

**Report from the 1st meeting of
Saving Asia's Vultures from Extinction
(SAVE)**



Pinjore, Haryana 16-18 November 2011

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1. Summary of main recommendations and priorities arising since the inaugural SAVE meeting of February 2011

1. The key most urgent step needed is to prevent injectable human diclofenac being produced in vials or ampoules larger than 3ml:

- through Government legislation (India to lead, also all South Asian countries)**
- through responsible pharmaceutical industry response**
- through combined pressure from conservation and veterinary circles**

Clear evidence has emerged that human diclofenac is being unofficially used on a large scale by veterinary practitioners. Making diclofenac for human use available only in smaller vials should eliminate or reduce this mis-use.

2. Establishing a network of 'Provisional Vulture Safe Zones' across South Asia is key to saving Gyps vultures, with the goal to confirm their diclofenac-free status as 'Vulture Safe Zones' and engage a wider partnership of Government and NGO involvement in creating these.

3. The breeding and release programme is inextricably linked with the creation of effective Vulture Safe Zones – with soft-releases planned not earlier than in 3-4 years time, and subject to stringent criteria being satisfied regarding diclofenac levels within 100km radius.

4. Commitment from governments and the pharmaceutical industry is needed:

(a) to establish formal procedures for testing the safety of potentially hazardous NSAIDs in veterinary use, and

(b) for preventing the use of compounds found to be toxic at concentrations present in the food of wild vultures.

A list of drugs for testing should be established, with untested compounds in widespread use, or likely to become so, as high priorities.

A method for preventing the veterinary use of those compounds shown to be toxic to vultures is needed immediately, because veterinary use of some toxic compounds, for example ketoprofen, remains legal in South Asian vulture range states. Obtaining Government and Pharmaceutical industry support for a process to achieve these objectives is essential and urgent.

5. Gaining the necessary support and funding for the above priorities needs more emphasis from within South Asia as well as internationally in order to ensure the overall objectives.

2. Programme and attendees

16th Nov 2011

09.00 Visit to Pinjore Vulture Conservation Breeding Centre hosted by Mr. R K Sapra, IFS, Haryana Chief Wildlife Warden and Dr V Prakash with presentations.

14.00 – 18.00 Summary presentations

- Nepal Breeding Programme (Binod Basnet)
- Pakistan Breeding Programme & diclofenac advocacy (Campbell Murn/Uzma Khan)
- Cambodia Vulture Programme (Hugo Rainey)
- India diclofenac advocacy and pharmaceutical industry (Janki Teli)
- Nepal Vulture Safe Zones (Mohan Chandra Bishwakarma)
- Sexing of captive vultures, carcass sampling (Mohini Saini/Vibhu Prakash)
- Research summary – including India road transect survey (Rhys Green/R Cuthbert)
- Fundraising situation overview (Michael Krause)

19.30 – Dinner – with honoured guests Mr. R K Sapra, IFS, Haryana Chief Wildlife Warden
Mr. C R Jotriwal, IFS, Principal Chief Conservator of Forests (Wildlife)

17th Nov 09.00-18.00 SAVE TAC and FACC All day Meetings
20.00-21.00 Presentation Condor Programme – parallels and lessons (Chris Parish)

18th Nov 09.00-13.00 TAC and FACC Chairs reports to SAVE Board and open meeting
14.00-15.00 SAVE Board meeting

Attendees:

Ian Newton (SAVE Chairman); Asad Rahmani (BNHS), Jemima Parry-Jones (ICBP), Tim Stowe (RSPB); Ishana Thapa (BCN); Chris Bowden (RSPB); Richard Cuthbert (RSPB), Rhys Green (RSPB), Vibhu Prakash (BNHS), Campbell Murn (HCT), Chris Parish (TPF), Mohini Saini (IVRI), Anil Sharma (IVRI); Homi Khusrokhani (BNHS), Michael Krause (RSPB), Ian Barber (RSPB), Hugo Rainey (WCS), Mohan Chandra (BCN), Toby Galligan (RSPB), Sachin Ranade (BNHS), Nikita Prakash (BNHS), Rohan Shringarpure (BNHS), Mandar Kulkarni (BNHS), Parag Deori (BNHS), Thalita Calvi (RSPB/ZSL), Bed Khadka (DNPWC); Binod Basnet (NTNC); Anil Bhagwat (BNHS), N M Ishwar (IUCN India),

Apologies/unable to attend:

Andrew Routh, Nick Lindsay, Mark Taggart, Anand Chaudhary, Devendra Swarup, Hum Gurung, Juddha Gurung, Naresh Subedi, Ram Jakati, Uzma Khan, Monirul Khan, Maheshwor Dhakal, Ganga Jung Thapa, BC Choudhury,

3. SAVE Membership, website and updates

Full list of membership of SAVE

Chairman – Prof Ian Newton

Board – Core members of BNHS, BCN, NTNC, ICBP, RSPB have each nominated – Asad Rahmani, Hum Gurung, Juddha Burung, Jemima Parry-Jones and Tim Stowe respectively.

Programme Manager – Chris Bowden

Technical Advisory Committee (TAC)

Richard Cuthbert (Chair), Vibhu Prakash, Rhys Green, Anand Chaudhary, Andrew Routh, Campbell Murn, Chris Parish, Mohini Saini, Naresh Subedi, Mark Taggart, Jemima Parry-Jones.

Fundraising, Advocacy and Communications Committee (FACC)

Hum Gurung (Chair), Homi Khusrookhan, Asad Rahmani, Ram Jakati, Devendra Swarup, BC Choudhury, Uzma Khan, Nick Lindsay, Michael Krause, Yadvendradev Jhala, Anil Sharma, Chris Bowden.

Project Members – Zoological Society of London, Hawk Conservancy Trust, WWF Pakistan, Wildlife Conservation Society, The Peregrine Fund.

Supporting Members – none yet formalised

Government Members – none yet formalised

Associate Members – new category to be established in 2012

Website – www.save-vultures.org was launched 16 November 2011

The Technical Advisory Committee was formed in July 2011,

The Fundraising, Advocacy and Communications Committee was formed in October 2011.

SAVE Board email account created: board@save-vultures.org

SAVE Contact email account created: contact@save-vultures.org

4. Country updates summary from partners

4.1 In-situ work by country

India

Two key papers were published reporting the reduction of diclofenac levels in cattle carcasses across India, and the changes in levels of diclofenac and other cattle painkillers available for sale in pharmacies. Both attracted considerable press and media coverage and the message that reducing the size of human diclofenac vials is a key step needed was clearly emphasised in the media. A further paper in *Current Science* was published immediately after the meeting in 2011.

