

## **SOCIAL PROBLEMS AND ECONOMIC POTENTIALS OF DOMESTICATION OF ELEPHANT AS A MEAN OF ELEPHANT CONSERVATION IN SRI LANKA**

**A.M.S.T. ATHAUDA**

*Department of Agricultural Economics and Business Management  
Faculty of Agriculture, University of Peradeniya, Sri Lanka*

### **ABSTRACT**

Loss of elephant habitats appears to be the main reason that leads to human elephant conflicts in most parts of the Dry Zone in Sri Lanka. Capturing and domestication of wild elephants is identified as one of the means of elephant conservation which promote the coexistence between humans and elephants that existed for generations. However, with the recent structural changes in the society and the economy such as mechanization and increased wage rates, captive elephant conservation may not be attractive as it was before. With this background, this study aimed at identifying the social as well as economic problems, and suggesting possible remedies that help to promote domestication of elephants.

The study was based on collecting the data from a survey and discussions with key informants. The survey was comprised of a mail survey based on structured questionnaire and face-to-face interviews. The study found that since elephants are reared in Wet Zone, feed availability is not a major problem. However, most of the elephant owners have to make payments for the feeds. Indigenous, western or both veterinary practices are used for captive elephants. Generally, a single mahout is used to control an elephant and most of the mahouts live below the poverty line. Most of the elephants in homegarden are reared for prestige, while temples and devalas keep elephants for ceremonies. Hotels and orphanages rear elephants with the intention of attracting tourists. When compared costs and revenues, orphanages and hotels enjoy with marvelous profits. Thus hotels that receive profit can rear captive elephants, where there is a demand for elephant safaris, rides, etc. In addition to that, tamed captive elephants can be used to establish an elephant park, which is a win-win solution for both owners and people who take pleasure from elephant related activities.

### **INTRODUCTION**

The Asian elephant (*Elephas maximus*) represents one of the most seriously endangered species of large mammals in the world. It is one of the few terrestrial megaherbivores extant in the world. In Sri Lanka elephants are declared as a protected species in 1937, under the enactment of the Fauna and Flora Protection Ordinance.

During past five decades, the Sri Lankan population declined drastically mainly due to loss of habitats caused by deforestation and forest fragmentation. Domestication of elephants for various purposes including logging and cultural purposes has bear a practice in Sri Lanka and other African countries. Capturing and domestication of those wild elephants can be considered as a one of the measure of elephant conservation. The number of purposes with regard to rearing of captive elephants are gain income, social prestige, use in ceremonies for promote tourism activities. In practice, mostly captive elephants are kept for one more of alternative purposes. Presently, there are about 15,000 elephants in captivity in the world (Sukumar, 1986) while 214 captive elephants in Sri Lanka (Santiapillai, 1997).

Mahouts are the people who handle the elephants. In early times mahouts are available from generation to generation and they are well-trained people. However, now adays people reluctant to work as mahouts.

### **Present status of captive elephant conservation in Sri Lanka**

At present, four types of captive elephant conservation methods are formed in Sri Lanka. They are individual people keep in their home gardens, temples and devalas keep in their garden, hotels keep captive elephants for tourism and keep captive elephants in the orphanages.

Jainudeen and Jayasinghe (1970) stated that the more wealthy and aristocratic families were living in those areas and they keep elephants for prestige.

The studies on captive elephants clearly indicate that captive elephant population is declining rapidly. There were 736 captive elephants in 1946(Santiapillai & De Silva), while in year 1955 there were 670 (Dereniyagala, 1955), According to the DWLC reports there were 344 domesticated elephants and this was declined to 214 by 1997(Jayewardene, 1997). The elephants in captivity decline over the time due to a number of reasons. Most of the captive elephants are too old thus their lifetime declines rapidly, absence of practicing breeding programmes among captive elephants, government banned to capture elephants from the wild and lack of veterinary practices and lack of availability of well-trained mahouts are rare of there.

Most of the captive elephants feed *kitul*, jack and coconut. Elephants need ample amount of feed per day. Dry matter need of the elephant is 0.5% of the body weight and daily ration should be according to the age groups (Krishnamurthy, 1992). Therefore, finding of this amount of feeds is much more difficult. Because growth rate of those trees are lower than the feed requirement rate of the captive elephants.

However compared to the world captive elephant population, Sri Lanka's captive elephant population is fairly low. Large numbers of captive elephant population are found in Myanmar, Thailand, India and Lao. Fifty percent of world captive elephant population lives in those countries. In Myanmar, captive elephants are used for many works such as, timber extraction (logging), transportation (as baggage elephants in hilly forests), religious ceremonies and processions, capturing wild elephants, state functions and ceremonies, tourism and agricultural activities in difficult areas. India possesses 20 percent of captive elephant population of Asia and they are used of the cultural activities in India and provide lot of care for them.

### **Problem justification**

As discussed earlier, deprivation of habitats for elephants appear to be the main problem of elephants. Given the limited forest coverage of 22% of total land area in Sri Lanka, it has been identified domestication of wild elephants as one of

the solution of mitigating human elephant conflict in Sri Lanka by a number of experts.

Though the practice of capturing and rearing has been done in Sri Lanka, for generations, given the limited land reserves and substitution by mechanical equipments, this option has to be justifiable economically. Of new areas of captive elephants, though tourism appears to be somewhat attractive, its economic potential has not been investigated. Therefore, in order to recommend elephant domestication on measures of conservation, it is of paramount importance to investigate the economics and the social aspects of the various means of captive elephant conservation

Against this background the objective of this study are to get an insight on present socio economic condition of captive elephant conservation so as to identify the problems of the elephant owners and then information would be helpful to develop meaningful recommendation to promote domestication as a mean of elephant conservation in Sri Lanka.

## METHODOLOGY

The study is manly based on data collected through primary survey. The data were collected using a structured questionnaire which includes general information, information on feeding, veterinary practices, bathing facilities, mahouts, income and specific information based on different type of captive elephant conservation methods. Face-to-face interviews and mail surveys were used to collect the data based on snowball sampling.

The target population of the study was composed of people who own elephants. *Basnayake Nilames* or chief incumbent of temples, chief of devalas, hotel owners who rear elephants and the officer-in-charge of the Pinnawala Elephant Orphanage. The sample consisted, nineteen elephant owners, eight Buddhist priest or *Basnayake Nilames*, two hotel owners and the officer- in-charge of the Orphanage at Pinnawala. The data analysis includes computation of the descriptive and cross tabulation. Statistical software Minitab was used for the analysis.

## RESULTS AND DISCUSSION

The situation presents the current status of rearing of elephants such as sources of feed, feed type, feed availability, feed cost, veterinary practices, mahouts, bathing facilities, cost and revenue.

