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CHRONOLOGICAL REVIEW OF INDIAN WHITE BACKED VULTURES *Gyps bengalensis* AND THEIR CONSERVATION IN INDIA.

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KEYWORDS

INTRODUCTION:

The author was associated with bird hazard projects since its conception in 1982 at Indian Agricultural Research Institute (IARI), New Delhi and Bombay Natural History Society (BNHS), Mumbai in different capacities. The author completed Ph.D. on "Biological and Microbiological Studies on white backed vulture (wbv) *Gyps bengalensis* and contributed a number of papers on vultures in National and International journals. Till today the author is also tracking the vultures in their past and present habitation all over India in different excursions along with my students. The author wish to put forward the chronology of vultures from the time we considered the vultures as problematic bird in aviation due to their proliferation in Metropolitan cities of India and now they are at the verge of extinction.

REVIEW OF RESEARCH ARTICLES:

One of the biggest hazards to flight safety, all over the world is the menace by birds. In India the magnitude of the problem is much greater due to the species of birds – the vultures and pariah kites, that our aviator have to contend with. No country in the world can afford to lose valuable aircraft and invaluable pilot at this rate. The bird menace in our country has already assumed grave proportion and needs to be tackled on war footing at the national level by all possible means. Birds naturally conglomerate where food is readily available. The need of hour is to deny these birds such large scale open air catering service. An effective start in this direction would be to ensure cleanliness in and around our airfields and those recognized routes of air operations where aircraft perforce have to fly low, Air chief Marshal Dilbagh Singh (1982).

Some people may think birds are not an unmitigated menace. Therefore we should recognise that there are problem birds but all birds are not a problem. Many sp. of birds are great friend in agriculture as biopesticide. The problem must be discussed with in the broad frame work of the changes which are taking place in our agriculture. Because it is in this context birds assume a particular significance. For thousands of years we have lived with a traditional agriculture when men, beast and birds found harmonious place. They share some of the produce and this was not such terrible thing when the human population was small, we could afford to share. But today the situation is changing very fast. We have to produce more to feed this overpopulated country and therefore changing from traditional to modern agriculture. Many ecologists are reminding us the danger nitrate toxicity that will result from such massive use of chemical fertilizers. Great deal of pesticides is the cause of concern. We are increasing the irrigated area and that again a cause of concern because it could lead to serious problem of soil erosion or loss of soil fertility and of course deforestation. We simply cannot go back to nature whether it is the problem of birds. The answer of the problem probably will be found not by eradication but by manipulation of techniques. You can change the ecology taking into consideration all their likes and dislikes. We have to study the psychology of birds & it lie in the availability of food. The answer can lie in ecology and other behavioral science, Jain (1982).

There is a heavy loss to air force and airlines due to bird aircraft strike hazard (BASH). The birds have an important role in nature and elimination cannot be an acceptable solution, Sinha (1982).

Air field should be garbage free. Industries based on dead animals are recognized so, that they do not stay as the source of food for these birds, Singh (1982).

In the early 1950s PM Nehru visited the Delhi Zoo and saw Lions and other wild animals kept within cages. He remarked that these animals roam around in their natural habitat and in the zoo they might be suffering because of being confined within cages. J. B. S. Haldane, the noted British scientist who chooses to settle down in this country, posed the question "Are these wild animals unhappy to be confined to the limited space available in zoo"?. He quoted an experiment saying that animal do not roam around for the pleasure of it. They move only in search of food. If food is available they will not undertake long trips. Their movement is in search of food and habitat conducive for living, Lakshminarayanan (1982).

The vultures in Europe have suffered a most drastic reduction in their range over the last few hundred years. This decline has been caused by a familiar catalogue of troubles: the removal of their food supply due to change in farming methods, habitat destruction, hunting pressure and other disturbances to their nesting areas, Houston (1982).

Boshoff (1982) interpreted the situation as follows: originally the entire food base of the vultures in Botswana consisted of carcasses from the game herds that abounded in the area. Now this source is rapidly dwindling and it is being replaced in parts, to a greater or lesser extent, by carcasses from domestic cattle. The vultures have adapted to the situation and still (?) maintain relatively stable populations as one food source is merely being replaced by another. What is significant is that the vulture, in a large part of their range in Botswana at least, have now become, albeit indirectly, dependent on man for the future existence and we contend that this could be the first step towards an eventful decline. However it is not impossible that the cattle industry in the country may collapse or undergo a major decline and so drastically reduce the amount of potential carrion available to the vultures. With the game already having been removed there will be nothing to replace the cattle and so an impoverished food base will exist.