Information on the prevalence and concentration of toxic NSAIDs in the food supply of wild vultures has been collected by BNHS staff, with three surveys now completed and analysed. Totals of 1445, 1488 and 1251 liver tissue samples from dead domesticated ungulates available to vultures have been collected from nine states in India from May 2004 to December 2008. These samples were analysed with a validated LC-ESI/MS methodology. Overall prevalence levels of diclofenac declined by almost a half over the three surveys, with a corresponding increase in meloxicam levels in survey 2 and 3. Surveys at seven site-clusters (with each site-cluster having a radius of 186 km) that were surveyed in all three sampling periods, indicated diclofenac prevalence Surveys 1, 2 and 3 of 13.5%, 11.4% and 8.9%, respectively. The same seven site-clusters indicated that meloxicam prevalence doubled from 3.0% to 6.0% from Survey 2 to Survey 3. These surveys indicate that two of the key conservation actions to counter the threat faced by vultures – banning veterinary diclofenac and the promotion of meloxicam as a safe alternative – are beginning to take effect, however despite its decrease the prevalence of diclofenac is still much too high to allow the recovery of vulture populations. The results of this study are in press with the Indian journal *Current Science* (*Cuthbert R.J., Prakash, V., Saini, M., Upreti, S., Swarup, D., Sharma, A.K., Das, A., Green, R.E. and Taggart, M. (2011). Are conservation actions reducing the threat to India's vulture populations?*).

Liver tissue samples were collected from fresh cattle, buffalo and other carcasses from nine different states of India over the period between 15th April 2009 and to 26th July 2010. Total 1898 samples comprised 566 samples from Rajasthan (310 during 2008), 206 from Maharashtra, 163 from Andhra Pradesh, 178 from Uttar Pradesh and 230 from Madhya Pradesh, 87 from Jammu & Kashmir, 33 from Haryana, 198 from Punjab, 236 from West Bengal and one sample from Bihar. The survey included largely buffalo (537), cattle (1303), goat (37), sheep (9), dog (5), horses (4) and three non-descript samples. All the extracts were analysed by indirect competitive ELISA standardized earlier (Saini et al., 2011). Out of total 1898 samples of livestock carcasses, 156 were found positive for the presence of diclofenac residue, thus indicating 8.22% prevalence. However, these figures include 310 samples collected from Rajasthan in 2008. Therefore, the actual prevalence in 2009-10 can be derived by eliminating these 310 samples from analysis. Thus in 2009-10, 87 out of 1588 extracts were found positive for diclofenac residue suggesting 5.47% prevalence. State-wise prevalence was as follows:

Andhra Pradesh (1/163, 0.61%), Haryana (3/33, 9.09%), Jammu & Kashmir (4/87, 4.59%), Madhya Pradesh (12/230, 5.22%), Maharashtra (2/206, 0.97%), Punjab (17/198, 8.58%), Uttar Pradesh (1/178, 0.56%), west Bengal (7/236, 2.97%), Rajasthan (109/566, 19.25% overall; 40/256, 15.62% in 2010 and 69/310 samples collected in 2008, 22.25%). It is apparent that high diclofenac prevalence in Rajasthan is a cause of concern as the prevalence in other states is declining and out of 1332 samples (excluding 566 Rajasthan samples), only 48 were positive for diclofenac residue indicating 3.52% prevalence. Species-wise prevalence analysis of 1898 samples revealed diclofenac positive 3.91% buffalo (21/537), 10.28% cattle (134/1303) and 25% horse (1/4). Sheep, goat and dog samples were found negative.

Information on the availability and provenance of toxic NSAIDs has been collected by BNHS staff and volunteers in India for the period November 2007 to June 2010. Data was collected from more than 250 veterinary and general pharmacies in 11 Indian states. The results of these surveys indicated that meloxicam is now the most commonly encountered NSAID on sale in pharmacies, however diclofenac and ketoprofen (toxic to vultures) and a large range of other untested veterinary NSAIDs were also encountered. A key issue is that meloxicam preparation are often produced in combination with paracetamol, however the safety of the latter drug to vultures is unknown. The other main finding of the surveys was the widespread availability of human diclofenac formulations which were available in large (30 ml) vials and which the evidence suggests are widely purchased to be subsequently used in treating livestock (thus circumventing the diclofenac ban). These results were recently published in the journal *Oryx* (Cuthbert, R.J., Dave, R., Chakraborty, S.S., Kumar, S., Prakash, S., Ranade, S.P. and Prakash, V. (2011). *Assessing the ongoing threat from veterinary NSAIDs to critically endangered Gyps vultures in India. Oryx, 45, 420-426.*). This paper and associated press releases obtained a good deal of publicity, both in India and internationally, and this publicity particularly emphasised the problem of human diclofenac and the need to legislate towards smaller size vials (2-3 ml) for human diclofenac products, in order to make these impractical and too expensive for treating livestock.

Diclofenac was also detected in vulture liver and kidney tissues of the dead vultures in 2009-10. Out of 33 vultures, 13 (39.39%) were found positive for diclofenac residue.

Nationwide road surveys in India, initially conducted in 1991-1993 and repeated in 2000, 2002, 2003 and 2007, revealed that, by 2007, *Gyps bengalensis* had fallen to 0.1% of its numbers in the early 1990s, with populations of *Gyps indicus* and *Gyps tenuirostris* having fallen to 3.2% of their earlier level. The last nationwide survey in India was undertaken in 2007 (Prakash et al. 2007. *Recent changes in populations of resident Gyps vultures in India. Journal of the Bombay Natural History Society 104:129-135*). A new nationwide census in India was undertaken from March to June 2011, which followed the same methods and transects as previous surveys beginning in 1992. The results indicate that populations of all three species of vulture remain at very low levels, but that the rate of decline has slowed and might even have reversed for *Gyps bengalensis* (details to be published in 2012). However, the rarity of vultures means that estimates of the most recent population trends are necessarily imprecise, so slow declines may be continuing. The degree to which the decline rate of *Gyps bengalensis* has slowed is broadly in accord with the effects on population trend expected from a reduction in the

prevalence and concentration of diclofenac in carcasses of domesticated ungulates since the ban on veterinary diclofenac was introduced in 2006, as was modelled in a recently published paper (Cuthbert et al. 2011. *Effectiveness of Action in India to Reduce Exposure of Gyps Vultures to the Toxic Veterinary Drug Diclofenac. PLoS One 6(5): e19069*). These results are encouraging and suggest that conservation actions implemented in India are beginning to take effect on the remaining population of vultures. However, further action to remove all remaining diclofenac in the veterinary sector must be enforced in order to allow numbers to increase. Further analysis of these results, in combination with the latest carcass survey results, will be undertaken in order to establish if there are spatial and temporal differences in the patterns of decline.

Vulture Safe Zones - Previous work funded by an RSPB managed Darwin Initiative project has focused *in-situ* conservation of vultures in Gujarat State (with work based around Ahmedabad and the Mouva region) and in Jharkhand State (with work focused around Hazaribad), with the aim of protecting remaining populations of vultures that are present in these areas. With encouraging results from similar *in-situ* conservation activities in Nepal and the realisation that vulture conservation areas will need to be far larger (a minimum radius of 150km) a new Darwin Initiative project was funded for trans-boundary conservation efforts for vultures in Asia. This work aims to establish Vulture Conservation Areas and to subsequently declare Vulture Safe Zones in India and Nepal, once monitoring of pharmacies and ungulate carcasses has established that these areas are free from diclofenac and other toxic NSAIDs. Initial modelling, based on limited satellite tracking data, has established that VCA/VSZ will need to remove diclofenac from a large area (having a radius of >100km) in order to encompass the foraging range and protect most vultures.

