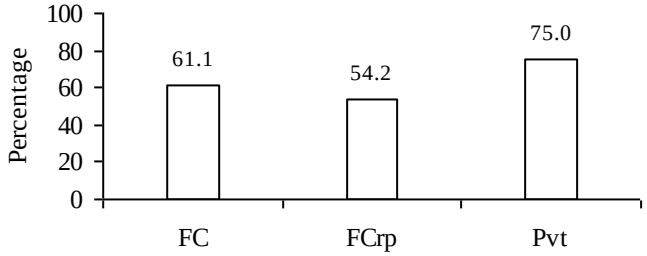



Figure 22b: percentage wise deviation from E-R for reproductive status of male elephants across regimes

Female reproductive status

- Oestrus cycle was observed for 40% of the female FC elephants (52% elephants— unknown status or not applicable); 30% were not exposed to males, 19% were not given opportunity to breed and many of them have given births (Figures 23a and b)

a

b

Figures 23a and b: Reproductively active females with their new born calves

- All observed FCrp elephants exhibited oestrus cycles; nearly 63% had not been given opportunity to mate

Mean rating was comparable across the two regimes (Figure 24a and b).

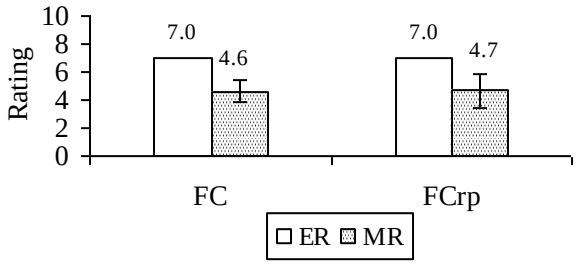



Figure 24a: Comparison of E-R and M-R for reproductive status of female elephants across regimes

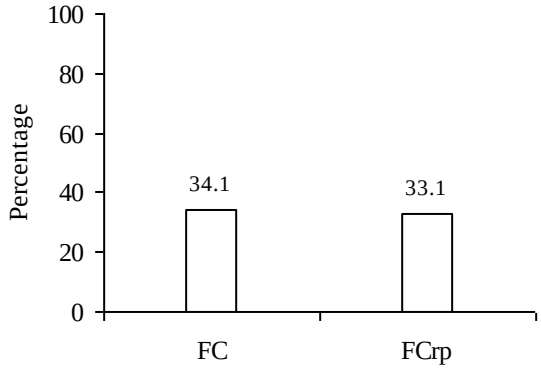



Figure 24b: Comparison of E-R and M-R for reproductive status of female elephants across regimes

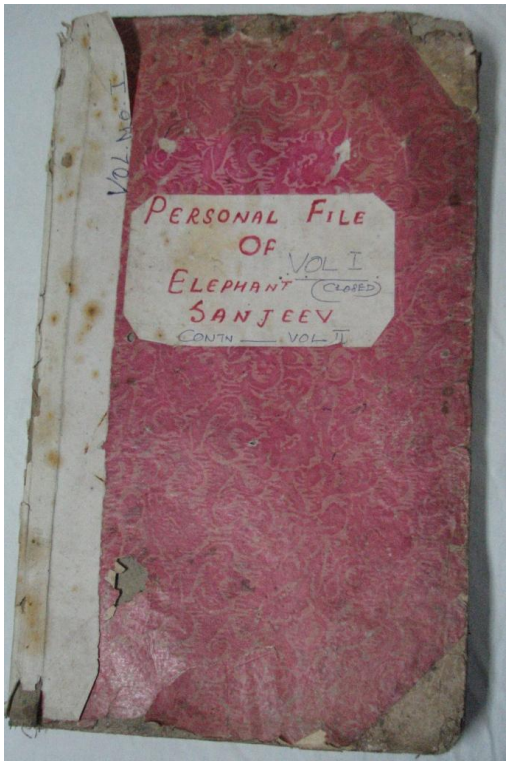
**Health and veterinary care**


Figure 25: Dispensary attached to a forest office

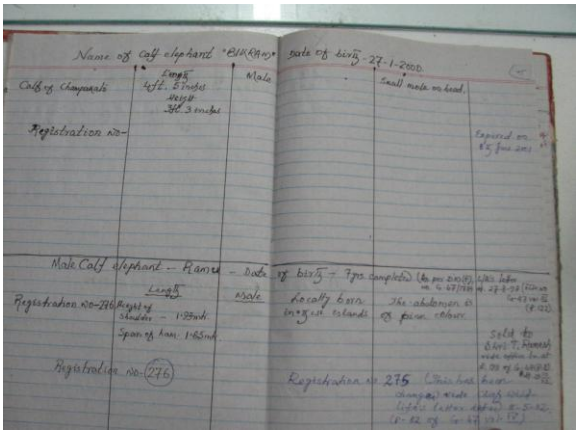
Captivity introduces a number of factors which makes health care for elephants an important issue. Prolonged chaining may cause injuries that are difficult to heal (Kurt and Garai, 2007), occurrence of leg problems (Mikota, et al., 1994).

- 21% of FC elephants reported diseases/injuries such as abscesses/ vision problems/ leg injuries/ respiratory problems; application of oil was not practiced; elephants were dewormed; all elephants had access to veterinary doctor; veterinary dispensary (Figure 25) was available

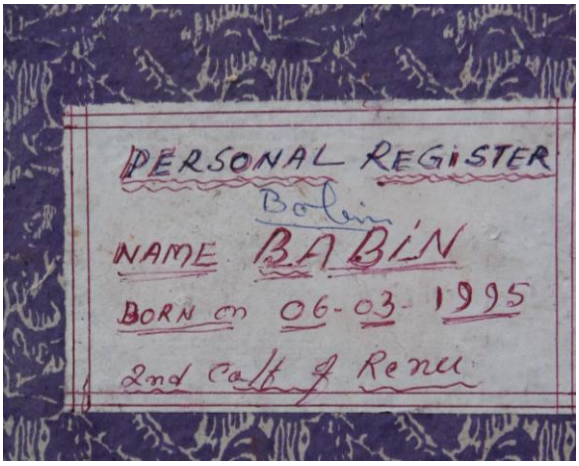
- Most FCrp elephants reported occurrence of Diarrhoea/ anemia; application of oil/ immunization was not practiced; veterinary doctor and assistant were available; dispensary was available, medical, service and other relevant records were well maintained (Figures 26 a, b and c) in both FC and FCrp




a




b




c

Figures 26a, b and c: Examples of records maintained for elephants

- Minor wounds were reported for the male in Pvt; veterinary doctor was available for all elephants; frequency of visits was monthly/ on call for the male elephant; records were not maintained for the female elephants

Mean rating was comparable across regimes with comparable variation being observed (Figure 27a and b) implying non-uniformity in standards of sub-parameters.

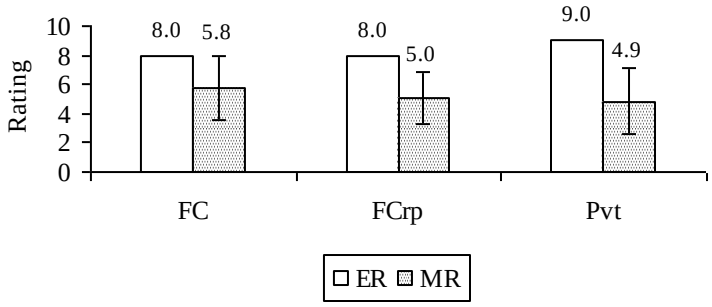



Figure 27a: Comparison of E-R and M-R for Health and veterinary care

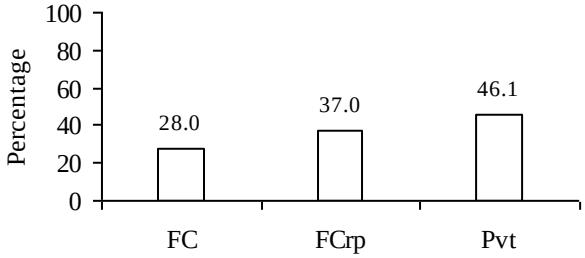



Figure 27b: Percentage wise deviation from E-R for health and veterinary care

**Overall rating for elephants in Andaman Island**

Overall mean welfare rating for FC was 5.1, for FCrp was 4.9 (Figure 28) and for Pvt it was 4.2, implying 36 % deviation from expert rating for FC, 39% for FCrp and 48% for Pvt. Variation among the ratings across the regimes may not be high as all the regime elephants are kept almost similar ecological environment, with small variations in their management practices

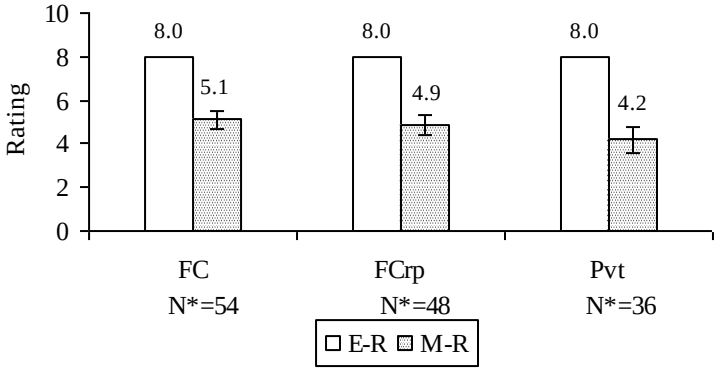


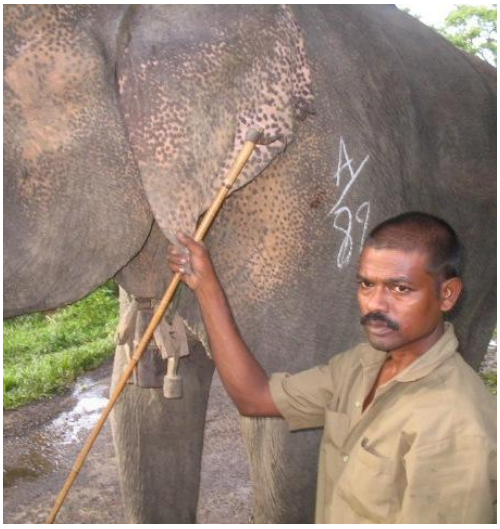

Figure 28: Overall comparison of rating across regimes

**Handler status**

A total of 113 handlers were employed across the institutions/ owners. Mean age was 43y, ranging from 24-60y, most handlers were aged between 30 – 50y (67%).

**Professional experience**

Knowledgeable handlers (Figures 29a and b) can prevent occurrence of untoward incidents of potential danger to public/ the elephant.



a b

Figures 29a and b: Profiles of elephant handlers for different elephants

- Mean experience (number of years) for FC handlers was 15y ranging from 0.3-35y; mean experience with a specific elephant was 9y, ranging from 0- 34y; 80% handlers had opted for this profession as a means of employment; hours spent with elephant free ranged from 2.5-8h; all used tools to control their elephant— wooden ankush, stick, knife (Figures 30a and b)

a b

Figures 30a and b: examples of types of tools used by handlers

- For FCrp handlers, mean experience in the profession was 22y, ranging from 6-35y; mean experience with a specific elephant was 7y, ranging from 0.2-27y; 89% had opted as a source of employment; hours spent with elephant free ranged from 3-8h; all used tools to control their elephant— wooden ankush, stick, knife

- For PVT, data was available for the male elephant only: experience in the profession was 10y, 1y with a specific elephant; opted out of interest in the profession; spent 8h with elephant; used wooden ankush, stick, knife to control elephant

Mean rating was comparable across regimes, variation observed for all (Figure 31) implying non-uniformity in suitability across regimes. While deviation from E-R (Figure 32) was relatively low for private handlers, it was offset by the variation in the mean rating.

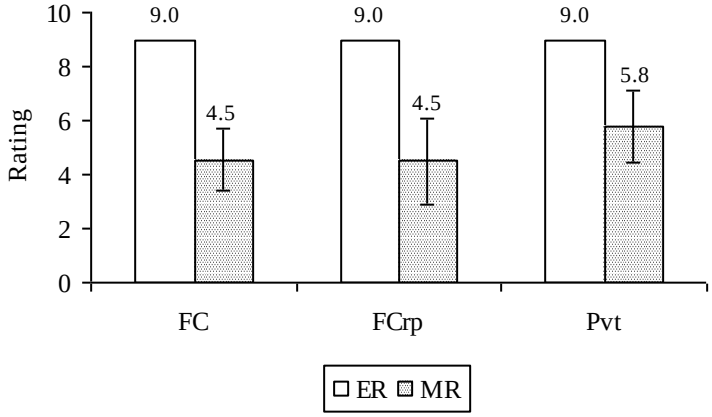



Figure 31: Comparison of E-R and M-R for professional experience of handlers

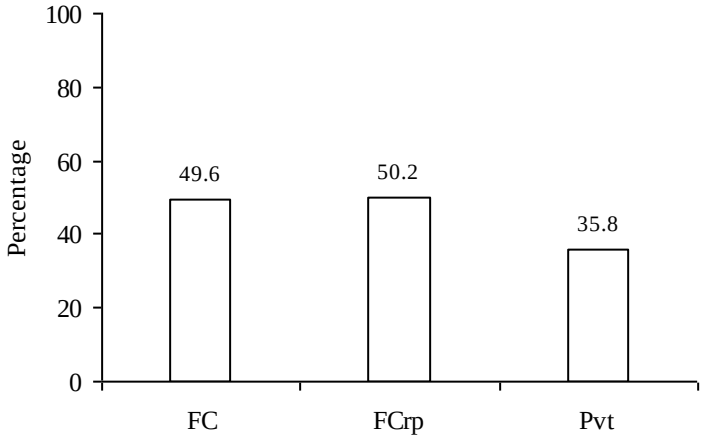



Figure 32: Percentage wise deviation from E-R for professional experience of handlers

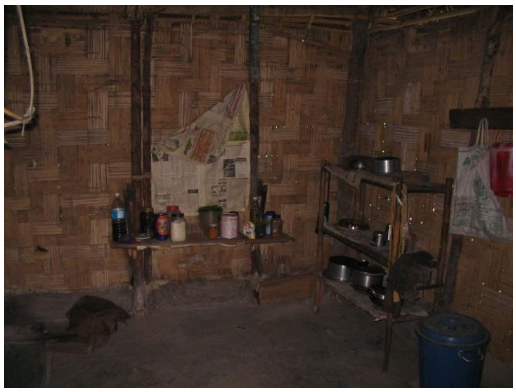
Socio-economic status:

- None of the FC handlers came from a family background (Figures 33a,b,c and d) handling elephants; 28% were not educated; mean annual salary was Rs.73900/-; mean number of children per family was 3, ranging from 0-9; insurance cover was

available for 55% of the handlers; only 12% handlers abstained from consuming alcohol

a

b



c

d

Figures 33a, b, c, and d: House structures and family members of handlers

- All FCrp handlers came from a non-handler family background; 52% had not attended school; mean annual salary was Rs. 70,800/-, mean number of children per family was 3; most handlers were covered by insurance; 90% did not consume alcohol
- Handler with private owner came from a family background not dealing with elephants; was educated upto 8$^{th}$ class; and their children go to nearest school (Figure 34) annual salary was Rs.36000/-; not covered by insurance; consumed alcohol

Figure 34: handler's children with school uniform getting ready to go to

Mean rating was comparable for FC and FCrp handlers and was relatively low for private handlers with corresponding deviation from E-R (Figure 35a and b).

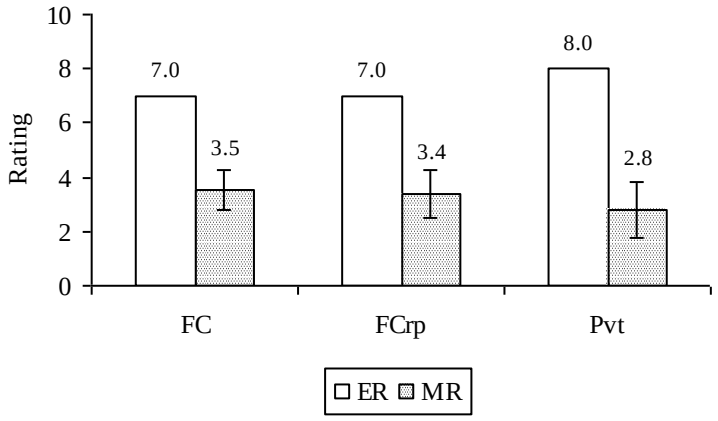



Figure 35a: Comparison of E-R and M-R for socio-economic status of handlers

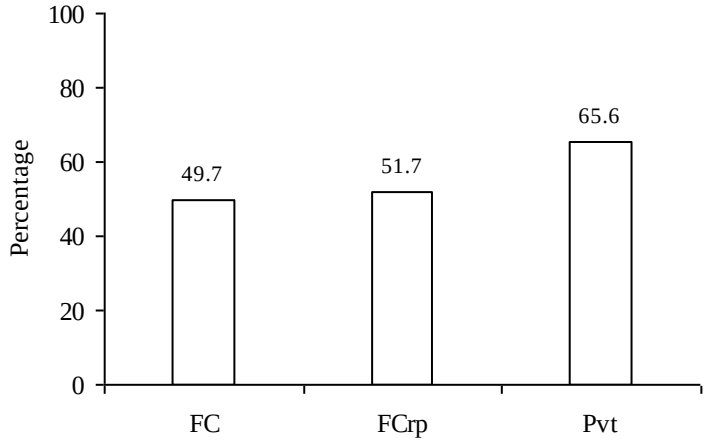



Figure 35b: percentage wise deviation from E-R for socio-economic status of handlers

**Discussion**

The knowledge gained from studies on wild elephants has been used to compare the provisions made for meeting the ecological and biological needs of captive elephants. Welfare status of captive elephants has thus been studied from a viewpoint of deviations from the wild and rated: greater deviation from wild conditions result in lower rating.

Overall rating, considering all observed parameters shows comparable values across regimes, with rating decreasing as number of parameters available for rating reduced. Observed variation across regimes indicates overlapping conditions with regard to suitability of the observed parameters.

Features suitable for the elephants were:

- Characteristics of the physical space available: proximity to forests and natural conditions such as varied vegetation and running water availability. The Shekhar Singh report (2002), however, recommends removal of all exotic species from the island group due to its effect on the native flora and fauna.
- Absence of stereotypy among FC and FCrp elephants
- Availability of veterinary doctor for the elephants

Features unsuitable for elephants were:

- The practice of chaining the elephants for defined durations per day— the suitability of the landscape around was thus lost due to the restrictions on movement of the elephants
- Absence of stall feed for FC and FCrp elephants— in conjunction with the above— food availability was reduced. Strikingly, wherever elephants were left to forage, crop raiding incidents by some were reported. Limited duration of foraging opportunity for the male with private owners implied reduced opportunity to feed on diverse plants and more importantly restricted expression of species-typical behaviour.
- The ban on harvest of trees enforced absence of work for most FC and FCrp elephants. This was, however, not supported by opportunity to express species typical behaviours as the elephants were restricted by chaining for defined periods and were hampered by limited group size. Some of the older female elephants (> 55y) were not allowed social interaction.
- Work performed by the elephant with private owners was tourist oriented with limited opportunity for the animal to engage in activities performed by the species. The male with private owners was kept in social isolation.
- Chaining of elephants during musth was universal across regimes: a practice employed as a means of maintaining safety standards (of the animal/ public) when the elephant is in musth, it cannot be considered suitable for the elephant which is chained for the duration of this period.
- Reproductive status of females showed variation in the parameters observed: absence of males/ death of offspring being noticed.
- Regular implementation of veterinary routines was needed: body measurements/ sample testing for parasites/ diseases/ immunization; easier accessibility of veterinary care was hampered due to spread of locations across the islands

Handler status:

- Negligible percentage of mahouts came from a family background that handled elephants. This, despite the presence of elephants on the islands for at least a century. This would imply that this profession is itself viewed as being unattractive by people.
- Duration of experience with specific elephants was low indicating shifting of handlers across different animals. The knowledge gained about an elephant may, thus, be lost when handlers are changed in the absence of written information about the elephant. For the elephant, the presence of new handlers would imply a new series of learning about the handler and his methods
- Absence of insurance cover was noticed

- Practice of alcohol consumption was prevalent across the regimes

**Reference:**


1. Ali, R. 2004. The effect of introduced herbivores on vegetation in the Andaman Islands. Current Science, **86** (8): 1103-1112.
2. Kurt, F., and Garai, M.E. 2007. The Asian elephant in captivity—a field study. Foundation books, Cambridge University press, New Delhi.
3. Lair, R.C. 1997. Gone Astray - The Care and Management of the Asian Elephant in Domesticity. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand
4. McKay, G.M. 1973 Behavior and Ecology of the Asiatic Elephant in Southeastern Ceylon. Smithsonian Institution Press, City of Washington
5. Mikota, S.K., Sargent, E.L., and Ranglack, G.S. 1994. Medical management of the elephant. Indira Publishing House, U.S.A
6. Poole, J. and Granli, P. 2009. Mind and Movement: Meeting the Interests of Elephants. In: An elephant in the room: the science and well being of elephants in captivity, (Forthman, D.L., Kane, F. L., Hancocks, D., and Waldau, P.F. eds.) Center for Animals and Public Policy, Cummings School of Veterinary Medicine, Tufts University
7. Poole, J.H. and Moss, C.J. 2008. Elephant sociality and complexity: The scientific evidence. In: Elephants and ethics toward a morality of coexistence (Eds: Wemmer, C and Christen, C. A) The John Hopkins University Press, Baltimore.(Accessed online: http://www.elephantvoices.org/index.php?topic=tools&topic2=tools/documents/2_Poole_Moss_Final_7_12_06.pdf)
8. Singh, S., 2002 Report of the Shekhar Singh Commission, submitted to the Supreme Court, January 2002.
9. Sivaganesan, N., and Kumar, A. 1994. Status of feral elephants in the Andaman Islands, India. Salim Ali Centre for Ornithology and Natural history (SACON)-Technical report 1
10. Sukumar, R. 1991. Ecology. In: Eltringham, S.K. (ed.), The Illustrated encyclopedia of elephants, Salamander Books, U.K.
11. Varma, S. 2008 Identifying and defining welfare parameters for captive elephants and their mahouts in India, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 7-16. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.
12. Varma, S. and Prasad, D. 2008 Welfare and management of elephants in captivity— insights and recommendations, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 54-64. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

13. Varma, S., Sujatha S.R., van de Brand, J., Ganguly, S. and Shiela R., 2008. Draft concept note on welfare parameters and their significance for captive elephants and their mahouts in India, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 17-53. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

# Section 2:
# Captive elephants in Forest Camps

## Executive Summary

Forest camps are relics of timber-extraction operations, with the elephants within these camps continuing to be maintained and being used to drag fallen logs/ for tourism/ supervised timber extraction.

This investigation assesses the welfare status of both elephants and their handlers in forest camps of Andaman Islands. Welfare status of the elephants has been assessed by comparing physical/ physiological/ social and psychological features in captivity with those observed in the wild. Based on a welfare rating scale developed by experts, Experts' Rating (E-R) was evolved to collect and compare the same with the Mean rating (M-R) obtained from the ground, that denotes welfare status of existing conditions for the particular parameter.

Source of animal was known for 63% of the elephants of which 25 were purchased and 23 were captive-born; year of purchase free ranged from 1954 to 1995; Locations were Sonepur (Bihar), Assam and within Andaman. Among the captive-born elephants, there were 9 males and 14 females.

All the elephants were maintained in a forest environment with varied vegetation and natural flooring. Space available free ranged from 35, 80 $ft^2$ (for two elephants) to 5km radius. M-R was 8.0 implying no deviation from E-R.

Streams formed water sources for all observed elephants and the distance free ranged from 20ft to 3km. Bath frequency free ranged from daily to weekly twice with fewer baths in summer and the bath duration free ranged from 10 min to 1.5h, most common duration being less than half-hour (82%). Natural, locally available materials were used as scrub while bathing, with only a few using plastic brushes. M-R was 5.2 showing a deviation of 34.8% from E-R.