### **Source of receiving elephants**

DWC does not allow capturing elephants from the wild. As a result, remaining captive elephant number increase or renew only through breeding programmes. However, breeding programmes are not generally practice in domestic elephants. The survey finds that the most of the elephants (54.44%)

reared in homegarden are reared by generations (Figure 1). In temples and devalas, most of the elephants were purchased from outside. This is in addition to the donation by Presidents and Priministers that is account for 25% of the domestic elephants. In temple of tooth relic, this was about 100%. The elephants in Pinnawala are directly captured by the DWC. However this was done by early stages and most of that elephants were captured due to bad health conditions and some were translocated from war areas. According to the different studies there are more number of male elephants in the wild and capturing of males will not be a big problem. In addition to that orphanage increase captive elephant number through breeding programmes since they have huge potential of spending ability and veterinary practices. As a result captive elephant number in orphanage increases with time. Though private owners show a high demand for tamed elephants and prefer adults, as those are directly profitable it is very difficult to do it more pragmatically. Capturing of elephants from the wild is a very huge task and need much cost and man power to do it. Well trained people are needed to that activity. After capturing translocation have to practice and it is very difficult task. The most common method for catching elephants is tranquillizing and translocation them by truck. As a result direct capturing cannot be practiced by individual people and temple and devala, who need elephants.

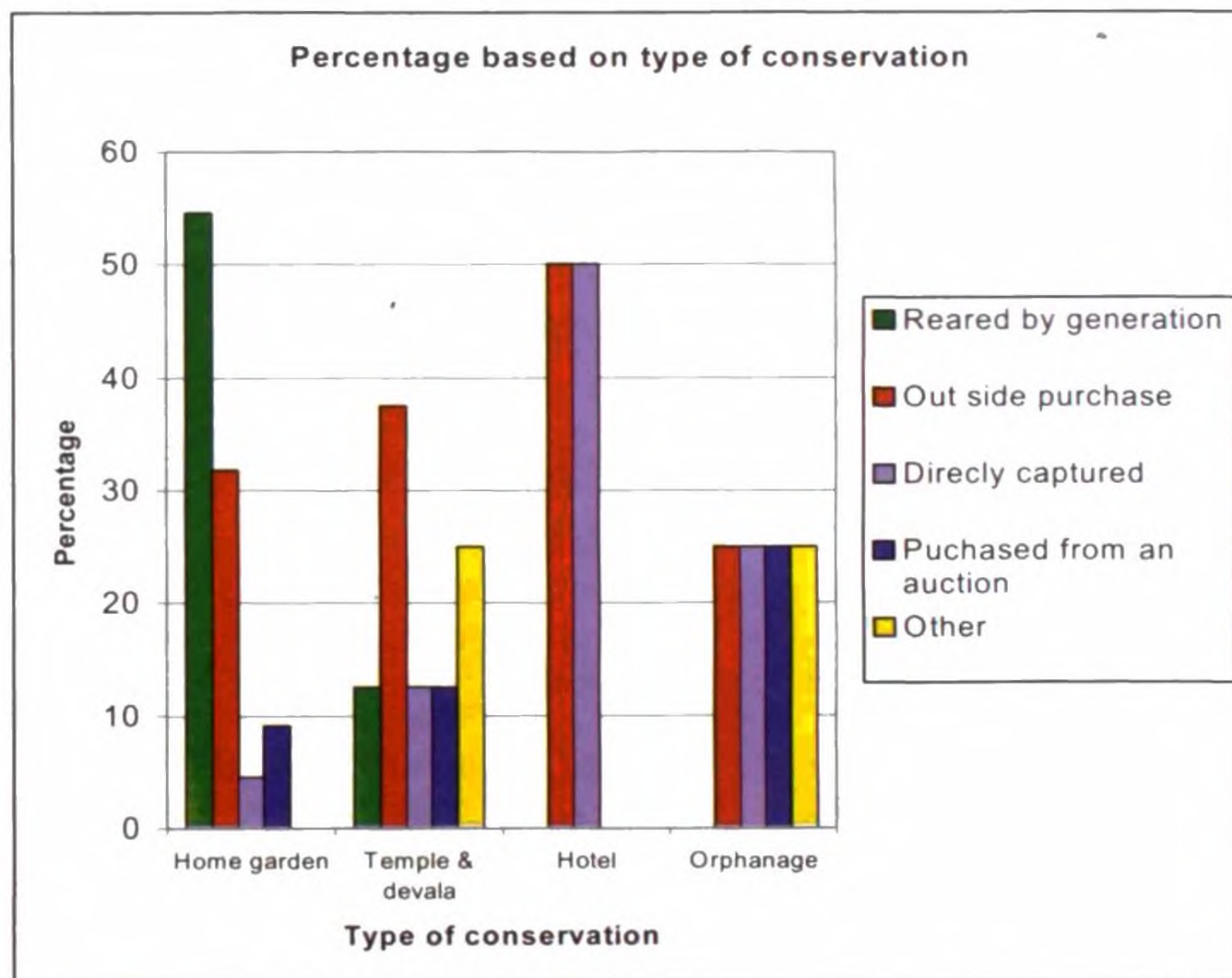


Figure 1. Source of receiving elephant

### Types and sources of feed

#### Feed type

Dung studies indicate that elephants eat around 140 different species, approximately 120kg per day. They prefer grasses, thorny and seasonal plants which have less chemical defenses. Among those feeds most common types of

feeds are Kitul, coconut and jack. Captive elephants in homegarden are mainly fed on Kitul (32.73%), coconut (27.27%) and jack (25.45%) (Figure 2) Due to the weakness of some captive elephant, owners give sustenance feed for them. Eventhough feed cost is high, owners provide those feeds, because of keeping elephants for social prestige. This special feed ration include mixture of feeds, eight breads, federal, cytoxine, protinex, soya flour(1kg), glucose, mung flour(500g), rice flour(1kg), four samaposa packets, sesame, *rulan* and Nestomalt. This feed ration give daily with the purpose of improving health conditions of the weak elephants. Consequently, elephants in hotels require much more feed compared with others.

Orphanage also had a special feed ration, which include kitul leaves, kitul trunk, jack leaves, coconut leaves and mixture of other leaves which increase taste. These are bought from outside contractors. There are five baby elephants also in the orphanage. These baby elephants were fed in milk, in addition to leaves. Each baby elephant receive a packet of Lactogen per milk time and there were five milk times per day.