The establishment of Provisional Vulture Safe Zones and Vulture Safe Zones (PVSZ/VSZ) in India is in its early stages, with only the work in Uttarakhand State (undertaken by the Mahseer Foundation) and Gujarat currently set up with systems in place for monitoring of vulture numbers and monitoring the availability of NSAIDs. Nationwide surveys of vultures, ungulate carcasses and pharmacies means that these critical parameters are being monitored at a large-scale and encompassing areas where VSZ sites are likely to be established, however it will be a priority to establish more detailed monitoring within established and new VCA/VSZ sites. Recent results from Uttarakhand State reveal that numbers of nesting white-backed vultures remain in areas adjoining Corbett National Park, with two colonies holding a total of 20 active nests and more than 100 individual vultures recorded. Monitoring of pharmacies in the area indicates that there is still a long way to go in order to remove the diclofenac problem: with 43% of shops still willing to sell human diclofenac for veterinary treatment (a total of 46 shops were surveyed). The availability of meloxicam was also low in this area with only 4% of shops offering this drug.

Identifying the safety and toxicity of NSAIDs to *Gyps* vultures is a critical requirement for the long-term conservation of vultures in South Asia. Currently we know the toxicity of two NSAIDs (diclofenac and ketoprofen), have serious concerns on the safety of two other NSAIDs (flunixin and aceclofenac) and only know of the safety of one compound (meloxicam). This limited knowledge exists in an environment where we know that at least 12 different veterinary NSAIDs are on sale in pharmacies in India and Nepal, and where 50% of meloxicam brands that are

sold have paracetamol (acetaminophen) as a second ingredient: the safety of paracetamol to vultures is unknown. Identifying further toxic NSAIDs is a key objective in order to remove future threats that are likely to be produced by these drugs. Conversely identify NSAIDs that are safe for vultures and suitable for treating domesticated ungulates will be of benefit for vulture conservation, as the promotion of a range of safe NSAIDs will greatly help in the cessation of veterinary diclofenac and the misuse of human diclofenac for veterinary treatment.

Direct meetings with Government ministries in 2011 have taken place only as informal contact meetings between BNHS Director and Vibhu Prakash and the Forest Department. The Minister of the Environment, Jairam Ramesh had been given some information and agreed to attend the SAVE launch event in February, but shifted ministry in July, making way for Ms Jayanthi Natarajan.

Dr. Rahmani and Vibhu Prakash attended the meeting on Vulture Conservation at MoEF on the 21 March 2011. The issue of human formulation of diclofenac being diverted for veterinary use was discussed in detail. It was agreed that educating the veterinary practitioners including local unskilled practitioners against the use of diclofenac is key and needs taking up more seriously.

It was decided that a notification may be issued under the Environment (Protection) Act , 1986 restricting packaging of diclofenac to single dose packs. The notification may be finalised in consultation with Drug controller General of India. Note that the Ministries had promised to implement a ban of human diclofenac vials larger than 3ml over two years ago, but unfortunately this has not emerged, and apparently requires further direct follow-up.

Contact with the pharmaceutical industry in India started at a meeting called by the Indian Ministry of Environment and Forests in April 2004, when the diclofenac issue was presented to around ten representatives from larger companies concerned, and since then the Indian Drug authorities have taken key actions regarding outlawing veterinary diclofenac formulations, but other requested measures have apparently not progressed such as the human diclofenac vial size issue and outlawing the licensing of ketoprofen or other untested NSAIDs on a precautionary principle. Our direct contact has focused largely around the meloxicam manufacturers. One natural ally is the first meloxicam manufacturer in India, Intas, which remains the largest meloxicam producer within India, and contact with that company has been maintained since the 2004 meeting.

Because of the identified problems with meloxicam formulations being produced and used within India, (most having extremely high pH and osmolarity values), with the voluntary help of Juergen Daemmgen, we have made two sets of visits to meloxicam producing companies and ensured that they are aware of the problem, and also aware that a neutral pH formulation is available which is out of patent. We also pointed out to the companies contacted what a marketing opportunity this presents (and can be marketed as environment-friendly), and how other NSAIDs may not be vulture-safe - or are definitely not safe in the case of ketoprofen – and thus highlighting the need for withdrawing their use as veterinary drugs. Six companies were contacted in India (plus one in Nepal) in 2008 and a further 20 in December 2010 (detailed reports available). Reactions by the companies to these visits (mainly in Ahmedabad and Mumbai where most key companies are based) by the Juergen, BNHS and RSPB team, were

mixed, varying from great interest and support to open hostility for interfering with the industry. Further follow-up on these visits is planned, mainly by correspondence as the next step.

Lists of meloxicam manufacturers have been compiled and updated, and these have increased from just one in 2004 to well over 30 in India alone.

A further list of diclofenac producers, highlighting those that produce injectable diclofenac vials larger than 3ml. Twelve companies are on record in the July 2011 Veterinary Drug Index of India (plus at least two more not listed) as producing large vials, and despite our close association with Intas, we are disappointed to see they are among them along with Novartis.

Three main press releases were prepared during the period, relating to the SAVE launch itself in February, and the two main publications regarding diclofenac sampling in cattle carcasses and the pharmacies surveys, the second of these were combined with breeding (fledging) results from this year although there were additional materials prepared for the breeding centres more locally for the states concerned. The SAVE launch received some coverage, but the other two were especially well covered, in particular the September one, which conveyed the vial size message quite clearly. Vultures have appeared a total of 67 times during this period, which comes to an average of about 11 per month. In addition to the main press releases mentioned, the Western Ghats CEPF/RSPB/BNHS work attracted significant publicity for the surveys and particularly for the awareness work, getting the diclofenac message across clearly (even on Yahoo India homepage at one point). The Vulture Safe Zone work in Uttar Pradesh in August also achieved good regional coverage, primarily instigated by the NGOs working with BNHS on this. The coverage of the breeding success was significant and good, both for Haryana and to a lesser extent for West Bengal. This was mainly managed by staff at the respective centres.

Nepal

Extent of current and newly established Provisional Vulture Safe Zone (PVSZ)

A total area of 30,344 km² has been declared as 'Provisional Vulture Safe Zone'. This area stretches along the western lowlands (from Chitwan to Kanchanpur district) and includes all six vulture safe feeding sites (VSFS) as well as the vulture conservation breeding centre. New expansion targets western hill districts in order to make a continuous block with more than 100km² radius to comply with the SAVE criteria of the effective area required.

Educational materials produced and distributed.

Over 2500 Leaflets on *Public Notice on Use of Diclofenac*, over 1000 posters (including a new design) on *USE MELOXICAM: STOP DICLOFENAC*, and over 250 leaflets on *Save Natural Scavengers* were distributed during the General Assembly of Para-veterinary Association, vulture conservation awareness workshops, IVAD and other awareness activities in 2011. A new eco-tourism promotional poster for vulture safe feeding sites has been developed and are now under distribution.

