Study on behavioral changes of animals prior to the natural disaster

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Abstract

Establishment of a pre-warning system using unusual behavior of domestic and wild animals, to predict natural disasters has been given a global attention. Therefore, a base line survey was conducted using a pre-tested questionnaire in order to collect observations from the people who observed unusual behavior of pets, domestic and wild animals prior to the Tsunami disaster in 2004. Information were collected from household chiefs and farmers from Tsunami effected 10 veterinary ranges in Matara, Galle, Hambantota district and from the field officers at the Yala National Park. Out of the total 180 respondents, included 167 farmers. Forty two percent farmers reported that they observed at least one instance of unusual behavior with farm animals prior to the disaster. The results revealed that neat cattle, buffaloes, and goats have shown more or less similar behavioral changes. There changes included shouting, frightening, restlessness, looking and listening and agitation. Pigs and poultry also showed similar signs as well. In addition poultry birds started pecking of feathers. Out of total respondents, 64% had pets at there households. Fifty four percent of them revealed that, they also witnessed at least, one instance of unusual behavior with there pets before the disaster. Twenty five percent respondents observed barking and howling of dogs without a proper reason. Dogs became restless, ran away and displaced before the disaster. Fifteen percent respondent revealed that cats became frightened and hiding in unusual places. Rabbits also became frightened, trying to hide in secret places and finally ran away and displaced. Wild animals such as elephants, monkeys, wild buffaloes etc. also showed similar behavioral changes as domestic animals or pets. Main signs included shouting, looking and listening, agitation, restlessness, and finally ran away from the coastal belt before the disaster. None of the dead animals' carcasses were found at Yala National Park after the disaster. The most frequent lead time of unusual behavior in animals was 0-4 hrs (68%) before the disaster. The results concluded that although not taken in to an account by there masters, animals have shown significant behavioral changes prior to the Tsunami disaster. Therefore it is possible to use animal sense as an indicator to develop pre warning system to detect disaster in the future. However, systemic approaches further investigations are necessary to develop such a system.

Keywords: disaster, behavior, pre warning system

Introduction

Natural disasters are a complicated problem which all living being have to face. Natural disasters can be classified in several ways. There are land sliding, flood conditions, earth quakes, volcanoes, tsunami conditions, cyclones (Sheldrake, 1995). It has been proved that it's impossible to escape from such a disaster even in highly technically developed modern world. Therefore, most success way is keeping away from these natural disasters. For that it's very important to predict such disaster conditions.

A study on unusual behavior of animals can be used as a predictable method for such disasters. Animals have the ability of predicting the disaster earlier. Through studying the animal behavior, most of the eastern people have predicted the climatic conditions (Browns, 1990). The sensitivity of animals and humans is differed from each. Therefore, animals have an ability to predict the environmental changes earlier (Hatai and Abe, 1932). Animal are highly sensitive mainly for earthquake from these natural disasters (Browns and Sheldrake, 1996). We can find out the records about this type of incidence not only from the recent. Especially Chinese people are awarded about this. A large earthquake was occurred in Greece in 383 B.C. The records of Diodrows (383 B.C) showed that, there was an abnormal behavior of rats, reptiles, and worms in the previous day of the earthquake. Diodrows reported that, animal behaviors alert the earthquake. According to the National earthquake bureau studies animal behavior is the best method to predict earthquakes (Wilson, 1974).

Tsunami occurred on 26th December 2004 was the largest natural disaster of Sri Lanka. The earthquake occurred in Western Ocean from 200km to Sumatra Island where 2500 km from Sri Lanka. It has recorded in the Richter meter 9.3. It was the second largest earthquake of the world and largest natural disaster with highest damages to the properties and living being. It caused a loss about 300000 humans in the 11 countries situated in Indian Ocean. It effect to the ¾ of the coastal areas of Sri Lanka and eastern and south beach of Sri Lanka.. (Lankadeepa, January 2005)

Recorded deaths were 39000 and 41000 peoples were displaced. 63472 of houses in 13 districts were fully damaged and 41600 houses were partially damaged (Liyanage and Subasinghe, 2005). However, while many numbers of peoples die, but recorded animal deaths were very low. For an instance, even a single death was not recorded in Yala National Park area revealed that many animals have excavated from those areas before the disaster. Based on the previous records, animal are capable to sense many number of environmental changes that humans are not sensitive (Nikonov, 1991). Technical equipments and unusual behaviors of animal are two methods to predict the tsunami conditions in the modern world (Kalpan, 2007). Studying of the unusual animal behavior is the most suitable way for a third world country like Sri Lanka which is situated in highly tsunami affected area.