Thirty-two percent of the elephants were not provided opportunity to interact. For those getting an opportunity to interact, number of individuals free ranged from 0-3 with 1-2 individuals forming 51% of all the groups; the groups comprised related/ unrelated individuals. M-R was 4.9 showing a deviation of 38.4% from E-R.

Only two females had injured people, while 15 males were reported to have inured/ killed people. Except for a female calf, none of the elephants exhibited stereotypy. M-R was 6.8 with a deviation of 14.5 from E-R.

In 2007, sixty-eight per cent of elephants were not given any work; absence of work was due to the ban on logging in forests. Work for the remaining elephants involved loading/ dragging, three adult female elephants were used for tourism. For tourism: elephants were used for providing rides, bamboo howdah weighing 30-40kgs was used, four people were carried per trip, number of trips depended on tourists (from 1 – 10 trips). M-R was 6.3 showing a deviation of 21.5% from E-R.

Since the Supreme Court's order to resume timber operations in the islands, work has resumed for the elephants in the camps. In 2009, when timber extraction resumed, only 24% of the elephants were not given any work. Both timber extraction and tourism were the types of work performed. Dragging and loading of logs for durations of 7h/day was done by elephants more than 15y of age. M-R (when logging work resumed) was 5.3 indicating a deviation of 34% from E-R; an increase in the deviation from that observed in 2007.

Three elephants, a calf, a 64y and a 59y old, were not allowed to free range. The calf was given stall feed, while the old elephants were tied to a place in the forest and allowed to forage. Provision of supplements was stopped following ban on logging (banned since 2001 and lifted in 2009); 58% of the elephants were reported to have raided crops; crops eaten were: paddy (*Oryza sativa*), coconut (*Cocos nucifera*), banana (*Musa* sp.), bamboo (*Bambusa* sp.), and sugarcane (*Saccharum* sp.). Provision of stall feed for an elephant was as per the schedule prescribed by the veterinarian. M-R was 4 with a deviation of 51.3% from E-R.

Among the male elephants which were reproductively active/ exhibited musth, 48% were not exposed to females or exposure was not constant, having taken place several years ago. Elephants in musth are chained for the period with one adult male reportedly chained for 8 months. M-R for male reproductive status was 3 with a deviation of 61% from E-R.

Among female elephants, 30% (N= 30) were not exposed to males. Sixteen offspring had died from various causes (abortion/ premature birth/ illness/ man-made) and three females were not bred as they showed aversive reaction to the presence of males. M-R for female reproductive status was 5 indicating a deviation of 34.1% from E-R.

Abscesses on neck/ shoulder, uro-genital problems, diarrhea, respiratory problems were reported among the elephants. Eleven elephants had eye associated problems with five blind in one eye at least. Foot problems such as foot rot/ fissures/ toe nail cracks were reported for eleven elephants with two elephants having fractured their legs.

Oiling was not done for majority of the elephants; deworming was practiced for the observed elephants. Veterinary doctor was available for all observed elephants; assistant was available in some camps. Dispensary with medicines and darting equipment were available in each Free range office. M-R was 6 showing a deviation of 28% from E-R.

Seventy-six elephants observed in these islands were handled by 94 mahouts/ cawadis, the ratio was 1:1.2. Six mahouts took care of more than one elephant with one mahout in charge of the maximum of three elephants. Mean age was 42.0 yrs, ranging from 24-60 yrs.

Mean experience of handlers in this profession was 15 yrs; experience with a specific elephant was 9 yrs, ranging from 0-34 yrs. Only 13.2% of observed handlers opted for

this profession out of interest, only two mentioned this profession to be traditional, most chose it as a means of employment. All used tools to control their elephant: Knife/wooden ankush/Stick. M-R was 5 showing a deviation of 49.6% from E-R.

Seventy per cent of handlers did not have relatives in this profession, none of the observed handlers came from a background of handling elephants; agriculture was the most common family occupation. Average annual salary was Rs. 73911, ranging from Rs. 13,000 to 1, 08,000. Number of children per family free ranged from 1 – 9. Only 12% handlers abstained from alcohol; of those who consumed alcohol, the frequency free ranged from daily, weekly or monthly, after work. M-R is 4, indicating a deviation of 50% from E-R.

## Introduction

The natural wealth of the islands induced the British to harvest timber for mainland use, bringing captive elephants into the island to aid in transporting timber. Such harvest continued even under Indian governments, until a ban on timber extraction was imposed in the year 2001.Timber extraction was allowed to resume from 2009 onwards. Forest camps are thus relics of timber-extraction operations, with the elephants within these camps continuing to be maintained and being used to drag fallen logs/ for tourism/ supervised timber extraction.

## Objective

The absence of the central reason for maintaining elephants, i.e., timber transportation, in forest camps following stoppage of logging makes it mandatory to assess their welfare status, along with their status when work for the elephants resumed following limited permission to extract timber. Elephant handlers are integral to a captive elephant situation; hence their conditions have also been evaluated.

- To assess the welfare of elephants in forest camps of Andaman islands through an examination of existing conditions, both physical and biological
- To assess the professional experience and socio-economic status of handlers of the elephants

## Method

When wild animals are raised in captivity, their living conditions are controlled/ regulated by people. However, the biological and ecological needs of these animals remain unaltered resulting in a potential difference between the species' needs and actual conditions. Welfare status of the elephants has been assessed by comparing physical/ physiological/ social and psychological features in captivity with those observed in the wild. Deviations from conditions in the wild have been considered to represent poor welfare. The greater the deviation, the poorer the welfare. Deviation from the wild state for the parameters observed was rated using a scale developed by elephant experts. Data was collected through observations of elephants/ interview of relevant personnel.

## The rating method

A rating scale from zero (unsuitable conditions) to ten (suitable conditions) was used to assess the welfare status of captive elephants and their handlers. Experts (both wild and captive elephant specialists, wildlife veterinary experts, managers from protected areas, those that hold both wild and captive elephants and other wildlife, personnel from welfare organisations and elephant handlers) were invited to assess the welfare based on welfare parameters and their significance through an exclusive workshop conducted on the subject (Varma, 2008; Varma, et al., 2008; Varma and Prasad, 2008). Experts rated a total of 114 welfare parameters covering major aspects of captivity

- The experts, based on their concept of the importance of a particular parameter to an elephant, developed a rating for each parameter. For example mean expert rating of 8.0 (SE= 0.5, N=29) for the parameter 'floor' and 9.0 (SE=0.4, N=31) for 'source of water' was arrived at, from the ratings suggested by each expert

- A mean rating for each parameter, across all the participating experts, has been used as the Experts' Rating (E-R) which represents the importance attached to a parameter i.e., for a parameter with 8.0 as the maximum value, only 2.0 (25%) deviation and a parameter with maximum value of 9.0, only 1.0 or 10% from the prescribed norm is considered acceptable.
- For example, if an elephant is exposed only to natural flooring, the animal receives a rating of 8 and for entirely unnatural flooring the value is 0; if the animal is exposed to both natural and unnatural flooring, the value is 4 (as 8+0/2= 8/2= 4). If an elephant is exposed to a natural water source such as a river, it receives a value of 9; if the source of water is large lakes or reservoirs, it gets 4.5. A value of 3.5 is assigned for small water bodies like tanks and ponds. Tap water (running) gets 2.5 and if only buckets, pots, and tankers are in use, then the allocated value is 0.5.
- Therefore, using the maxima given by experts as a base, a rating scale starting from zero to the particular maximum value for that parameter has been used and the data for each animal was collected. For a given animal or group of elephants in a given regime (for example, forest camp) Mean Rating (M-R) was calculated for a given parameter, along with its sub-parameter. Thus the Mean Rating (M-R) denotes welfare status of existing conditions on the ground for the particular parameter.
- In this investigation, variables which represent a common feature of the captive condition have been grouped to form a parameter. The variables have been termed sub-parameters. For example, the variables shelter type, shelter size, floor type in the shelter; all represent different aspects of the physical space provided to the elephant. Hence, they are grouped together to form the parameter "Shelter" and each constituent variable is a sub-parameter. In this investigation, the E-R for a parameter (say, shelter) represents the mean of E-Rs across all related sub-parameters. M-R is also based on similar lines.
- E-R and M-R for each of the regimes here represent the average across related parameters observed for that zoo. For instance, E-R / M-R for a parameter "shelter" represent the average of related parameters (termed sub-parameters) such as type, flooring, size, and shade availability. Not all related parameters will be rated for each regime. The number of such related parameters varies for each regime.
- Results have been presented comparing E-R and M-R as a means of comparing the extent of deviation present in the parameters observed. The difference between E-R and M-R (expressed as percentage) indicates deviations from the prescribed norm.
- For handlers, the difference between the maxima provided by experts (E-R) and existing status (M-R) have been used to indicate their professional/ socio-economic status, of value to the handler and his elephant.
- N refers to number of individuals and N* refers to number of observed parameters/ sub-parameters

**Result**

Forest camps from North, Middle and South Andaman, and Havelock Island were surveyed. Data on 76 elephants was collected, comprising 25 males and 51 females with 45 adults (60%). Of the animals observed, age (Figure 1) was known for 60% of the animals. Calves and young (less than/ 10y old) formed 28.1% and 28.6% respectively of the female and male population (includes only those animals whose ages, adults and young, were known, i.e., total number of females= 32 and total number of males = 14).

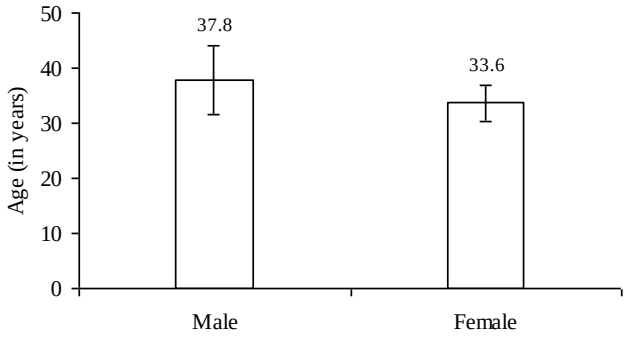



Figure 1: Mean age of elephants

**Source of elephant**

The change in living conditions experienced by a wild-caught elephant will be greater than that experienced by a captive born elephant. This may result in greater stress for the animal.

- Source was known for 63% of the elephants (N= 76), of which 25 were purchased and 23 were captive born
- Year of purchase free ranged from 1954 to 1995; Locations were Sonepur (Bihar), Assam and within Andaman
- Figure 2 shows the age of elephants at purchase, most elephants being in the free range of 16-20yrs; Figure 3 gives the average age at purchase based on sex of the elephant
- Among the captive born elephants, there were 9 males and 14 females. Figure 4 gives the number of known elephant deaths for a ten year period

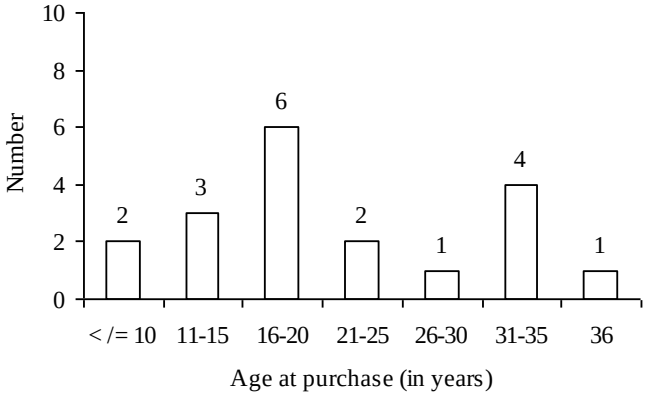



Figure 2: Age of elephants at purchase

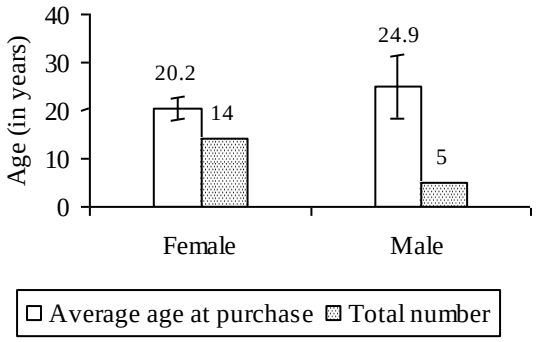



Figure 3: Mean age at purchase

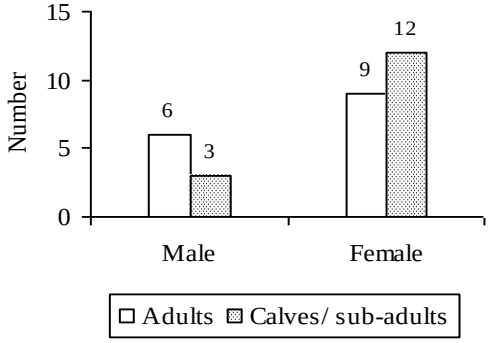



Figure 4: Elephant deaths from 1997-2007

**Mahout change**

The bond developed between handler and elephant may be broken if handlers are changed. New handlers involve a period of learning for elephants and handlers which maybe stressful, hence, frequent mahout change has been given low rating.

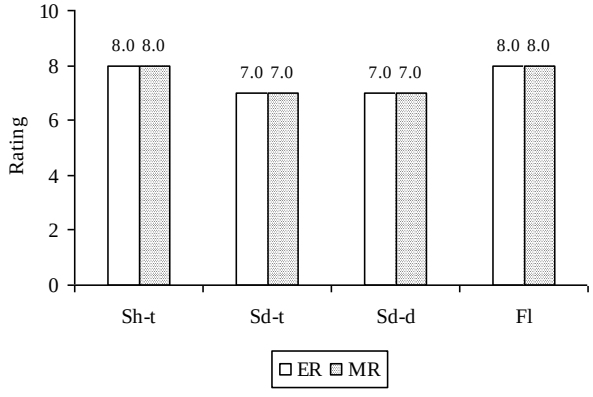
- Most mahout changes involved 2-3 handlers (43%, N= 53)
- Most common reason was retirement (16), followed by transfer (13). Total number of observations, N= 41.

M-R was 5.5 (SE= 0.4, N= 54) indicating a deviation of 31.4% from E-R.

**Shelter**

The physical space provided to captive elephants (Figure 5) maybe different from those experienced by wild elephants: absence of vegetation, occurrence of hard substrates maybe prevalent.

- All the elephants were maintained in a forest environment with varied vegetation and natural flooring
- Space available free ranged from 35, 80 $ft^2$ (for two elephants) to 5km radius.




Sh-t: Shelter type Sd-t: Shade type Sd-d: Shade type-day Fl: Flooring

Figure 5: Comparison of E-R and M-R for shelter sub-parameters

M-R was 8.0 (SE= 0.0, N*= 4) implying no deviation from E-R.

**Water availability**

Suitable water sources not only provide clean water, free from contamination, but also opportunity to perform species-typical behaviours.

- Streams formed water sources for all observed elephants
- Distance free ranged from 20ft to 3km
- The elephants were said to drink water from once to 7 times/ day, most drank twice a day
- Bathing place was streams/ the sea
- Bath frequency free ranged from daily to weekly twice with fewer baths in summer
- Bath duration free ranged from 10 min to 1.5h, most common duration being less than half-hour (82%)
- Natural, locally available materials were used as scrub while bathing, with only few said to use plastic brushes
- No tests were done on quality of water

M-R was 5.2 (SE= 1.3, N*= 8) showing a deviation of 34.8% from E-R (Figures 6 and 7).

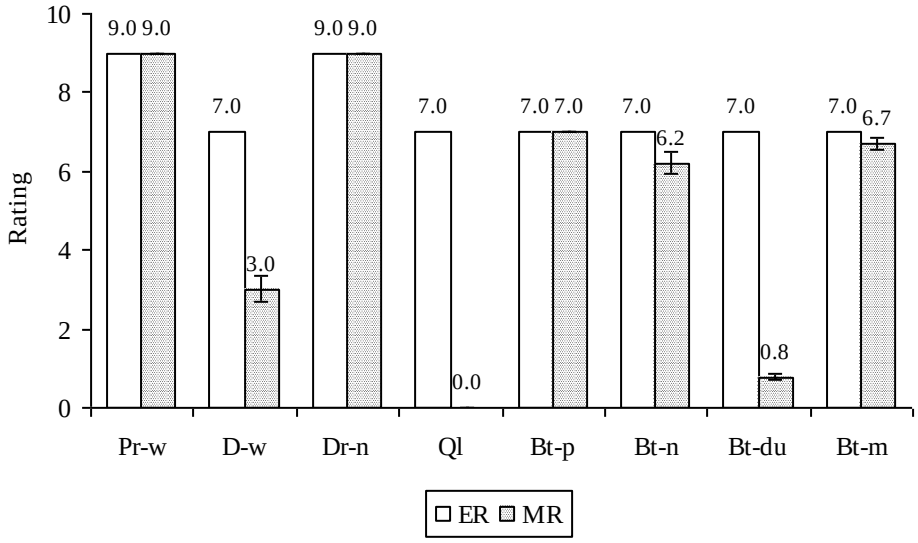



Figure 6: Comparison of E-R and M-R for 'water' sub-parameters

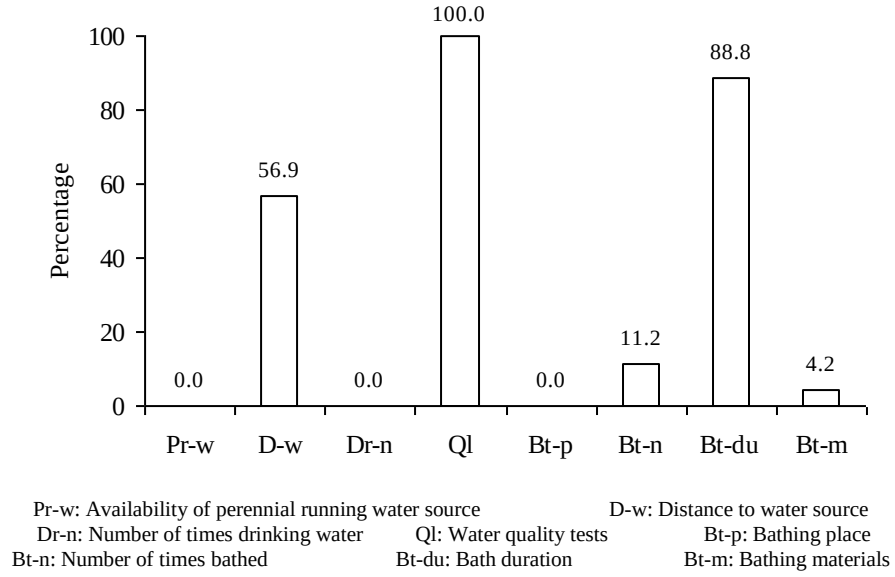



Figure 7: percentage wise deviation from E-R for water sub-parameters

**Sleeping place and duration**

Unsuitable substrates may result in abrasion related injuries/ foot problems in elephants. Kurt and Garai (2007) state the duration of sleep for adult elephants to be 3-4h. Excess sleep maybe indicative of ill-health/ absence of suitable activities for the elephant to perform.

- 50% of the elephants were said to sleep for duration of 2-3h (N=20), duration free ranged from 1- 5h
- Forest was the sleeping place for all observed elephants

This parameter was rated considering two sub-parameters only: sleep duration and sleeping place (Table-1).

Table – 1: Comparisons of Expert and Mean Ratings for sleep and related parameters

| Rating | Sleep duration | Sleeping place |
|---|---|---|
| E-R | 8.0 | 8.0 |
| M-R | 5.6 | 8.0 |
| SE | 0.5 | 0.0 |
| N | 9.0 | 32.0 |
| % deviation from E-R | 30.6 | 0.0 |

**Social interaction**

Elephants are known to live in groups of related individuals, females remaining in their herd (Sukumar, 2006); males disperse gradually from their herds (Poole and Moss, 2008). Social interaction that resembles social interaction in the wild has been given high rating.

- 32% of elephants were not provided opportunity to interact, age ranging from 10 – 64y (male/ female)
- 41% of elephants were allowed zero to less than one hour interaction while 54% were allowed for 18-24h duration
- Number of individuals free ranged from 0-3 with 1-2 individuals forming 51% of all the groups
- Most elephants were in close proximity (0-100ft.), with few being 100-200m from each other
- Groups comprised related/ unrelated individuals

M-R was 4.9 (SE= 1.1, N*= 4) showing a deviation of 38.4% from E-R (Figures 8 and 9).

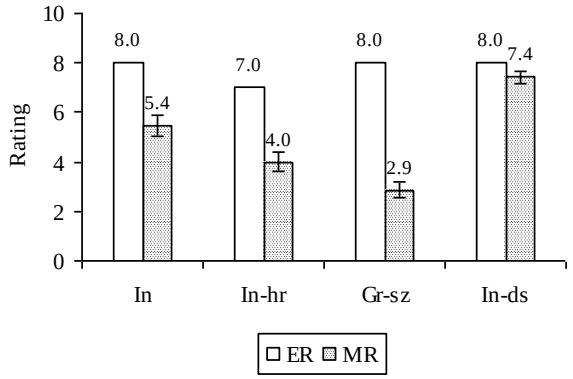
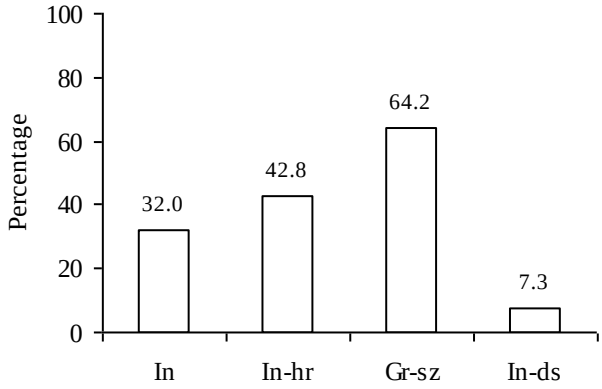



Figure 8: Comparison of E-R and M-R for 'interaction' sub-parameters




In: Opportunity for interaction In-hr: Hours of interaction Gr-sz: Group size
In-ds: Interaction distance

Figure 9: Percentage wise deviation from E-R for 'interaction' sub-parameters

**Chaining**

Captive elephants are subjected to various periods and types of chaining as a means of controlling them.

- Only five elephants (all, except one, being less than 10y, the single elephant's age was unknown) were not chained
- Plain chains were used
- 88% of elephants were chained in the leg region; *Bandhan*, Dragging, *Bedi*, Hook chains were used depending on work performed
- 85% of elephants were shackled by their forelegs
- 26% elephants (N= 61) were not allowed to free range at night; drag chain and/or *bedi* was used while ranging free
- All elephants of Makarti valley swam across to other islands (1-2 km) and returned, 4-5 times/ month; it is not known if drag chain was still attached when they swam

M-R was 2.5 (SE= 1.0, N*= 6) implying a deviation of 68.5% from E-R (Figures 10 and 11).