Urbanization was presumed to be responsible for decreasing species richness and diversity, increasing biomass and density and favouring dominance by few species, Beissinger and Beissinger (1982).

Indian griffon vultures seem to be thriving when seen from the surface. In fact there is not any decline on the population of griffon vultures in totality and they are thriving to the extent that a certain species (Indian white backed vulture *Gyps bengalensis*) has phenomenally proliferated at many areas (Urban). But the very nature of proliferation of this species gives a foreboding of the future status of griffon vultures in India. Indian white backed vulture is the commonest and most abundant vulture in India, distributed throughout the entire peninsula. Wherever we see vultures at carcasses, they appear to hold ground and do not in any way appear to be threatened. However, underneath this apparent prosperity, there is some serious problem, a calamity yet to surface but likely to strike if the prevailing situation is permitted to drift and take its own course. We see two major problems threatening the Indian griffons, specially white backed vulture: One is diminishing

of natural habitat and natural food sources and the other unnatural proliferation of the griffon around large towns and cities.

The griffons have a valuable role to play in Indian forests where they are the most effective scavengers of carrion and left overs of animal kills. As such, these vultures thrive at all natural forests in India where food supply from large mammals is assured. However with the fast deterioration of our natural forests and depletion of large wild ungulates vultures are gradually disappearing from such areas. This is particularly applicable in southern India where food supply from domestic livestock carcasses is meagre and hence not dependable as a regular supplementary or alternate food supply. What is necessary here therefore is to restore the natural forests and the population of large mammals.

We have a different picture in the upper parts of India where cattle cannot be slaughtered owing to religious sentiments. Here the vultures have a superabundance of meat supply, particularly at dairies around town and cities. Besides cattle meat the griffon vultures also get plenty of slaughter house wastes (such as offal and intestines) from buffaloes which are allowed for slaughter.

The griffons have proliferated so much, and have come to depend on towns and cities to such an extent, that the size of a town or a city can be roughly guessed by the amount of vultures soaring over these. And this is where the problem is. These vultures have lately become the major hazard for aircraft in India owing to their phenomenal proliferation around towns and cities. This problem is gradually driving the aviation authorities towards decisions favouring mass killing of the vultures using chemicals. But mass killing methods if efficiently employed can result in extermination of most of the vulture species in India. It will then be an immense loss to the world and can also cause havoc with the ecology, environment and human health. Natural forests and country sides would lose the only efficient scavengers who can 'incinerate' even putrefied meat and carcasses of diseased animals.

If direct killing – Man has locally destroyed certain species of birds in the past and ran into troubles. The Chinese for instance exterminated the house sparrow almost totally from vast areas to some food grains. But they did not then realize that these very sparrows also consumed immense quantities of insects harmful to agricultural crops and it took years before the sparrows made a comeback.

It should be born in mind that the number of vultures inhabiting a given area is usually the optimum number that can be supported by the area through food supply. When this food supply is cut off the surplus population quickly abandones the area and if no alternative food supply is available which usually is the case, perish, Grubh (1983).

Human related factors recorded for Cape vulture in SWA/ Namibia include-

1. Shortage of food resulting from –
   a. The elimination of the indigenous game herds and recent improvement in Animal husbandry.
   b. Changing land use pattern with cultivation replacing stock farming.
2. Electrocution on electricity tower
3. Collision with wire stays of radio masts and other structures.
4. Drowning in farm reservoirs.
5. Disturbance at breeding sites
6. Direct or indirect persecution- dosing of carcasses with poison to kill Jackals.

The use of poisons is generally associated with small stock farming. Although this (Poison) could also be attributed to bush encroachment. Corroborative evidence in support of poison being an important cause of mortality in the Cape vulture (cv) is not immediately apparent from adult white backed vulture numbers. There is no evidence to support/ suggest that this species (white backed vulture), which nests in large numbers with in the Cape vultures range has declined, even though they forage and feed in very similar manner to Cape vultures. If poisons were the main cause of mortality in Cape vultures, one would expect the white backed vultures to be as severely affected, and while it is possible that they are, there is as yet no evidence to show this, Christopher (1985).