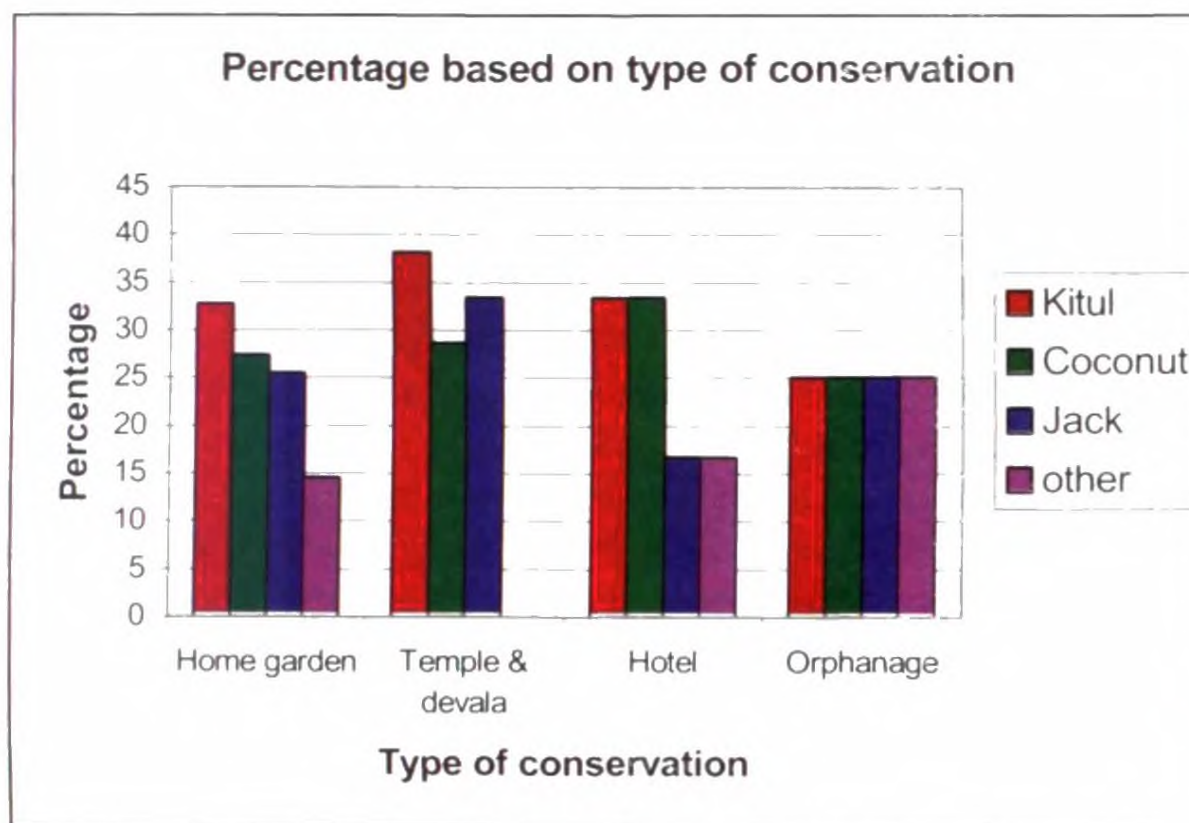


Figure 2. Feed types

### Feed availability

According to the results of the survey, feed availability is high among areas where captive elephants are reared. Most of these areas belong to wet zone, thus vegetation is available throughout the year. However, some of people who rear captive elephants in homegarden indicated difficulty in finding feeds while others experienced that it is extremely difficult to find the feeds (Figure 3). Though temples and devalas possess high amount of land area, they do not keep elephants in those lands, because of lack of water availability and feeds. Orphanage normally has enough amounts of feeds, as they purchase them suppliers from outside. Since orphanage is a government institution, their budget is covered through government fund allocation and in addition to that they earn huge income which could be able to spend buy feeds from out side suppliers.

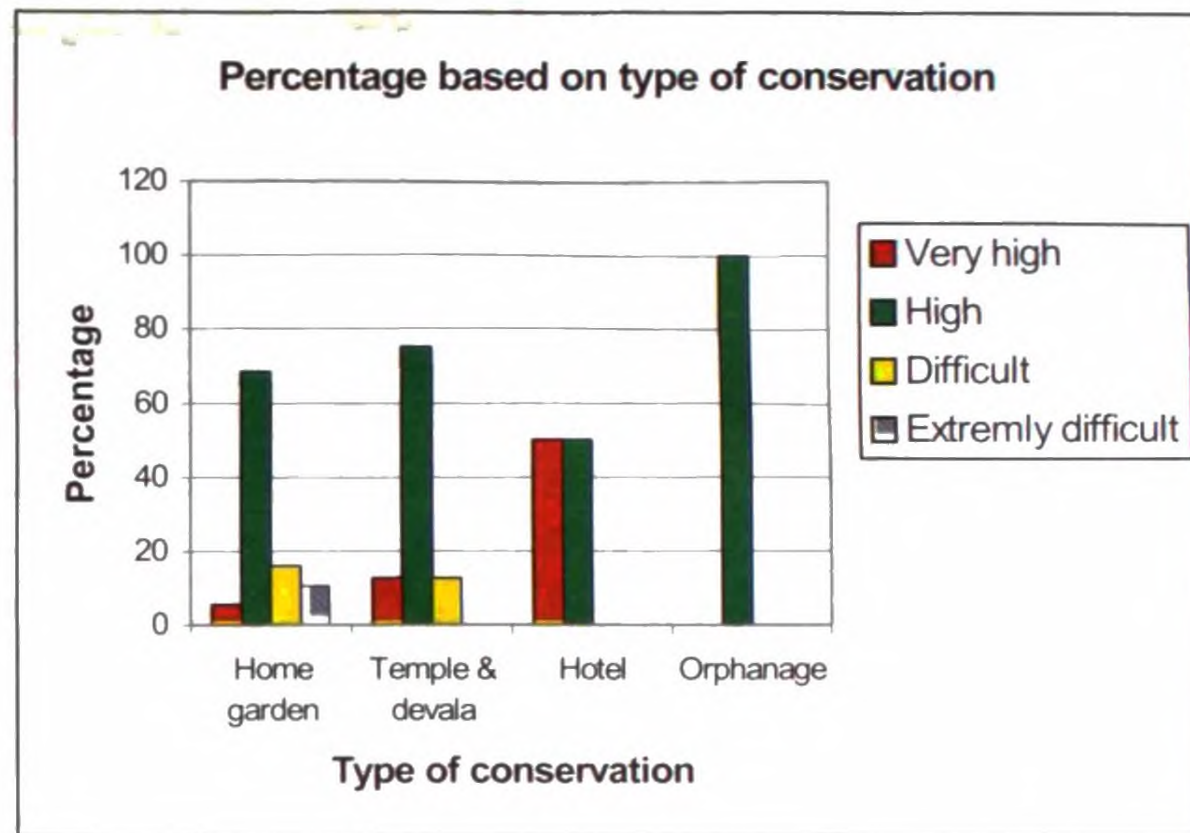


Figure 3. Feed availability

**Source of finding of feeds**

Elephant owners find the feeds for elephants either from freely or with some payment. All types of elephant owners buy feeds for their elephants (Figure 4). Since orphanage possesses seventy captive elephants, they cannot find such amount of feeds with freely, also they have enough amounts of funds to allocate feeds and as a result they totally depend on outside feed suppliers. Most of the people rear elephants in homegarden and temple and devala, owned large land areas. Thus they can find some amount of feeds with freely. Some elephants that are in hotels are reared by generation, hence they possess large land areas, and thereby they obtain part of elephant feeds with freely. However all types of elephant owners buy large proportion of feeds from outside suppliers and spend huge cost on feed.