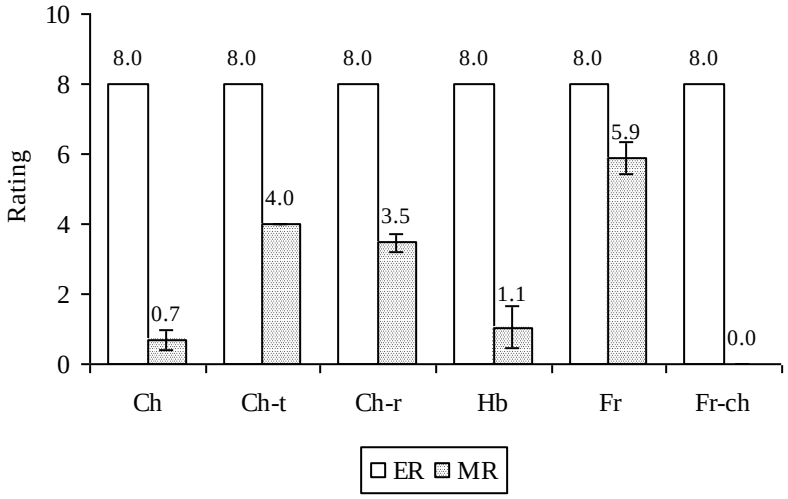
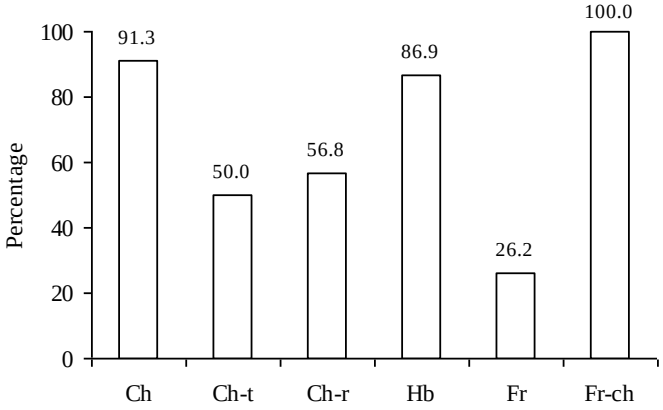



Figure 10: Comparison of E-R and M-R for 'chaining' sub-parameters




Ch: Chained/ free-ranging Ch-t: Chain type Ch-r: Chaining region Hb: Hobbled/ not (Shackling)
Fr: Opportunity to free range at night Fr-ch: Chain type while free ranging

Figure 11: Percentage wise deviation from E-R for 'chaining' sub-parameters

**Observed behaviour**

The temperament of elephants can be indicative of the ease of managing the elephant. Occurrence of abnormal behaviours such as stereotypy has also been considered.

- 16% of elephants (N= 75) were described as agitated/ nervous/ undependable/easily frightened
- 21% were described as rough/ aggressive/ quiet but easily frightened/ nervous; remaining were described as quiet
- Only two females (age unknown) were said to have injured people; 15 males were reported to have injured/ killed people
- Except for a female calf, none of the elephants exhibited stereotypy

M-R was 6.8 (SE= 0.8, N*= 3) with a deviation of 14.5 from E-R (Figures 12 and 13).

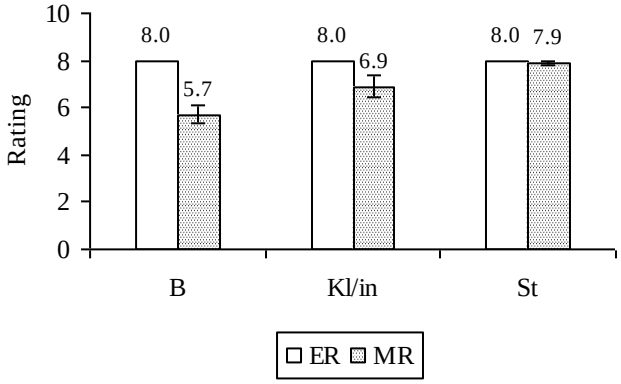
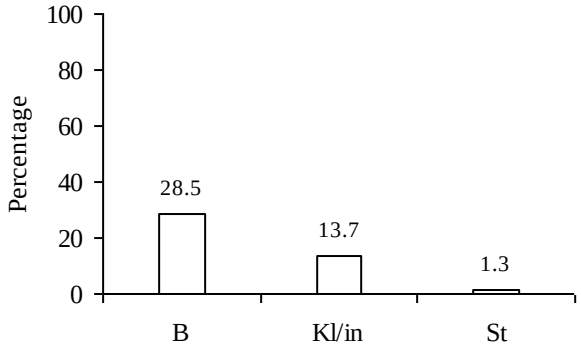



Figure 12: Comparison of E-R and M-R for 'behaviour' sub-parameters




B: Observed behaviour Kl/in: Incidents of killing/injury St: occurrence of stereotypy

Figure 13: percentage wise deviation from E-R for 'behaviour' sub-parameters

**Work**

Work could be a reason for maintaining captive elephants. Work that is alien to an elephant's natural repertoire has been given low rating.

Work schedule for elephants when timber operations were banned:

- 68% of elephants were given any work (N=75); absence of work was due to the ban on logging in forests; some elephants had stopped working as recently as 2 months ago while others from 10y
- Work for the remaining elephants involved loading/ dragging, three adult female elephants were used for tourism
- For tourism: elephants used for providing rides, bamboo howdah weighing 30-40kgs was used, four people were carried per trip, number of trips depended on tourists (from 1 – 10 trips), distance/trip traveled was 0.5km
- Work duration free ranged from 1-5h, from 9 a.m. to 2 p.m. or in shifts from 8/9 a.m. to 12noon/1p.m.
- Forest shade and water was available while working, rest duration free ranged from 5-10minutes to 1h

M-R was 6.3 (SE= 1.0, N* = 7) showing a deviation of 21.5% from E-R (Figures 14 and 15).

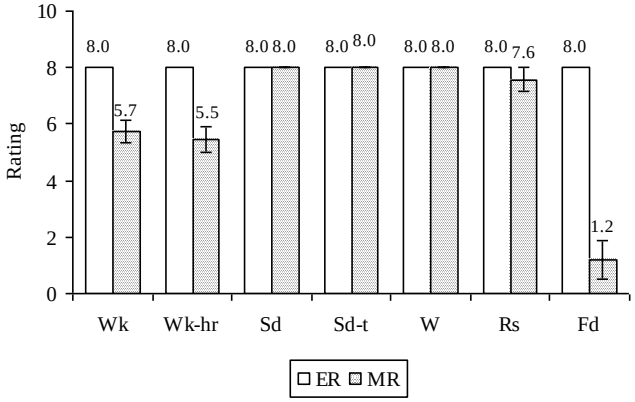
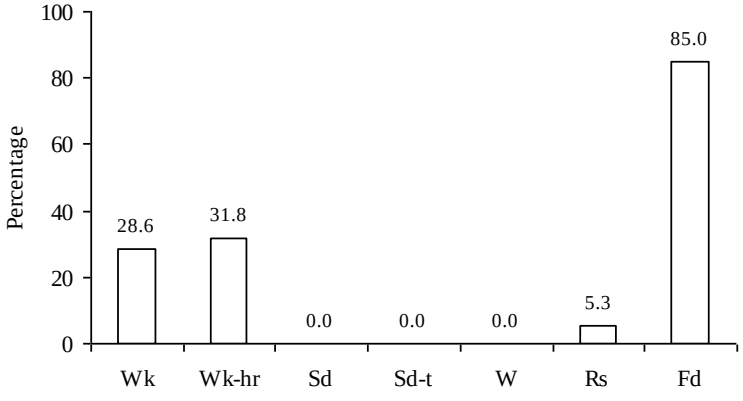



Figure 14: Comparison of E-R and M-R for 'work' sub-parameters




Wk: work type Wk-hr: Working hours Sd: Shade availability Sd-t: Shade type W: Water availability
Rs: Rest availability Fd: Food availability during work

Figure 15: percentage wise deviation from E-R for 'work' sub-parameters

Work schedule for elephants when timber operations resumed in 2009:

- Timber extraction is done from December to March
- Elephants aged more than 7y were used for work; only 24% of the observed elephants (N= 62) were not used for work
- Work type was timber extraction: elephants were used for dragging and loading onto trucks, especially tuskers were used for loading; logs are dragged by using chains fixed to a breast band (Galabandh)
- 7-15y elephants were used for light dragging for 5 days/week; > 15y old elephants performed normal work such as dragging logs of volume 3.5$m^3$ to 12.5$m^3$/ day; elephants could perform such work for a 30y period before becoming sluggish (Verghese, pers.obs.).
- Elephants retired from work when they were 60y
- When elephants are in their 13th month of pregnancy, work load reduced to half, after calf-birth no work for six months, stall feed is given; calves weaned when they are 3y, trained till they 7 and sent for work

Daily schedule was as follows:

- Elephants brought back from grazing early in the morning
- taken for watering/ bathing
- taken to work, work duration 7h/ day
- after work, cooked ration was given
- left to graze

M-R was 5.3 (SE= 1.3, N*= 7) with a deviation of 34% from E-R (Figures 16 and 17).

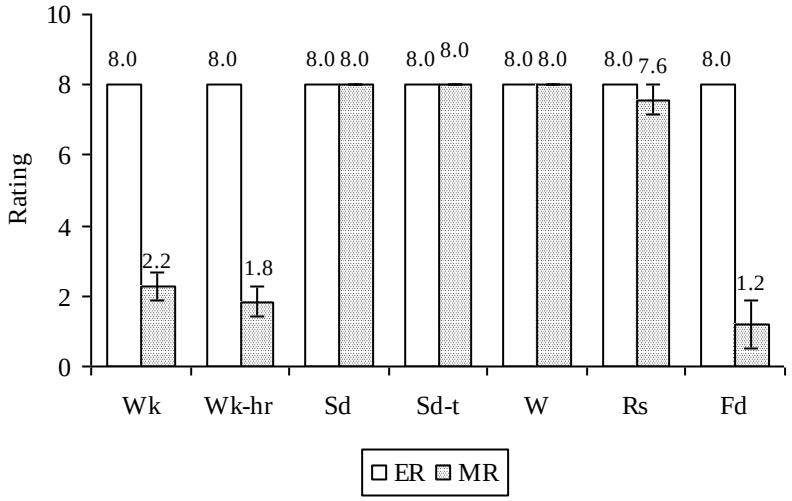



Figure 16: Comparison of E-R and M-R for 'work' sub-parameters

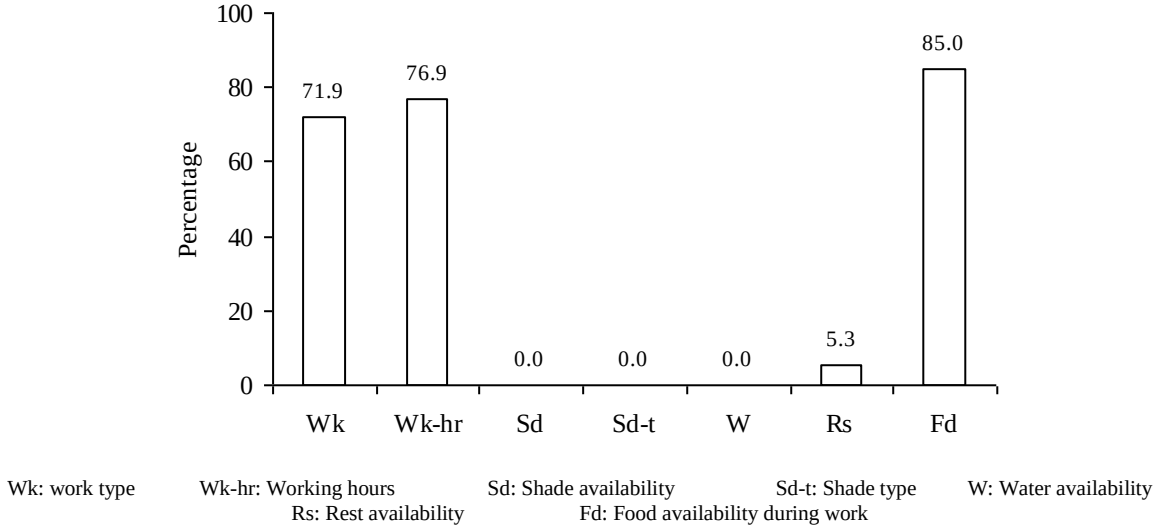



Figure 17: percentage wise deviation from E-R for work sub-parameters

**Food provisioning**

Wild elephants are known to eat diverse plants, learning from others in the herd (Kurt and Garai, 2007). In captivity, this may not be completely represented as the elephants are allowed to free range for limited duration/ are restricted by chains.

- Three elephants, one calf, a 64yrs and a 59yrs old, were not allowed to free range. The calf was given stall feed, while the old elephants were tied to a place in the forest and allowed to forage
- 58% of the elephants (N= 62) were reported to have raided crops; crops eaten were: paddy (*Oryza sativa*), coconut (*Cocos nucifera*), banana (*Musa* sp.), bamboo (*Bambusa* sp.), and sugarcane (*Saccharum* sp.)
- Ration charts were not used for any of the observed elephants

Rating and status and the percentage deviation from E-R for food is given in Figures 18 and 19

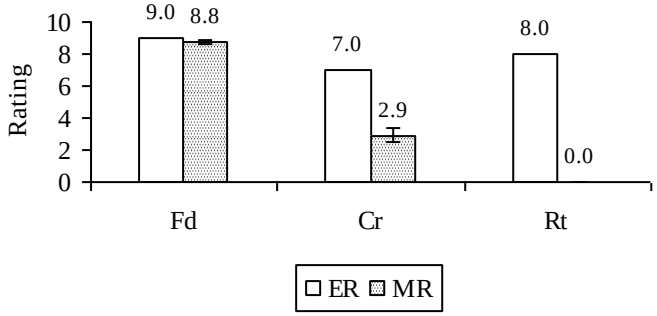
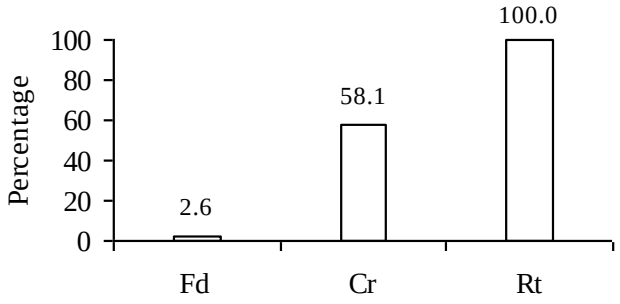



Figure 18: Comparison of E-R and M-R for ‘food’ sub-parameters




Fd: Food provisioning type Fd-n: Number of supplementary food items Cr: Crop raiding
Rt: Usage of ration chart

Figure 19: percentage wise deviation from E-R for 'food' sub-parameters

**Reproductive status**

Normal reproductive functioning among adult captive elephants can be considered to be an indicator of normal physical health/ and/or good welfare status (Clubb and Mason, 2002) with provision for expression of some/ all species-specific behaviours in this context.

- Among the male elephants which were reproductively active/ exhibited musth (N=21), 48% were not exposed to females or exposure was not constant, taking place several years ago
- Males were said to be aggressive during musth (aggressiveness said to be less than that observed for mainland elephants) (per. obs., Verghese)
- Elephants in musth were chained for the period with one adult male reportedly chained for 8 months
- Among female elephants, 30% (N= 30) were not exposed to males.
- Sixteen offspring had died from various causes (abortion/ premature birth/ illness/ man-made)
- Three females were not bred as they showed aversive reaction to the presence of males

Figures 20-23 give the respective ratings and percent deviation for male and female reproductive status.

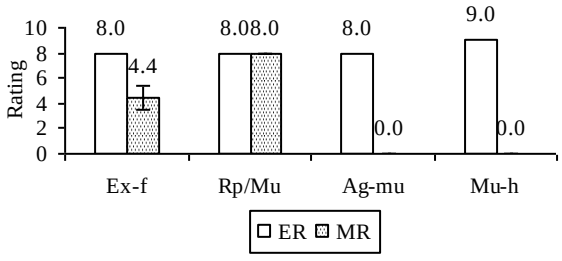



Figure 20: Comparison of E-R and M-R for males

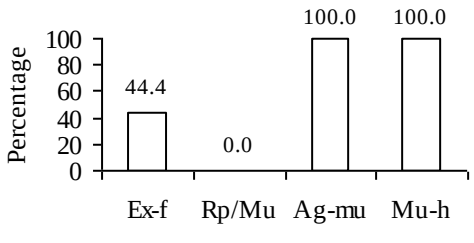



Figure 21: Percentage wise deviation from E-R for males

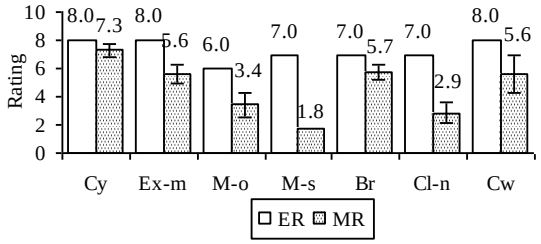



Figure 22: Comparison of E-R and M-R for female

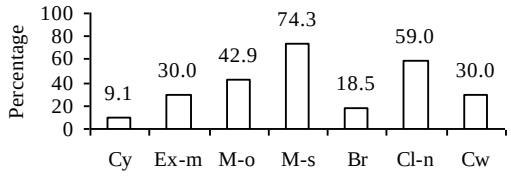



Figure 23: percentage wise deviation from for females

**Health status and veterinary care**

Captivity may introduce a number of factors predisposing elephants to diseases/ injuries.

- Abscesses on neck/ shoulder, uro-genital problems, diarrhea, respiratory problems was reported among the elephants
- Eleven elephants had eye associated problems with five said to be blind in one eye at least
- Foot problems such as foot rot/ fissures/ toe nail cracks was reported for eleven elephants with two elephants having fractured their legs
- One female elephant was said to be weak, with pus collected in its back; it was used for work
- Oiling was not done for majority of the elephants; deworming was practiced for the observed elephants
- Veterinary doctor was available for all observed elephants, assistant was available in some camps
- Facilities: dispensary with medicines and darting equipment available in each Free range office; no accommodation, no cooking shed/ vessels, no food preparation hall, no provision shed, camp site available

M-R was 5.8 (SE= 2.2, N*= 4) showing a deviation of 28% from E-R (Figures 24 and 25).

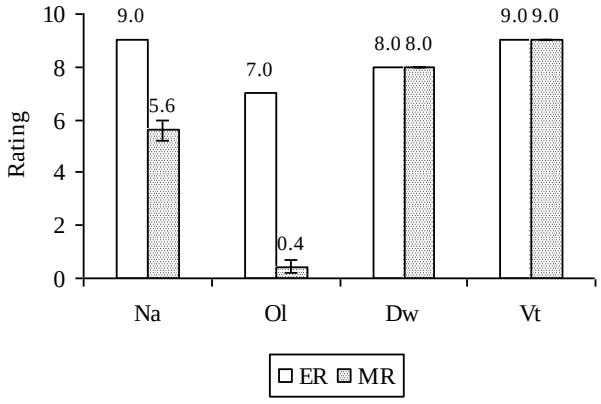
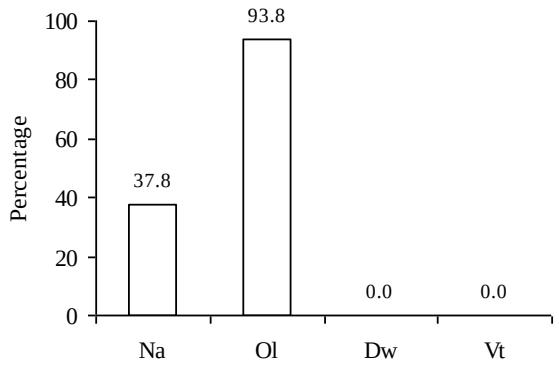



Figure 24: Comparison of E-R and M-R for 'health and veterinary' sub-parameters




Na: Nature of disease/injury Ol: Oiling status Dw: Deworming status Vt: Veterinary doctor availability

Figure 25: percentage wise deviation from E-R for 'health and veterinary' sub-parameters

**Handler experience and socio-economic status**

Seventy-six elephants observed in these islands were handled by 94 mahouts/ cawadis, the ratio was 1:1.2. Six mahouts took care of more than one elephant with one mahout in charge of the maximum (for this study) of three elephants. Mean age was 42.0 yrs (SE= 1.0, N= 91), ranging from 24-60 yrs.

**Professional experience**

Lack of knowledge about elephants/ inexperience can prove to be dangerous to both elephant and handler.

- Mean experience in this profession was 15.4y (SE= 0.9, N= 82), experience with a specific elephant was 9.1y (SE= 0.8, N= 85) ranging from 0-34y
- Only 13.2% of handlers opted for this profession out of interest, only two mentioned this profession to be traditional, most chose it as a means of employment
- Handlers spent 2-8h with their elephants (average= 5.1h, mode = 5)
- All used tools to control their elephant: Knife/wooden ankush/Stick

M-R was 4.5 (SE= 1.2, N*= 4) showing a deviation of 49.6% from E-R (Figures 26 and 27).

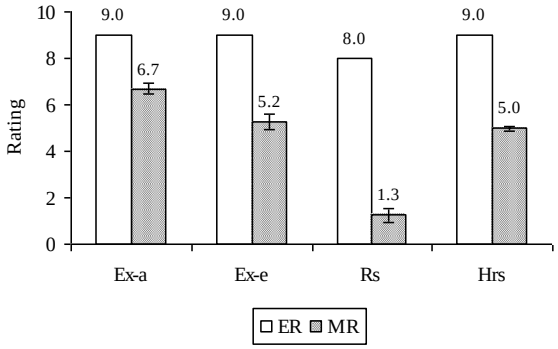
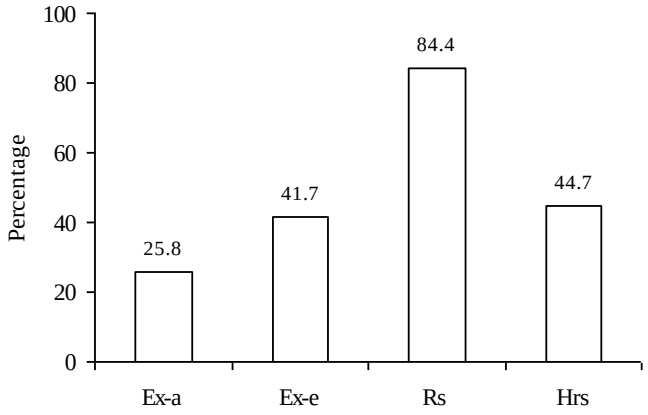



Figure 26: Comparison of E-R and M-R for mahout (handler) professional experience




Ex-a: Professional experience (as % of handler age) Ex-e: Professional experience (as % of elephant age)
Rs: Reason for choosing this profession Hrs: Hours spent with elephant

Figure 27: Percentage wise deviation from E-R for mahout (handler) professional experience

**Socio-economic status**

Inadequate remuneration, absence of education and consumption of alcohol may reduce the quality of work performed by the mahout. When family occupation is handling elephants, it becomes easier for the mahouts/ cawadis to communicate and understand existing work related issues.

- 75% of handlers did not have relatives in this profession, none came from a background of handling elephants; agriculture was the most common family occupation
- Twenty-eight percent of mahous/ cawadis were not educated
- Average annual salary was Rs. 73911/- (N= 70) ranging from Rs. 13,000 to 1,08,000/-
- Except for two handlers, each handler knew a minimum of two languages
- Number of children per family free ranged from 1 – 9 (with the most common being three children/ family)
- There was no periodic health check-up for the handlers
- 45% of handlers were not provided insurance cover; for the handlers with insurance cover, they paid the insurance amount from their salary
- Only 12% handlers abstained from alcohol; those who consumed alcohol, the frequency free ranged from daily, weekly or monthly, after work

M-R was 3.5 (SE= 0.8, N*= 8) indicating a deviation of 49.7% from E-R (Figures 28 and 29).