Visits to Pharmacies and veterinarians

A total of 294 pharmacies were surveyed in Nepal during 2011, with all surveys undertaken throughout six districts in the western lowlands. These surveys didn't record any veterinary diclofenac in pharmacies during 2011. Meloxicam was recorded in 285/294 (97%) of pharmacies and is now easily available to farmers. Meloxicam was found in both injectable and bolus (tablet) formulations. 16 pharmacies were found stocking nimesulide + paracetamol formulations during the surveys. Injectable forms of human diclofenac in 30ml vials was recorded at two of pharmacies in Bardia district.

A joint survey by BCN and BNHS in August 2011 visited pharmacies in Uttar Pradesh, India, along the Nepal-India border. These surveys found that the human diclofenac in large vials (>3ml) is most common form being sold and is easily available in pharmacies in Uttar Pradesh. Surveys by BCN have found that these human formulations are being supplied to Nepalese markets for veterinary use which is also verified by the Uttar Pradesh survey. Therefore, there is a great risk of human diclofenac to vultures along these border areas.

More than 1000 veterinarians were directly sensitized by BCN in different national and local level awareness workshops and activities. BCN made presentation on diclofenac and vulture conservation at general assembly of Nepal Para-Veterinary Association in Kathmandu. The key message was spread out to the every corner of the country through its participants. Similarly, 765 veterinarians were directly sensitized by the Department of Livestock Services (DLS) in its 51 working districts And also continuing this work in the fiscal year 2011-12. The involvement of the DLS is a real step forward and results from a briefing that BCN gave the DLS Director General. The DG DLS has taken an active interest in the vulture conservation since then and sent a circular to DLS Officers informing them to budget for and incorporate vulture conservation awareness work within their training programmes.

Provision of ungulate carcass free from toxic NSAIDs

A total of six vulture safe feeding sites operated by BCN are providing diclofenac free food to vultures. Within this year, a total of 444 cows were collected, 332 fed to vultures and at present 126 cattle are available at the cow rescue centres.

Vulture and nest monitoring

Monitoring of vultures was undertaken within six VSFSs during the vulture feeding last year, with regular counts undertaken in Pithauli of Nawalparasi, Gaidatal of Lumbini, Lalmatiya and Bijouri of Dang, Khutiya of Kailali and Ghachowk of Kaski districts. The maximum number of vultures recorded attending a single feeding site was 233, with an average of 76 birds attending at the six VSZ feeding sites. This year, the highest number of white-backed vulture nests was observed in Lalmatiya in Dang district where 68 nests were recorded. Another important nesting site was at Pithauli, the site of the first VSZ, where 57 nests were recorded in the 2010/11 breeding season. In total 304 nests were monitored in the 2010/11 breeding season.

The number of white-backed vulture nests in and around the VSFS has fluctuated slight in the last season, which might be due to a shifting distribution of nesting throughout the western lowlands along with the expansion of VSFs. For example, numbers of nests at Pithauli were lower this season with 57 nests in comparison to 2009/10 when there were 68 nests. However numbers at this site have increased dramatically in the previous three seasons with a low of just 17 nests in 2006/07, with 33, 45 and 68 nests recorded in the following three seasons. At Dang VSZ district nest numbers fluctuated with 46 nests in 2008/09, 71 in 2009/10 and 56 in 2010/11.

Mortality and post-mortem records of vultures

A total of 33 dead vultures were recorded within 2011 and comprised 14 Himalayan griffon, 2 white-backed and 1 cinereous vulture died at a single event in Dang district when they were

exposed to a poisoned dog which had been placed out intentionally. Similarly, 7 Himalayan Griffon died in Salyan district when they were exposed to a poisoned animal carcass. Among the 33 carcasses recovered six were found dead due to natural causes, with a further 4 birds found injured of which 3 subsequently died during or following treatment. The highest mortality was observed in the Himalayan griffon vulture. Sick or injured Himalayan griffons are often encountered in the lowlands of Nepal and often these birds have injuries or sickness leading to mortality. These birds are often juvenile or immature birds and the apparent high prevalence of deaths may be due to these young birds migrating to or from the Himalayas. A most serious mortality issue occurs in the mid-hills of Nepal, where people frequently and intentionally use poison in cattle carcasses to kill leopard and other carnivores, but accidentally vultures and other scavenging birds and mammals are exposed and poisoned. 25 of the 33 dead birds were recorded in the Nawalparasi to Kanchanpur districts in the VSZs.

Meetings with concerned departments and outcomes and other activities

A national workshop on Diclofenac Free Zone Declaration was held in June 2011 in Kathmandu. Department of National Parks and Wildlife Conservation (DNPWC), Department of Drug Administration (DDA), Department of Livestock Services (DLS), Department of Forest (DoF), Nepal Veterinary Council (NVC) along with conservation organizations such as National Trust for Nature Conservation (NTNC), World Wildlife Fund (WWF) participated the workshop. The overall objective was to make the government body aware of the current situation and accountable for the sustainability of VSZ work in Nepal. The issue of illegal use of human diclofenac and the issue of >3ml vials in veterinary use was discussed and identified and the immediate priority to limit the vial size <3ml and label all diclofenac as “NOT FOR VETERINARY USE” . The workshop also identified the need of endorsement of *Diclofenac Free Zone Declaration, Monitoring and Management Guideline* in collaboration with DNPWC and DLS. An MoU was signed between DNPWC, NTNC and BCN for five years for further sustaining and managing the Vulture Conservation Breeding Centre (VCBC) at Kasara, Chitwan National Park.

Contact made at national and district level government agencies

Frequent contact has been made mostly with DNPWC, DDA and DLS in central level. The BCN team provided technical support to DLS vulture conservation awareness workshops in most of the districts. Also regular contact is made to District Livestock Service Offices (DLSOs) for NSAIDs monitoring. We were able to organize a monitoring visit of Natural Resource Committee of Constituent Assembly and high level government officials to vulture safe feeding site (VSFS) at Dang. They were updated on the current situation of the VSFS. They have realised that the government should financially support this innovative concept for its long term sustainability.

Pakistan

A vulture species survey was carried out throughout Pakistan in Punjab, Sindh, Baluchistan, Khyber Pakhtunkhwa (KPK) and Azad Jammu and Kashmir (AJK) from November 2010 to April 2011, covering the breeding season. Only coastal areas of Balochistan Province could be covered and the tribal area and areas of Khyber Pakhtunkhwa could not be covered all because of security concerns. Of the two critically endangered species that occur in Pakistan; *Gyps bengalensis* was only observed in Sindh and Punjab provinces, while *Gyps indicus* only in Sindh Province. Considering that Nagar Parker remains the last stronghold of these two critically endangered species in Pakistan, and that it borders with Runn of Kutch in India, a cross-border initiative and extended Vulture Safe Zone is seen as highly desirable in this area.

As part of the education and awareness component of the Gyps Vulture Recovery Programme (GVRP), numerous schools have visited the facility since it was established including Lahore Government College, Beaconhouse School System and the University of Veterinary and Animal Sciences, Lahore. The GVRP also works with a Community School in the vicinity of Changa Manga, where the breeding centre is located. To celebrate International Earth Day, the GVRP centre at Changa Manga, was visited by the US Consulate General, Carmela Conroy and community school students.