Methodology

Tsunami affected coastal area in the Southern province of Sri Lanka and Yala National Park area was selected as the study area. A field survey was conducted at selected Grama Niladari (GN) Division of each tsunami affected veterinary office area in Galle, Matara and Hambantota districts. Ambalangoda, Hikkaduwa, Galle and Habaraduwa veterinary office areas were selected from Galle District. Matara and Weligama veterinary office areas were selected from Matara district and Ambalantota, Hambantota and Thissamaharama veterinary office areas were selected from Hambantota district. Yala National Park area mainly divided from five Blocks. The Block 1 and Block 2 areas were highly susceptible to the Tsunami disaster. The Block 1 and Block 2 areas were selected for data collection.
The detail list (Name and Addresses) of the farmers in Galle, Matara and Hambantota district was collected from the veterinary office in the area. Two main categories of information are Primary source of information and Secondary source of information were collected.

Primary data were collected from Personal interview method through an administration of a structured pre- tested questionnaire to a sample of effected farmers and informal discussions with officials and community organizations. Secondary data were collected from Books, Journals and Reports, News paper articles, Publications, and past research reports in other countries.

Collected data were tabulated using tabulation sheets and transferred subsequently to the computer. Necessary data were extracted from computer sheets and they were subjected to tabular, graphical and economic analysis. Computer packages MS Excel, was used for data analysis.

Resultes and Discussion

In was found that neat cattle, buffaloes, poultries, goats and pigs were mainly reared as farm animals in coastal areas. Three main rearing methods identified were Intensive, Semi-intensive, and Extensive methods. As reported by respondents, neat cattle and buffaloes showed more similar behavioral changes before the tsunami disaster. The most significant behavior changes of neat cattle and buffaloes were shouting (17%, 11%), frightening (11%,14%), restlessness (10%,13%) and refrained from eating (10%,11%) respectively.

Most significant behavioral changes shown by goats were frightening (15%), looking and listening (14%), restlessness (12%) and shouting (11%). Approximately ten percent of people reported that goats came closer to them before the disaster. Where as this behavior change was not evident either with neat cattle and buffaloes.

Most of poultry farmers in the Southern Province used the intensive method to rearing. Therefore, some limitations were occurred in observing unusual behavior. However, Excitement, restlessness, nervousness, agitation (11%), shouting (19%), frightening (19%), and pecking (19%) as unusual behavior patterns which were observed before the disaster with poultry birds.

When compare with other livestock, pig rearing is not popular in the coastal area of the Southern Province. Therefore number of piggeries was less and most of there were managed under intensive system. Similar to poultry certain limitations were existed in that, observations of the respondents revealed that pigs were frightened (27%), became restlessness (18%), nervousness (18%), and started shouting (18%) before the disaster.

Table 1: Number of animal deaths or lost during disaster

	Before Disaster	After Disaster	Death/ lost
Neat cattle	1141	955	191
Buffalo	941	858	93
Poultry	3915	195	2720
Goat	465	328	137
Pig	73	0	73
Dog	134	115	19
Cat	76	58	18

The results revealed that 64% of the respondents were rearing pets in their houses. The most preferred pets were dogs (60%) followed by cats (32%).Seven percent respondents reared rabbits while 1% was having other pets such as love birds etc.

Three common methods were used to rear pet animals in collected areas were free range system, either keep pets inside the house or in a cage.

Fifty four farmers have been noticed unusual behavior of the pets just before the tsunami disaster. Forty six percent farmers had not noticed any behavior changes in their pets prior to the disaster.

Some of important behavior changes observed with dogs were barking (13%), howling (12%), restlessness (11%), ran away (11%), missing, running around, nervousness, agitation and going to unusual places. Just before the tsunami disaster many of the dogs have shown continues barking and howling without any reason, running here and there and restlessness.

Where as cats also showed major significant behavioral changes before tsunami. Sixteen percent cats were missing, while shouting (15%), hiding in unusual places (14%), refrained from eating (12%) were common. Minor behavioral changes showed by cats were nervousness (3%) and excitement (1%).

As we know rabbits are very sensitive animals for the changes of the environment. Rabbits are rearing as a pet in houses and as well as commercial purposes. When they are reared as pets' semi intensive method is mostly used. Before the tsunami disaster they have shown few of abnormal behaviors. The main observations regarding behavioral changes were, frightening (38%), hiding (24%), ran away and closer to people (19%).