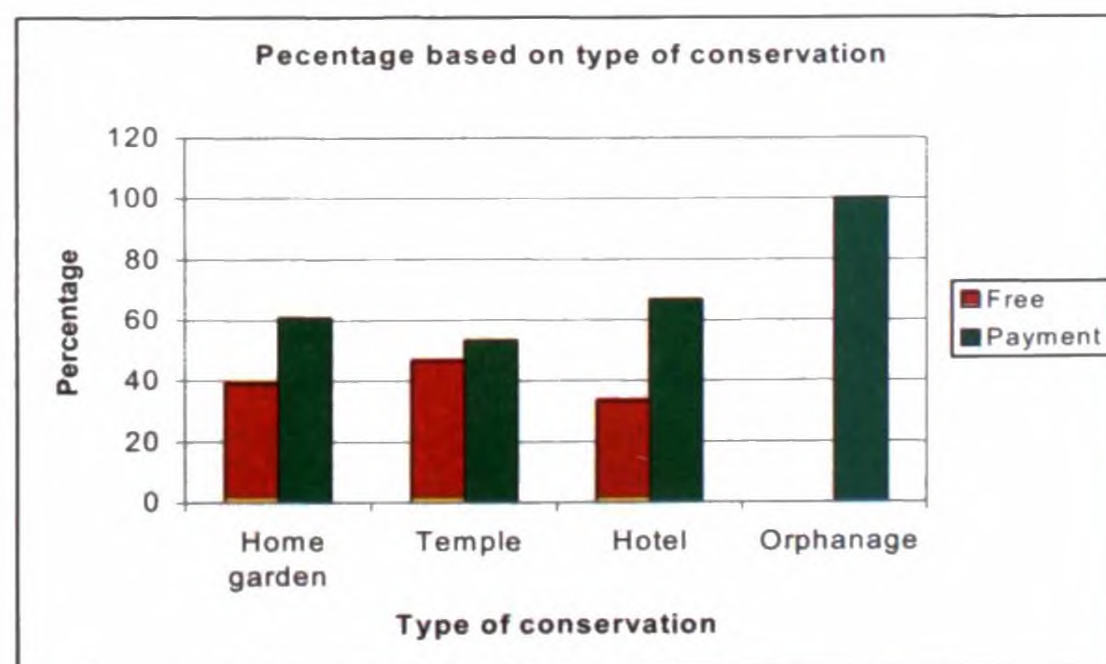


Figure 4. Source of finding of feeds

## Feed cost

Pinnawala orphanage incurs a very high feed cost per elephant relative to other conservation strategies, which is around Rs.3,64,285 (Figure 5). Temples and devalas also spend high cost for feeds of elephants, because they possess paddy fields and other income sources. As a result, they spend much on feeds. Since hotels concern about profit, they spend less amount of money on feeds. However, the elephant feed costs of hotel is Rs.300-500 /elephant/day and around 4-5 people take care for the food supply. Most food comes from the coconut plantations nearby.

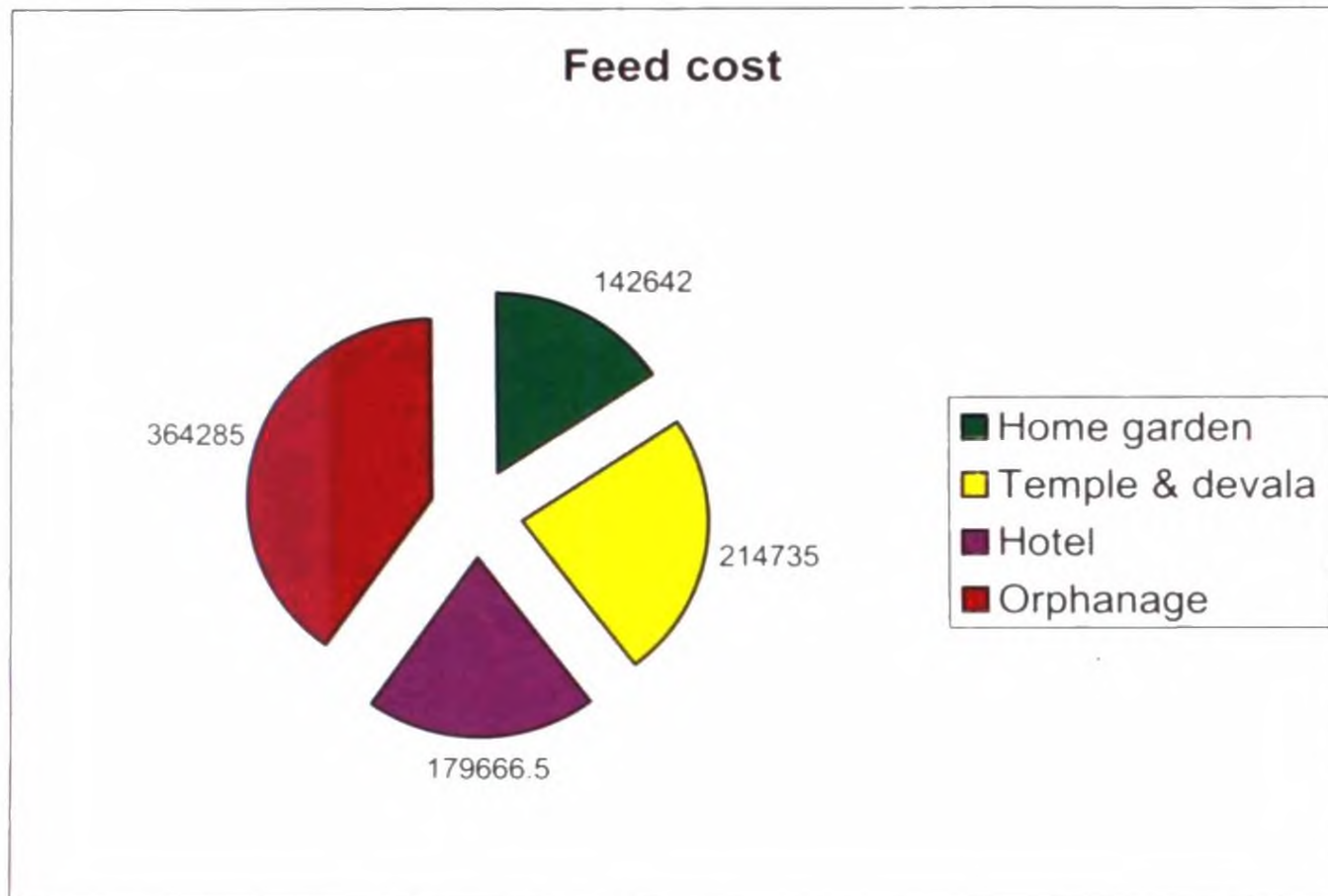


Figure 5. Feed cost

## Veterinary practices

### Type of veterinary practices

Both western as well as indigenous veterinary practices are used. However, use of indigenous veterinary practices diminishing due to number of reasons such as, lack of finding of indigenous veterinary doctors are difficulties of finding of these medicines,

Western veterinary practices are popular among elephant owners. Recovery rate is high with veterinary practices and western veterinary practices are highly available throughout captive elephant conservation areas.

People who rear elephants in homegardens and temples and devalas, mainly use both veterinary practices due to low cost while orphanage totally depends on western veterinary practices (Figure 6). There are two veterinary doctors attached to Pinnawala elephant orphanage and they give special vaccines

to the elephants. In addition to that keep litters in very clean. Regular check ups are practiced by the veterinary doctors in orphanage.