The other main focus has been on the breeding centre (see below)

Cambodia, Myanmar, Tibet and Afghanistan

WCS leads the Cambodia Vulture Conservation Project which was established in 2004 with government and NGO partners. The main activities of this project are monitoring vulture populations and nests; provision of supplementary food at vulture restaurants; advocacy to support control of veterinary use of diclofenac; and raising awareness about the threat to human and wildlife health from misuse of pesticides. Populations of the three resident vulture species appear to be stable or increasing (total approx. 300 birds) and breeding numbers appear to be recovering. However, populations remain low, particularly of Slender-billed and Red-headed Vulture with fewer than 50 individuals each. Major threats include the misuse of pesticides, loss of habitat and a low wild prey base. Diclofenac is not used for veterinary purposes in Cambodia and a veterinary formulation has only been detected once. This was removed from sale as the Department of Animal Health issued a recommendation that diclofenac should not be used in veterinary medicine: a veterinary medicine law is being drafted.

Vulture surveys by BirdLife and WCS in Myanmar detected populations in the northern states with a minimum population of 135 individuals of four species (mostly White-rumped, Slender-billed and Himalayan Vultures). White-rumped Vultures breed in the Hukaung Valley. Diclofenac is not used in veterinary medicine, but there is a risk of dumping of Chinese formulations in Myanmar.

In Afghanistan few data exist before 2006, but Himalayan Vultures may be less abundant than previously thought. Bearded Vultures are common, but it is not possible to comment on trends for Egyptian Vultures. There is a decreasing trend in the use of veterinary diclofenac to the benefit of veterinary meloxicam, which is well accepted. Human diclofenac is not widely used for veterinary purposes. A diclofenac survey is planned for December in 2011 in Kabul.

In Tibet, diclofenac is used for human, but not veterinary medicine. Metamizole is recommended for veterinary use by government.

Bangladesh

From vulture records since 2005, the highest concentration of sightings (5.1 sightings/interviewee/year) is in Sylhet division in the northeast and the lowest (0.7 sightings/interviewee/year) in Chittagong division in the southeast. Three key areas were identified for which include seven known nest sites. These areas are located in the northeast, north and southwest of Bangladesh. Surveys showed that 57% of cattle-owners in these areas use diclofenac to treat their cattle, and 61% bury the dead cattle to control the smell. In the 2009-10 nesting season, 32 nests of White-rumped Vulture were monitored, which only successfully fledged five juveniles, so the overall breeding success (15.6%) was very low. The majority of nests (n = 14) were observed in Sylhet Division (northeast), mainly in shade-trees

within tea estates. The deduced primary cause of the low breeding success was diclofenac poisoning. One colony dropped from over 40 vultures to only six since the previous year and at least eight vulture carcasses were found in the area.

Diclofenac poisoning has been identified as the principal cause (90% responsible) for vulture declines. Diclofenac was found to be the most widely available and most commonly used cattle medicine and the recorded availability and use of diclofenac found to be inversely proportional to the observed relative abundance of vultures. Other factors such as food availability, human disturbance and destruction of nesting trees may also further contribute to the decline. In response to repeated appeals through media and meetings, on 25 October 2010, the Government banned diclofenac, for use in cattle, however, the implementation of this ban remains a major challenge. The veterinary diclofenac manufacturers objected to the ban, arguing that vultures may have declined for other reasons like food shortage. Although the Government veterinary diclofenac ban was implemented, illegal production and use continue and manufacturers are putting some pressure to remove the ban. Gathering further information and continued support from the media are important further steps which the conservation bodies need to persist with in order to convince the Government to stand by the ban. Highlighting the safe alternative meloxicam has been a further step taken, but unfortunately it is not currently available in Bangladesh.

Europe

Engaging with the pharmaceutical industry in Europe has perhaps unsurprisingly not been easy. The focus has largely been on potential financial support for resolving the problem the industry has caused, but most progress so far has been with more direct technical support offered by one meloxicam producer. Although diclofenac was originally developed by Novartis in Europe, the problem is largely caused by the generic producers within South Asia, and since the drug was never licensed for veterinary use in Europe or North America it is too easy for the company to discount their responsibility, despite being a major producer in India.

In 2008, contact was established with Boehringer Ingelheim (BI) - the company that developed meloxicam, and their product 'Metacam' remains one of its top 3 products for European and North American markets, They have given one grant of £25,000 in 2009 to support the programme, and their recently retired head of research and development, Dr Juergen Daemmgen has become an important volunteer for us (fortunately being a very keen birdwatcher helped!). Most significantly of all, BI agreed to drop their patent on the formulation for Metacam within South Asia, which otherwise would have run to 2023. (note the patent on the meloxicam compound itself already expired in 2003). Juergen continues to give technical help, and BI staff also assisted with checking Indian formulations properties. One final recent development is that BI have initiated Metacam production in South Africa, and are in contact with our collaborators there regarding its promotion as a vulture-safe drug.

RSPB has made considerable efforts since February 2011 to approach over 30 major pharmaceutical companies in Europe, and focusing this through loose endorsement of International Federation for Animal Health (IFAH), we have requested a dialogue and support.

None of the companies has responded positively to this despite IFAH's assistance in the process.

Two press releases were prepared during the period, relating to the two main scientific publications regarding diclofenac sampling in cattle carcasses and the pharmacies surveys which was combined with breeding (fledging) results from this year. Both received good coverage in the print and online media, in particular the second of the two conveyed the vial size message quite clearly and was covered most widely.

The level of contact with BNHS press officer increased and helped the process for conveying the same main messages. It was noted that the spin on the second release was more negative, and perhaps for this reason received more coverage, although this also referred to the breeding success story. Although most coverage has been achieved in UK media, it has reached a worldwide media audience.

The RSPB 16 minute film 'Saving Asia's Vultures from Extinction' was made available online, but was apparently not used very widely in India partly because there were insufficient Government officials portrayed within the film. This could be addressed with some additional editing/effort if deemed worthy of the effort involved? It has still been used at a number of meetings within India, and Nepal. There has been some discussion regarding adding a Nepalese soundtrack.

There was no official public launch event (so far) in Europe, partly due to attempts, (so far unsuccessful) to involve Prince Charles. It was decided that British Birdwatch Fair plans for a launch in August 2011 would not have attracted significant publicity. It remains an option to present a launch event in future (combined with fundraising) if this appears worthwhile.

4.2 Ex-situ Breeding programmes overview

The total number of birds held at the centres significantly increased during the year, through additional captures of 20 wild Oriental white-backed vulture nestlings in Nepal and five nestlings for the Pakistan centre. The Indian figures increased mainly through increasing breeding success in India and just two full-grown birds brought in to centres (Table 1 below).

Additional aviaries were constructed during the period at the Pinjore centre, funded by Indian and Haryana State Government, adding new smaller breeding aviaries there and largely completing a fourth colony aviary.

Important progress with molecular sexing techniques was made in India and this now appears reliable and it is anticipated that the sex of most birds will be sexed this way within the coming year. This work is another collaborative effort by Indian Veterinary Research Institute (IVRI) together with BNHS and RSPB. In Pakistan molecular sexing was carried out for all the birds at the Environmental Laboratories in UAE.

