

Study on illegal sale and transfer of live elephants from Assam

Chaturbhuj Behera, IFS

Regional Dy. Director, Wildlife Crime Control Bureau, Kolkata

Abstract:

Assam has a glorious history of its association with elephants, of taming wild elephants for domestication and harbouring maximum number of wild and captive elephants. Abrupt fall in the forestry activities since 1996 and subsequent deterioration in economic conditions of the elephant owners have spurred sale of captive elephants from the state in the face of public outcry, administrative and legal restrictions, and have created inter-state nexus for smuggling.

To study the cause and process of smuggling, the dynamics of demand and supply in the market, and the effectiveness of counter-measures initiated by the Government, analysis has been done in the following broad areas: (1) Trend of transfer of captive elephants from Assam (2) Implementation of micro-chipping programme in Assam (3) Legal provisions regarding elephant transfer (4) Crime networks involved in elephant trafficking and their modus operandi (5) Role of Sonepur mela on sale of captive elephants (6) Steps to check illegal transfer of elephants.

The illegal trade has declined over the years and is prevalent in a low-scale by circumventing the procedural norms. Steady downward trend of trafficking gives indication that the amended laws and regulations have been largely successful in curbing the illegal activities. Poverty of elephant owners complement the demand from the temples in South India and have kept the trade alive. Complete inventorization and micro-chipping, and absolute compliance with the guidelines can ensure a permanent rein in the trade in the future.

Key words: Captive elephant, ownership certificate, micro-chipping, transfer, illegal trade

1. **Introduction:**

Captive elephants were maintained by Indian rulers since the ancient time for warfare and transportation. Historical records indicate that maximum number of captive elephants was kept during Mauryan period in 3rd century B.C. and the Mughal period in 17th Century. The culture continued even during the British period. Records reveal that 30,000 to 50,000 wild elephants were captured especially in the north-east of the country (Sukumar 1989). The capture of wild elephants and taming them for various uses has been a part of Assamese culture. Every year elephant festival is observed in Assam with pomp and grandeur under the state patronage. The respect for elephant has not withered although people die every year due to elephant trampling, and enormous damage is inflicted on crop and dwelling houses.

The need and relevance of maintaining captive elephant has drastically fallen over the years and demand of use has shifted. The stagnancy in captive elephant population can be attributed to number of factors, including modern transport facility and changed life style. Ban on logging operations after the Supreme Court ruling on green felling has devastated the timber industry in the North-East and caused economic loss (Godavarnan case, Rosencranz, 2007). It has created joblessness and aggravated the plight of the elephant owners. Stricter legal provision on possession and transfer of elephant has also created hurdles for the owners. Owning an elephant is now more of a liability for its high cost of maintenance.

Captive elephants can be classified based on the ownership types (government owned, private-owned) and on the predominant work performed by the elephants. The elephants are used in circus, temples, forest camps, zoological gardens, travelling and begging. Specially trained elephants called “Kunki” are employed to capture wild elephants or rogue elephants. Study by

Project Elephant reveals that 75 % captive elephants are owned by private individuals, 6 % by temples, 2 % by zoos, 3 % by circuses and 14 % by state forest department..

There are about 3400-3600 captive elephants in the country, with 1903 to 1970 in North-east, 860 to 920 in South India, 271-300 in North India, 79-92 in West India and 78 in Andaman and Nicobar Island. Assam has around 1290 captive elephants (Census 2000) and 5281 wild elephants (Census 2007-08). There has been exodus of elephants from Assam and Arunachal Pradesh to other states, especially South India. Again, Kerala is the main destination, which uses these domesticated elephants for the temple purposes. It has promulgated Kerala Captive Elephant (management & Maintenance) Rules, 2003 for the welfare and upkeep of captive elephants. This has influenced the Government of India to lay down systematic procedure and guidelines for the entire country.

The domesticated elephants received importance under the Wildlife Protection Act, 1972 after the amendment of 2002. MoEF had set up an Expert Committee in 2003 under the Chairmanship of Mr. S. C. Dey, Ex-ADG to study the status of captive elephants in India. The Committee gave several recommendations for welfare and management of captive elephants. It included guidelines on ownership certification, transportation of elephants, housing facility and culling of tusks.

The states followed the norms and guidelines to stop illegal practices after 2004. The objectives were largely fulfilled although some shortfall in registration and issuing of ownership certificate against the actual number of captive elephants remained unresolved. NGOs allege that calves are captured from the wild and tamed by Mahouts. The criticism prompted the authorities to look into the quantum of the illegal transfer, source and process of transfer, and modus operandi adopted to evade the existing guidelines.