Cape vultures *Gyps coprotheres* in southern Africa are to varying extents in different areas, dependant on stock farmers for a good supply of large carcasses. One can envisage a continuum in the degree of this translation, from early days when there were relatively low stock numbers in relation to free ranging ungulates, to an end point, perhaps epitomised in the sw Cape, where birds feed almost exclusively on sheep carcasses It is likely that, given Indian's population trend and agricultural and industrial development, a similar scenario (of total dependence on stock, as opposed to wild carcasses) can be expected for an increasing remainder of the population in the future Robertson and Boshoff (1986).

Siegfried (1984) considers the Cape vulture to be headed towards "imminent extinction", as a result of the elimination of the natural food source. One might expect that stock losses in farming areas will diminish with time due to advances in for example veterinary knowledge; this aspect is obviously directly relevant to the vultures food supply.

The vultures are very useful since they 'clean' the veld by eating carcasses of stock that could spread disease. However, this function has assumed less importance in recent years because improved farming and administrative methods are now employed. This is related to one of the major reasons for the decrease in the vulture population there is a serious shortage of food for these birds, Coetsee(1986).

Widespread ecological collapse looms all over. Famine, desertification, deforestation and depletion of top soils are coupled with rapid population growth in many developing countries. To solve the dreaded problems, (Massive relief schemes), different policies and programmes usually do little more than put off the evil hours as symptoms rather than causes are treated. Unpracticed at living off their renewable resources, many states/ countries wastefully exploit their 'Capital' by destroying forests and cramming vast numbers of wild life into marginal areas which are, simply unable to support them on a long term basis. For the conservation of wild life to succeed in any way, it appears that it must be justified in economic as well as ecological terms. The conservation of our life support system, planet earth and its renewable resources, is dependent upon a change of ethics attitudes by the human race, Butchart (988).

The B N H S undertook to make an ecological study of bird hazard at Indian aerodromes (22) with financial support from Aeronautical Research and Development Board (ARDB), Ministry of Defence, Government of India, under the leadership of late Dr. Salim Ali as the Principal Investigator and Dr. Robert B. Grubh as the executive investigator from 1982 – 1988. Author was also the part of research team in the project. B N H S gave recommendations for different airports of the country to minimize the bird strikes. The important recommendations recommended specially for vultures are as given below –

1. Setting up a modern slaughter house having built in facility to convert waste items into high grade animal/ chicken feed and industrial tallow. Thereby denying the food supply to vultures which are the major source of food.

2. Setting up a modern carcass cum nonvegetarian garbage processing centre outside the buffer zone – "when vultures are denied food they would soon disperse and disappear from the area in a matter of weeks, Grubh (1989).

Food shortage may ultimately cause death by starvation, or have more subtle effects of growth and development and associated nutritional status. During breeding seasons, any form of food shortage would have a relatively greatest effect on the colony population as a whole. Cape vultures have declined, like many

others vultures species in southern Africa, as they have been indirectly affected by change in land use Komen (1988). "Vulture restaurant". Will these feeding stations ultimately prove to be the only viable 'foraging area for cape vultures in the rural areas of southern Africa?

We need to tackle the problem of vulture poisoning with fore sight and patience – no lasting solution are going to be found by throwing people into jail, satisfying though this is to us in the short term, Ledger (1988).

Eitnier (1989) Man's influence on vulture population is observable around most of the globe. "Although no more than half a dozen birds occur together as a flock under natural conditions, unnatural abundance of food supply available at several Indian towns and cities cause unusual congregation amounting to several hundred flocking together." In portions of Latin America, where food supplies exist, Black vultures numbers are exploding.

Man continues to alter the holding capacity of the environment for vulture species. While few speak out when their numbers are alarmingly low, great concern exists when they become abundant. Too many may be as undesirable as too few.

One changing parameter most difficult to deal with from a management perspective, is man's continual manipulation of food supply. In particular areas, slaughter yards can, over the years, greatly increase vulture populations. Should they cease operations, massive starvation may occur.