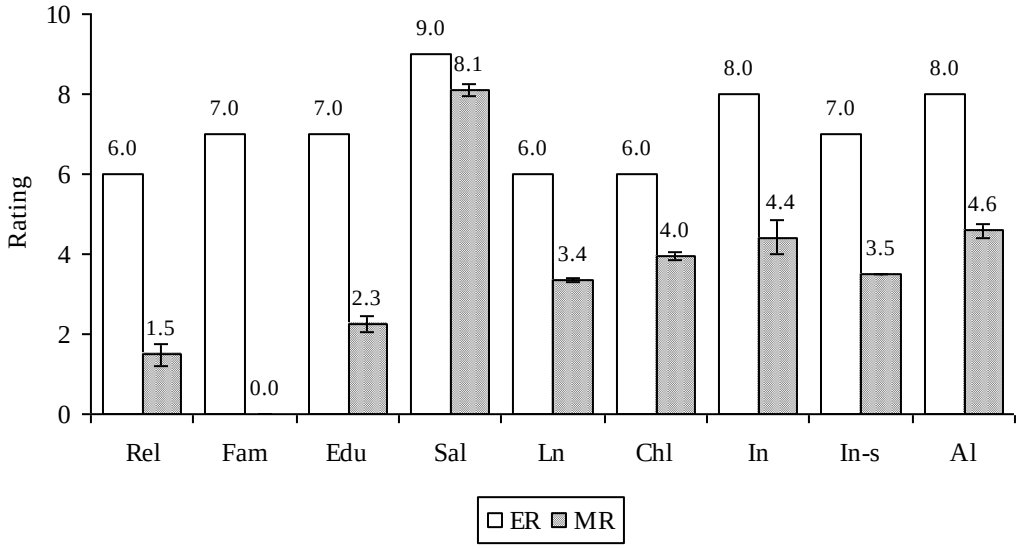
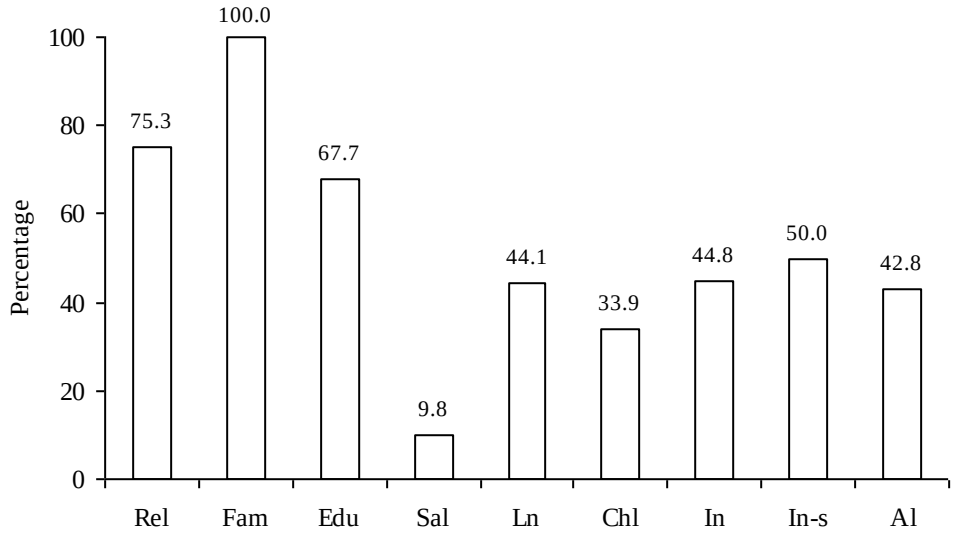



Figure 28: Comparison of E-R and M-R for mahout (handler) socio-economic status




Rel: Having mahout/cawadi relatives Fam: Family occupation Edu: Education level
Sal: Salary drawn Ln: Languages known Chl: Number of children In: Insurance availability
In-s: Source of insurance Al: Alcohol consumption

Figure 29: percentage wise deviation from E-R for mahout (handler) socio-economic status

**Overall rating**

Overall M-R, averaged across all observed parameters, was 5.1 (SE= 0.4, N*= 54) showing a deviation of 36.8% from E-R, this rating is for the period in 2007 when timber operations were banned in the islands.

When work for the elephants resumed in 2009, following timber extraction, overall M-R was 4.9 showing a deviation of 38.4% from E-R. Thus, the deviation from the norm, prescribed by the experts, was slightly higher when work resumed in 2009. This deviation was only due to the work performed. Other features of captivity remained the same contributing to lesser deviation from prescribed norms even when the elephants were worked, leading to similar pattern of deviation from E-R for both years (Figures 30 and 31).

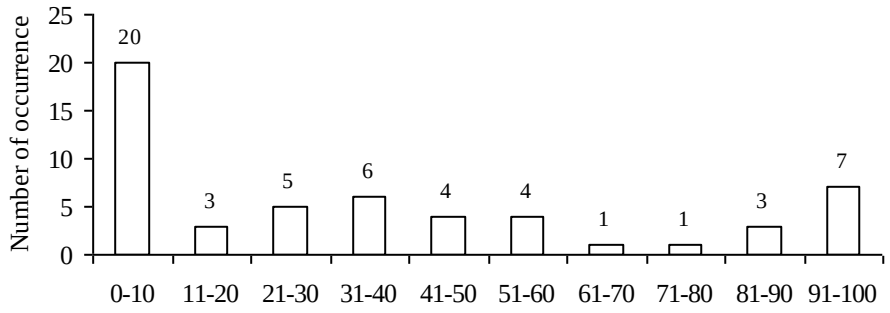



Figure 30: Distribution of percentage wise deviation (from E-R) values across all sub-parameters in 2007

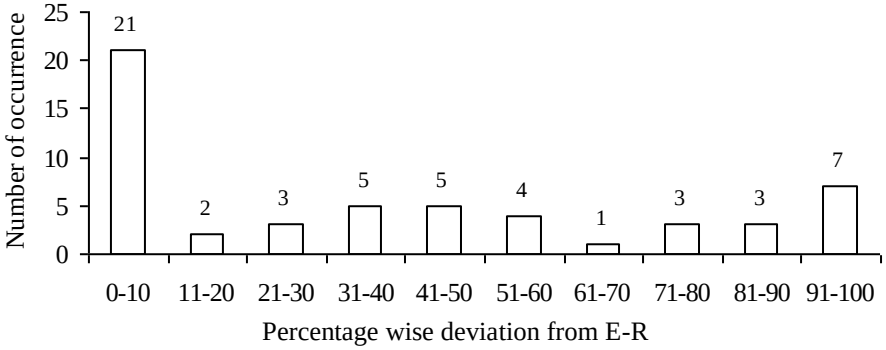



Figure 31: Distribution of percentage wise deviation (from E-R) values across all sub-parameters in 2009

Mean ratings for a parameter varied from being similar to what the experts considered ideal to showing complete divergence (100%) from E-R. Nearly 32% of the parameters (total number of parameters was 54) showed a divergence of 50% or more from E-R, spread across observed parameters, implying absence to the extent of 50% or more from what the experts considered suitable.

**Discussion**

Imposing alien living conditions, physical/ social, will have negative consequences on the captive animal's life as it tries to cope with the new environment. In addition, captive elephants' lives will be predominantly controlled by people (Bradshaw, 2009), a factor that may─ depending on the extent and degree of change brought in by people─ add to the stress and consequent poor welfare of the animal/s.

Positive features

Physical conditions in the camps:

- Prevalence of ideal/ suitable shelter conditions in the form of forests with varied vegetation and natural substrate— taking care of physical space and shade requirements of the animals; zero deviation from E-R was observed
- Occurrence of streams within the forests as water source; access to sea; no deviation from E-R for this sub-parameter

Biological features:

- Absence of stereotypy in most of the observed elephants; zero deviation from E-R

Administrative feature:

- Provision of free-ranging opportunity to forage: foraging opportunity, though restricted, was provided for 96% of the observed elephants (N= 76); deviation of 3% from E-R was observed for this sub-parameter
- Old elephants maintained as "pensioners" and not given any work
- Availability of veterinary doctors for the elephants; no deviation from E-R

Negative features of the camps:

- The predominant reason for introduction of elephants into the islands was use in timber related work as trees were harvested from the forests. In 2007, sixty-eight percent of the observed elephants were not given any work. The consequence of absence of work for the elephants was lack of food supplements through stall feed. Foraging opportunity was restricted by two means: it was not unrestricted, i.e., the elephants were left to forage towards the afternoon and brought back in the morning. Secondly, their movement was restricted by the use of shackles for the forelegs, drag chains, *bedi*. A significant fact was that 58% of the observed elephants had visited crop fields in search of food.

In 2009, 76% of the elephants were used for work. Elephants were weaned when only three years old to be put to training, 7y old elephants were given "light work". At this age, male/ female elephants are still dependent on their herd-mates and are in the process of learning social skills (Poole and Moss, 2008). Separating them from their companions can be stressful, in this situation the elephants had to undergo training.

- Some of the older elephants (above 55y) were tied within the forest and left to forage, thus, restricting their ability to choose food plants. Additionally such elephants may need supplements following loss of dentition as a consequence of old age (one male elephant was reported to be 90y old). This was not provided. A deviation of 63% from E-R was noticed for this parameter.

- The selection of elephants for work: three elephants, all above 55y, were used for work.

A female elephant with pus on its back, and emaciated, was also said to be used for loading work.

- Social interaction was allowed among some of the elephants; however, the group size was restricted to a maximum of only three individuals. Interaction was not allowed for 33% of the elephants, this included 57% of the older elephants (number of elephants above 55y was seven), all females. It is known from observations of wild elephants, that elephant society is matriarchal with the oldest female leading the herd (Sukumar, 2006). The absence of elephant companions for the old female elephants in the island reduces the welfare status of such animals. A deviation of 38.4% from E-R was observed for this parameter.

- While adult males were reported to be reproductively active, exposure to females was not universal as 48% of such males were not allowed an opportunity. Also, all musth elephants were chained for the duration of their musth. Deviation from E-R was 61% for this parameter. \

- Opportunity to breed was prevalent for most female elephants, mothers with zero to 50% survival of offspring formed 67% of the elephants. Reasons for death varied/ were not known. But, among the abnormal behaviours noticed was the killing of its offspring by a female. Among other reasons, those cited were: "punishment of a male offspring by starvation/ no water, hence, died; a male died due to illness; a male tied to a tree, unattended for 2 days, died." While this needs to corroborated/ investigated, it could point to absence of supervision of the handler-elephant relationship.

Mahout/cawadi

While mean experience in the profession was >10y, mean experience with the observed elephant was only 9y indicating shift/ change of elephant. Frequent changes may cause stress to both elephant and handler as each may have to undergo a learning period. Maintaining elephants in the islands may date back several hundred years, but the reason for choosing this profession among the observed mahouts was only as a source of employment. This may point to lack of interest in this profession among the established handlers and their progeny. A deviation of 50% from E-R was observed for professional experience.

The distance from chaining place of the elephants to the mahout/cawadi's place varied: from less than a kilometer to 40kms. Some places were accessible by boat only. Such isolation may not be conducive for the handlers to involve themselves with the job of elephant care. The salary paid to the handlers was considered suitable but there was no insurance cover for 75% of the mahouts/ cawadis. Even for handlers with insurance the source was their salary, a practice that may not prove to be an incentive to opt for coverage.

Eighty-eight percent handlers consumed alcohol with varying regularity. This practice may be indicative of a latent problem for the handlers. The deviation from E-R for socio-economic status was 50%.

**Reference**


1. Bradshaw, G.A. (2009). Inside looking out: neuro-ethological compromise effects in elephants in captivity, In: An elephant in the room: the science and well being of elephants in captivity, (Forthman, D.L., Kane, F. L., Hancocks, D., and Waldau, P.F. eds.) Center for Animals and Public Policy, Cummings School of Veterinary Medidcine, Tufts University, p: 55-68.
2. Clubb, R. and Mason, G. (2002). A review of the welfare of zoo elephants in Europe: A report commissioned by the RSPCA. Oxford, U.K., University of Oxford, Animal Behaviour Research Group, Department of Zoology.
3. Kurt, F. and Garai, M.E. (2007). The Asian elephant in captivity—a field study. Foundation books, Cambridge University press, New Delhi.
4. Poole, J.H. and Moss, C.J. (2008). Elephant sociality and complexity The scientific evidence. In: Elephants and ethics toward a morality of coexistence (Eds: Wemmer, C and Christen, C. A) The John Hopkins University Press, Baltimore. (Accessed online: http://www.elephantvoices.org/index.php?topic=tools&topic2=tools/documents/2_Poole_Moss_Final_7_12_06.pdf)
5. Sukumar, R. (2006). A brief review of the status, distribution and biology of wild Asian elephants *Elephas maximas*. International Zoo Yearbook **40**: 1-8.
6. Varma, S. 2008. Identifying and defining welfare parameters for captive elephants and their mahouts in India, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 7-16. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.
7. Varma, S. and Prasad, D. (2008) Welfare and management of elephants in captivity— insights and recommendations, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 54-64. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.
8. Varma, S., Sujatha S.R., van de Brand, J., Ganguly, S. and Shiela R., (2008) Draft concept note on welfare parameters and their significance for captive elephants and their mahouts in India, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare

Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 17-53. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

# Section 3:
# Captive Elephants in Forest Corporation

## Executive Summary

The Andaman and Nicobar Islands Forest and Plantation Development Corporation (ANIFPDC) was initially set up for the plantation and harvesting of palm oil, rubber trees. Elephants were brought here to be employed, to assist in its timber related work, which had been stopped for a period of eight years.

This study was conducted to assess the welfare status of captive elephants with the ANIFPDC in terms of existing physical/ biological features and provision of veterinary care and also assess the professional experience and socio-economic status of handlers (mahouts/ cawadis) as they are integral to a captive elephant's life

Deviations from conditions in the wild have been considered to represent poor welfare. Based on welfare rating scale developed by experts, Experts' Rating (E-R) was evolved to collect and compare the same with the Mean rating (M-R) obtained from the ground, that denote welfare status of existing conditions for the particular parameter.

Seventy-one percent of the elephants were captive born, and the remaining elephants were purchased, most recent being 2004; source of purchase was within Andaman Islands/ Sonepur, Bihar. M-R was 4.7 indicating a deviation of 22.1% from E-R.

The forests of Andaman Islands were the shelter for all the observed elephants, thus, accessibility to varied vegetation and natural flooring was guaranteed. M-R was 8.0 implying no deviation from E-R

All elephants had access to streams in the forests for drinking/ bathing**.** Mean distance to water source was 0.41km, ranging from 0.05 to 1km. Bath duration free ranged from 25minutes to one hour and natural locally available materials were used as scrub. M-R was 5 with a deviation of 24.1% from E-R.

Twenty percent of the elephants were not given opportunity to interact; this included three males and a 43y old female. Group size free ranged from 1- 3 individuals, five pairs of related elephants. M-R was 6 showing a deviation of 23.7% from E-R.

Seventy percent of the elephants were chained for various periods; all calves less than five years were left to free range. All elephants were chained by their legs, 40% of elephants were chained additionally by a body chain. Elephants were also shackled by their forelegs when free ranging.

Sixty percent of elephants were described as quiet. One adult male elephant described as quiet had injured people. Two adult male elephants had injured/ killed other elephants/ people; none exhibited stereotypy

Work type was dragging, loading, unloading, logging, tourism, removal of palm fruits, dragging trays of palm fruits in the forest. Work duration for timber/ palm fruit

operations free ranged from 2.5-7h; tourism duration was 10h. For tourism, weight carried was 220-250 kg for a distance of 200 m, number of people carried was four (2 adults, 2 children) on mud roads in the forest, number of trips was1-2 (monsoon 1-2 trips; summer- 3-5 trips).

All elephants were allowed to forage in the forest and some elephants had raided crop fields of paddy (*Oryza sativa*), plantations of banana (*Musa* sp.), coconut (*Cocos nucifera*), arecanut (*Areca catechu*). M-R was 2 with a deviation of 71.9% from E-R.

Adult males were reproductively active and experienced musth; one 10y old male was also reproductively active and exhibited musth. The 10y male had sired one calf with a female which was 54 yrs. Oestrus was observed for all adult females, however, 63% females were not exposed to males. M-R for male reproductive status was 4 with a deviation of 54.2% from E-R. M-R for female reproductive status was 5 with a deviation of 33.1% from E-R.

Diarrhoea, eye problems and foot related injuries/ diseases were reported. Three elephants had foot injuries with one having fracture of a fore leg and injuries on both forelegs and water discharge from eyes. Veterinary doctor and assistant were available for all observed elephants. M-R was 5 indicating a deviation of 36.9% from E-R.

Mean experience in this profession for handlers was 21.6yrs, ranging from 6-35yrs and mean experience with a specific elephant in this camp was 6.6yrs, ranging from 0.2-27yrs. Knife/wooden ankush/Stick was used by all handlers to control their elephant. M-R was 5 implying a deviation of 50.2% from E-R.

Overall M-R, averaged across all observed parameters for elephants belonging to this regime, was 4.9, showing a deviation of 39% from E-R.

## Introduction

The Andaman and Nicobar Islands Forest and Plantation Development Corporation (ANIFPDC) is a government of India undertaking, initially set up in 1977 for the harvesting of timber, plantation and harvesting of palm oil, rubber trees. It is in this context that elephants were brought to be employed during the Corporation's nascent years to assist in its timber related work. With the restriction on felling or harvesting of natural growth forests, the corporation's main objective has been altered, with no timber work for most elephants for a period of eight years from 2001 to 2009, from which year timber harvesting was allowed.

## Objective

Irrespective of their use for work/ otherwise, the maintenance of elephants in captivity makes it mandatory that their welfare needs are met. This study was conducted to:

- Assess the welfare status of captive elephants with the ANIFPDC in terms of existing physical/ biological features and provision of veterinary care
- Assess the professional experience and socio-economic status of handlers (mahouts/ cawadis) as they are integral to a captive elephant's life

## Method

Elephants are wild animals that have evolved over millennia. Alien living conditions, physical/ biological, impose stress on elephants (Bradshaw, 2009) as the animals try to cope with the new environment. Welfare status of the elephants has been assessed by comparing physical/ physiological/ social and psychological features in captivity with those observed in the wild. Deviations from wild conditions have been considered to represent poor welfare. The greater the deviation, the poorer is the welfare. Deviation from the wild state for the parameters observed was rated using a scale developed by elephant experts. Data was collected through observations of elephants/ interviews of relevant personnel.

## The rating method

A rating scale from zero (unsuitable conditions) to ten (suitable conditions) was used to assess the welfare status of captive elephants and their handlers. Experts (both wild and captive elephant specialists, wildlife veterinary experts, managers from protected areas, those that hold both wild and captive elephants and other wildlife, personnel from welfare organisations and elephant handlers) were invited to assess the welfare based on welfare parameters and their significance through an exclusive workshop conducted on the subject (Varma, 2008; Varma, et al., 2008; Varma and Prasad, 2008). Experts rated a total of 114 welfare parameters covering major aspects of captivity

- The experts, based on their concept of the importance of a particular parameter to an elephant, developed ratings for each parameter. For example mean expert rating of 8.0 (SE= 0.5, N=29) for a parameter 'floor' and 9.0 (SE=0.4, N=31) for the source of water was arrived at from the ratings suggested by each expert
- A mean rating for each parameter, across all the participating experts, has been used as the Experts' Rating (E-R) which represents the importance attached to a parameter i.e., for a parameter with 8.0 as the maximum value, only 2.0 (25%)

deviation and for a parameter with a maximum value 9.0; only 1.0 or 10% from the prescribed norm is considered acceptable.

- For example, if an elephant is exposed only to natural flooring, the animal receives a rating of 8 and for entirely unnatural flooring the value is 0; if animal is exposed to both natural and unnatural flooring, the value is 4 (as 8+0/2= 8/2= 4). If an elephant is exposed to a natural water source, such as a river, it receives a value of 9; if the source of water is large lakes or reservoirs, it gets 4.5. A value of 3.5 is assigned for small water bodies like tanks and ponds. Tap water (running) gets 2.5 and if only buckets, pots, and tankers are in use, then the allocated value is 0.5.
- Therefore, using the maxima given by experts as a base, a rating scale starting from zero to the particular maximum value for that parameter has been used and the data for each animal was collected. For a given animal or group of elephants in a given regime (for example, forest camp) Mean Rating (M-R) was calculated for a given parameter, along with its sub-parameter. Thus the Mean Rating (M-R) denotes welfare status of existing conditions on the ground for the particular parameter.
- In this investigation, variables which represent a common feature of the captive condition have been grouped to form a parameter. The variables have been termed sub-parameters. For example, the variables shelter type, shelter size, floor type in the shelter; all represent different aspects of the physical space provided to the elephant. Hence, they are grouped together to form the parameter "Shelter" and each constituent variable is a sub-parameter. In this investigation, the E-R for a parameter (say, shelter) represents the mean of E-Rs across all related sub-parameters. M-R is also based on similar lines.
- E-R and M-R for each of the regimes here represent the average across related parameters observed for that regime. For instance, E-R / M-R for a parameter "shelter" represent the average of related parameters (termed sub-parameters) such as type, flooring, size, and shade availability. Not all related parameters will be rated for each regime. The number of such related parameters varies for each regime.
- Results have been presented comparing E-R and M-R as a means of comparing the extent of deviation present in the parameters observed. The difference between E-R and M-R (expressed as percentage) indicates deviations from the prescribed norm.
- For handlers, the difference between the maxima provided by experts (E-R) and the existing status (M-R) have been used to indicate their professional/ socio-economic status, of value to the handler and his elephant.
- N refers to number of individuals; N* refers to number of observed parameters/ sub-parameters

**Result**

Twenty elephants, (four males, 16 females) from different locations in Little and South Andaman were observed and data was collected. Female age free ranged from 0.6 – 59yrs, male age free ranged from 4 – 51yrs.

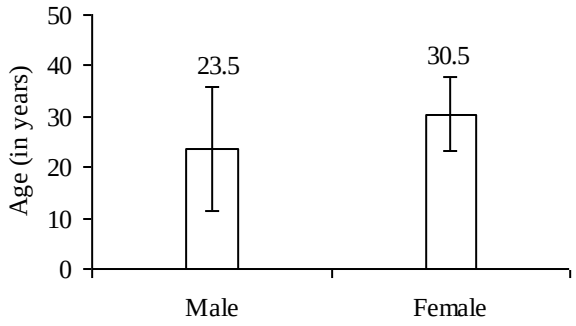



Figure 1: Mean age of elephants with the corporation

**Source of elephant**

Different levels of change in environment will be experienced by elephants depending on whether they are wild caught/ captive born or have been shifted across institutions. Maximum change will be experienced by wild caught elephants, whereas captive born elephants are already exposed to human presence and interference.

- 71% of the elephants (N=17) were captive born, year of birth ranging from 1936 to the recent, 2007.
- All four males were born in captivity
- The remaining elephants were purchased, most recent being 2004; source of purchase was within Andaman Islands/ Sonepur, Bihar

M-R was 4.7 (SE= 0.5, N= 17) indicating a deviation of 22.1% from E-R.

**Purpose of keeping**

Use of elephants for monetary gain under unnatural living conditions has been assigned low rating.

- All the observed elephants were maintained for logging/ tourism

M-R was 2.0 (SE= 0.0, N= 6) implying a deviation of 75% from E-R.

**Mahout change**

Frequent change of handlers will add to the stress period as both handler and elephant have to undergo a period of learning. Change of mahout will also mean loss of the mahout-elephant relationship formed, if any, which maybe be a cause of stress for the animal.

- Number of mahouts changed free ranged from 0 – 4; modal value was two. Most cited reason was transfer of handler, followed by job loss/ resignation. One handler was killed by an elephant

M-R was 5.4 (SE= 0.7, N= 14) showing a deviation of 33% from E-R.

**Shelter**

Wild elephants are known to cover long distances as part of their home free range, subject to availability of suitable vegetation and water (Sukumar, 1989). Provision of suitable physical space may enhance performance of concomitant behaviours by the species in captivity.

- The forests of Andaman Islands was the shelter for all the observed elephants, thus, accessibility to varied vegetation and natural flooring was guaranteed
- Source of shade was forest vegetation

M-R was 8.0 (SE= 0.0, N*= 3) implying no deviation from E-R (Figure 2).

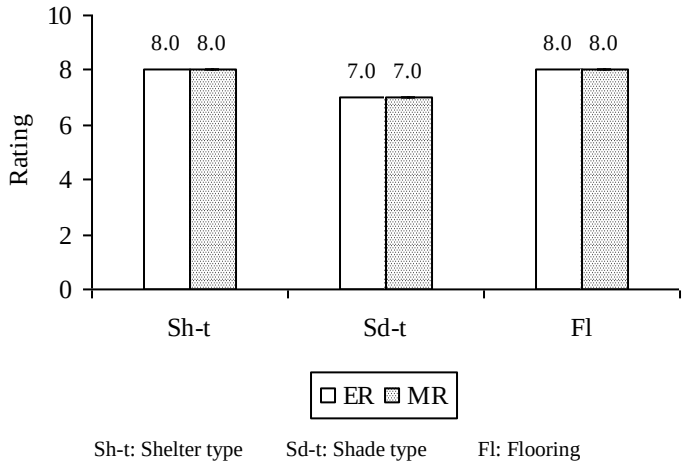



Figure 2: Comparison of E-R and M-R for 'shelter' sub-parameters

**Water availability**

Availability and access to running water sources which enable performance of species-specific behaviors have been assigned high rating. In captivity, elephants are bathed by their handlers, Hence, bath duration and materials used for scrubbing have also been rated.