2. Materials and methods:

The information was collected mostly from various Divisions of Assam, office of the Conservators and the Chief Wildlife Warden. I had visited Divisions of Doom Dooma, Tinsukia, Karimganj, Jorhat, Silchar, Bokaghat and Kokrajhar, which have majority of captive elephants.

Study was made in the inter-state check posts of Assam to know the process of identity verification of the elephants and scrutiny of documents while elephants are transferred to other states. Discussions were held with the zoo officials, who were involved in the micro-chipping process, to elicit information about the technical dimensions of micro-chipping and the issues pertaining to the programme.

Two important cases-one in Karimganj Division and the other in Kokrajhar Police station- relating to seizure of captive elephants during smuggling, and arrest of a few accused were followed up systematically to study the modus operandi of the crime, attitude of people towards illegal smuggling and level of enforcement practiced by the agencies in Assam.

The role of Sonapur mela as a market of illegal sale was also studied by personal visit to the site during the fair in 2010. The record of forest department relating to the elephants coming to the mela was also analyzed to determine the market mechanism, trend of elephant smuggling and age-distribution of the elephants.

The issues of the illegal trade have been carefully assessed with logical interpretation of data combined with personal observation in the field. Both inductive and deductive logic have been adopted in the analysis of the socio-cultural, economic and administrative problems leading to non-compliance to the prescribed rules and regulations.

3. Results and discussions:

3.1. Trend of elephant transfer:

The ban on green felling drastically reduced logging operations and forestry activities in Assam. The elephant-owners became jobless, and without having any alternative, considered it expedient to sell the elephants. Some of the elephants were used by the department for tourism, patrolling and some essential purposes. In the ensuing period, demand from South India and some other parts of the country provided a favourable market to address the pressing need for elephant sale.

Elephants transferred from Assam gradually diminished from the year 2006 to 2010. This is an encouraging trend to the enforcement agencies and law-makers. There was a constant resistance from all sources against the illegalities and irregularities which reduced the transfer to outside states. Assuming the data of 2005 an aberrated one due to change in Act, data of the subsequent years can be fit to the following equation.

$$y = 188.32e^{-0.724x},$$

where x= th year (2006 is 1st year & x=1, 2007 is 2nd year & x=2, so on)

Out of 188 elephant transferred, 133 were sent to Bihar, 34 to UP and transportation for other states was negligible. The elephants were routed to Bihar and UP for selling them to other states in Sonapur mela or otherwise since the market and nexus was operating through these states. On the other hand, the area falling under Eastern Assam Circle was the leading source of smuggling, which was due to presence of more captive elephants in the Divisions under the circle.

Figure 1: Year-wise transportation of elephants from Assam since 2005 (Data source: the official record of the Assam Forest Department)

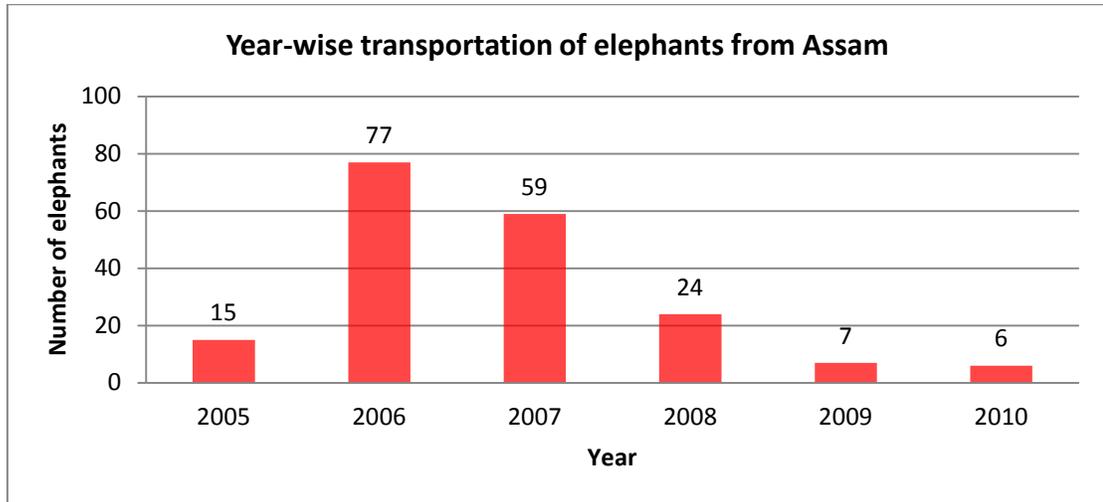


Figure 2: Share of elephants of the destination states of elephants smuggled from Assam (Data source: the official record of Assam forest Department)