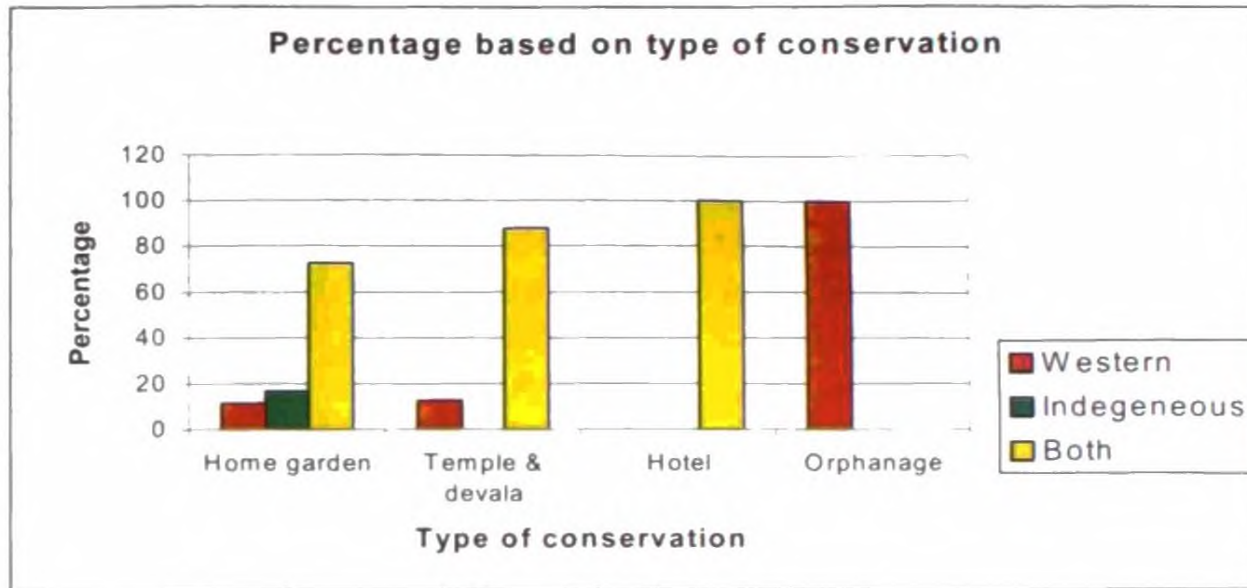


Figure 6. Type of veterinary practices

People who rear elephants in home gardens and temples and devalas, mainly use both veterinary practices due to low cost while orphanage totally depends on western veterinary practices (Figure 6). There are two veterinary doctors attached to Pinnawala elephant orphanage and they give special vaccines to the elephants. In addition to that keep litters in very clean. Regular check ups are practiced by the veterinary doctors in orphanage.

**Veterinary cost**

Highest veterinary cost is spent in homegardens, because there are two elephants that are weak and old thus owners spend high cost to improve their health status (Figure 7). Orphanage also spends much cost on veterinary practices. Elephants in orphanage receive vermicides in every four-month and when they sick, doctors give penadols and one dosage include twelve penadols. People rear elephants in home garden for social prestige are wealthier people. Therefore, they spend much cost on veterinary practices. Hotels do not much concern on veterinary practices, because of their main purpose is to obtain income.

Since elephants are large animals, providing of veterinary practices are cost effective, because owners have to give large dosage to recover elephants. Elephants are aggressive therefore providing veterinary practices incorporate with danger; as a result, owners have to spend much on the doctor's fee.

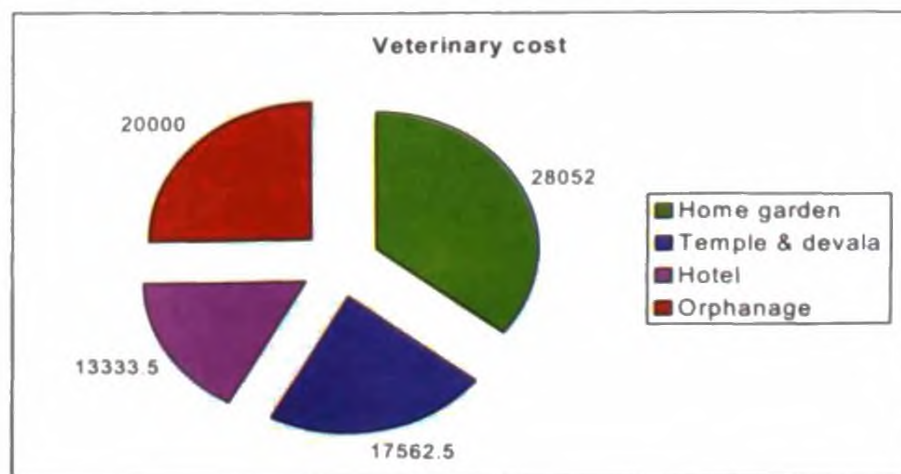


Figure 7. Veterinary cost

## Bathing facilities

Elephants mainly bathe in rivers. Since elephants are large animals, they need large water bodies for bath (Figure 8). Most of the captive elephant rearing areas belong to wet zone in Sri Lanka. As a result, water is available throughout year in those water sources. Difficulties in finding water sources are not a main problem among captive elephant owners. Rivers, lakes streams are found in those areas, such as Mahaweli river, Maha oya, etc. However finding of good quality water is difficult during rainy season is a problem among owners because of mixing of mud with water.