- All elephants had access to streams in the forests for drinking/ bathing
- Mean distance to water source was 0.41km, ranging from 0.05 to 1km
- The elephants were said to drink between 1-2 times/ day with some drinking more (three times/ day during summer)
- Bath frequency free ranged from once everyday to weekly thrice on holidays; summer- weekly once
- Bath duration free ranged from 25 minutes to one hour
- Natural and locally available materials were used as scrub

M-R was 5.3 (SE= 1.4, N*= 5) with a deviation of 24.1% from E-R (Figures 3 and 4).

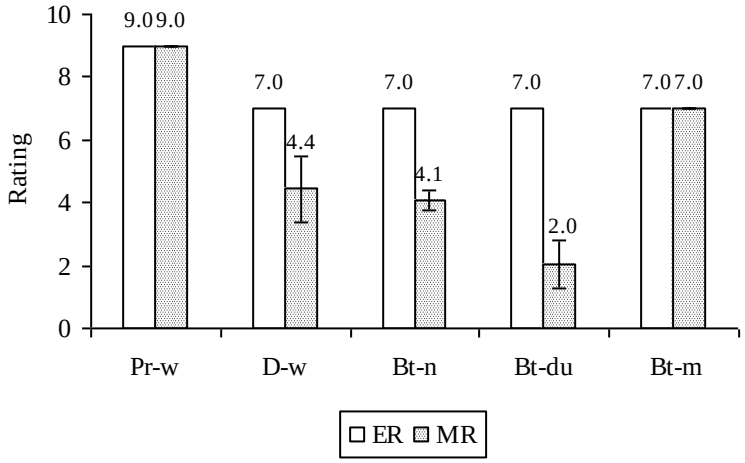
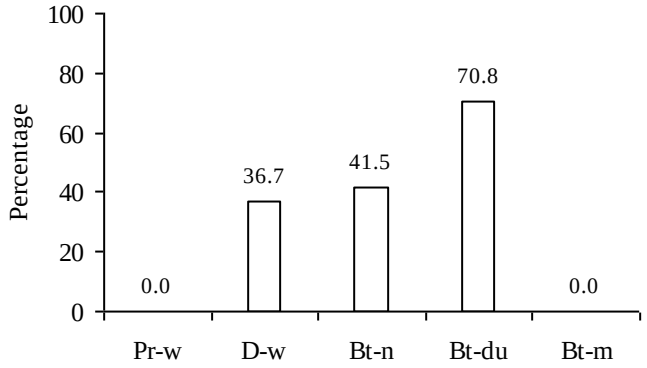



Figure 3: Comparison of E-R and M-R for 'water' sub-parameters




Pr-w: Availability of perennial running water source D-w: Distance to water source
Bt-n: Bathing number of times Bt-du: Bath duration Bt-m: Bathing materials

Figure 4: percentage wise deviation from E-R for 'water' sub-parameters

**Social interaction**

Elephants are known for their complex social interactions among related individuals, relationships maintained across generations (Sukumar, 2003).

Captivity that enables formation of groups and allows for expression of interaction among elephants has been given high rating.

- 20% of the elephants were not given opportunity to interact (N= 20), this included three males and a 43y old female
- Among those allowed to interact, all elephants except one, duration of interaction was 24h; the lone elephant was a 71y old female which was tied near three female elephants for 6h
- Group size free ranged from 1- 3 individuals, five pairs of related elephants

M-R was 6.1 (SE= 0.6, N*= 4) showing a deviation of 23.7% from E-R (Figures 5 and 6).

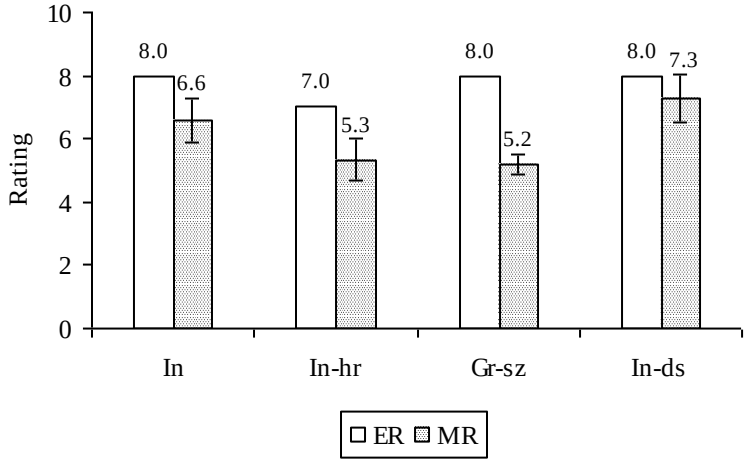
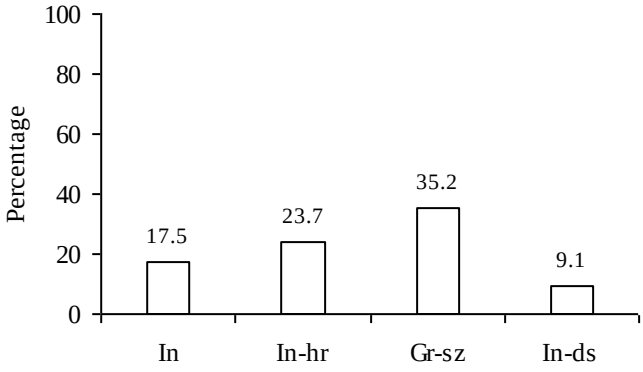



Figure 5: Comparison of E-R and M-R for 'interaction' sub-parameters




In: Opportunity for interaction In-hr: Hours of interaction Gr-sz: Group size
In-ds: Interaction distance

Figure 6: percentage wise deviation from E-R for 'interaction' sub-parameters

**Chaining**

Use of chains is one way to restrict movement of elephants, a practice seen among different management regimes. Chaining can lead to restriction of appropriate and normal behavioural expression as a study by Gruber et al., (2000) reported occurrence of stereotypy among chained elephants.

- 75% of the elephants were chained for various periods; all calves less than five years were left to free range.
- All elephants were chained by their legs, 40% of elephants (N=10) were chained additionally by a body chain
- Chain size for legs free ranged from 12-76mm, length from 12-16m and weight 50-75kgs

- Body/ *bedi* chain length free ranged from 2-5m, size 10mm, weight 5kgs
- Elephants were also shackled by their forelegs when free ranging
- Elephants brought into camp from 8a.m. to 2p.m
- Distance from chaining place to mahout's place free ranged from 1-23km
- Except for an adult male, all observed elephants were allowed to free range at night

M-R was 2.5 (SE= 1.6, N*= 5) implying a deviation of 68.3% from E-R (Figures 7 and 8).

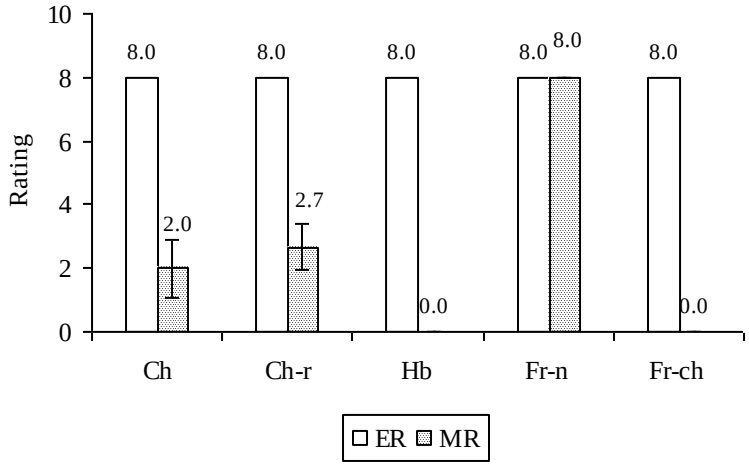
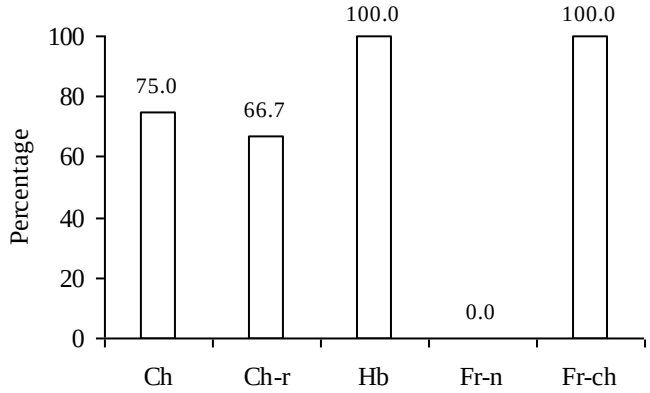



Figure 7: Comparison of E-R and M-R for 'chaining' sub-parameters




Ch: Chained/ free-ranging Ch-r: Chaining region Hb: Hobbled/ not (Shackling)
Fr: Opportunity to free range-free at night Fr-ch: Chain type while free ranging

Figure 8: percentage wise deviation from E-R for 'chaining' sub-parameters

**Observed behaviour**

Elephants that are easy to handle have been given higher rating than those which are unpredictable/ aggressive. Occurrence of stereotypy has been considered.

- 60% of elephants were described as quiet

- One adult male elephant described as quiet had injured people
- Two adult male elephant had injured/ killed other elephants/ people
- None of the elephants exhibited stereotypy

M-R was 7.7 (SE= 0.4, N*= 3) indicating a deviation of 3.8% from E-R (Figures 9 and 10).

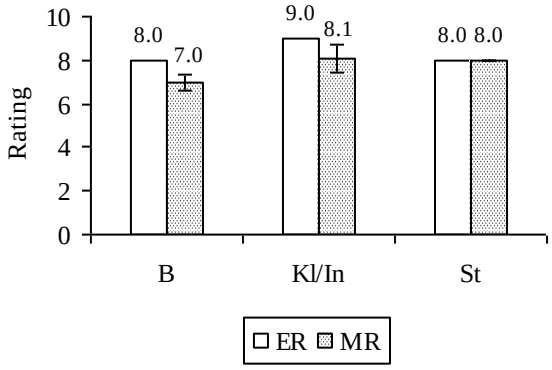
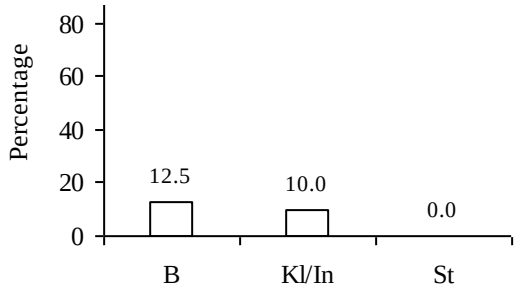



Figure 9: Comparison of E-R and M-R for 'behaviour' sub-parameters




B: Observed behaviour Kl/in: Incidents of killing/injury St: occurrence of stereotypy

Figure 10: percentage wise deviation from E-R for 'behaviour' sub-parameters

**Work**

Nature of work alien to an elephant's natural behavioural repertoire has been given low rating. Working conditions which lack shade/ water/food has been assigned low rating.

- Work type was dragging, loading, unloading, logging, tourism, removal of palm fruits, dragging trays of palm fruits in forest
- 40% of the elephants were employed for work in 2007; when logging resumed in 2009, 78% (N= 17) were used for work
- Elephants aged 7y and above were used for work; normal work was given to elephants more than 15y old
- Work duration for timber/ palm fruit operation free ranged from 2.5-7h; tourism duration was 10h
- For tourism, weight carried was 220-250 kgs, for a distance of 200 m, number of people carried was four ( 2 adults, 2 children) on mud road in forest, number of trips was1-2 (monsoon 1-2 trips; summer- 3-5 trips)

- Shade and water was available for all observed elephants, food and rest availability was not uniform

In 2007, M-R was 4.8 (SE= 1.4, N*= 6) indicating a deviation of 39.5% from E-R (Figures 11 and 12). In 2009, M-R was 4.4 (SE= 1.5, N*= 6) with a deviation of 45% from E-R (Figures 13 and 14).

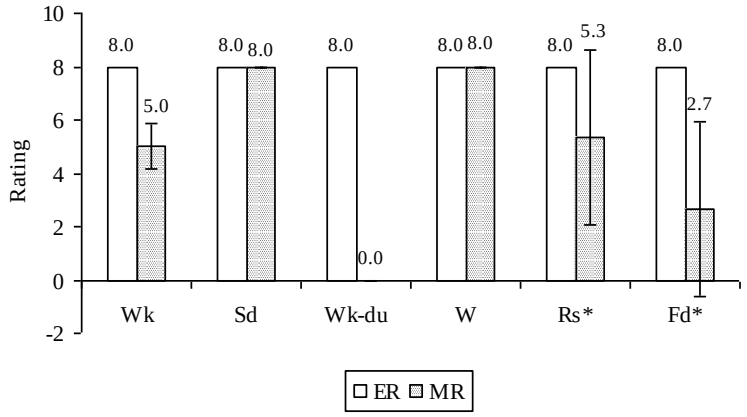
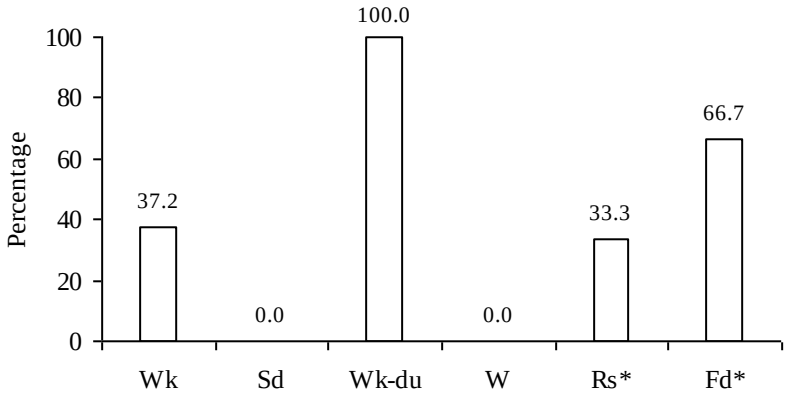



Figure 11: Comparison of E-R and M-R for 'work' sub-parameters in 2007




Wk: work type Wk-hr: Working hours Sd: Shade availability Sd-t: Shade type W: Water availability
Rs: Rest availability Fd: Food availability during work
*: data for three elephants only

Figure 12: percentage wise deviation from E-R for 'work' sub-parameters in 2007

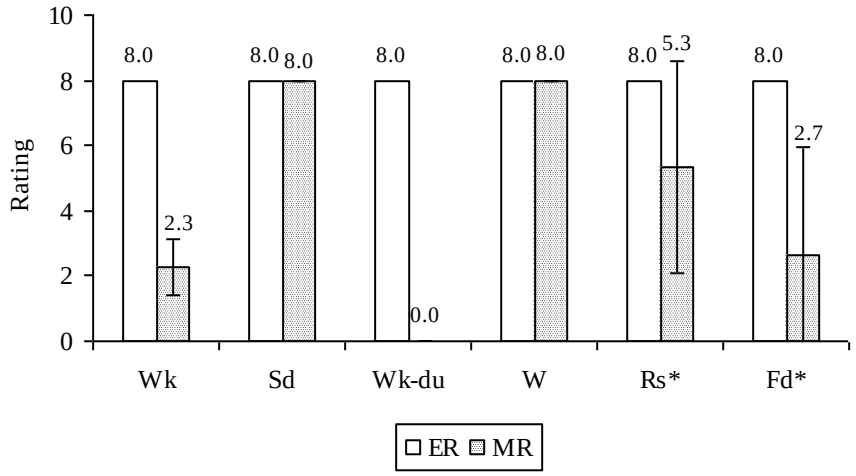
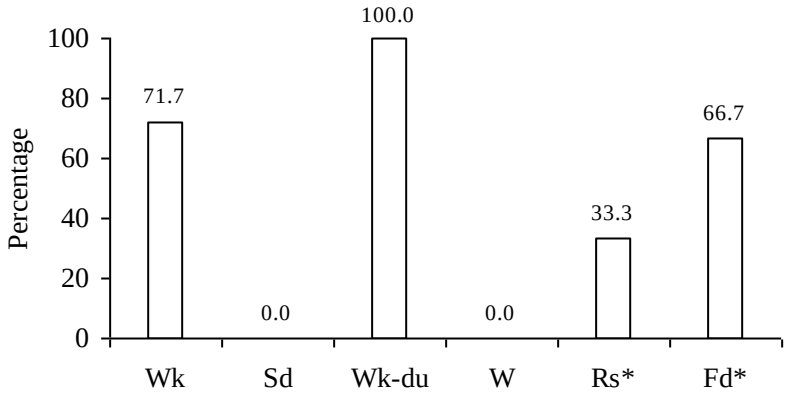



Figure 13: Comparison of E-R and M-R for 'work' sub-parameters in 2009




Wk: work type Wk-hr: Working hours Sd: Shade availability Sd-t: Shade type W: Water availability
Rs: Rest availability Fd: Food availability during work
*: data for three elephants only

Figure 14: percentage wise deviation from E-R for 'work' sub-parameters in 2009

**Food provisioning**

When left for free ranging in forests, elephants can feed on diverse plants, as wild elephants are known to, on number of different species (McKay, 1973). For elephants whose movement is restricted/ for old/ convalescing animals, food needs to be supplemented with stall feed.

- All elephants were allowed to forage in the forest
- One adult male was tied within the forest to forage
- Elephants had visited crop fields of paddy, plantations of banana, coconut, arecanut
- No ration chart was maintained

M-R was 3.0 (SE= 3.7, N*= 3) with a deviation of 62.5% from E-R (Figures 15 and 16).

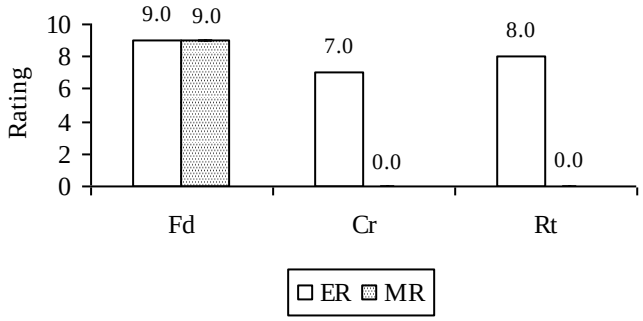
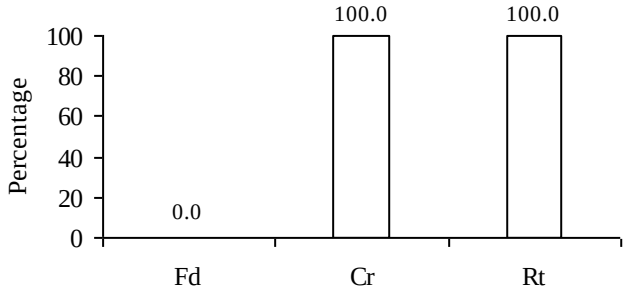



Figure 15: Comparison of E-R and M-R for 'food' sub-parameters




Fd: Food provisioning type Fd-n: Number of supplementary food items Cr: Crop raiding
Rt: Usage of ration chart

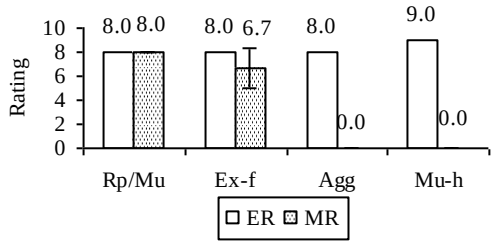
Figure 16: percentage wise deviation from E-R for 'work' sub-parameters

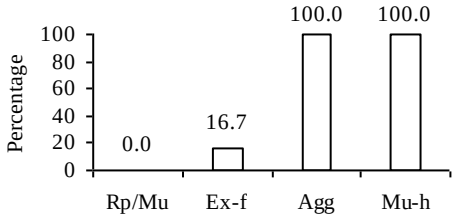
**Reproductive status**

Absence of normal reproductive functioning maybe indicative of underlying health or welfare issues among the observed elephants

- Both adult males were reproductively active and experienced musth; one 10y old male was also reproductively active and exhibited musth
- All were exposed to females
- All were aggressive during musth and were chained during this period
- The 10y male had sired one calf, in 2007, with the female Gangavathi, 54y
- Oestrus was observed for all adult females of appropriate age
- A 58y old female was not in oestrus, a 71y old females status was not known
- 62.5% females were not exposed to males

M-R for male reproductive status was 3.7 (SE= 2.5, N*= 4) with a deviation of 54.2% from E-R. M-R for female reproductive status was 4.7 (SE= 1.2, N* = 5) with a deviation of 33.1% from E-R (Figures 17, 18, 19 and 20).

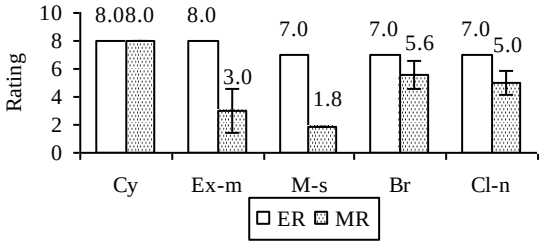


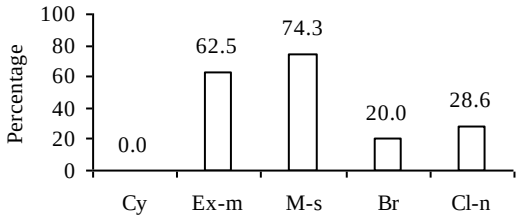




Rp/Mu: Reproductively active/ musth occurrence Ex-f: Exposure to females Ag-mu: Aggression during musth
Mu-h: Handling of musth

Figure 17: Comparison of E-R and M-R for male reproductive status

Figure 18: percentage wise deviation from E-R for male reproductive status




Cy: occurrence of oestrus Ex-m: Exposure to males M-S: Male source M-s: Male sourceBr: Opportunity to breed
Cl-n: Number of calves born

Figure 19: Comparison of E-R and M-R for female reproductive status

Figure 20: percentage wise deviation from E-R for female reproductive status

**Health status and veterinary care**

Diseases seen in captive elephants such as tuberculosis may not be as prevalent as in the wild population. Living conditions such as exposure to unsuitable substrate or lack of care may predispose the elephants to foot problems.

- Diarrhoea, eye problems and foot related injuries/ diseases were reported
- Three elephants had foot injuries with one having fracture of a fore leg and injuries on both forelegs and water discharge from eyes
- Foot rot was reported on both hindlegs for an elephant
- Oiling/ immunization was not practiced
- Veterinary doctor and assistant were available for all observed elephants

M-R was 5.0 (SE= 1.8, N*= 6) indicating a deviation of 36.9% from E-R (Figures 21 and 22).