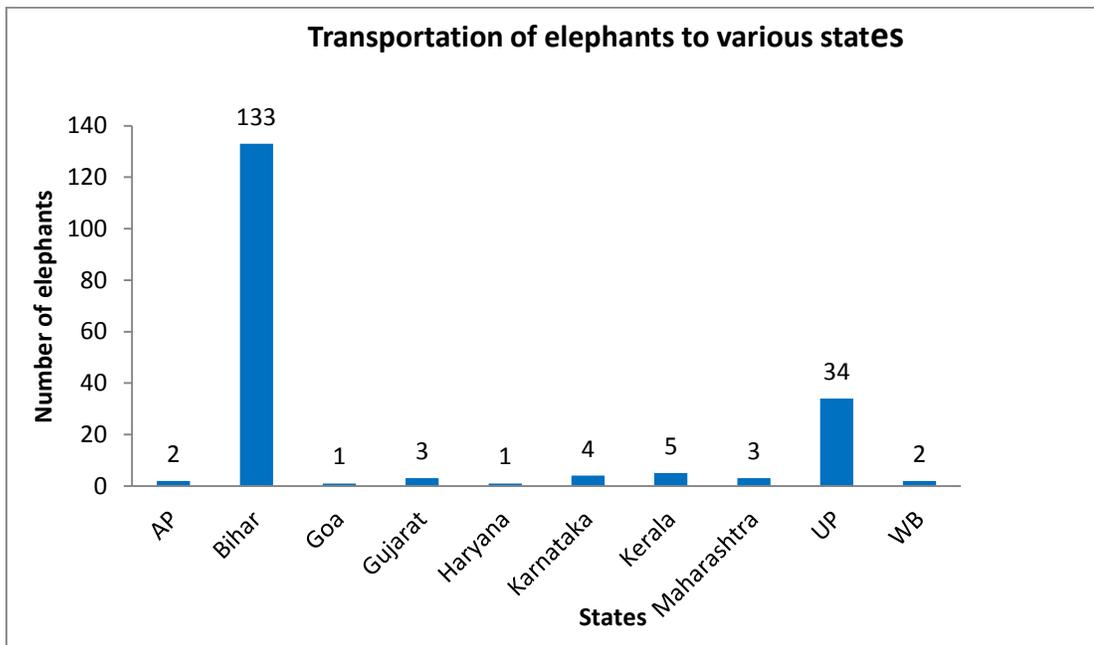
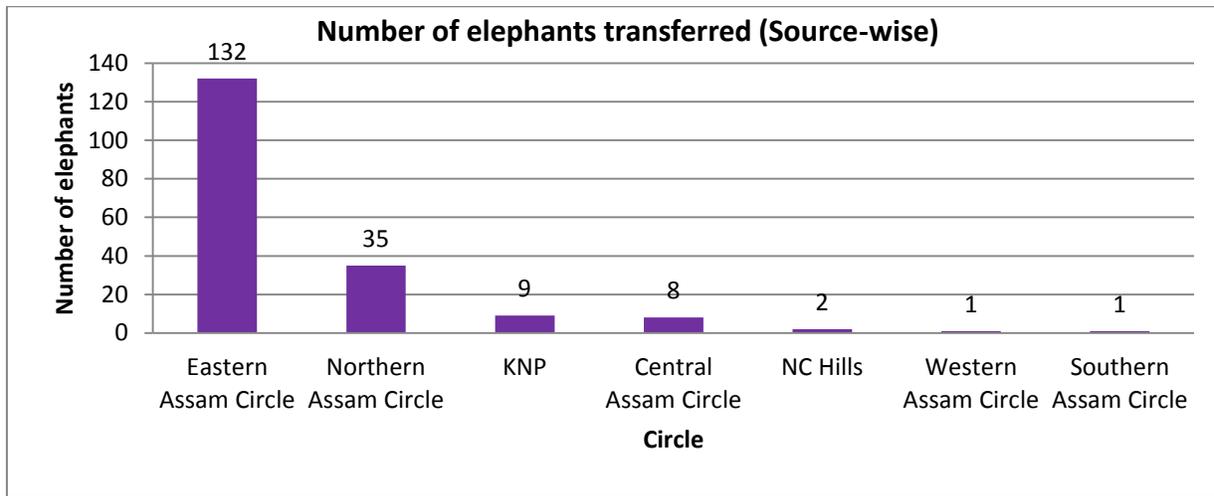


Figure 3: Source area of elephants smuggled from Assam (Data source: the official record of Assam forest Department)



Allegations are made by civil society on the trading of calves with the grown-up captive elephants. Taming wild elephants other than calves is a daunting task and it can't be done without subjecting the elephant to continuous torture such as deprivation of food and water and freedom (Fred Kurt, 2005). Locals in Doom Dooma, Tinsukia, Jorhat, revealed that young ones are occasionally captured and tamed by the elephant trainers. To eliminate such possibility of illegal trade of calves, it has been made mandatory to report pregnancy of female elephants for registration of birth of calves. However, this condition is rarely followed by the elephant owners. In case of transfer of the calves to outside states, the birth certificates are not alone sufficient. DNA testing of the calves has to be made by matching its blood samples with that of the mother.