The Korakendra carcass processing plant (near Mumbai) processes carcasses from all over Mumbai and the surroundings and utilise almost all parts of carcasses for different purposes. Carcasses which are decomposed and hence not fit for processing provide regular food supply to a large number of vultures, singh (1991).

The Vanasthalipuram carcass processing plant near Hyderabad accommodates as many as 3000 vultures and 500-600 vultures could be seen in any casual visit, Singh (1993).

The population study of vultures (*Gyps bengalensis*) was carried out at the permanent feeding ground at Korakendra and nearby roosting sites between June 1986 to May 1988 and a strong relationship was observed between the two. At one occasion number reached nearly 700, Singh *et al*. (1996).

Experimental study on the normal gut microflora and the survival of known bacterial pathogens was carried out on vultures, but without much observable effect, Singh and Sherikar (1999).

Singh *et al*. (2016) observed the strong impact of carcasses handling workes' strike on the massive starvation and abandonment permanent feeding ground and roosting sites by Indian white backed vultures at the outskirts of Mumbai, India. This may contribute to drastic decline of vultures not only in Mumbai but also in other areas of the Indian sub-continent and south east Asia. Such socioecological issues need immediate attention for conseving Nature and its dependents like the vultures. In India still patches are found which are ray of hope specially West Bengal for the revival of vultures provided authorities are helping to create natural restaurant away from the buffer zone area of airfields, Singh (2016).

VULTURE CONSERVATION MEETING (6-8-1999), BNHS, MUMBAI

It could be (decline) effect of pesticides/insecticides, unavailability of proper nesting sites, lack of food or failure of hatching of eggs, Yahya (1999).

Initial analyses of tissues from dead vultures should not be used to draw final conclusion that chemical are killing. Rather, it should be taken as an indicator and one of the causes. They have not just declined but declined drastically, Javed (1999).

Dr.Gerhard Verdoom/ Chairman of the vulture study group and poison working group of the Endangered wildlife trust of South Africa has provided the following information.

i) The levels of the pesticides mentioned by the director of centre of science and Environment (who is also the Editor of Down to earth) and Dr. Rahmani (Director, BNHS) in the paper and talk (held on 14 jan.1999) are not lethal levels for vultures.

ii) Pesticides contamination has not killed a single vulture in South Africa but poison carcasses have. Pesticides might have affected their reproductive cycle , Satheesan (1999).

PERSONAL COMMUNICATION

24.5.2000. Meerut slaughter house - Mr. Mehtab is a supervisor and working since last six year. He could not see any vultures since last two years. He told that now everything of animal is being utilized and nothing is left to vultures. But we have not come across dead vultures also.

30.5.2000 Hapur - Mr. Teekam Singh (Ex army) told that now a days nobody is there to lift the dead animals. We have to pay to rickshaw pullers or cart pullers to lift the animals and nobody is there to skin them.

31.5.2000 Meerut veterinary hospital - Dr. R.G. Sharma and Dr. N.K. Sharma told that 1) food is not available to vulture as all the parts of carcasses are being utilised for some or other purposes. 2) Because of pesticides vultures will not die as we have no report on the same.

31.5.2000 Dr. V.S. Rana, (toxicologist), then Reader and Head, department of Zoology, Meerut University, Meerut. He told that in India use of pesticide is much lesser than the western country. So, in this short span of 10 years there will not be much impact on egg /shells /clutch/reproduction of vultures. But certainly vultures are not seen now a days so, proper work is needed.

NEWS PAPERS (IE = Indian Express).

1E Feb. 7, 2002. In the workshops "on vultures and birds survey techniques" organized by BNHS in collaboration with the wildlife dept. of Haryana at Parwanoo in Himachal Pradesh from January 21 to 25, 2002. Two schools of thought were put forward.

(1) Vultures are succumbing to an AIDS like disease called drooping neck syndrome leading to the bird's death within a month and

(2) Their (vultures) number is going down because of decreasing availability of food.

1E Feb. 13, 2003. The first vulture care center in Asia was inaugurated at Pinjore near Chandigarh by BNHS from the 1.1 crore grant from the Darwin institute of the British Govt. to identify the causes of the death.