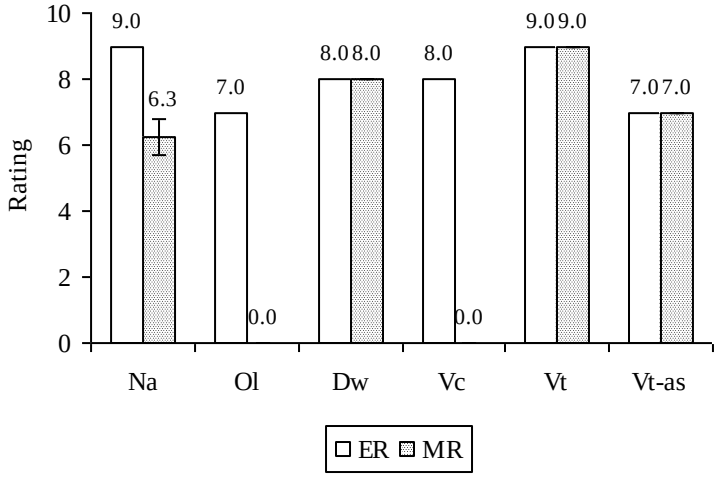
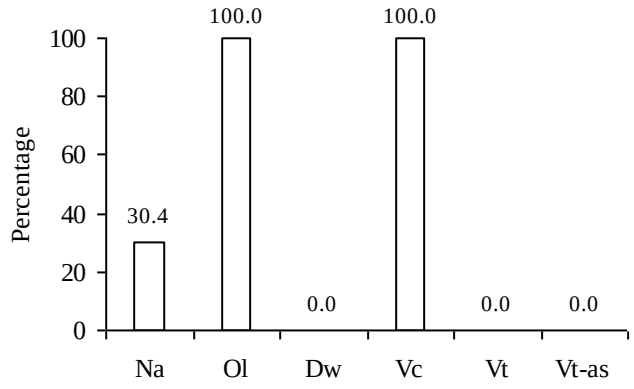



Figure 21: Comparison of E-R and M-R for 'health and veterinary' sub-parameters




Na: Nature of disease/injury Ol: Oiling status Dw: Deworming status Vc: Vaccination status
Vt: Veterinary doctor availability Vt-as: Veterinary assistant availability

Figure 22: Percentage wise deviation from E-R for 'health and veterinary' sub-parameters

**Overall rating for elephants in the Forest Corporation**

In 2007, overall M-R, averaged across all observed parameters, was 4.9 (SE= 0.5, N*= 47) showing a deviation of 39% from E-R. This refers to the mean deviation considering all parameters together. While most deviations from suitable conditions (Figure 26) were less than 10%, those accounting for 50% or more deviation from the prescribed norms formed 34% (total parameters = 47) of the parameters observed.

In 2009, when work resumed for the elephants, overall M-R was 4.8 (SE= 0.5, N*= 47) showing a deviation of 40% from E-R. The difference in deviation from E-R, between the two situations of little/ no work (2007) and working elephants (2009) was slight and ratings were comparable.

**Handler experience and socio-economic status**
Twenty-one handlers were employed for the elephants observed, a ratio of 0.8:1: mahout: elephant was observed. Mean age of handler was 47y (SE= 1.9, N= 21) ranging from 30-60 yrs.

**Professional experience**
Knowledgeable handlers help in efficient handling of elephants without causing stress. Inexperience may be dangerous to handler/ elephant.

- Mean experience in this profession was 21.6y, ranging from 6-35y
- Mean experience with a specific elephant in this camp was 6.6y, ranging from 0.2-27y
- Except for one handler, all had opted for this profession as a means of employment
- Mean duration spent with elephant was 5.8h, ranging from 3.5-8h
- Knife/wooden ankush/Stick was used by all handlers to control their elephant

M-R was 4.5 (SE= 1.6, N*= 4) implying a deviation of 50.2% from E-R (Figures 23 and 24).

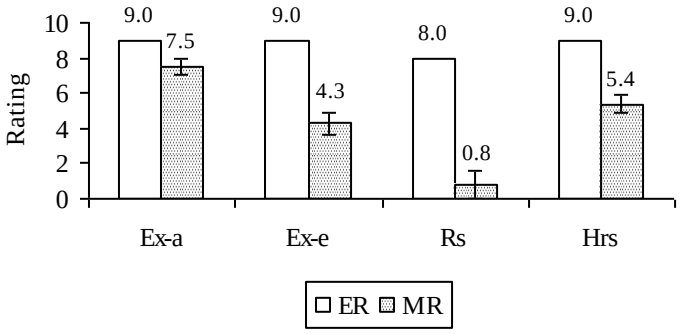
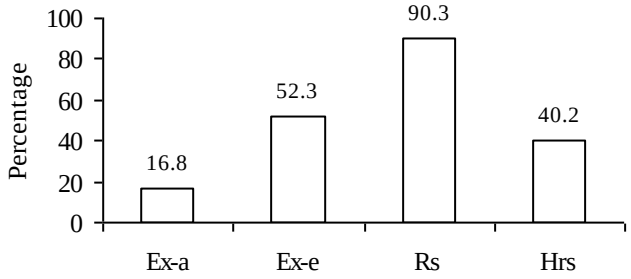



Figure 23: Comparison of E-R and M-R for mahout (handler) professional experience




Ex-a: Professional experience (as % of handler age) Ex-e: Professional experience (as % of elephant age)
Rs: Reason for choosing this profession Hrs: Hours spent with elephant

Figure 24: percentage wise deviation from E-R for mahout (handler) professional experience

**Socio-economic status**

Inadequate salary, absence of insurance cover for a job involving risk to life, alcohol consumption, etc may create conflict in the smooth functioning of the institution.

- Eighty one percentages of handlers did not have any relatives in this profession, all of them came from an agricultural background/ government job
- 53% of handlers were not educated, only one had studied upto the $10^{th}$ class
- Mean salary drawn was Rs. 70,814/- ranging from Rs.3600 – 102000/-
- Mean number of children was 3, ranging from 0 – 7
- The handlers knew between 2-3 languages
- A 48yrs old handler of an adult female elephant was undergoing treatment for Tuberculosis
- Except two, all handlers were covered by insurance, source was their salary
- Most handlers (N= 11) had worked with 1-3 elephants with five having worked with 5- 15 elephants, Figure 23 shows distribution of reasons for handlers changing their elephants
- 90% mahouts/ cawadis consumed alcohol, weekly/ monthly at various frequencies

M-R was 3.4 (SE= 0.9, N*= 10) indicating a deviation of 51.7% from E-R (Figures 25, 26 and 27).

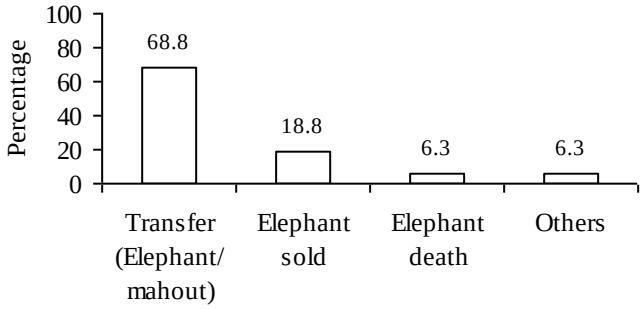



Figure 25: Reasons for handlers working with >1 elephant

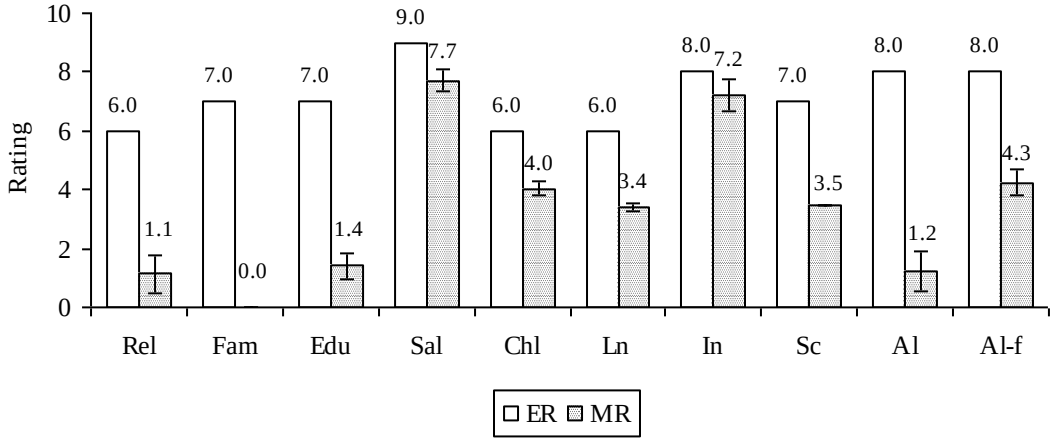



Figure 26: Comparison of E-R and M-R for mahout (handler) socio-economic status

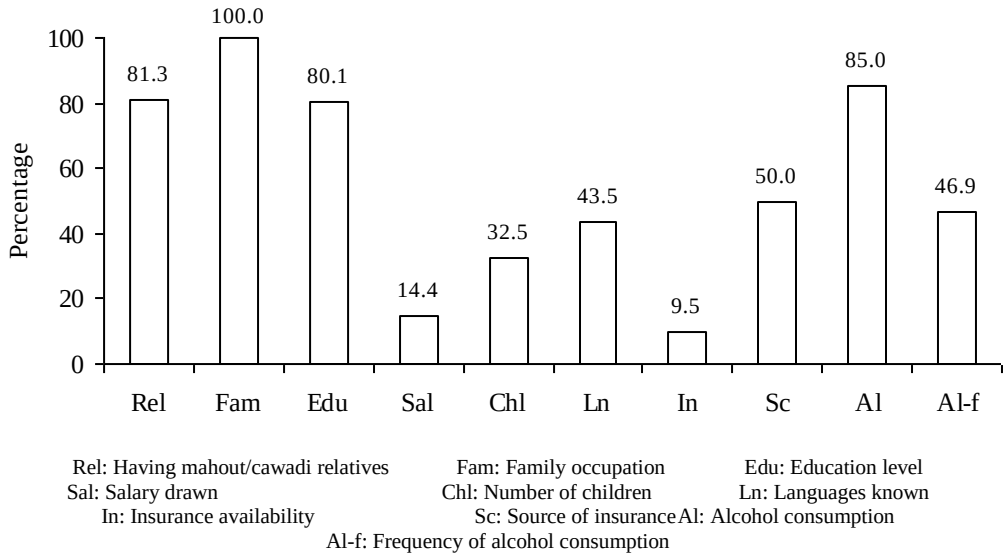



Figure 27: Percentage wise deviation from E-R for mahout (handler) socio-economic status

**Overall rating**

Overall M-R, averaged across all observed parameters, was 4.9 showing a deviation of 39.3% from E-R. While most deviations from suitable conditions were less than 10%, those accounting for 50% or more formed 34%. These deviations were distributed across several sub-parameters (Figure 28) implying its unsuitability to elephants.

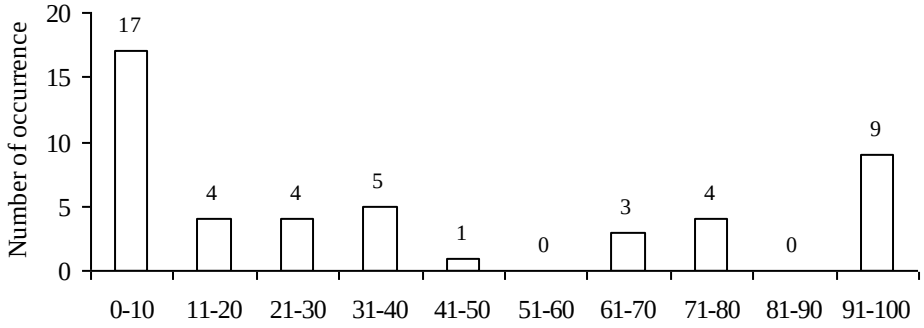



Figure 28: Distribution of percentage wise deviation (from E-R) values across all sub-parameters

**Discussion**

The biological and ecological needs of elephants should be of primary importance when keeping them in captivity. Captive conditions that deviate from those experienced in the wild will restrict the expression of species-typical behaviours of elephants, leading to poor welfare. The rating of captive conditions follows the principle of deviation from wild, with the scale for suitable to unsuitable conditions decided by elephant experts.

Conditions suitable for elephants:

- Provision of shelter in the form of forest, thereby providing extensive physical space, natural shade, natural flooring and varied vegetation for the performance of species-typical activity; rating for shelter showed no deviation from E-R
- Provision of running water through natural streams in the forest, as source of drinking/ bathing; no deviation from E-R for this sub-parameter
- Absence of stereotypy among the elephants; no deviation from E-R
- Availability of veterinary doctor/ assistant; no deviation from E-R
- Opportunity for social interaction among elephants with occurrence of related individuals among some; deviation of 24% from E-R

Conditions unsuitable:

- Absence of interaction for most males (except the calf) and two female elephants. Wild, male elephants may not live in groups, but associate themselves with female groups depending on their reproductive status (Poole and Moss, 2008), their dispersal from natal herds is said to be gradual. McKay (1973) has observed non-negative interactions among wild males. The restriction on interaction implies inability by the elephants to express their species-specific behaviours. In addition, management of female elephants did not allow interaction for some. A 71y old female was allowed restricted interaction by chaining it when other corporation elephants were brought into the camp. Older elephants are integral to elephant society (Poole and Moss, 2008), indicating the importance of interaction to the mature individual.
- While all elephants were left to free range to forage in the forest, their movement was restricted by the use of hobbles/ drag chains. Thus, their ability to find appropriate food sources would be restricted. Also, supplements were not provided within the camp through stall feed. The presence of mature elephants (four elephants aged > 50y) would make it imperative to provide supplements as such animals may lose their ability to chew/ manipulate forest vegetation. All observed elephants had visited crop fields, an issue of potential conflict with local people; deviation of 72% from E-R was observed for the parameter "food"
- The reproductive status of elephants in the camp was normal, with most animals being captive born and adult females having given birth. However, the handling of new births or captive born animals was not clear: data available for some of the 25 elephants born in the camp shows sale of elephants. Of the 10 elephants sold (irrespective of being captive born/ otherwise), eight were males and two females. Among the elephants sold, eight were sent to Kerala. The welfare status of elephants in Kerala (Varma, in press) is not considered suitable in its current form for an elephant to be sent there.
- Chaining of male elephants during musth; this may ensure no untoward incidents occur, but prevents the natural behavioral repertoire of the elephant; 100% deviation from E-R. Provision for space needs to be considered.
- Occurrence of foot injuries among the elephants: an adult female with injured forelegs was used for tourism for a duration of 10h, another with foot rot on its hind legs was also used for work; deviation of 30% observed for nature of disease/ injury. The availability of natural flooring does not ensure absence of

foot problems, in the absence of proper care and excessive work load (Harris, et al., 2008). Fractures/ foot rot can be life threatening for a massive animal like the elephant, if not treated/ supervised properly.

- Bradshaw (2009) suggests an association between trauma and abnormal behaviour. An adult male with the corporation was reported to have killed three elephants (a male and a female) and a calf. Such occurrence of mortality has not been reported among wild elephants. A detailed investigation on the existing behaviour and past history of management is needed

Mahout/ cawadi

- Experience with specific elephants was less than desired due to administrative decisions such as transfer of workers
- Most handlers came from an agricultural background. This, despite, the presence of elephants for several hundred years on these islands. This may show an aversion to this profession as the offspring of mahouts/ cawadis may not be inclined to continue in this profession.
- Insurance coverage was not provided by the employer as the source was the handlers' salary
- Occurrence of alcohol consumption among most of the handlers

**Reference**


1. Bradshaw, G.A. (2009). Inside looking out: neuro-ethological compromise effects in elephants in captivity, In: An elephant in the room: the science and well being of elephants in captivity, (Forthman, D.L., Kane, F. L., Hancocks, D., and Waldau, P.F. eds.) Center for Animals and Public Policy, Cummings School of Veterinary Medidcine, Tufts University, p: 55-68.
2. Harris, M., Sherwin, C., and Harris, S. (2008). The welfare, housing and husbandry of elephants in U.K. zoos, Final report, University of Bristol.
3. Gruber, T.M., Friend, T.H., Gardner, J.M., Packard, J.M., Beaver, B. and Bushong, D. (2000). Variation in stereotypic behaviour related to restraint in circus elephants. Zoo Biology **19**: 209-221
4. McKay, G.M. 1973. Behavior and Ecology of the Asiatic Elephant in Southeastern Ceylon. Smithsonian Institution Press, City of Washington.
5. Poole, J.H. and Moss, C.J. (2008). Elephant sociality and complexity The scientific evidence. In: Elephants and ethics toward a morality of coexistence (Eds: Wemmer, C and Christen, C. A) The John Hopkins University Press, Baltimore. (Accessed online: http://www.elephantvoices.org/index.php?topic=tools&topic2=tools/documents/2_Poole_Moss_Final_7_12_06.pdf)
6. Sukumar, R. (1989). Ecology of the Asian elephant in southern India I. Movement and habitat utilization patterns. Journal of Tropical Ecology. **5**: 1–18.
7. Sukumar, R. (2003). The living elephants. New York: Oxford University Press
8. Varma, S. and Prasad, D. (2008) Welfare and management of elephants in captivity— insights and recommendations, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma

and D. Prasad, eds.), pp. 54-64. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

9. Varma, S., Sujatha S.R., van de Brand, J., Ganguly, S. and Shiela R., (2008) Draft concept note on welfare parameters and their significance for captive elephants and their mahouts in India, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 17-53. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

# Section 4:
# Private Elephants in Andaman

## Executive Summary

Private ownership of elephants includes individual owners as well as timber companies. Approximately 75 elephants were under private ownership, which were kept for contractual work with the Forest Department. Following the Supreme Court's judgment on winding up of timber extraction activities, most of the elephants (barring around 10 privately owned elephants) were sold to mainland buyers. Most of the buyers were from the states of Kerala and Tamil Nadu interested in employing the elephants for temple activities. Privately owned elephants, irrespective of the reason for their maintenance, continue to exist in Andaman Islands.

This investigation assesses the welfare status of both elephants and their handlers in forest camps of Andaman Islands. Welfare status of the elephants has been assessed by comparing physical/ physiological/ social and psychological features in captivity with those observed in the wild. Based on a welfare rating scale developed by experts, Experts' Rating (E-R) was evolved to collect and compare the same with the Mean rating (M-R) obtained from the ground, that denotes welfare status of existing conditions for the particular parameter.

Information on three elephants, two females and an adult male, belonging to two owners, was collected. The male elephant was maintained in Havelock Island and the females were in Makarti Valley. Information on the two female elephants was limited to a few (N= 12) parameters only, for the male, data was available for 33 parameters.

The adult male had been purchased by a private owner when the elephant was 21y old. The elephant was leased to the present owners. M-R for source was 2 indicating a deviation of 75% from E-R.

All elephants, the adult male and the two females, were kept in and near forest areas. The male elephant was tied in a shed from 2p.m. to 6a.m. M-R was 7 implying a deviation of 10% from E-R.

All elephants had access to streams. During musth, the male elephant was provided water through a hose. M-R was 4 with a deviation of 45.4% from E-R.

The adult male was maintained in social isolation. The two females were kept together; interaction duration was 24 h. M-R was 4 with a deviation of 48% from E-R.

The male elephant was tied from 2p.m. to 6a.m. in its shed, left to forage from 6 a.m. to 9a.m. Both females were allowed to free range in the forest at night; the male elephant was tied in its shed. M-R was 2 showing a deviation of 76% from E-R.

The male elephant was described as quiet, but aggressive towards people. Stereotypic signs of medium intensity were exhibited during musth. M-R was 5 implying a deviation of 42.4% from E-R.

Work type for the male elephant was tourism related duties: diving in the sea with tourists and duration was 9a.m. to 2p.m. M-R was 3 with a deviation of 62.5% from E-R.

Both stall feed and free-ranging to graze/browse was provided for the male. Food given was banana, sugarcane, paddy (*Oryza* sp.)- 10 kgs, *channa* (*Cicer arietinum )* - 3 kg and no incidents of crop raiding were reported. M-R was 6 with a deviation of 25% from E-R.

Musth was reported for the adult male, the elephant was chained, isolated during musth. The male was not exposed to female elephants, no calves sired in the present location. M-R was 2 with a deviation of 75% from E-R.

Lacerated wounds were seen on left hind leg (likely to have been caused by chains) of the male elephant. Veterinary doctor was available for all the elephants and the doctor's visit for the male elephant was monthly, when needed another doctor was called to treat. M-R was 5 with a deviation of 46% from E-R.

The mahout who looked after the male elephant had a total of 10 yrs experience in this profession. Experience with the male elephant was only 1yr and he used Knife/wooden ankush/Stick to control the elephant. M-R was 6 showing a deviation of 36% from E-R. The mahout had attended school up to the 8$^{th}$ standard, annual salary given to him was Rs.36,000/-, there was no insurance cover for the mahout and he consumed alcohol, after work. M-R was 3 showing a deviation of 66% from E-R.

The overall M-R for all observed elephants was 4 showing an overall deviation of 48% from E-R.

**Introduction**

Known sources of private ownership of captive elephants in the Andaman Islands dates back to the period of timber harvest/ logging operations during British rule. Some of these elephants have become feral, having been abandoned by their owner/s during the later part of 20th century (Sivaganeshan and Kumar, 1994). Privately owned elephants, irrespective of the reason for their maintenance, continue to exist in the islands.

**Objective**

A change in management may imply a change in the living conditions provided for the elephants. Hence, a survey was conducted to:

- Assess the welfare status of sampled captive elephants maintained by private owners
- Assess the professional experience and socio-economic status of handlers (mahouts/ cawadis)

**Method**

Studies in the wild have brought forth data on ecological and social aspects of elephants (Barber, 2009); this can serve as a benchmark for comparison with the living conditions of captive elephants. Long life span, extensive distances covered, physical strength, complex social organization─ are features characteristic of wild elephants. Such animals are brought under human control and provided a set of features─ physical space/ social aspects in the form of presence of elephant companions/biological needs─ restricted by economic/ other considerations, leading to a difference in the living conditions of captive elephants from those experienced in the wild. This difference from the wild forms the basis for assessing the welfare status of elephants in captivity in this survey.

Welfare status of the elephants has been assessed by comparing physical/ physiological/ social and psychological features in captivity with those observed in the wild. Deviations from wild conditions have been considered to represent poor welfare. The greater the deviation, the poorer the welfare. Deviation from the conditions in the wild for the parameters observed was rated using a scale developed by elephant experts.

**The rating method**

A rating scale from zero (unsuitable conditions) to ten (suitable conditions) was used to assess the welfare status of captive elephants and their handlers. Experts (both wild and captive elephant specialists, wildlife veterinary experts, managers from protected areas, those holding both wild and captive elephants and other wildlife, personnel from welfare organisations and elephant handlers) were invited to assess the welfare based on welfare parameters and their significance, through an exclusive workshop conducted on the subject (Varma, 2008; Varma, et al., 2008; Varma and Prasad, 2008). Experts rated a total of 114 welfare parameters covering major aspects of captivity

- The experts, based on their concept of the importance of a particular parameter to an elephant, developed a rating for each parameter. For example mean expert rating of 8.0 (SE= 0.5, N=29) for a parameter ‘floor’ and 9.0 (SE=0.4, N=31) for ‘source of water’ was arrived at for from the ratings suggested by each expert

- A mean rating for each parameter, across all the participating experts, has been used as the Experts' Rating (E-R) which represents the importance attached to a parameter i.e., for a parameter with 8.0 as the maximum value, only 2.0 (25%) deviation and parameter with maximum value 9.0, only 1.0 or 10% from the prescribed norm is considered acceptable.
- For example, if an elephant is exposed only to natural flooring, the animal receives a rating of 8 and for entirely unnatural flooring the value is 0; if animal is exposed to both natural and unnatural flooring, the value is 4 (as 8+0/2= 8/2= 4). If an elephant is exposed to a natural water source, such as a river, it receives a value of 9; if the source of water is large lakes or reservoirs, it gets 4.5. A value of 3.5 is assigned for small water bodies like tanks and ponds. Tap water (running) gets 2.5 and if only buckets, pots, and tankers are in use, then the allocated value is 0.5.
- Therefore, using the maxima given by experts as a base, a rating scale starting from zero to the particular maximum value for that parameter has been used and the data for each animal was collected, for a given animal or group of elephants in a given regime (for example, forest camp) Mean Rating (M-R) was calculated for a given parameter, along with its sub-parameter. Thus the Mean Rating (M-R) denotes welfare status of existing conditions on the ground for the particular parameter.
- In this investigation, variables which represent a common feature of the captive condition have been grouped to form a parameter. The variables have been termed sub-parameters. For example, the variables shelter type, shelter size, floor type in the shelter; all represent different aspects of the physical space provided to the elephant. Hence, they are grouped together to form the parameter "Shelter" and each constituent variable is a sub-parameter. In this investigation, the E-R for a parameter (say, shelter) represents the mean of E-Rs across all related sub-parameters. M-R is also based on similar lines.
- E-R and M-R for each of the regimes here represent the average across related parameters observed for that regime. For instance, E-R / M-R for a parameter "shelter" represent the average of related parameters (termed sub-parameters) such as type, flooring, size, and shade availability. Not all related parameters will be rated for each regime. The number of such related parameters varies for each regime.
- Results have been presented comparing E-R and M-R as a means of comparing the extent of deviation present in the parameters observed. The difference between E-R and M-R (expressed as percentage) indicates deviations from the prescribed norm.
- For handlers, the difference between the maxima provided by experts (E-R) and existing status (M-R) have been used to indicate their professional/ socio-economic status, of value to the handler and his elephant.