The cases point out that there are fraudulent gangs operating in Nawgaon, Hujai, who are making fake documents. The Karimganj case reveals that elephants can be transferred out of the Division with fake documents and even without transport permit by any impersonating owner. Within the state, transportation from one Division to another is not strictly checked. Once the elephant reaches the border areas, it can cross to other side of the fence without much problem.

5.5. A view of micro-chipping programme in Assam:

Micro-chipping of the elephants has helped to enumerate and identify the animals at all locations. The Government had opted for radio frequency identification (RFID) technique with Active Reader Passive Tag (ARPT) system for the purpose. The tags used were without battery, cheap and easy to implant, and had factory-assigned serial number. The chip (transponder) is injected intramuscular or subcutaneous at the base of the left ear and the reader, used for reading the identity in the transponder. (Somgrid, General Health Care in Captive Asian Elephant). It was mandatory and a prerequisite condition to get the elephants tagged with micro-chip to obtain ownership certificate. Micro-chipping camps were conducted at the Assam, State Zoo, Guwahati and Kaziranga NP in various phases to cover all the captive elephants of the state. During the programme, external features and the body condition of every animal were also assessed. This was done on the evaluation method prepared by V Krishnamurthy (Wemmer, et al. 2006) which considers physical features like temporal, scapular, thoracic, flank, lumbar and pelvic regions, extent of depression or visibility of body protuberances.

Some of the elephants micro-chipped during 2003 had been taken to Nagaland and Arunachal Pradesh, without procuring the certificate of ownership from the department. The elephant owners were renting the animals to the logging contractor in Nagaland on contract through agents and didn't withdraw them from Nagaland territory for fear of retaliatory killing. The department had given enough opportunities to produce the animals for physical verification and to obtain ownership certificates. But many owners had failed to complete the entire process, leading to shortfall in ownership certificates when compared to the number of micro-chipped ones. The result of the microchipping programme is summarized in the table below:

(Table 1: Abstract of micro-chipped elephants and number of ownership certificate issued)

Male elephant	446
Female elephant	700
Total number of captive elephants	1146
Certificate of ownership (CO) issued	660
CO under process	93
CO not applied	393

Field level functionaries face enormous problem during checking and monitoring of the elephants due to the non-compatibility of micro-chip readers. There were 05 series of micro-chips and 03 series of micro-chip readers used by Forest Department. Assam Forest Department was the nodal agency for purchase of micro-chip readers for Assam and Arunachal Pradesh. The readers were purchased by the office of the Chief Wildlife Warden or the Assam zoo from three companies- A-Boca BV, Trovan (Type: LID 571), Trovan (Type: LID 560)- which led to the confusion and non-compatibility.

The following facts emerged regarding the micro-chip readers:

- i. The micro-chip readers are rarely functional and hardly in use in the field to detect the micro-chip of the elephants. The functional micro-chip readers also fail to detect micro-chip of different series, which is a technical jolt to the programme.
- ii. The micro-chip number is not verified in the inter-state border during transportation. Out of the two inter-state check-posts between Assam and West Bengal, reader is available at Chagolia and there is no micro-chip reader at Srirampur.

- iii. Forest officials of other states are not conversant with micro-chipping technology and procedure adopted in ascertaining the identity of the elephants.

5.3. Legal provisions of elephant transfer and their practicability

Elephant is a schedule animal and covered under the Schedule-I of the Wildlife (Protection) Act, 1972. The registration and ownership of live elephants is regulated under special provisions as an exception and contrary to other Schedule-I animals. Section 40 (2A) which allows the registration without inheritance, does not apply to live elephant. Further, it is stipulated under section 43(1) that elephant can be transferred only for non-commercial purpose. However, nature of transfer even when done for commercial purpose, the fact cannot be proved by any agency.

Sec 40 (2A):After the amendment of the Act in 2002, no person other than a person having a certificate of ownership can keep any captive animal, animal article or trophy specified in Schedule I or part II of Schedule-II, except by way of inheritance. However, the section does not apply to live elephant.