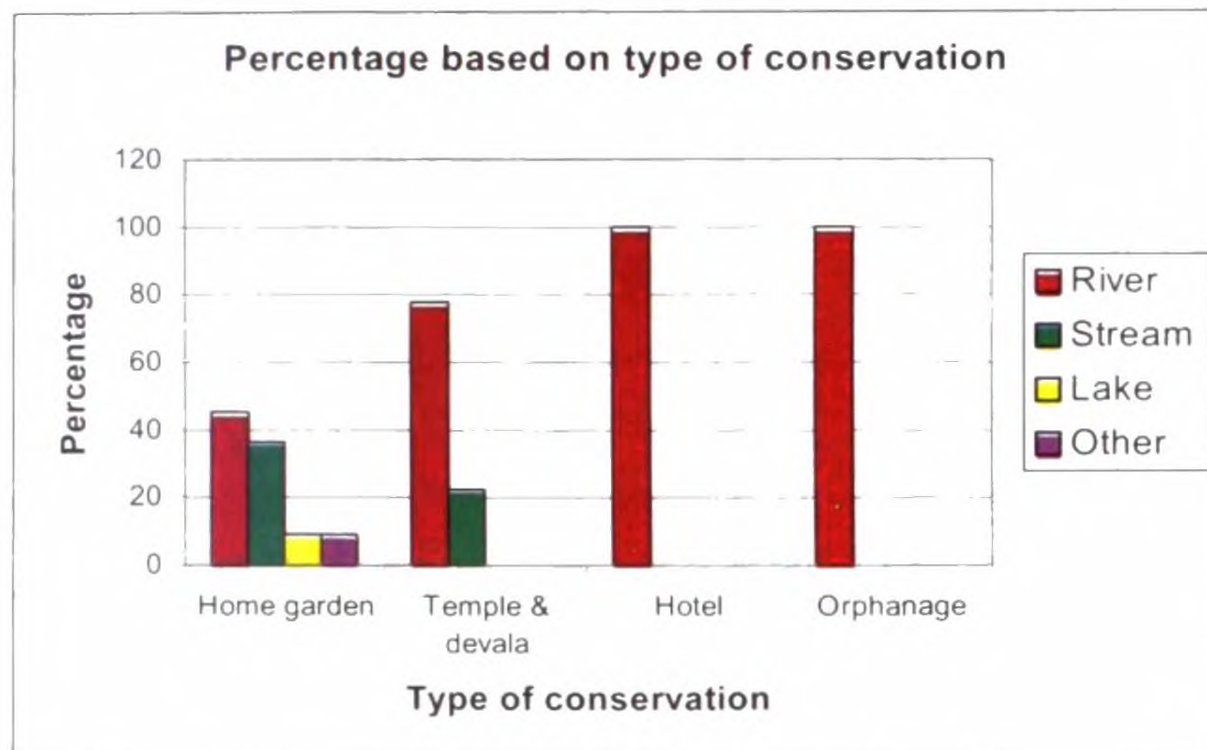


Figure 8. Bathing facilities

## Mahouts

The role of mahouts are crucial in captive elephant conservation. In most cases, owners hire one or two mahouts to handle the elephants in captivity. Since the elephants are so aggressive during musth period two mahouts are used to handle them. Captivity elephants need to be chained, however this will make them aggressive towards mahouts. Homegarden and temple and devala use two mahouts to control an elephant, while hotels and orphanage use only one mahout. Hotels and orphanage mainly concern about their profit. For that reason keeping two mahouts per elephant is an additional cost for them. As a result, they keep only one mahout to handle their elephants. However, some mahouts are coming from generation, therefore they possess enough skills to handle more than one elephants. In the orphanage, a mahout controls several captive elephants. Number of mahout per elephant, is an important issue to provide better care and attention for elephants.

Wages of mahouts are important issue due to a number of reasons Low wages leads to low level of living of mahout population and it leads to less care to elephants by mahouts. On the other hand, high mahout wage rate will alter the profits of keeping elephants. The study revealed that mahouts serve in hotels and the orphanage, receive Rs.3500- 6000 wage per month (Figure 9). When elephants participate to processions, owners receive income and most of the time this

income goes to the mahouts. Most of the mahouts in hotels receive around Rs.6000.00 per month. However, it was found that some temples and devalas do not provide desired wage for mahouts, because these mahouts are coming from generations and temples and devalas give lands for those mahouts on behalf of wage. Instead they are asked to find work and earn money. Elephant owners give high wage rate to mahouts otherwise opportunity cost of being mahout is high. Wage rate is a sensitive factor, because most of the mahouts receive low income, which is not enough to cover cost of living. Consequently, they live below the poverty line. In addition to that social level of being mahout is low, so the perception management is needed to improve the social status of mahouts. This can be done by giving them a uniform and a higher salary or simply by changing the name of the job.

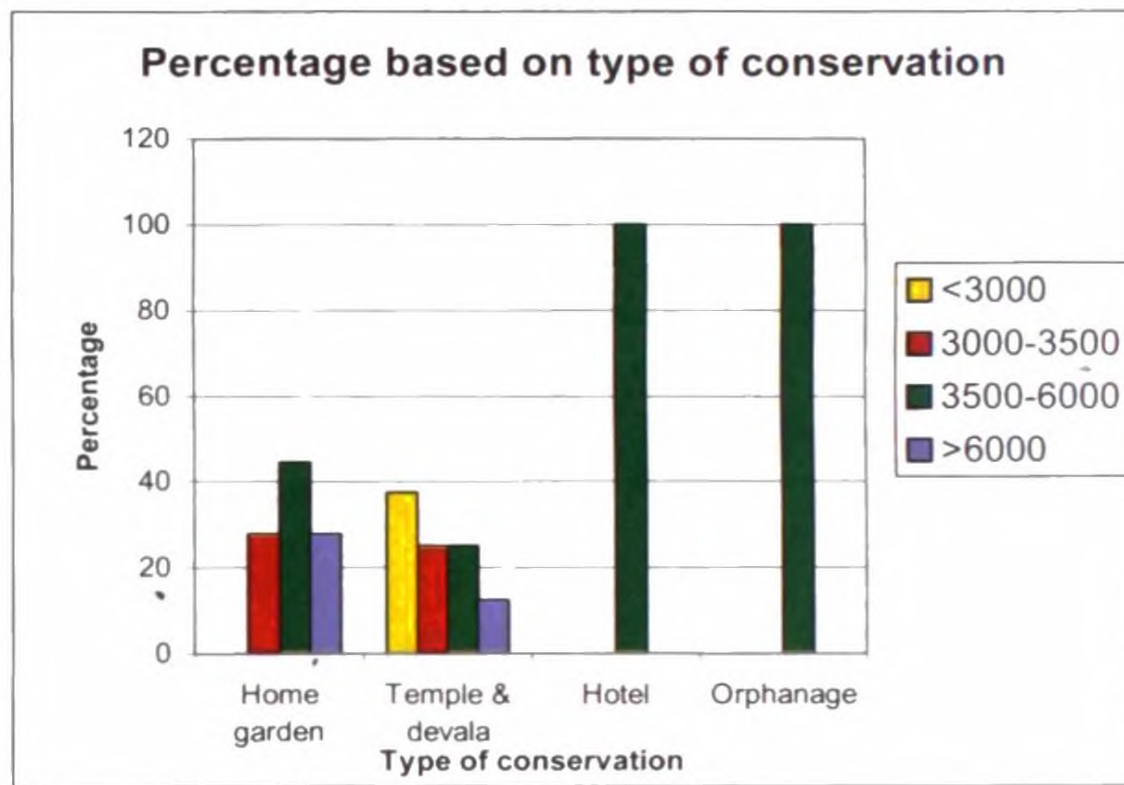


Figure 9. Mahout wages

**Purpose of rearing captive elephants**

Mixed use strategies, allowing for one or more purposes will yield positive impact of domestication of elephants. So that most of the elephants rear in homegarden (43%) for social prestige and they keep elephants as symbol of their wealth (Figure 10). In addition to that, some elephant owners (21.62%) keep elephants for logging and tourism activities. Most of devalas and temples rear elephants to use in pageants. Number of elephants in procession is declining with time. As a result attractiveness of that procession's get reduces and most of the temples and devalas want to rear more number of elephants. The new trend of captive elephant rearing is, use these elephants for tourism activities. Setting up eco-tourism projects could be a source of income for farmers during the dry season. Hotels and orphanage earn more revenue directly and indirectly due to rear elephants. The elephants in orphanage are going to train for procession like cultural activities and they are very concerned about the well being of our animals and that is the reason why they will not sell elephants to the private owners. Tourism profits were not the main goal to start the safaris. The general idea was to safe the domestic elephants that had been used in the logging industry. In fact

most elephant owners did not have enough money to take good care for their elephants.