1E-January 31, 2004. A study carried out on the white backed vulture (*Gyps bengalonsis*) in the Punjab province of Pakistan by a team of 14 American and Pakistani scientists has identified diclofenace residue as the cause of population decline. Almost two third of the 20 captive vultures which were experimentally fed meat laced with diclofenac died.

1E- January 2, 2007. Despite a central ban on use of diclofenac the drug is still being hoarded and used for veterinary purpose.

1E- January 28, 2007. Rare vulture species (white backed vulture) have been spotted on the Punjab -Himachal Boarder: Now, its a question of restoring their habitat.

1E- February 23, 2007.- BNHS and forest officials of Haryana say that the two chicks born to endangered white backed vulture pair in January this year, died a natural death and no morphological disorders could be attributed.

1E March 27, 2008. This year while seven eggs were laid by vultures, Vibhu (Chick was named vibhu in honour of Dr. Vibhu Prakash. The Principal scientist of the BNHS which runs the captive

breeding centre at Pinjor) was the only one born and crossed 55 days.

1E May 7, 2009. Research by Indian veterinarian Ajay Poharkar has shown that apart from the diclofenac, malaria too is a major cause for vulture deaths. He found that40 of 60deaths in Gadchiroli (Maharashtra) had been caused by malaria, a fact confirmed by the CCMB and Mumbai's Veterinary College. He says "I always thought the diclofenac theory was inadequate. One vulture requires at least 500 gm. of meat / day. In that there would be very little trace of diclofenac. Also, how could we apply findings in Pakistan to all areas without verifying".

IE May 4, 2008. 30 million was the number of Oriental white backed vultures across north in the 1990s. its now down to 11000. Expert blame this on the use of diclofenac, a banned anti-inflammatory drug, on cattle.

IE September 7, 2009. More than 300 birds were spotted since last year in Pathankot and Hoshiarpur's Dhar area.

1E Oct 26, 2009. G. Ramana Murthy, Dy. conservator of forest, Ahmedabad, pointed out that the postmortem of white backed vulture in the city three months ego had found no trace of diclofenace, and the cause of death was concluded to be due to an unknown disease.

1E Oct 21, 2010. The BNHS is scheduled to launch another pioneering project to track the migratory Eurasian and Griffon vultures through the French Argos satellite, to their nesting grounds in control Asia and Europe in turn we can warn European and central Asian scientists of the threat of the Griffons taking the disease from India right across Europe and Africa, explained Dr. Vibhu Prakash.

Sakal Nov.21,2010. Photograph of sighting of vultures in Raigarh District of Maharashtra.

IESeptember. 4, 2011. A new study shows that the ban on the veterinary drug, diclofenac has helped lover the death rate of vultures in India. Dr. Vibhu heading Pinjor captive breeding centre, hopes to release first batch of artificially incubated birds in 2016, in batches of 20-25 birds.

1E Aug. 25, 2012. Research paper by Pradeep Sharma of Rajasthan University Veterinary and Animal Science., Bikaner shows accelofenac is as dangerous as diclofenac.

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CONCLUSION AND SUGGESTIONS

A. There are two schools of thoughts. One is pinpointing the drug diclofenac exclusively while the other school is stressing on the food shortage and habitat destruction for the decline of vultures.

B. Opinion and conjecture will not hold ground unless supported by facts. Management policy must be formulated around facts, and until we know the specific cause of population declines, we will make no progress towards protecting these species.

C. I disagree strongly with the theory of diclofenac being propagated as the basic/only cause of drastic decline of vultures and more specifically the Indian White backed vultures. It might have caused death of vultures sporadically.

D. I am of the strong opinion that it is the destruction of habitat and manipulation of food source by man. After the recommendation of bird hazard project in 1989 through BNHS to the Ministry of Defence, allover India the food source of vultures from carcass dumping grounds and offal from slaughter houses completely vanished. This massive starvation has contributed to drastic decline of vultures not only in the Indian sub-continent but also in south east Asia.

E. While our interests and prospective differ, I think all Vultures researchers would agree that their goals include contribution to vulture conservation.

F. In India still patches are found which are ray of hope specially West Bengal for the revival of vultures provided authorities are helping to create natural restaurant away from the buffer zone area of airfields instead of spending on captive breeding.

I hope that the above chronological fact might contribute to this goal.

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