Section 43 (1): No person having in his possession captive animal, animal article, trophy shall transfer by way of sale or offer for sale or any other mode of commercial nature

The Assam Forest department faces enormous pressure from the elephant owners to allow the transfer of elephants, which is objected by NGOs, conservationists and animal-lovers. The state officials argue in favour of liberal implementation of the provisions in view of the socio-economic condition in Assam, especially of the elephant owners and Mahouts. General views are as:

- (1) Sale and transfer of elephants should be allowed on the consent of the two parties. The poor owners cannot be coerced to maintain the elephants which cost about Rs 15,000/- to Rs 20,000/- per month per elephant.
- (2) The guidelines issued by the Central government have been prepared keeping in view the interests of captive elephants in temples of South India.
- (3) The states may take over the elephant after payment to the owner and keep the elephant in the “elephant care centre”. The centre needs to provide financial assistance to the state for construction of “elephant care centre” and expenses to maintain the elephants and to pay to the care-taking establishment.
- (4) “Transfer” of elephant from one state to another state does not take place without any tacit understanding of commercial nature. The state agencies cannot ensure a truly non-commercial transaction between any two parties.
- (5) Nature of possession and use of elephant in Assam is not comparable with that of South India due to historical and socio-economic reasons. Recent proposal to include “Guardianship” will open up more complicated mechanism for captive elephant transfer.
- (6) The transfer is inconsequential when the transferee states care for the captive elephants. Some are of the view that better care and maintenance can be extended by the rich temples in South India in comparison to the poor Mahouts of Assam, who themselves are poverty-stricken and poorly fed. Rich landlords acquiring the elephants may be

5.4. Guidelines and procedure of elephant transfer-Process study

The Expert Committee of MoEF, under the Chairmanship of S.C. Dey, prescribed norms to eliminate the shortcomings in the legal provisions and regulations relating to acquisition of

captive elephants. It suggested fresh survey of the captive elephants in their states and union territories within a span of six months. Assam Forest Department, in accordance with the latest regulations, gave opportunity to the owners to get Certificate of Ownership (CO) within 15/1/2010. Only the owners of micro-chipped elephants were eligible to secure the Certificate of Ownership after physical verification of elephants by the staff. As per norms, fresh CO should be issued in the prescribed form for a period of five years and should be renewed every five years in case there is no violation of the norms to be followed.

Under the new guidelines of MoEF, Illegal elephants i.e those which have not been declared under the declaration of the Wild life Stock Rules 2003 or are found without valid documents will be confiscated.

It is mandatory for the owners to declare in writing to the nearest Divisional Forest Officer or to the authorized officer by the state government of the pregnancy of the female elephants in order to get fresh ownership certificate of the calf. The certificate would be issued to the calves of the legal cows only after physically ascertaining that they are genuine offspring or after getting the DNA test done.

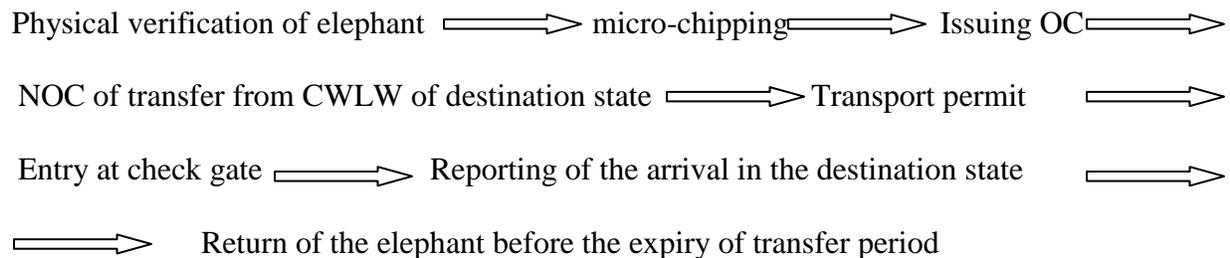
For transportation of elephants outside the state it is necessary to get permission from CWLW or any officer authorized by the government in this behalf shall be obtained as per section 48 A of the Wildlife (Protection) Act 1972. It is issued by the CF for the Divisions subordinate to him after due approval by the CWLW. Micro-chip implant of the elephant and CO of owner are mandatory pre-condition for the transit permit.

Permission, if any, should be given for transport to a particular destination and for a fixed period. It would be incumbent for the owner to bring back the elephant to the original place of residence within this period.

It will be mandatory for the owner to inform the CWLW of the state within 30 days where it has been transported. Except for return journey, no permission for the further onward transport of the elephant to other states will be given by the CWLW of the state where it is in transit.