Artificial incubation methodology developed significantly, the number of eggs pulled increased and the number of young produced improved sufficiently that this will now be extended to other centres in future. The majority of fledged juveniles at Pinjore were artificially incubated and reared, and significantly, four were the result of induced double-clutching prompted by the pulling of the first egg and the birds re-laying.

**Table 1. Numbers of each of the Critically Endangered Gyps species held in the SAVE Conservation Breeding Centres November 2011.
(Number successfully fledged on site in brackets)**

Centre	Pinjore	Rajabhat Khawa	Rani Forest	Chitwan	Changamanga	Total
Vulture species	Haryana	W Bengal	Assam	Nepal	Pakistan	
	India	India	India	Nepal	Pakistan	
Oriental white-backed	62 (15)	52 (5)	27	60	20	221 (20)
Long-billed	66 (11)	17				83 (11)
Slender-billed	18 (4)	14 (1)	15			47 (5)
Total	146	83	42	60	20	351 (36)

5. Full sub-committee updates (TAC and FACC) from meetings

5.1 Priorities and actions agreed by FACC at SAVE meeting Pinjore, 17 Nov 2011

FACC Members present: Homi Khusrokhani (acting Chair), Asad Rahmani, Chris Bowden, Anil Sharma, Ishana Thapa (representing Hum Gurung), Michael Krause

Observers present: Janki Teli, Tim Stowe, Ian Barber, Binod Basnet, Hugo Rainey

Apologies from FACC: Ram Jakati, BC Choudhary, Nick Lindsay, D Swarup, Y Jhala, Hum Gurung (Chair)

1. **Highest immediate priority: Prevention of large human diclofenac vials from being available in the market and thereby to vets.**

Change needed is: removal of all human injectable diclofenac vials larger than 3ml

- **Via pharmaceutical industry contact**

Approach Pharma Associations

- | | | |
|-------------------------------------------------|-------|----------|
| 1. Prepare presentation | CB | 15.01.12 |
| 2. Prepare brochure/leaflet | CB/JT | 15.01.12 |
| 3. Research dates of Assocs meetings H2 Jan/Feb | HK | 15.01.12 |
| 4. Book dates with OPPI & IDMA + IPA | HK | 15.01.12 |

- **Via Government legislation**

Approach Drug Controller General of India (DCGI)

- | | | |
|-------------------------------------------------|----|----------|
| a. Prepare presentation/data | CB | 15.01.12 |
| b. Invite attendees, D Swarup, A Sharma, BNHS | CB | 15.01.12 |
| c. Agree date for meeting – contact via Mongia? | HK | 15.01.12 |

- **Approaching MoEF and other Ministries – through CBD COP and IUCN meetings**

- | | | |
|-------------------------------------------------------------|-------|----------|
| a. Getting vultures/diclofenac put on agenda for COP | AR | 30.11.11 |
| i. (consult Ashish Kothari) | | |
| b. Getting vultures/diclofenac put on agenda for IUCN/Korea | HK | 30.11.11 |
| i. (consult Aban Kabraji) | | |
| c. Preparing/followup | CB/AR | |
| d. Contact with WHO and UNICEF? (consult Aban) | HK | 02.12.11 |

- **Via priority state government levels** eg Rajasthan where apparently higher diclofenac levels persist or need for influence on industry greatest

Approach Drug Controller Rajasthan (highest diclofenac levels state)

- Prepare presentation/data CB 15.01.12
- Invite attendees, D Swarup, A Sharma, BNHS CB 15.01.12
- Agree date for meeting – contact via Mongia? HK 15.01.12

Approach Drug Controller Maharashtra

- Find contact/to start process HK 31.12.11
- Plan next step/meetings

2. Prosecuting or highlighting contraventions to existing legislation on diclofenac use by pharma outlets and vets

- Contacting Investigative Journals within India
 - Sunita Narayan, Rajat Bhargav, Tehelka, AR 31.12.11
 - Further options (to clarify) VP 31.12.11
- Contacting Investigative journalists from outside was agreed as less appropriate and only to be considered if Indian options not taken up CB has contacts
- Contacting TV/documentary channels to take this up AR 31.12.11
 - (eg Nat Geo, Discovery, - Atul Sathe to be engaged)

3. Sensitising veterinary community - Presentations at Veterinary colleges

- List all vet colleges JT 31.12.11
- Approach A Sharma, D Swarup on potential visit dates CB 31.12.11
- Research dates of vet gatherings to approach AS 15.01.12
- Develop programme of college visits

4. Explore options for a safety-mark for veterinary products

- Check with Dr Rao of Novartis on approval process HK 30.11.11
- Include this issue in DCGI meeting (see above)
- Also discuss with Satish Pasrija HK 30.11.11
- Discuss options for taking this forwards

5. Engaging more support for SAVE activities

- Creation of Associate Member category for local NGOs (circulate criteria among FACC) CB 15.01.12

6. Collating information on vulture loss consequences

- Dr Bhagwat to supply water contamination evidence AB 31.01.12
- HK to seek carcass disposal methods for 5 states HK 31.12.11

7. Information gathering on sales by Institutions vs Retail

HK 30.11.11

(contact via Satish Pasrija)

8. Wider awareness-raising through celebrities

eg contact Sharukh Khan + other options AR 31.12.11

eg contact Prince Charles, others UK CB ongoing

9. Selection/actions for upcoming 3 Vulture Safe Zones

- Meet with Chief Ministers for each state agreed AR 31.12.12

10. Measures to extend actions to all South Asian countries

CB 15.01.12

(to discuss with Uzma Khan & Bangladesh contacts)

11. Fundraising

- Agreed to work together to fund SAVE and use networks across countries and continents most effectively All ongoing
- Share grant applications between partners All ongoing (CB coordinates)
- Share Tata UK and pharma leads HK 30.11.11
- Follow up Tata UK and pharma leads MK 15.01.12
- Plan approach to Tata foundations MK/MK 31.12.12
- Consider appointing a full-time resource in BNHS AR/HK
 - Advertise and recruit locally
 - Second a person from RSPB if agreed as efficient
 - Use a Professional Funding Adviser – working on commission
- Use new RSPB Brochure 'Space to survive' with minor modifications Any as required

- Recommend a Fund Allocation Process & Disciplines to the SAVE Board
All As income rec'd
- Consider Institutional/Supporting Membership criteria
for SAVE (Pledge for membership)
FACC topic by email

5.2 Priorities and actions agreed by TAC at SAVE meeting Pinjore, 17 Nov 2011

Attendees at the TAC meeting

TAC members present: Vibhu Prakash (BNHS), Richard Cuthbert (RSPB), Rhys Green (RSPB), Jemima Parry-Jones (ICBP), Mohini Saini (IVRI), Campbell Murn (Hawk Conservancy), Chris Parish (Peregrine Fund)

TAC members unable to attend but supplied comments: Andrew Routh (ZSL), Mark Taggart (ERI), Anand Chaudhary (ex BCN)

Others present and contributing to discussions: Ian Newton (SAVE Chairman), Rohan Shringarpure (BNHS), Mandar Kulkarni (BNHS), Mohan Bishwakarma (BCN), Toby Galligan (RSPB), Hugo Rainey (WCS Cambodia), Bed Khaka (DNPWC Nepal), Binod Bisset (NTNC Nepal), Thalita Calvi (RSPB/ZSL), Anil Bhagwat (BNHS council & CB Patel Research Centre)

Meeting outline

The Save Technical Advisory Committee (TAC) met on the 17 November 2011 at Pinjore, Haryana, during the second SAVE meeting held from 16-18 November. Prior to the TAC meeting a list of potential discussion topics were circulated to the TAC group and to the SAVE Board for comments and suggestions. These nine topics (see below) formed the basis for the meeting's discussions along with three other topics raised under "any other business".

