Assam, the North Eastern province of India, is the habitat of several endangered species of avifauna. Out of the total 950 species and sub species of avifauna found in Assam, almost 100 came under different kinds of threat. Moreover, out of 78 species of birds of Red Data Book, in India as many as 4 5 species are found in Assam.

Population of some species of birds declining gradually without any visible cause related to habitat destruction. Mainly the wetland based carnivorous and omnivorous avifauna is becoming threatened. The greater adjutant stork (L.dubius) is one such bird, which recognized as endangered.
The Brahmaputra Valley of Assam is well known for the habitat of world's most endangered species of stork, the *Leptoptilos dubius*. Earlier, it was common in Northern India, Nepal Terai, Bangladesh, Burma, Thailand, Laos, Vietnam and Cambodia. The Bird Life International (BLI) stork specialist group network reported that the species is systematically disappeared from almost throughout the former distribution range. The recent report about *L. dubius* breeding colony is from Assam and Cambodia only. The nesting of birds is extremely localized in few ecological pockets of the Brahmaputra Valley of Assam. It was reported that in Assam there were nesting mortality of *L. dubius*, caused by unknown causes.

The contemporary literature exposed that several fish eating and carnivorous bird species are affected by organ chlorine pesticides and heavy metals which results in reduction of eggshell weight and thinning of eggs shells which leads to eggshell breakage and reproductive failure.

The present study was undertake to reveal the relationship of heavy metal pollutants with declining population of *L. dubius*, as there is no such study ever conducted in Assam till date.

Heavy metals are known biodegradable natural components of earth crust, but some enter into the environment from anthropogenic source. Some of the heavy metals are found as trace elements in the body of organism, but some are non-essential to the organism. The heavy metals like mercury, lead and cadmium can bio

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accumulate in the body of organisms, which may cause serious problem at high concentration. As the fish eating and other carnivore birds are at the top of the trophic level, they have to suffer much.

The study was aimed to investigate the heavy metal pollution related to environmental stress on the eggs of the wetland base bird species.

Hence; it is aimed to investigate the oil-field pollution i.e., heavy metal pollution, related to environmental stress on the eggs of the wetland bird species.

To establish the hypothesis the following objectives for the study has been taken:

1. To evaluate the composition of the eggshell structure of one endangered (*Leptoptilos dubius*) and one threatened (*Leptoptilos javanicus*) species for comparison of the impact of heavy metal at species level.

2. To evaluate the status of the elements in the eggshell.

3. To assess the damages at the structure and at the ultra-structure level of the eggs.

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The Greater adjutant stork (*L. dubius*) is classified as endangered on the IUCN Red List (2004), which is listed under schedule IV of the Indian Wildlife (Protection) Act, 1972.

The *L. dubius* inhabits wetland habitat where fishes are abundant. The nesting sites are located generally near small or large flowing water channels on tall trees.

The egg laying of *L. dubius* in the month of November and number of egg lays is 2-3. The *L. dubius* at present is undergoing threat due to loss of nesting habitat and foraging sites due to cutting of nesting trees and pollution of wetland and other anthropogenic causes.

The Lesser Adjutant Stork (*Leptoptilos javanicus*) qualifies as vulnerable species on the IUCN Red List (2005) and enlisted in the schedule IV of Indian Wildlife (Protection) Act. 1972. The *L. javanicus* is an inhabitant of fresh water as well as salt-water wetlands. The habitat used by the bird in Assam is flexible and seasonable. For nesting the birds select tall trees like *L. dubius*, which are generally surrounded by wetlands. The breeding season starts from the month of July. The *L. javanicus* has experienced rapid decline recently due to habitat loss and habitat degradation.

The nesting sites from Sivasagar and Nagaon (undivided) district where selected for collection of eggshells. The Sivasagar area has been selected, as the sites...
The eggshells samples were collected from Konwarpur, Komarphodia, Bhotiapar and Mogorahat nesting sited of Sivasagar and from Monoha, Tokorabahi and Khutikotia nesting sites of Nagaon.

Soil and water samples were collected from Rudrasagar and Boliaghat foraging site of Sivasagar and Monoha, Deobali and Sensua Sialmari of Nagaon. The soil and water sample were assayed in an Inductively Coupled Plasma Spectrometer, ICP-AES (Labtam 8440 M GBC) for the heavy metal lead (Pb), mercury (Hg), nickel (Ni) and cadmium (Cd).

The eggshell samples were viewed under Scanning Electron Microscope (JSM-35CF, Jeol) to study the structural features of the eggshell. The eggshells were also observed to study the organic matrix present in the eggshell by energy dispersive X-ray microanalysis. An analysis of organic components of eggshell matrix was also done.

In Sivasagar area, the nesting trees are scatteredly distributed around their foraging areas. The foraging areas are situated within two to four kilometer distance.
from their nesting sites. The foraging areas are adjacent to the oil fields of ONGCL for which these areas may have some environmental stress due to discharges from oil fields. In Nagaon area the nesting were found within one and half to ten kilometer distance from the foraging sites.

In Sivasagar area *L. dubius* breeds during the month of October and January and *L. javanicus* during the month of September and October. In Nagaon *L. dubius* earlier in comparison to the birds of Sivasagar and egg laying of both *L. dubius* and *L. javanicus* take place during the month of September to October.

The elemental analysis reveals that there is a high concentration of mercury and lead in the soil and water of foraging areas of storks in Sivasagar area. In Nagaon area the concentration of some heavy metal were found lower in comparison to those of Sivasagar area.

Scanning electron micrograph reveal that the shell plates present on the eggshell surface are damage severely in all the nesting sites of Sivasagar area than those of Nagaon area except the case in Monoha site.

The energy dispersive X-ray microanalysis of crystals on eggshell plates reveals that crystals in bird species of Sivasagar area experienced the deposition of both the mercury and lead where as in Nagaon area only lead was detected.

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From the above observations it was clear that high concentration of heavy metals on the environment means more damage in the shell plates. The study suggests that structural features of the eggshell surface are more important in determining the susceptibility of the eggshell to heavy metal toxicity.

The present study reveals that the heavy metals in the environment are creating a serious problem in birds particularly the carnivorous and omnivorous, large birds. But this problem must also have a serious concern to a number of other species, and that are gradually becoming endangered, without being noticed in terms of conventional conservation practices, prevalent in the area.