No transit permit is required for the elephant to move within a Division. However, it is essential to have the TP for movement outside the Division which will be issued by the DFO. There is no need to inform the CF or the CWLW for such transportation. It appears that the movement within the state is not strictly enforced by the department, and the owners do not adhere to the guidelines which have led to illegal transportation through the borders. The entire process can be summarized in a flow chart.

(Flow chart of the process of registration elephant to transfer of the elephant)



After verification of records in various Divisions and case studies of some elephants, it was found that there is hardly any procedural flaw in the process of transfer. The majority of problems lie after transfer of the animal to the destination. The animal is never monitored by either of the two states-source or the destination state. The guidelines of MoEF are not adhered

to by the agencies after the transfer of the animal, which has propelled the actual sale of the elephants without subsequent repatriation.

Bihar has modified the earlier conditions and imposed a few new ones to ensure safe return of the elephants to the issuing state. This has led to decrease in the transfer of elephants to Bihar. Some of the new conditions laid are:

- (1) The Elephant shall be taken back to Assam within 180 days.
- (2) In the event of any damage to human lives/properties, the owner and caretaker will compensate for the loss.
- (3) The CWLW of Assam shall cancel the ownership certificate within the prescribed period of 180 days. He shall arrange the seizure of the elephant from the owner/caretaker for which CWLW of Bihar will not take responsibility.

5.5. Gangs and network of elephant trafficking:

Well-organized elephant traffickers are spread over various districts of Assam, Bihar and UP. Their presence is significant around the source areas, such as Tinsukia (Dibrugarh, Doom-Dooma), Golaghat, Nawgaon, Lakhimpur, Sonitpur, Sivsagar and the destination points around Sonepur; Saran, Patna, Chapra, Balia, Baishali, Sitamarhi. Some of the elephant traffickers belong to Tripura, Deoria (UP) and Kerala.

Some of the business men of Bihar and UP settled in Assam have developed links with the local agents in Assam for facilitating the transfer of elephants. Some of the elephant smuggler groups are dealer in coal, timber and auctioned vehicles. They engage locals to mediate with the elephant-owners and settle the negotiations for transactions after paying advance. The official formalities of getting NOC, health certificate, DNA testing, transport permit etc. are

done by the local agents with the help of the Government officials. The agents have developed close links with the officers dealing with the relevant jobs, which ensure the sale without any impediment. The business-men are quite conversant with the transporters, the buyers in Bihar & UP and know how to evade or circumvent checks on the forest check posts at the Assam-WB border.

Temples, religious organizations and political parties place their demand through messengers and sometimes directly through Government officials. Sadhus are sent by Maths. Wildlife Crime Control Bureau information reveals that well-conversant traffickers visit interiors of Assam and Arunachal Pradesh and make direct purchase from the owners. A person from Kerala, namely Chacko, used to frequent every nook and corner of Assam and Arunachal Pradesh to identify best elephants for transfer to Kerala.

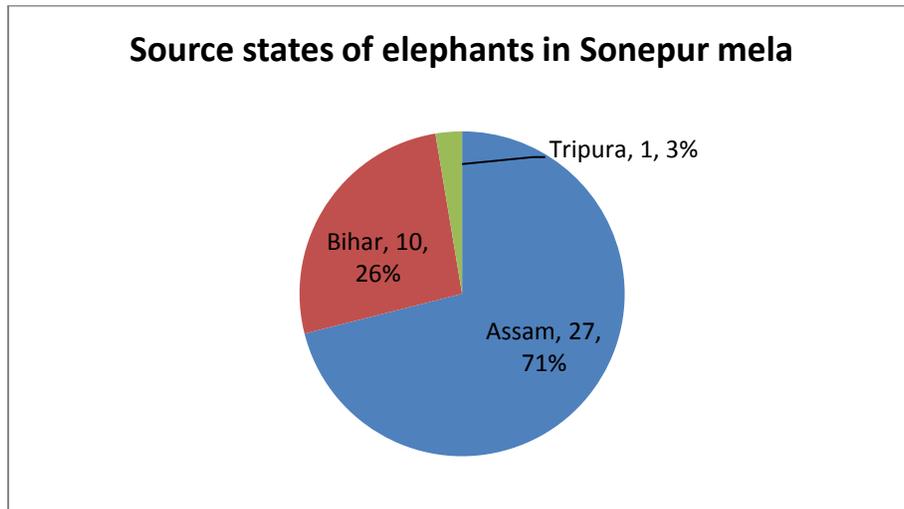
5.6. Role of Sonapur mela in elephant trafficking

Sonapur mela has been a market for elephant sale and conduit for trafficking for generations. The fair is held on the banks of river Ganga on the full moon day of the Hindu lunar month of Kartik (approximately November) and continues for about one month. It is organized and sponsored by the state to maintain its cultural tradition and practice. Various animals like Camels, donkeys, dogs, fishes, Indian and exotic birds are sold, but the beautifully decorated elephants displayed for sale have remained the main attraction.