- 1 Breeding centre data
- 2 Veterinary support sustainability
- 3 Training requirements
- 4 Measurements within Provisional Vulture Safe Zones (PVSZ)
- 5 Nationwide surveying
- 6 Establishing VSZ
- 7 Which alternative NSAIDs to safety test next
- 8 Reducing feeding costs
- 9 Release plans

The following items were raised as "any other business" after discussion of the preceding topics:

- 10 Other mortalities
- 11 Red-headed vultures

Information covered in these meeting notes

- A. Summary of discussion topics
- B. Actions points and nominated persons for each topic

Summary of discussion topics - The following items were discussed and agreed:

Breeding centre data – the TAC agree that breeding centre data needs to be recorded so that analysis can be performed rapidly and comparably between centres and countries. A series of data to be determined will include pedigrees, mortalities and fecundity. Records will be kept and primarily used in-house, but will be valuable for potential bird movement between centres and for when birds are chosen for release. Use of free or cheap to buy zoo/captive breeding software to be evaluated, as good software for this purpose exists. Not recommended to follow any web-based recording keeping (e.g. ARKS/SPARKS).

2. **Veterinary support sustainability** - the TAC agree that a veterinary support ideally must come from host countries: a professional veterinarian with expertise in birds/vultures; and through centre staff who are trained as be para-vets. Concern was raised that without good incentive, in the form of a competitive salary and/or a long-term contract, professional vets will be hard to keep. This raises the problem of finding funding to do so. New agreement by BNHS EC allows contracts to run “for duration of the project” and could be advantageous offering long-term contract. Potential for specialist project vets to be based within nearby veterinary colleges (so that teaching/research may take up 50% of time and be on call for vulture centres) was viewed as a potential solution and needs to be explored. Visits from international vets and 6-month postings viewed as highly beneficial in the current absence of vulture/avian specialist vet.
3. **Training requirements** – the TAC sees the necessity to train centre staff as para-vets, and expand the expertise of field biologists and community mobilisers. Training of all staff as para-vets viewed as essential as they can respond immediately to potentially catastrophic outbreaks of disease at centres. Para-vet training should occur in the respective countries and the UK, and continue with frequent ‘refreshers’ via Skype/video conferencing. Field biologists require training in experimental design, data collection, statistical analysis and reporting. Similarly, community mobilisers/advocacy officers need training to do their work effectively.
4. **Measurements within Provisional Vulture Safe Zones (PVSZ)** – the TAC agree to stick to planned criteria to measure diclofenac and other harmful NSAIDs in VCA (i.e. very low or no diclofenac prevalence from >800 carcass samples). Dipsticks will be used as a cost effective means to carry out carcass sampling and trained field biologists and ‘friendly’ skimmers will be involved in sampling. Consider use of biopsy tools for collecting liver samples, without need to open up carcass. Duplicate tissue samples will be stored for future analysis including LCMS to determine other NSAIDs present. Final confirmation of dipstick accuracy is planned, also need to test reliability of storing tissue samples in saturated salt (NaCl) solution. The TAC also agrees that satellite tagging are necessary for a better idea of the necessary size and shape of VCA, including

tagging of additional species to WBV. It was agreed that “Provisional Vulture Safe Zone” was the most appropriate name for these areas and “Vulture Conservation Areas” will not be used

5. **Nationwide surveying** – Nationwide road, carcass and pharmacy surveys should also continue without modification as this data is vital to show decision makers developments in vulture conservation. Pharmacy survey, if done at the same time, will add little to the expenditure while adding greatly to data. Up-to-date data and publications are essential; therefore, duration between surveys should continue as planned and preparation of manuscripts streamlined. External funding sources for nationwide carcass surveys not identified and needs addressing.
6. **Establishing VSZ** – the TAC agrees that more VSZ need to be established to encompass all species, including slender-billed and long-billed vulture which are currently under represented. Current sites and potential sites include western lowland and mid-hill regions in Nepal, areas within Uttar Pradesh, Uttaranchal, Assam, Madhya Pradesh and Gujarat in India, and Sind province in Pakistan. Work will initially focus on Nepal (where established), three sites in India (UP, Uttar + Other) and initial preparatory work in Pakistan (Sind). Further sites to be included in due course with potential trans-boundary project in Sind/Kutch (Gujarat) region. Northwards expansion of VSZ sites agreed as priority work in Nepal. TAC thinks that declaring high profile site, such as Keoladeo National Park (India) and Changa Manga Forest (Pakistan), as Vulture Safe Zones in the future will be an ideal political and financial move. Agreed that initial sites be called Provisional Vulture Safe Zones with declaration of Vulture Safe Zones after 2 years of monitoring has established them as safe for vultures.
7. **Which alternative NSAIDs to safety test next** – the TAC sees the necessity to continue safety testing. The NSAIDs next to be tested should be those that commonly encountered in pharmacies. Testing will initially focus on potentially safe drugs, followed by potentially dangerous drugs. A total of 4-5 drugs likely to be tested. Plans are to test paracetamol and analgin in first round of safety testing (former is mixed with meloxicam, latter was in use in India prior to vulture declines). Next round of pharmacy surveys and carcass surveys will confirm the next NSAIDs to be selected. Ketoprofen toxicity evidence will be pushed to Government decision makers with the help of the IUCN contacts, if unsuccessful may need to consider toxicity testing in India (first toxicity study completed in South Africa). Safety testing will take place over a 2 year period using Himalayan griffon vulture as surrogate species (and final confirmation of safety in threatened *Gyps* species). Funding application currently being developed by IVRI/BNSHS/RSPB for submission to MoEF with aim to begin in late 2012.
8. **Reducing feeding costs** – cultural and practical barriers make using small mammals as alternative foods difficult in India and Nepal; however, these are used successfully in Pakistan and benefits to chicks/birds of feeding small mammals. Buffalo appears to be the cheapest and most sustainable food source in both India and Nepal, although not possible (for cultural reasons) in some centres. Using old cattle (following vulture feeding site approach) not possible for cultural/practical reasons. Alternatives including shipping-in rats (from Europe) and using “road kill” of wild animals (including elephants as at West Bengal) were discussed but large quantities and freezers bring extra costs. Comparison of costs of freezers and small mammal rearing needs to be done. Investigating if culling programme of Nilgiri (blue bull) by Indian Forestry Department can be used as a source of food needs to be evaluated, although will depend on use of non-lead bullets and freezers.