Figure 1 shows the percentage of death animals due to tsunami disaster. Highest percentage of deaths were reported for poultry (89%), pigs (100%) because they were kept in cages and could not have opportunity for them to ran away.
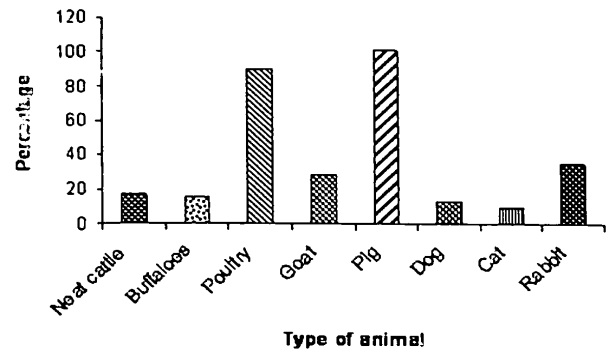

Figure 1. Percentage of animal deaths during tsunami disaster

This figure 2 shows rearing methods of the animals when tsunami was happening. Pigs and rabbits were reared totally in cages and 90% of poultry were reared in cages. According to the figure 100% pigs and 89% of poultry have died. It conforms that there is a relationship between rearing method and animal deaths. In case of neat cattle many of tethered cattle were died by the tsunami while few of other deaths were reported. The reason for this is tethered animals and that were rearing in cages could not have a chance to excavate from the tsunami affected areas.
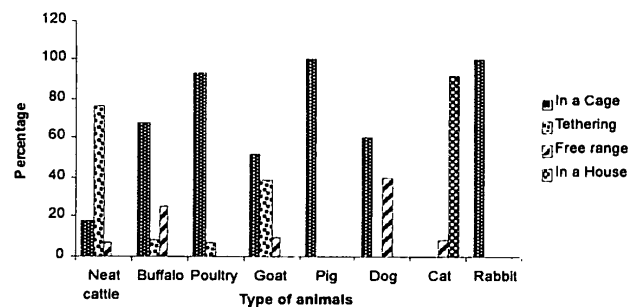

Figure 2: Rearing methods of animals during disaster

The wild animals in Yala National Park area (especially elephants, deer, monkeys, peacocks, and other birds) showed most of unusual behaviors just before the disaster. While they showed signs of looking and listening, shouting, ran away, nervousness, frightening and they flawed as a flock before the disaster. Field officers recorded that, no animal deaths were reported after the disaster.

It was evident that before the disaster elephants were more restless (20%), frightening (16%) and ran away (18%). Shouting, looking and listening and nervousness was least recorded behavioral changes. Thirteen percent of respondents reported elephant were agitated before the disaster.

Deer are very sensitive animals for changes of the environment. Deer were rearing as a pet in some hotels in the Southern region under the semi intensive method. Though deer were also showed similar behavior changes as elephants. There were ran away and frightening (23%), restlessness and agitation (20%). None of the respondents reported that nervousness and agitation was evidence with them.

Normally monkeys showed number of unusual behaviors prior to the tsunami disaster as well as other animals. Those were Ran away (12%), restlessness (21%), nervousness (12%), agitation (12%), shouting (21%), frightening (15%).
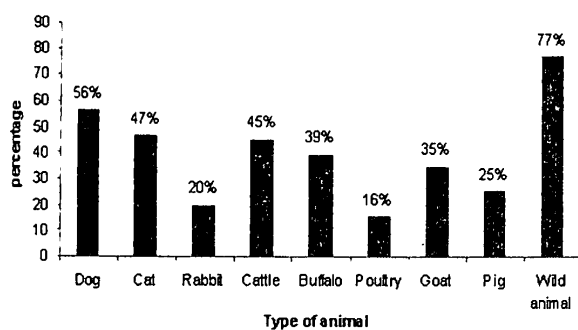

Figure 3: Difference of sensitivity in animals

Peacock and all other birds showed most similar abnormal behavioral changes. Shouting (42%) was the most pre dominant behavior in peacock. Flying as flocks (41%) were prominent behavior is other birds. None of them showed behavior changes such as nervousness, agitation and looking and listening.

Sixty eight percent of animals have shown their abnormal behaviors throughout 4 hours before tsunami. 18 % of animals have shown their abnormal behaviors throughout 8 hours before to effect of tsunami. Therefore we can say that most suitable time

period to observe animal behaviors for predict a natural disaster is 8 hour time period before the disaster.

According to the above figure 3 wild animals were more sensitive to the changes of surrounding environment than domestic animals. The reason for that is they have adapted well for the environment and they have many predators and then they are more sensitive for the environment. Out of the domestic animals dogs, cats and cattle are more sensitive.

Conclusions

The results revealed that pets, farm animals and wild animals have shown accountable unusual behavioral changes prior to the tsunami disaster. This may be due to their sharp natural sense and close interaction with the nature due undisturbed life style. Therefore it is possible to use animal sense as an indicator to develop a pre-warning system to detect disasters in the future.

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