In the year 2010, forty (40) elephants had been brought from Assam, Bihar, and Tripura and camped in two places in the fair. All the elephants got sold within first 3-4 days of the fair and left the fair. Fear psychosis has trickled into the traders and the violations are slowly falling.

There is a gradual decline of the elephants brought to the fair. During 2009, there were 53 elephants in the mela as per the records of the forest department.

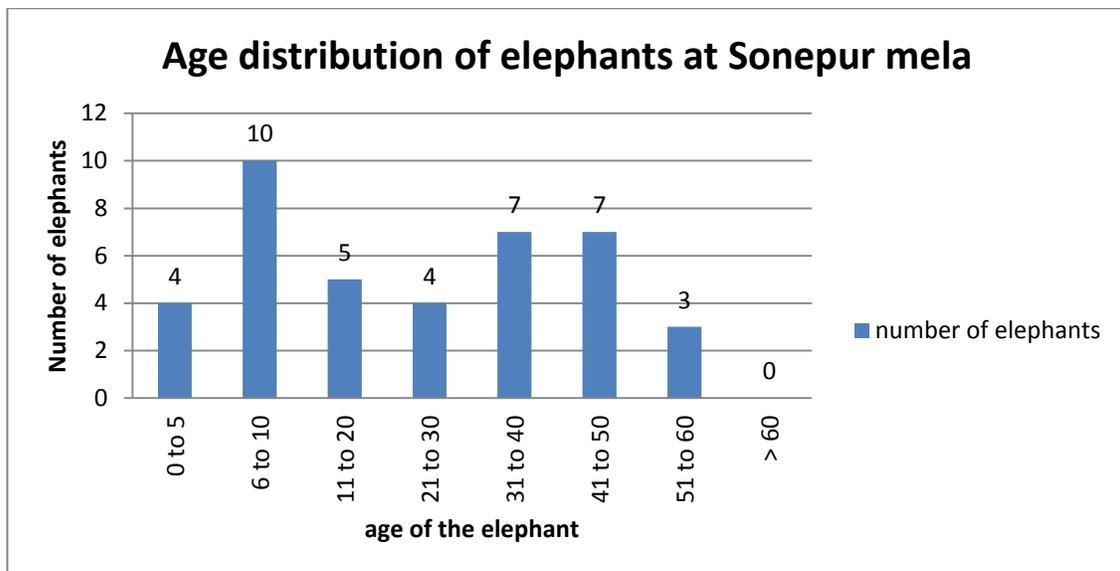
(Figure 4: Share of states sending elephants to Sonepur mela)



Micro-chips numbers, sex and other particulars of the elephants are recorded by the staff of Sanjay Gandhi Zoo, Patna on the basis of the documents provided by the Mahouts. It is callousness on the part of the staff that they don't verify the authenticity of the micro-chips using micro-chip readers. On the basis of the records, age of the elephants was analyzed to know the demand and supply of elephants in various age-groups.

The demand of elephants largely falls between age from 5 to 50, with maximum in 5-10 age group. This high demand in younger age classes can be attributed to the available service life of the elephants. On personal interaction, it was observed that general price of adult elephants is about Rs 15 lakhs to Rs 20 Lakhs, which may vary depending on other qualitative factors used in selecting elephants. However, the price of sub-adults or calf is almost double of the general price.

(Figure 5: Age distribution of elephants brought to Sonapur mela)



There were violations of conditions of TP and other regulations on elephant transfer in respect of the elephants brought to the mela. Out of the 40 elephants, 05 elephants had transport permit for UP, one male elephant had for Gujarat. But these animals were brought to Sonapur without taking the prescribed route and destination. One female elephant was transferred from Tinsukia during advanced stage of pregnancy, which is a violation of the guidelines.

6. Conclusion:

The elephant trade cannot be stopped completely unless the provision of transfer is abolished.