**Result**

Information on three elephants, two females (age unknown) and an adult male (56y), belonging to two owners, was collected. The male elephant was maintained in Havelock Island and the females were in Makarti Valley. Information on the two female elephants

was limited to a few (N= 12) parameters only, for the male, data was available for 33 parameters; totally N= 35.

**Source**

Sourcing of elephants, whether wild-caught/ captive born/ shifted across owners has an effect on the life of the animal through a change in living conditions.

- The adult male had been purchased by a private owner (I) when the elephant was 21y old. The elephant was leased to the present owners (II) since last 5y (upto the year of data collection, 2007)

M-R for source was 1.5 (N=1) indicating a deviation of 75% from E-R.

**Shelter**

Availability of unrestricted access to forest areas is considered suitable for elephants as they can engage in species-typical behaviours.

- All elephants, the adult male and the two females, were kept in and near forest areas.
- The male elephant was tied from 2p.m. to 6a.m.
- The shed, for the male, was cleaned twice daily with broom, however, dung was visible

M-R was 7.2 (SE= 1.0, N*= 5) implying a deviation of 10% from E-R. It should be noted that of the five sub-parameters, two were exclusive to the male and one was exclusive to the female elephants. Considering only sub-parameters common to all elephants, M-R was 8.0 (SE= 0.0, N*=2) showing no deviation at all from E-R (Figures 1 and 2).

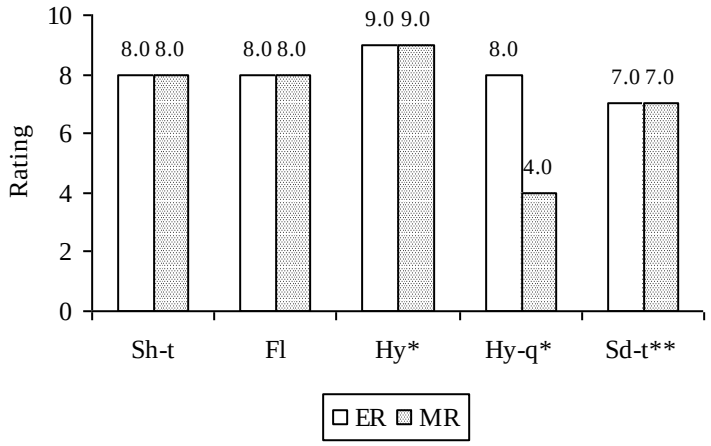
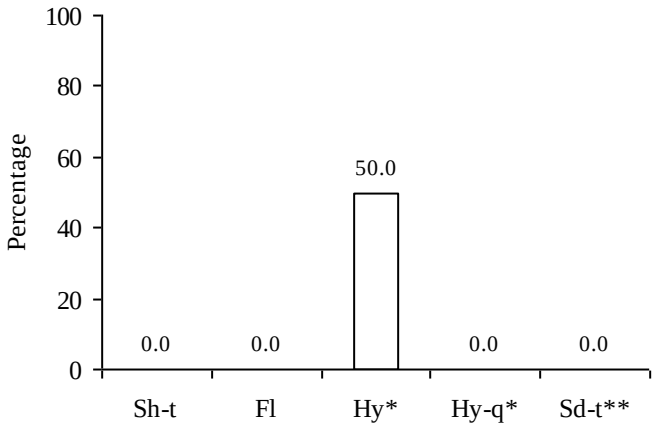



Figure 1: Comparison of E-R and M-R for shelter




h-t: Shelter type Fl: Flooring Hy: Hygiene maintenance Hy-q: Quality of hygiene maintenance
Sd-t: Shade type

*: Parameter exclusive to male elephant
**: Parameter exclusive to female elephants

Figure 2: Percentage wise deviation from E-R for shelter

**Water**

Unrestricted access to running sources of water, when the elephants need it, is important. Such sources, in presence of other elephants, can help in performance of species-specific activities.

- All elephants had access to streams
- During musth, the male elephant was provided water through a hose, twice daily, reported to drink 10 trunkfuls

M-R was 4.4 (SE= 2.9, N*= 3) with a deviation of 45.4% from E-R. Considering only sub-parameters common to all elephants, M-R was 9.0 (SE= 0.0, N*=1) showing no deviation at all from E-R (Figures 3 and 4).

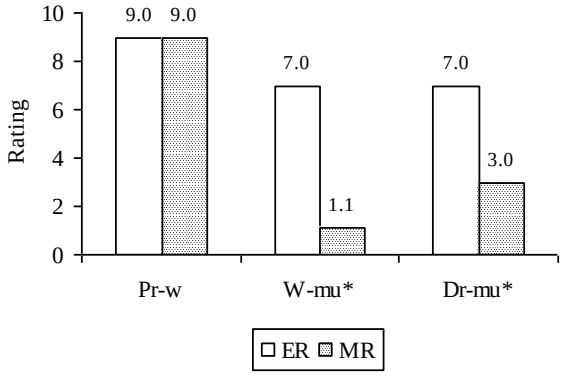
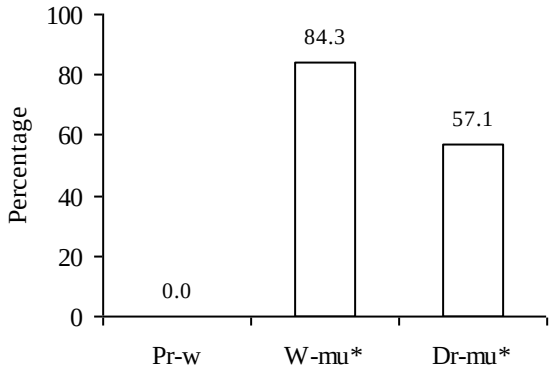



Figure 3: Comparison of E-R and M-R for water




Pr-w: Availability of perennial source of running water W-mu: Water during musth
Dr-mu: No. of times drinking water during musth

*: Parameters exclusive to male elephant

Figure 4: Percentage wise deviation from E-R for water

**Social interaction**

Elephant society is complex, lasting across generations with males gradually dispersing from their herds (Poole and Moss, 2008), or males have to learn about the strengths and weakness of other males through interaction (Poole and Granli, 2009). Captivity generally imposes conditions restricting expression of their natural behavioural repertoire.

- The adult male was maintained in social isolation
- The two females were kept together, interaction duration was 24h

M-R was 4.2 (SE= 1.1, N*= 4) with a deviation of 48% from E-R (Figures 5 and 6).

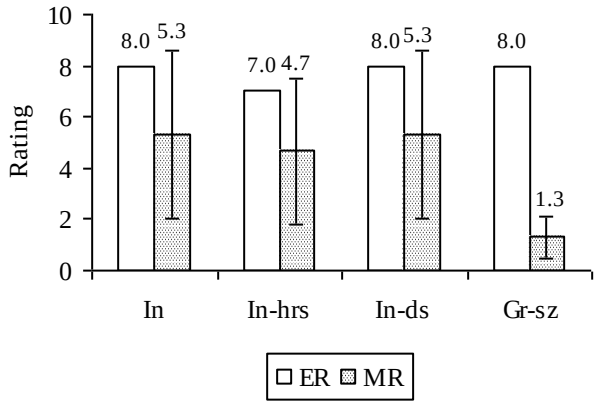
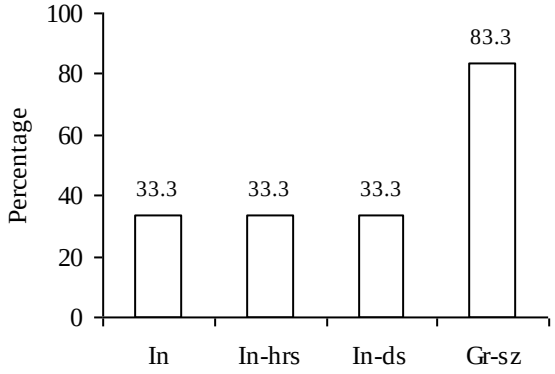



Figure 5: Comparison of E-R and M-R for social interaction




In: Opportunity for interaction In-hrs: Interaction hours In-ds: Distance between elephants
Gr-sz: Group size

Figure 6: Percentage wise deviation from E-R for social interaction

**Chaining**

Control and management of elephants is generally done by using chains on different parts of the body and restricting its movement.

- The male elephant was tied from 2p.m. to 6a.m. in its shed, left to forage from 6 a.m. to 9a.m.
- All the elephants were chained with plain types of chains; forelegs were hobbled for the male while free ranging, no information available for the females
- Both females were allowed to free range in the forest at night, the male elephant was tied in its shed
- For the male, chain dimensions were: length (leg)-12m, body-2m, corresponding weight- 80kg, 15kg

M-R was 1.9 (SE= 1.3, N*= 5) showing a deviation of 76% from E-R. Considering sub-parameters common to all elephants, M-R was 3.1 (SE= 0.6, N*= 3) showing a deviation of 61% from E-R (Figures 7 and 8).

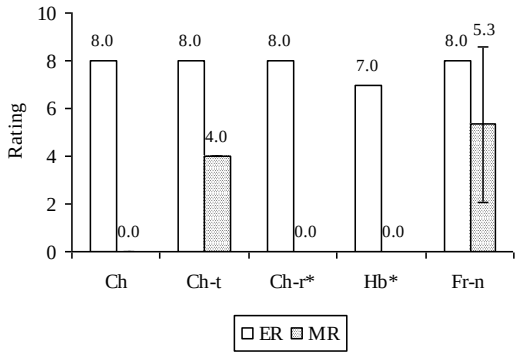
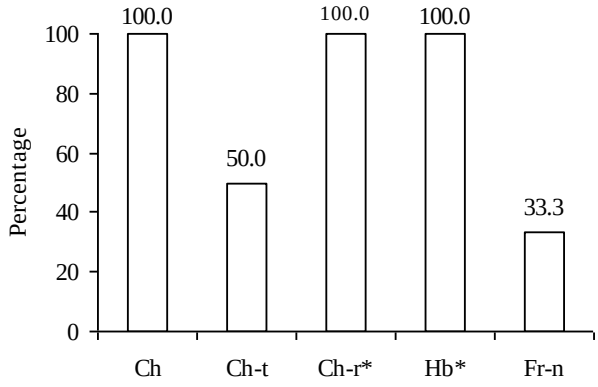



Figure 7: Comparison of E-R and M-R for chaining




Ch: Chaining status Ch-t: Chain type Ch-r: Region of chaining Hb: Hobbling of forelegs
Fr-n: Opportunity to free-free range at nigth

*: Parameters exclusive to male elephant

Figure 8: Percentage wise deviation from E-R for chaining

**Observed behaviour**

Manageability of elephants can be indicated by its temperament. Hence, this aspect was rated. Occurrence of stereotypy/ aggression was also considered as they can be linked to current/ previous poor welfare conditions. Data was available for the male elephant only.

- The elephant was described as quiet, but aggressive towards people
- Stereotypic signs of medium intensity were exhibited during musth

M-R was 4.8 (SE= 2.2, N*= 4) implying a deviation of 42.4% from E-R (Figures 9 and 10).

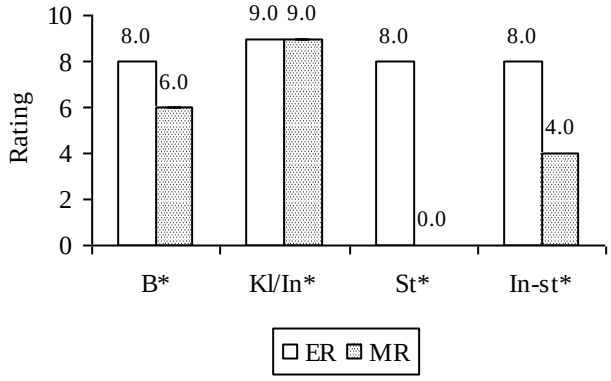
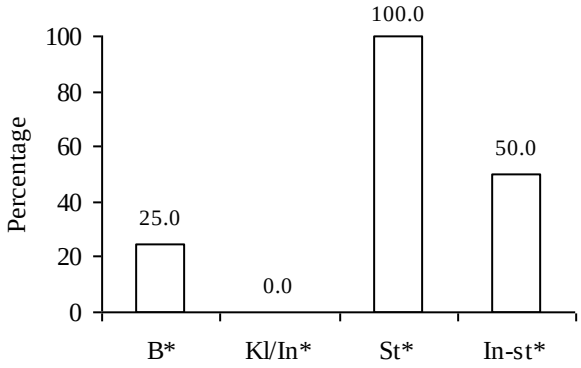



Figure 9: Comparison of E-R and M-R for observed behaviour




B: Behaviour (temperament) Kl/In: Incidents of killing/ injury St: Occurrence of stereotrypy
In-st: Intensity of stereotypy

*: Parameters exclusive to male elephant

Figure 10: Percentage wise deviation from E-R for observed behaviour

**Work**

The nature of work and working conditions determine the living conditions for elephants maintained exclusively for work.

Data was available for the male elephant only.

- Work type involved tourism related duties: diving in the sea with tourists
- Duration was 9a.m. to 2p.m.
- Food was given during work: banana (*Musa* sp.) - 20 kg, sugarcane (*Sacharum* sp.)- 10 no., jaggery (sweet derived from sugarcane)- 500gm

M-R was 3.0 (SE= 3.1, N* = 3) with a deviation of 62.5% from E-R (Figures 11 and 12).

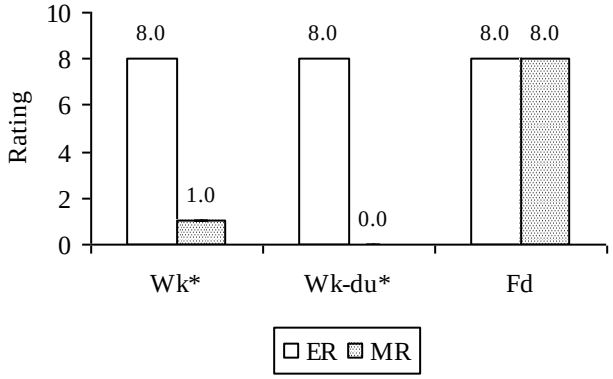
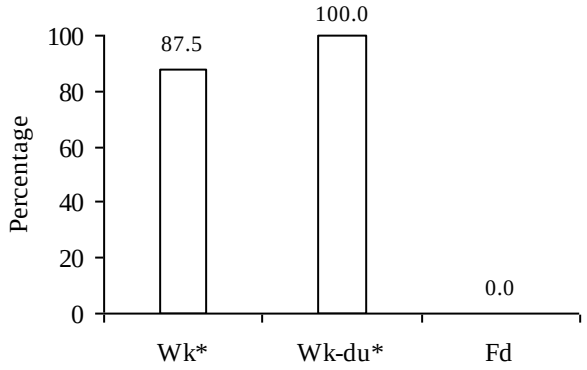



Figure 11: Comparison of E-R and M-R for work




Wk: Work type Wk-du: Duration of work Fd: Food given during work

*: Parameters exclusive to male elephant

Figure 12: Percentage wise deviation from E-R for work

**Food provisioning**

Foraging forms a major activity for wild elephants (Sukumar, 1991), feeding on a wide variety of plants, providing an opportunity for other herd members to learn efficient ways of feeding. Captivity may not provide this opportunity to its elephants. Data was available for the male elephant only.

- Both stall feed and free-ranging to graze/ browse was provided
- Food given was banana, sugarcane, paddy (*Oryza* sp.)- 10 kgs, *channa* (*Cicer arietinum )* - 3 kg
- No incidents of crop raiding were reported

M-R was 6.0 (SE= 2.5, N*= 3) with a deviation of 25% from E-R (Figures 13 and 14).

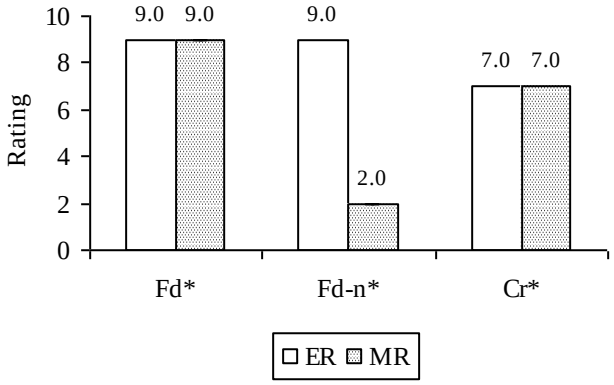
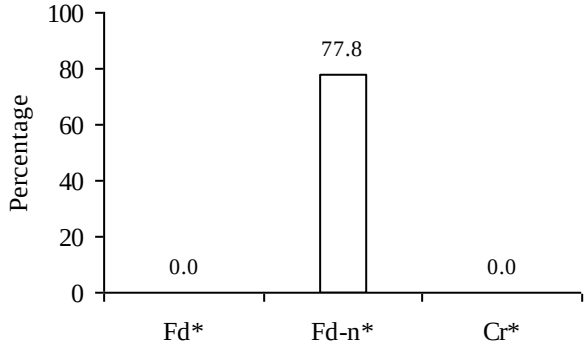



Figure 13: Comparison of E-R and M-R for food




Fd: Food provisioning type Fd-n: Number of food items Cr: Incidents of crop raiding

*: Parameters exclusive to male elephant

Figure 14: Percentage wise deviation from E-R for food

**Reproductive status**

Captivity may not be conducive for normal reproductive functioning, especially when elephants are maintained singly. Data was available for the male elephant only.

- Musth was reported for the adult male, the elephant was chained, isolated during musth
- The male was not exposed to female elephants, no calves sired in the present location

M-R was 2.0 (SE= 2.3, N*= 4) with a deviation of 75% from E-R (Figures 15 and 16).

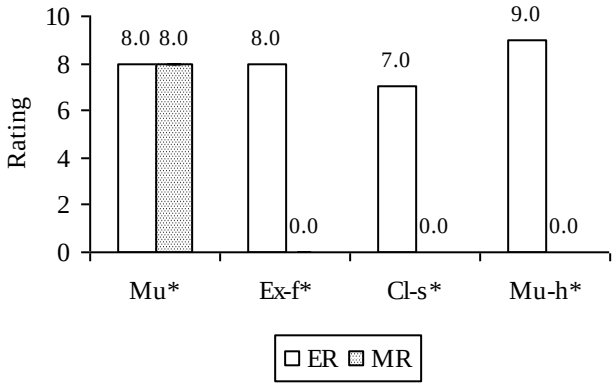
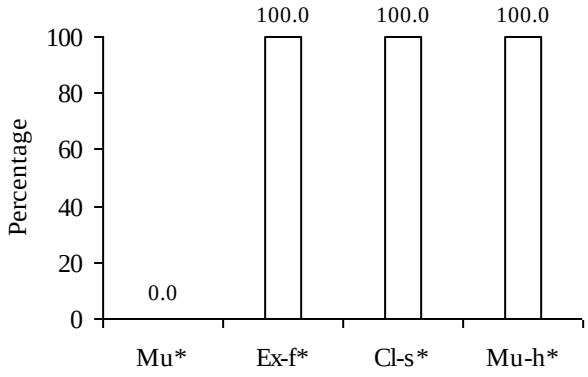



Figure 15: Comparison of E-R and M-R for reproductive status of male




Mu: Occurrence of musth Ex-f: Exposure to females Cl-s: Number of calves sired Mu-h: Musth handling

*: Parameters exclusive to male elephant

Figure 16: Percentage wise deviation from E-R for reproductive status of male

**Health and veterinary care**

Maintenance of health of captive elephants with proper veterinary facility is an essential feature, especially when the elephants are kept in un-natural living conditions/ subjected to an altered daily activity pattern.

- Lacerated wounds were seen on left hind leg (likely to have been caused by chains) of the male elephant
- Veterinary doctor was available for all the elephants
- Doctor's visits for the male elephants was monthly, when needed another doctor was called to treat
- Records were not kept for both female elephants

M-R was 4.9 (SE= 2.2, N*= 4) with a deviation of 46% from E-R (Figures 17 and 18).

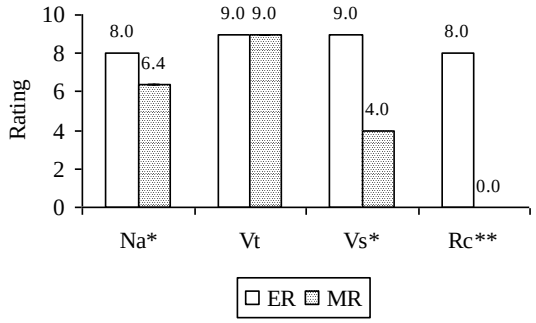
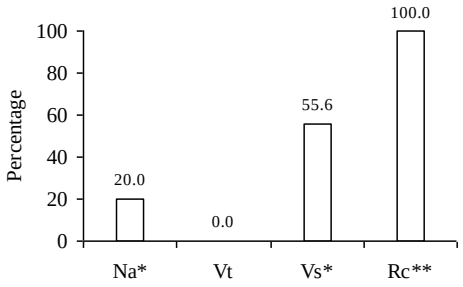



Figure 17: Comparison of E-R and M-R for Health and veterinary care




NA: Nature of disease/ injury Vt: Availability of veterinary doctor Vs: Frequency of visits
Rc: Maintenance of records

*: Parameter exclusive to male elephant **: Parameter exclusive to female elephants

Figure 18: Percentage wise deviation from E-R for health and veterinary care

Overall rating

The overall M-R for all observed elephants was 4.2 showing an overall deviation of 48% from E-R (see figure 19 for distribution of percentage deviation from E-R across all parameters). Availability of data for the female elephants maintained by one of the owners was limited to a few parameters. This, however, need not be a limiting factor if all the elephants are considered together in the category of private ownership. Sex related features can be excluded to provide a relatively accurate representative rating for all elephants under private ownership.

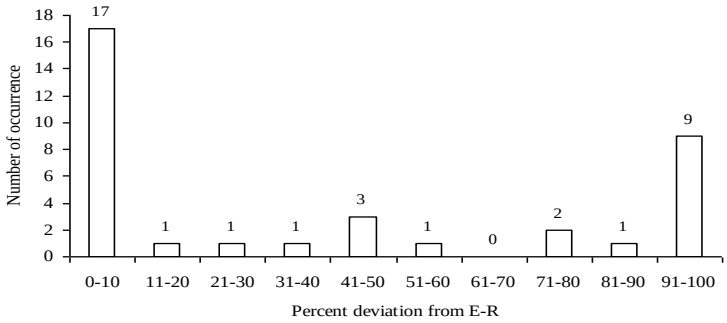



Figure 19: Distribution of percentage wise deviation from E-R across all observed parameters

Table-1 gives the M-R for each category of elephants. When reproductive status of the male is excluded, the M-R for the male elephant is comparable with that of the overall M-R (deviation of 51% and 48%, respectively, from E-R).

Table -1: Comparison of ratings across different scenarios

| | E-R | M-R | SE | N |
|---|---|---|---|---|
| Overall M-R | 8 | 4.2 | 0.6 | 36 |
| Male elephant only | 8 | 3.6 | 0.6 | 33 |
| Male elephant (excluding reproductive status) | 8 | 3.9 | 0.6 | 28 |
| Female elephants only | 8 | 6 | 0.9 | 13 |

**Handler status**

Professional experience and socio-economic status has been considered. Data was available for the mahout of the male elephant only. Age of the mahout was 28yrs.