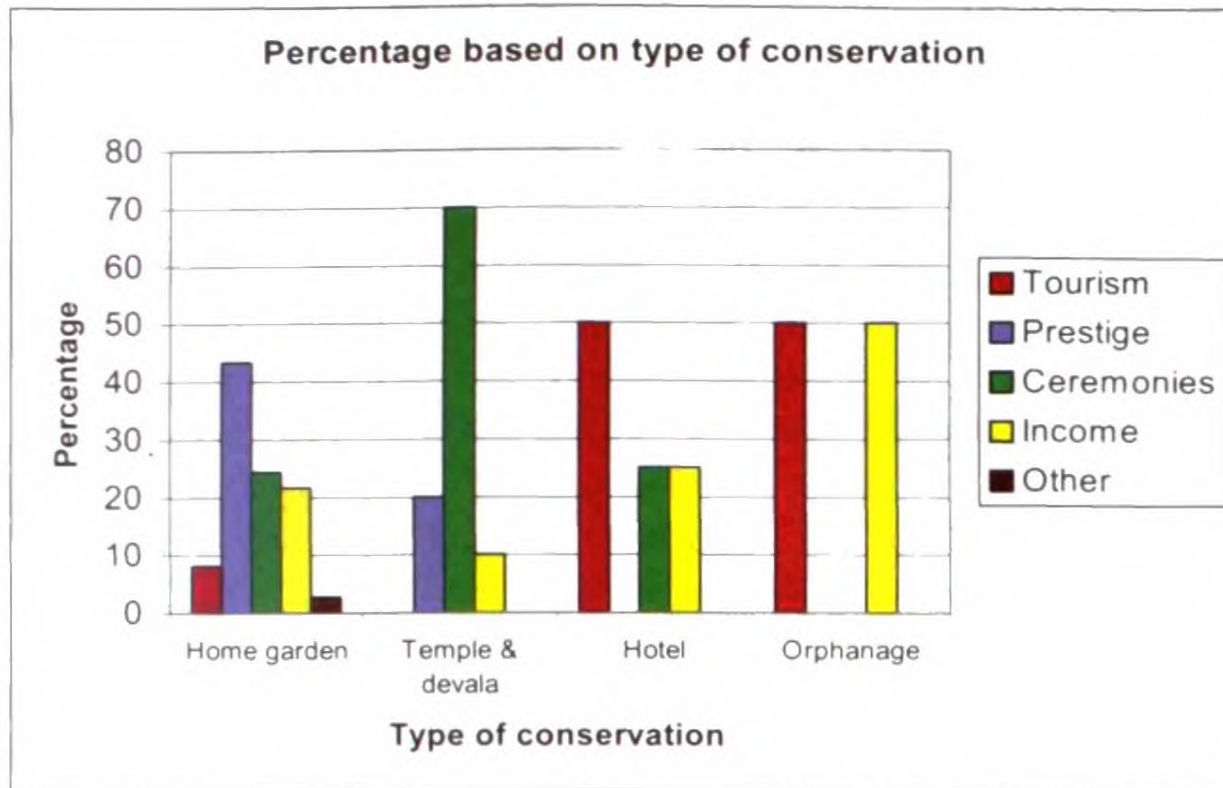


Figure 10. Purpose of rearing captive elephants

### Revenue and costs

The economic justification for rearing captive elephants can be found by considering revenue and costs. In Orphanage and hotels revenue exceeds the costs thus hotels and Pinnawala elephant orphanage enjoy profits by rearing captive elephants (Figure 11). Orphanage possesses seventy captive elephants and it is the only place in the world where people can see such a large herd of captive elephants. As a result most of foreigners as well as local people visit the Pinnawala elephant orphanage to get an experience from this rare occasion and most of them prefer to see feeding on baby elephants and bathing of elephants. In orphanage huge amount of income comes from the entrance fee. The price of ticket of adult foreigner is Rs.500, child is Rs.250, local adult is Rs.50 and from local child is Rs.25. In order to bring video cameras they pay Rs.500-1500. During season, about 500 foreigners and about 500 local people visit this place daily. In addition to that earnings 10% of the total annual income of the Maximus shop goes to Pinnawala. Medical costs, feeding and other management, without the salaries, is between Rs.50 and 75 thousand a day. Hotels organize some elephant related activities such as elephant rides, safaris, processions, mock war, etc and they pay Rs.400 from foreign and Rs.50 from local person. In addition to elephant related activities they practice some other income related activities which gain profit for the hotel. Temples and devalas received least income due to keep elephants. Most of the temples and devalas and some of people who rear elephants did not use elephants to earn profit. Because those people keep elephants for prestige and temples and devalas keep elephants to participate ceremonies. In addition to that, people participate their elephants to participate ceremonies, however do not obtain income from those activities. Also some people possess vehicles to transport their elephants. As a result, maintaining cost of elephants is high.

The temple of the tooth relic used to have 100 elephants. However they are becoming old(60% is older than 50). As a result temples need more elephants. Specially, during July to September most of temples in Sri Lanka held processions and elephants are used to decorate them. As a result during that period temples suffer lack of elephants.

In Sri Lanka, company started called 'Maximus' produce recyclable paper using elephant dung. One elephant produce around 80kg dung a day and with 10kg dung can produce 120 sheets of rough paper equal to 720 A4 size sheets. Thereby it gives economic values to elephants dung and creates more awareness for elephant protection. In future they expect to collect elephant dung from areas where people suffer from human elephant conflict. This will create positive intention on elephant conservation among the people suffered human elephant conflict. The annual turnover of the Maximus is around US\$ 250,000 and it contributes to national income of the Sri Lanka.

A captured elephants costs now around 2 million rupees and a tus between 4 and 5 million. There is a huge demand for captured elephants and very difficult to get, because the owners do not want to sell their elephants and it is not allowed by DWLC to capture more elephants from the wild. In 1985 Captive Elephants Owners Association (CEOA) was founded and there has been demonstration against the governmental policies to get more elephants to private owners. The CEOA wanted the possibility for the owners to buy elephants from the Pinnawela elephant orphanage, captured from the wild, or other imported elephants.