However, within the ambit of the existing provisions, the transfer has to be regulated for bonafide use of the elephants, and enforcement agency has to oversee compliance to the rules and guidelines by the owner, transferring state and transferee state. The cause of defects and distortions in the process and loopholes in the procedure and practices are as summarized as:

- (i) The elephants are purchased either directly from the owner or through agents from various Divisions of Assam; majority are from Eastern Assam Circle. The main destinations are Bihar, UP and Kerala.
- (ii) Most of the elephants have been transferred without changing the ownership. The TP is issued in the name of the original owner for a particular destination, route and purpose as sanctioned by the CWLW of the state. The rights over the elephants are given to the transferee through General Power of Attorney.
- (iii) “Transfer” is merely a camouflaging term for “sale”. Most of the forest officials know the practical meaning of “transfer”. Everybody, including the agents, believes that the “transfer” operation is legal and there is nothing wrong in it. The “No objection Certificate” to “purchase and transfer” prevailing prior to amendment in 2002 of the Wildlife (Protection) Act, has been replaced by “transfer” without affecting the purchase and sale in reality. The new practice has done away with sale deed as an eyewash, which otherwise would make the sale process apparent and conspicuous.
- (iv) The Transit Permit does not stipulate period of stay in the transferee states.
- (v) The elephants transferred outside the states have never been returned since the owners have received full price of the elephant. The transferring states also have never pointed out the violation nor taken any initiative for the return of the transferred elephant.
- (vi) The transferred animals have obtained with micro-chips and ownership certificates and undergone the entire process methodically. Even the calves have been subjected to DNA analysis for parentage determination by LaCONES prior to issuance of certificates.
- (vii) Sub-adult elephants and calves are more in demand in comparison to older elephants.

Government has been partially successful in combating and controlling the illegal trade through the modified set of procedures in conformity with the amended Act and spirit of the provisions. An integrated approach to scrutiny and monitoring of the activities and cooperation among the concerned states will bring the desired results all over the country. The correcting steps for improvement are suggested as below:

- (1) All captive elephants are to be micro-chipped after due physical verification and ascertainment of authenticity of ownership. Ownership certificates are to be renewed every 5 years and old certificates are to be cancelled.
- (2) DNA testing of calves is pre-requisite for transfer. Many females within days' of transfer have been shown to have calves. Calves born in the destination state are to be subjected to DNA testing.
- (3) Many States do not know much about micro-chipping and they do not have the system of verification of the micro-chip numbers. Once the elephant is transported out of Assam, it is never checked for entry to the states. It is even not known whether the animal specified in TP or some other animal is transported against the issued permit. The programme of micro-chip monitoring may be applied throughout the country. Micro-chip readers are to be made universal.
- (4) Since the number of captive elephants is very small from database point of view, photo-database of the elephants and elephant owners can be maintained at the state as well as central level for monitoring the transfer and controlling the illegal trade.
- (5) "Transfer" of elephant is based on the NOC of the Chief Wildlife Warden of the destination state. After transfer of the elephants, whereabouts of the animal is never reported to department nor followed up. The CWLW of the destination state has to ensure

the return of the elephant after stipulated period. Quarterly report after arrival need to be submitted to the CWLW of the source state. A special drive may be undertaken for repatriation of captive elephants to rectify the deviated system and to set an ideal state. Repatriation will cause enormous loss to the purchaser and act as a disincentive to illegal sales in future.

References:

1. Armin Rosencranz, Edward Boenig, and Brinda Dutta (2007) *The Godavarman Case: The Indian Supreme Court's Breach of Constitutional Boundaries in Managing India's Forests* Environmental Law Institute Washington, DC., ELR®, 1-800-433-5120, <http://www.eli.org>.
2. Chaleamchat Somgird, Tulyawat Sutthipat and Waroot Wongkalasin (2013) *General Health Care in Captive Asian Elephant*, Chiang Mai, Thailand, Elephant Research and Education Center, <http://www.asianelephantresearch.com>
3. *Elephant Census of Assam (2007-08)*
4. Fred Kurt (2005) *History and Biology of Traditional Elephant Management*, First European Elephant School, <http://www.colyerinstitute.org>
5. *Kerala Captive Elephants (Management & Maintenance) Rules, 2003*
6. Katina Michael, M G. Michael, Rodney(2008) *Microchip implants for humans as unique identifiers: a case study on VeriChip Ip*
7. Project elephant(2003): *Guidelines for care and management of captive elephant*, No.-9-5/2003-PE2
8. Richter, V and Freegard, C. (2009) Permanent marking of vertebrates using microchips SOP No: Department of Environment and Conservation, Western Australia

9. Sukumar. R. (1992) *The Asian Elephant: Ecology and Management*, Cambridge, University Press
10. The report of the Elephant Task Force, MoEF (2010): *Gajah, Securing the future of elephants in India*
11. Wemmer, C., Krishnamurthy, V., Shrestha, S., Hayek, L.A., Thant, M. & Nanjappa, K.A. (2006) *Assessment of body condition in Asian elephants (Elephas maximus)*. *Zoo Biology* 25: 187-200