Professional experience

- The mahout had a total of 10y experience in this profession
- Experience with the male elephant was only 1yrs
- He had chosen this profession out of interest
- Was said to spend 8h with the elephant
- Used Knife/wooden ankush/Stick to control the elephant

M-R was 5.8 (SE= 1.3, N*= 4) showing a deviation of 36% from E-R (Figures 20 and 21).

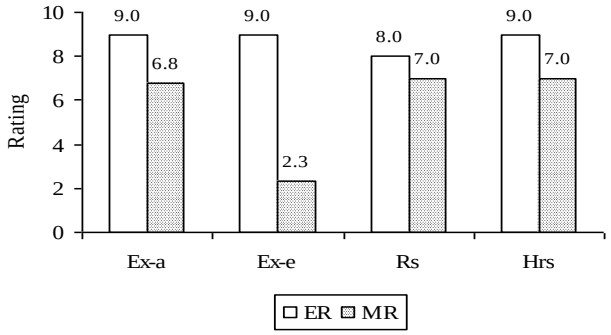
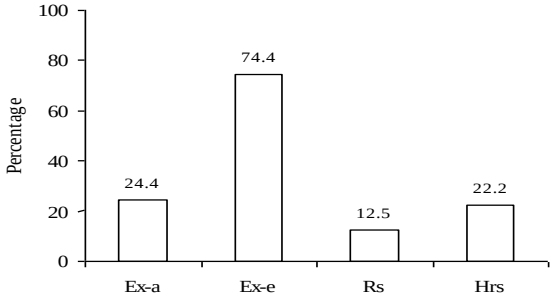



Figure 20: Comparison of E-R and M-R for professional experience of handler




Ex-a: Experience as % of mahout age Ex-e: Experience as % of elephant age Rs: Reason for choosing this profession
Hrs: Hours spent with elephant

Figure 21: Percentage wise deviation from E-R for professional experience of mahout

Socio-economic status

- The mahout had attended school upto the 8th standard
- Number of languages known were three
- Annual salary was Rs.36,000/-
- The mahout was not married
- There was no insurance cover
- Consumed alcohol, after work

M-R was 2.8 (SE= 1.0, N*= 6) showing a deviation of 66% from E-R (Figures 22 and 23).

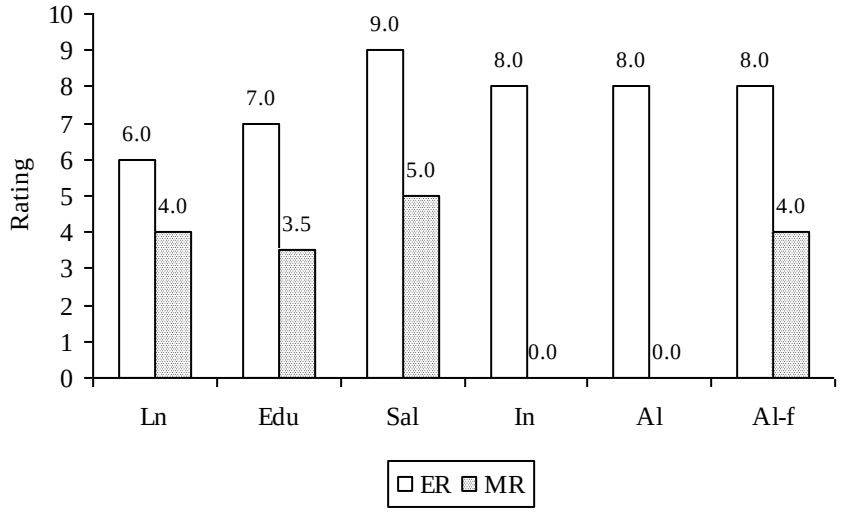
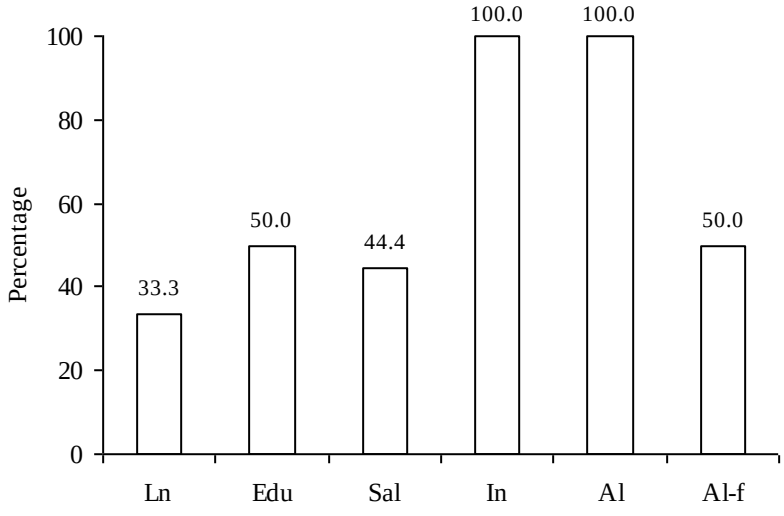



Figure 22: Comparison of E-R and M-R for socio-economic status of mahout




Ln: Languages known Edu: Education level Sal: Salary drawn In: Insurance cover availability
Al: Alcohol consumption Al-f: Frequency of alcohol consumption

Figure 23: Percentage wise deviation from E-R for socio-economic status of mahout

**Discussion**

Poole and Granli (2009) suggest that the biological and ecological needs of captive elephants are not different from those of their wild counterparts as they have not been genetically altered in captivity. The difference observed in living conditions in captivity from those in the wild has been rated to arrive at a welfare status for captive elephants. Figure 21 shows the distribution of deviations across all observed parameters for all the elephants. It can be seen that 44% of the parameters showed a deviation of 50% or more from E-R.

The overall M-R for all observed elephants was 4.2 showing an overall deviation of 48% from E-R. When reproductive status of the male is excluded, the M-R for the male elephant is comparable with that of the overall M-R.

The higher M-R when the female elephants are considered exclusively is because:

- restricted data availability for these elephants
- The data comprised 54% of presence-absence type parameters, of which 71% indicated presence of suitable parameters. Such parameters need more data to provide greater insight into the extent of suitability to elephants, which was not available.

While the occurrence of suitable shelter with varied vegetation, space availability and natural flooring and the presence of streams was a positive feature, it was overrun by human controlled factors such as:

- Chaining and restricting movement of the elephants for varied duration— access to natural conditions was thus curtailed. In addition, the male elephant was tethered in a shed overnight. Gruber, et al., (2000) report of the association between increased frequency of stereotypy and chaining in elephants. Abrasion induced injuries maybe be difficult to heal (Kurt and Garai, 2002).
- Use for work— the male elephants was put to tourist related work for a duration of 5h. During this period, the elephant did not have any control over its activities. Following work, it was tethered in its shed, in isolation without individuals of its own kind.
- Restricted foraging opportunity for the elephants as a consequence of work or daily schedule of chaining
- Maintenance of the male in isolation without access to females

For the female elephants:

- Absence of records on the health/ reproductive status of the elephants is an indication of the care provided to the animals. Irrespective of the veterinary care available to the elephants, maintenance of information on the health history and normal reproductive functioning is integral to long-term well-being of the animals.

Handler status:

- The handler for the male elephant was trained in the profession by experience; this was not a traditional family occupation implying a difference in knowledge with regard to elephants in general and handling in particular.
- Relatively low salary was paid, which in conjunction with absence of insurance cover may prove to be economically detrimental
- The practice of alcohol consumption may prove to be deleterious to the handler in the long run

**Reference**


1. Barber, J.C.E. (2009). Unpacking the trunk: Using basic research approaches to identify and address captive elephant welfare concerns. In: An elephant in the room: the science and well being of elephants in captivity, (Forthman, D.L., Kane, F. L., Hancocks, D., and Waldau, P.F. eds.) Center for Animals and Public Policy, Cummings School of Veterinary Medicine, Tufts University
2. Gruber, T.M., Friend, T.H., Gardner, J.M., Packard, J.M., Beaver, B. and Bushong, D. (2000). Variation in stereotypic behaviour related to restraint in circus elephants. Zoo Biology **19**: 209-221.
3. Kurt, F. and Garai, M. (2007). The Asian elephant in captivity—A field study. Cambridge University press, New Delhi.
4. Poole, J. and Granli, P. (2009). Mind and Movement: Meeting the Interests of Elephants. In: An elephant in the room: the science and well being of elephants in captivity, (Forthman, D.L., Kane, F. L., Hancocks, D., and Waldau, P.F. eds.) Center for Animals and Public Policy, Cummings School of Veterinary Medicine, Tufts University
5. Poole, J.H. and Moss, C.J. (2008). Elephant sociality and complexity The scientific evidence. In: Elephants and ethics toward a morality of coexistence (Eds: Wemmer, C and Christen, C. A) The John Hopkins University Press, Baltimore. (Accessed online: http://www.elephantvoices.org/index.php?topic=tools&topic2=tools/documents/2_Poole_Moss_Final_7_12_06.pdf)
6. Sivaganeshan, N. and Kumar, A. (1994). Status of feral elephants in the Andaman Islands, India. Salim Ali Centre for Ornithology and Natural History (SACON-Technical Report 1), Coimbatore, India
7. Sukumar, R. (1991). Ecology. In: Eltringham, S.K. (ed.), The Illustrated encyclopaedia of elephants, Salamander Books, U.K.
8. Varma, S. 2008. Identifying and defining welfare parameters for captive elephants and their mahouts in India, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 7-16. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.
9. Varma, S. and Prasad, D. (2008) Welfare and management of elephants in captivity— insights and recommendations, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and

their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 54-64. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

10. Varma, S., Sujatha S.R., van de Brand, J., Ganguly, S. and Shiela R., (2008) Draft concept note on welfare parameters and their significance for captive elephants and their mahouts in India, In: Welfare and management of elephants in Captivity: Proceedings of a Workshop on Welfare Parameters and their Significance for Captive Elephants and their Mahouts in India. (S. Varma and D. Prasad, eds.), pp. 17-53. Ministry of Environment and Forests (MoEF), Government of India, Compassion Unlimited Plus Action (CUPA) and Asian Nature Conservation Foundation (ANCF), Bangalore, India.

Appendix 1: Distribution of elephants across different management regimes in Andaman Islands

| S.No | Name of the Elephant | Age ( yrs) | Female/ Male | Type of ownership | Current Location of animal | District |
|---|---|---|---|---|---|---|
| 1 | Yamuna | 0.17 | Female | FD | Parnashala | Middle Andaman |
| 2 | Priyanka | 3 | Female | FD | Pathar Tikry,Tugapur | North Andaman |
| 3 | Vijaya laxmi | 4 | Female | FD | Kalapattar training camp, Havelock | Havelock Island |
| 4 | Amitha | 4 | female | FD | Ferragunj | South Andaman |
| 5 | Vijaya Kumari | 8 | Female | FD | Kalapattar training camp, Havelock | Havelock Island |
| 6 | Indira | 21 | Female | FD | Pathar Tikry,Tugapur | North Andaman |
| 7 | Mammy | 28 | Female | FD | Kalapattar training camp, Havelock | Havelock Island |
| 8 | Niharika | 28 | Female | FD | Pathar Tikry,Tugapur | North Andaman |
| 9 | Parvati | 34 | Female | FD | Rutland Island | |
| 10 | Sarasu | 36 | Female | FD | Pathar Tikry,Tugapur | North Andaman |
| 11 | Chanchal | 37 | Female | FD | Basduck,Radhanagar | North Andaman |
| **12** | **Ambika** | **37** | **female** | **FD** | **Ferragunj** | **South Andaman** |
| 13 | Lucy | 40 | Female | FD | Ferragunj | South Andaman |
| 14 | Indira | 46 | Female | FD | Kalapattar training camp, Havelock | Havelock Island |
| 15 | Champa | 47 | Female | FD | Basduck,Radhanagar | North Andaman |
| 16 | Gulab Kali | 50 | Female | FD | Radha nagar beach, Havelock | Havelock Island |
| 17 | Chandra | 51 | Female | FD | Throtang | Middle Andaman |
| 18 | Chanchal Kali 2 | 53 | Female | FD | Radha nagar beach, Havelock | Havelock Island |
| 19 | Mallika | 57 | Female | FD | Chidia Tapu camp | South Andaman |
| 20 | Motikali | 59 | Female | FD | Nabagram | North Andaman |
| 21 | Gulab Kali | 64 | Female | FD | Manglutan | South Andaman |
| 22 | Bani | | Female | FD | Paschim Sagar | North Andaman |
| 23 | Rupkali | | Female | FD | Paschim Sagar | North Andaman |
| **24** | **Smitha** | **50** | **Female** | **FD** | **Nabagram** | **North Andaman** |
| 25 | Lilly | | Female | FD | Nabagram | North Andaman |
| 26 | Sita Kumari | | Female | FD | Nabagram | North Andaman |
| 27 | Menaka | | Female | FD | Nabagram | North Andaman |
| 28 | Mini Kumari | | Female | FD | Ramnagar | North Andaman |
| 29 | Varsha | | Female | FD | Ramnagar | North Andaman |
| 30 | Anna Kumari | | Female | FD | Ramnagar | North Andaman |
| 31 | Paru | | Female | FD | Betapur | Middle Andaman |
| 32 | Nikki | | Female | FD | Throtang | Middle Andaman |
| 33 | Razia | | Female | FD | Throtang | Middle Andaman |
| 34 | Ganga | | Female | FD | Markarti Valley | Middle Andaman |
| 35 | Sundar Kali | | Female | FD | Markarti Valley | Middle Andaman |
| 36 | Pawan Kali | | Female | FD | Markarti Valley | Middle Andaman |

| | | | | | | |
|---|---|---|---|---|---|---|
| 37 | Chanchal Kali | | Female | FD | Markarti Valley | Middle Andaman |
| 38 | Sunitha | | Female | FD | Parnashala | Middle Andaman |
| 39 | Chanchal Kali 1 | | Female | FD | South Creek | Middle Andaman |
| 40 | Pawankali | | Female | FD | Ferragunj | South Andaman |
| 41 | Laxmi | | Female | FD | Shol Bay | South Andaman |
| 42 | Hemamalini | | Female | FD | Shol Bay | South Andaman |
| 43 | Sania | | Female | FD | Shol Bay | South Andaman |
| 44 | Kaushalya | | Female | FD | Tugapur | North Andaman |
| 45 | Rupkali | | Female | FD | Bajota | North Andaman |
| 46 | Laila | | Female | FD | Bajota | North Andaman |
| 47 | Jaya | | Female | FD | Karmatang | North Andaman |
| **48** | **Sharon** | **8** | **Female** | **FD** | **Karmatang** | **North Andaman** |
| 49 | Makai | | Female | FD | Kaamtang | North Andaman |
| **50** | **Danimala** | **8** | **Female** | **FD** | **Mohanpur** | **North Andaman** |
| 51 | Mohini | | Female | FD | Mohanpur | North Andaman |
| 52 | Champa | | Female | FD | Mohanpur | North Andaman |
| 53 | Rani | | Female | FD | Mohanpur | North Andaman |
| 54 | Sumit | 10 | Male (Makhna) | FD | Nabagram | North Andaman |
| 55 | Ganga Prasad | 49 | Male (Makhna) | FD | Tugapur | North Andaman |
| 56 | Bijli Prasad | 60 | Male (Makhna) | FD | Tugapur | North Andaman |
| 57 | Sanjeev | | Male (Makhna) | FD | Karmatang | North Andaman |
| 58 | Laxmi Prasad | | Male (Makhna) | FD | Mohanpur | North Andaman |
| 59 | Lal Bahadur | | Male (Makhna) | FD | Paschim Sagar | North Andaman |
| 60 | Sunil | | Male (Makhna) | FD | Throtang | Middle Andaman |
| 61 | Indrajit | | (Makhna) | FD | Ferragunj Checkpost | South Andaman |
| 62 | Ganesh | 3 | Male | FD | Throtang | Middle Andaman |
| 63 | Sheetal | 23 | Male | FD | Rutland Island | |
| 64 | Ravish | 24 | Male | FD | Rutland Island | |
| 65 | Chaitanya | 27 | Male | FD | Basduck,Radhanagar | North Andaman |
| 66 | Naresh Bahadur | 47 | Male | FD | Ferragunj | South Andaman |
| 67 | Krishna Prasad | 59 | Male | FD | Rutland Island | |
| 68 | Laxmi Prasad | | Male | FD | Nabagram | North Andaman |
| 69 | Gai Bahadur | | Male | FD | Nabagram | North Andaman |
| 70 | Vikram | | Male | FD | Markarti Valley | Middle Andaman |
| 71 | Pawan | | Male | FD | Markarti Valley | Middle Andaman |
| 72 | Ram | | Male | FD | Kalapahar | Middle Andaman |
| 73 | Kumar | | Male | FD | Lorojig | Middle Andaman |

| | | | | | | |
|---|---|---|---|---|---|---|
| 74 | Mattu Bahadur | | Male | FD | South Creek | Middle Andaman |
| 75 | Niras | | Male | FD | South Creek | Middle Andaman |
| 76 | Harihar Prasad | | Male | FD | John Lawrance Island | Havelock Island |
| 77 | Lal Ram | | Male | FD | John Lawrance Island | Havelock Island |
| 78 | Billy Bahadur | | Male | FD | Ferragunj Checkpost | South Andaman |
| 79 | Gulab Kali | | Female | F&PDC | White surf falls, Hut bay | Little Andaman |
| 80 | Un named calf | 0.5 | Female | F&PDC | Check post, Hut bay | Little Andaman |
| 81 | Amaravathi | 1 | Female | F&PDC | White surf falls, Hut bay | Little Andaman |
| 82 | Akash (Shreya) | 8 | Female | F&PDC | Check post, Hut bay | Little Andaman |
| 83 | Marry | 16 | female | F&PDC | Ferragunj | South Andaman |
| 84 | Anarkali | 43 | Female | F&PDC | Ferragunj | South Andaman |
| 85 | Champakali | 47 | Female | F&PDC | Ferragunj | South Andaman |
| 86 | Renu | 50 | Female | F&PDC | Krishana nalla, Hut bay | Little Andaman |
| 87 | Gangavathi | 54 | Female | F&PDC | Check post, Hut bay | Little Andaman |
| 88 | Rup Kumari | 59 | Female | F&PDC | Krishana nalla, Hut bay | Little Andaman |
| 89 | Jill | 71 | Female | F&PDC | Krishana nalla, Hut bay | Little Andaman |
| 90 | Vanrani | | Female | F&PDC | White surf falls, Hut bay | Little Andaman |
| 91 | Kalpana | | Female | F&PDC | Ferragunj | South Andaman |
| 92 | Appu | 3.5 | Male (Makhna) | F&PDC | Krishana nalla, Hut bay | Little Andaman |
| 93 | Gautam Bahadur | 29 | Male (Makhna) | F&PDC | Krishana nalla, Hut bay | Little Andaman |
| 94 | Dulip Bahadur | 10 | Male | F&PDC | Netaji Camp, Hut bay | Little Andaman |
| 95 | Samsher | | Male | F&PDC | Farm Trikery, Hut bay | Little Andaman |
| 96 | Balvant | | Male | F&PDC | Ferragunj | South Andaman |
| 97 | Rajan | 56 | Male | Private | Radha nagar beach, Havelock | Havelock Island |
| 98 | Chanchal Pyaari | | female | Private | Makarti Valle | |
| 99 | Man Pyaari | | female | Private | Makarti Valle | |

**Sold to private owners in main land India**

**Andaman Nicobar Forest Department (**The Department of Environment & Forests) is the nodal department in the administrative structure of Andaman & Nicobar Administration for planning, formulation and implementation of policies and programmes for conservation, protection, and management of the forests and wildlife in the territory. The main objective includes, conservation of environment, forests and wildlife following National Forest Policy, 1988 and through protection, effective planning and scientific management, meeting local requirement of forest produce through sustainable utilization of forest resources, implementing provisions of the Indian Forest Act, 1927, the Wildlife (Protection) Act, 1972, the Forest Conservation Act, 1980 and the Environment Protection Act, 1986 including the Coastal Regulation Zone Notification, 1991, promoting research in forestry and wildlife, human resource development through capacity building and awareness generation by educating people and promoting eco-tourism and peoples participation.

**Compassion Unlimited Plus Action (CUPA**) is a non-profit public charitable trust registered in 1991 that works for the welfare of all animals. Since 1994, CUPA has worked in close collaboration with government departments and agencies on various projects. CUPA's mission is to protect animals from abuse and violence and do what may be required to alleviate their suffering at the hands of humans. CUPA does not differentiate among pet, stray or wild animals, since all of them require assistance and relief from cruelty, neglect and harm. The organisation's objective has been to design services and facilities which are employed fully in the realisation of these goals.

**Asian Nature Conservation Foundation (ANCF)** is a non-profit public charitable trust set up to meet the need for an informed decision-making framework to stem the rapidly declining natural landscape and biological diversity of India and other countries of tropical Asia. The Foundation undertakes activities independently and in coordination with governmental agencies, research institutions, conservation NGOs and individuals from India and abroad, in all matters relating to conservation of natural resources and biodiversity, endangered flora and fauna, wildlife habitats and environment including forests and wetlands. It participates and disseminates the procured information, knowledge and inferences in professional, academic and public flora.

**World Society for Protection of Animals (WSPA)** With consultative status at the United Nations and the Council of Europe, WSPA is the world's largest alliance of animal welfare societies, forming a network with 910 member organisations in 153 countries. WSPA brings together people and organisations throughout the world to challenge global animal welfare issues. It has 13 offices and thousands of supporters worldwide.

Photo credits: Front cover (anti-clockwise) 2, 3, 6,9,10, Figures. 1a, e, f, g, k, m, v, aa, ab and aj, 4b and e, 6a,b,c and d, 8a,b and g, 10a,b and g, 13a,b,c and d, 15a, b, c, d and f, 19a and b, 20: David Abraham. Figures. 1a,b,c,i,h,j,l,n,o,p,z,ad and 28e: Rajendra Hasbhavi. Figures 13g, h, i and j: source Elephant! (by Steve Bloom- Publisher-Thames Hudson, 2006), Front cover (anti-clockwise) 1,4,5 and 8, Figures 1q,r,s,t,w,ac,ae,af,ag,ah and ai, 13e and f,15e,h,g and I,17a and b,24a and b,25a and b,28a,b,c and d: Surendra Varma.

**Project team**

**Field investigators**

David Abhram, Mr Rajendra Hasbhavi,
and
Mr Surendra Varma

**Research team**

Ms. S. R. Sujata
Compassion Unlimited Plus Action (CUPA)

Dr.Roshan K Vijendravarma
Post Doctoral Researcher, Department of Ecology and Evolution,
University of Lausanne, 1015-Lausanne
Switzerland

**Layout & design support**

Neema, Y.S, Bangalore
Ramesh Belagere, Bangalore

**Adviser**

Prof. R. Sukumar
Centre for Ecological Sciences,
Indian Institute of Science, Bangalore 560 012

**Co-Investigators**

Mrs. Suparna Baksi-Ganguly
& Dr. Shiela Rao
Compassion Unlimited Plus Action (CUPA),
Veterinary College Campus, Hebbal, Bangalore 560 024, &
Wildlife Rescue & Rehabilitation Centre (WRRC),
Bannerghatta Biological Park,
Bangalore – 560083

**Principal Investigator**

Mr. Surendra Varma
Asian Elephant Research & Conservation Centre
(A Division of Asian Nature Conservation Foundation (ANCF)),
Innovation Centre, Indian Institute of Science, Bangalore 560 012

The welfare status of captive elephants in Andaman Islands was assessed by comparing the captive environment with that of the wild. For this investigation data was collected for ninety-nine elephants across three management regimes: Forest Camps (FC), The Andaman and Nicobar Islands Forest and Plantation Development Corporation (FCrp) and private owners (Pvt).