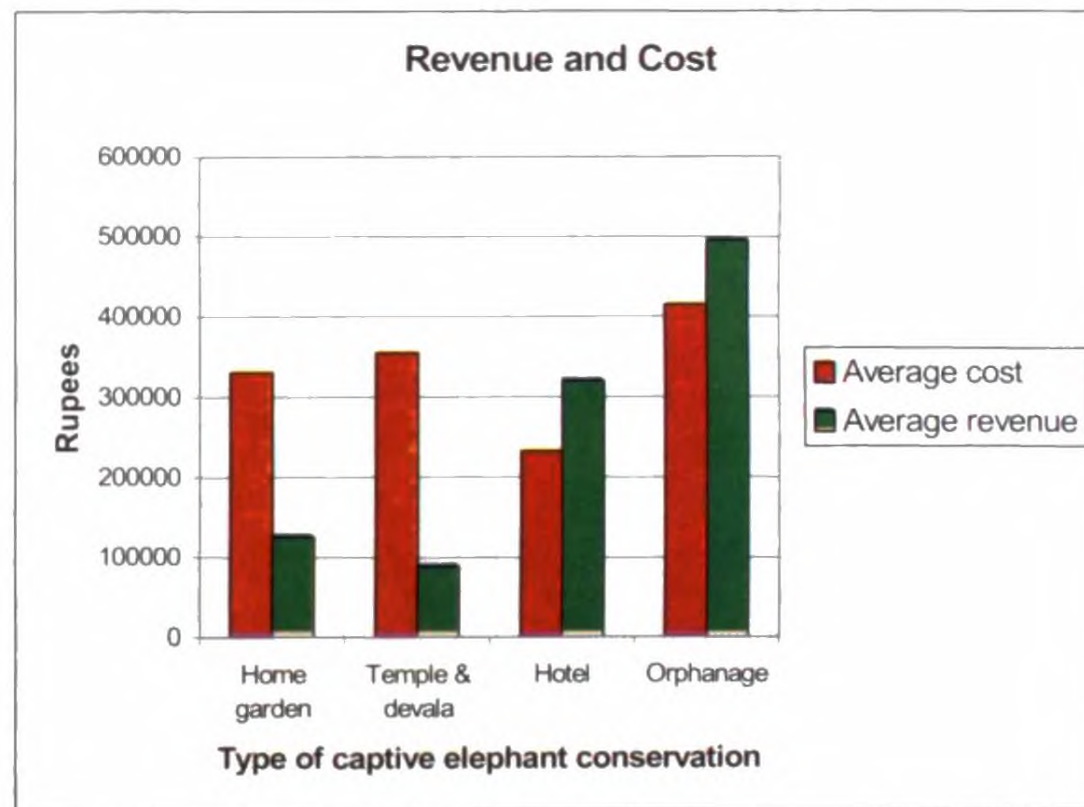


Figure 11. Revenue and costs

## Importance in captive elephant conservation in Sri Lanka

Table 1. Significance of captive elephants in Sri Lanka

Keeping system	Economics		Religion	Urban	Education	Ecology	Total
	Owners	Mahouts	Social	tourism		forestry	
Temple	2	1	3	0	1	0	7
Homegarden	3	1	3	2	1	2	12
Hotel	3	1	1	3	1	1	10
Orphanage	3	2	0	3	3	0	11

▪ 0=not significant 1=low 2= moderate 3= relatively high

A highest total mark is given for elephants keep in homegarden and it is followed by the elephant's keep in Pinnawala elephant orphanage(Table 1).

Elephants in homegarden are mostly used for religious activities and also for logging, elephant safaris and rides like income generating activities. As a result, owner receives somewhat high income from the elephants. Most of the elephants in Pinnawala elephant orphanage frequently use for educational and research activities, income generating activities like tourism. In addition to that the elephant dung in orphanage is used as fertilizer for the coconut palms, banana and rubber trees. The orphanage possible attractions could be elephant watching, and specially on feeding of baby elephants and everyone wants to feed them. For entertainment, elephant watching works already very well. Elephants in hotels create lot of money for the owners, however they pay less for mahouts. Mainly these elephants are used for tourism activities and rarely use for educational and research activities. Temples and devalas use these elephants mainly for religious activities and rarely use for educational, tourism like activities. Temples and devalas do not use these elephants to generate income.

### Problems associated with captive elephant rearing

Both elephant owners and mahouts face a number of problems, when keeping and handling elephants. When handle some elephants, there are some incidences that some the mahouts and indigenous veterinary doctors were killed when elephant becomes musth. During this time elephants damage to the properties of other people and owners have to bear financial compensation for damages. As a result of reduction of forest coverage, finding of feeds for elephants were much more difficult. Since elephant is a large mammal, should give large dosage of medicines compared with other animals which is much expensive for elephant owners they need large water bodies to bath. Therefore, finding of bathing place during drought period and rainy period is a much more difficult. Indigenous veterinary practices are shared by all among captive elephants, nevertheless finding of veterinary practices become difficult among elephant owners. Some mahouts who handle elephants in temple and devala do not receive wage from the owners consequently mahouts attempt to get more

works from the elephants. Some people give liqueur to mahouts and endeavor to get more work from elephants, which exceed their carrying capacity. This will result early death among captive elephants. Some mahouts put less care on elephants and mistreat the elephants that lead to early deaths among captive elephants. With the popularization machinery, the number of work available per elephant declined with time and owners receive lower income and keeping an elephant become much more difficult. Although Pinnawala elephant orphanage is a better place for elephants, number of mahouts in this place is very low and elephants do not receive required degree of care and attention from the mahouts. DWC wants to register every elephant owner for Rs.500, however owners will get nothing in return. For killing an elephants have to pay Rs.5000 and most of the time murders are set free without charge. As a result, elephant owners do not register in DWC.

### CONCLUSION

This study aimed at investigating the economic and social aspects of captive elephant rearing as measures of conservations of elephants in Sri Lanka. The following conclusions can be generated according to the results of the study.

Rearing of elephants in homegarden and temple and devala, face a number of problems such as finding of feeds, finding of mahouts, high maintenance cost, difficulties in finding of water during drought and difficulties in finding good quality water during rain and mahouts are less care and mistreat the elephants, etc. Nevertheless, they prefer to rear one more elephants with the intention of social prestige and to use for ceremonies.

As stated in results and discussion, still there are ample amounts of feeds available throughout the captive elephant conservation areas. The average income of mahout range between Rs. 3000.00 – 7000.00 which is not adequate. Hotels and orphanage enjoying profit. The annual profit of the orphanage is about 5 million, while hotels gain Rs. 80,000.00 annually from an elephant. Orphanage spends Rs.3,64,285.00 annually for feeds of an elephant and spends highest feed cost per elephant. People who rear elephants in homegarden spend remarkably highest cost on veterinary practices of an elephant (Rs.28, 052)

As indicated in problem justification, captive elephant conservation methods should be economically sound. However with the mechanization, the elephant gets less draft work thus captive elephants become wild elephants. Consequently, since hotels enjoying with profit, can recommend rearing elephants in hotels, which has high demand for elephant safaris, rides, etc.

The captive elephants in orphanage are not tamed. As a result, people unable to move closer to elephants. Therefore, tamed captive elephants can be used establish an elephant park, which is economically sound. A park could create awareness of both tourists and local community, creating income possibilities for community, mitigating human elephant conflicts in the short term and contribute to the conservation. Establishing an elephant park is win win situation for both elephant owners and people who take pleasure from elephant related activities.

## ACKNOWLEDGEMENT

I express my sincere gratitude and appreciation to my supervisor Dr. L.H.P.Gunaratne, Senior Lecturer, Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya, for his valuable advises, encouraging guidance and persistent throughout this study.

## REFERENCES

- Chadwick, D.H. (1991). Elephants –Out of time and space: National Geographic. Quoted in T.N.Samarasinghe. An economic assessment of damage caused by the wild elephants in villages around Ritigala strict nature reserves. B.Sc.thesis., University of Peradeniya,2000.
- Eltringham, S.K.(1992). The Return of the illustrated Encyclopedia of elephants. Tiger paper. Quoted in T.N.Samarasinghe. An economic assessment of damage caused by the wild elephants in villages around Ritigala strict nature reserves. B.Sc.thesis., University of Peradeniya,2000.
- Gokula, V. and Vardharajan, M. (1996). Status of temple elephant management in Tamil Nadu, Southern India.Gajah15:37-40.
- Jayewardene, J.(1998). Captive elephants in Sri Lanka: status, distribution and numbers. Nature 4:13-18.
- Kurt, F. and Maze, K.U. 2003.Guidlines for the management of captive Asian elephants and the possible role of the IUCN/SSC Asian Elephant Specialist Group. Gajah22:30-41.
- Lair,R.C. (1997). The care and management of the Asian elephant in domesticity. Rome: FAO, 1997. Thailand.
- Williams, A.C. and Jahnsingh, A.J.T. 1996. Elephant capture in Meghâlaya, Northeast India- the past and the future. Gajah17:1-5.
- The care and management of domesticated Asian elephants in Sri Lanka[on line]. Thailand: Jayantha Jayawrdena. 2001[cited 16 December 2004]. Available from internet <http://www.fao.org/DOCREP/005/AD031E/ado31eov.htm>