9. **Release plans** – the TAC agree that breeding of F2 generation birds in the centres is essential prior to any releases in the wild – fortunately this is likely to be 1-2 years away given age of F1 birds in centres. Releases should be ‘soft releases’ in VSZ. Preparation for release should begin immediately, however programme of work and the transformation from VCA to VSZ will do much of this preparation. Captive birds for release will likely consist of small groups of 10-15 birds covering a cross section of ages (3 year birds to adults birds including non-breeding wild-caught birds). Captive populations should acclimatise for 6 months at release sites in holding pens, which can later be used to lure birds for monitoring and recapture. Potential to release birds from very close to the existing breeding centres in West Bengal and Assam. Supplementary feeding such as already present at VSZ sites in Nepal will make these releases even ‘softer’. The first species likely to be released is WBV and releases could start in 3-4 years in India because captive populations are larger; followed by Nepal (4-5 years), Pakistan (within 10 years). Other species LBV and SBV will follow. The TAC do not see any problems arising from the government or public relating to releases – rather they see potential support. Satellite tagging and detailed monitoring of first releases essential. Naming and sponsorship of released birds should be given serious consideration.

The following items were raised as “other business” after discussion of the preceding topics:

- **Other mortalities** – unintentional poisoning and kite festivals are real problems for remaining small populations. Awareness raising, rather than persecution, is probably the best way to tackle this problem. Nepal has evidence to suggest that this works. Useful to link to Cambodia work (where poisoning an acute problem) and learn lessons from approach being used here. Potential to link use of pesticides/poisons to human health risks?
- **Red-headed vultures** – we need to investigate whether species is declining. We have data waiting to be analysed. If species is still declining then capture and holding of birds in the breeding programme needs to be decided upon. Permission to collect from the wild will not be a problem, but locating enough individuals will be. We also know very little of the species ecology and satellite tracking studies and causes of mortality essential.
- **Data after release** – the TAC suggests that data on mortality, breeding success and movement are fundamental.

A. Actions points for each topic

The following either offered at the meeting or are considered in the best position to pursue the topics below:

- 1 **Breeding centre data**
Provide advice on existing zoo software for VCBC records – *Campbell Murn*
Investigate using Access database for VCBC records – *Richard Cuthbert, Thalita Calvi*
- 2 **Veterinary support sustainability**
Investigate basing project vets within nearby veterinary training colleges – *Vibhu Prakash*
Investigate salaries and contract issues for vets at BNHS and BCN – *Ian Barber, Vibhu Prakash, Mohan Bishwakarma*
- 3 **Training requirements**
Assess paravet training requirements, timing and who requires training for centre and field staff (if possible during Thalita Calvi’s six months?) – *Vibhu Prakash, Mohan Bishwakarma, Andrew Routh*

- Determine additional training requirements for BNHS and BCN vulture staff and plan timing, content and delivery – *Vibhu Prakash, Mohan Bishwakarma, Chris Bowden*
- 4 **Measurements within Provisional Vulture Safe Zones (PVSZ)**
 Plan carcass sampling methods for PVSZ – *Toby Galligan*
 Confirmation of dipstick reliability and accuracy – *Richard Cuthbert, Toby Galligan, BNHS staff*
 Evaluating reliability of saturated salt solution for sample storage – *Toby Galligan*
 Pursuing permission and funding for further satellite tracking – *Vibhu Prakash, Richard Cuthbert*
- 5 **Nationwide surveying**
 Following up with Bangalore lab on LCMS testing of carcass samples – *Richard Cuthbert*
 Seeking funding within India for road transects or carcass surveys – *BNHS funding officer*
- 6 **Establishing VSZ**
 Prioritisation exercise for selecting next PVSZ sites – *Richard Cuthbert*
- 7 **Which alternative NSAIDs to safety test next**
 Finalise costings and submit funding proposal to MoEF – *Mohini Saini, Vibhu Prakash*
 Assess recent carcass/pharmacy surveys for next NSAIDs to test – *Richard Cuthbert*
 Pursue ketoprofen and aceclofenac ban in India based on existing evidence – *Janki Teli, Chris Bowden*
- 8 **Reducing feeding costs**
 Find out costs and practicality of guinea pig breeding for Pakistan centre – *Campbell Murn*
 Evaluate construction and running costs of walk in freezers at India centres – *Chris Bowden*
 Cost effectiveness of shipping lab rats from Europe (or Asian source?) – *Jemima Parry-Jones*
 Utilising Forest Department cull of Nilgai in India – *Vibhu Prakash, Dr Bhagwat*
 If Nilgai cull possible provide guidance on non-lead bullets – *Chris Parish*
- 9 **Release plans**
 Actions for selecting release sites currently covered under PVSZ work and need confirmation of F2 generation from breeding centres before can go ahead
- 10 **Other mortalities**
 Provide advice on poisoning issue and awareness raising from Cambodia – *Hugo Rainey*
 Continue collecting evidence on scale of poisoning issue – *BNHS/BCN field teams*
 Seek advice from RSPB investigations team on testing for toxins – *Richard Cuthbert*
- 11 **Red-headed vultures**
 Analyse existing data on RHV from last Indian road survey – *Rhys Green/Vibhu Prakash*
 Pursue records of nesting locations with BNHS and BCN field staff in order to establish ecology study and tracking – *Toby Galligan*
- 12 **Data after release**
 No action at this stage

6. Manifesto

MANIFESTO OF SAVING ASIA'S VULTURES FROM EXTINCTION 'SAVE'

Populations of three formerly abundant species of vultures endemic to Asia* collapsed in the 1990s and have not recovered. The area over which populations are known to have been affected is huge; comprising India, Nepal, Bangladesh and Pakistan. Scientific research has identified the cause of these population declines and practical ways to arrest and reverse them. However, the most recent information indicates that declines are still continuing because of the limited effectiveness of implementation. For this reason, we feel that governments, agencies and organisations with a stake in resolving this major problem for conservation and environmental services need a clear statement of the principal actions required. This document, prepared by the Saving Asia's Vultures from Extinction (SAVE) consortium[†], sets out the programme needed to achieve vulture recovery.

Since the discovery of its effects in 2003, convincing evidence has accumulated that the main, and probably the sole cause of the vulture decline is the non-steroidal anti-inflammatory drug (NSAID) diclofenac. When this drug is injected into livestock, it remains active in the animal's body for a few days. If the animal dies in this time and is eaten by vultures, they in turn receive sufficient amounts of the drug to kill them. Vultures are unusually sensitive to the drug, compared to other animals. The enormously wide use of the drug, millions of doses administered per year across the subcontinent, ensured a rapid decline in vulture numbers – populations fell by more than 97% in ten years. If we are to save Asia's vultures, and avoid the environmental problems that their loss will cause, we have first to solve the problem of diclofenac contamination of their food supply and then to prevent its replacement in veterinary use by other drugs toxic to vultures. It will also be necessary to identify and counter any emerging threats to vultures; including those occasioned by their low population density and the development of alternative ways of disposing of carrion.

Following publication of the scientific evidence about the effect of diclofenac in 2004, the governments of India, Nepal and Pakistan acted with commendable speed to ban the manufacture and use of diclofenac for veterinary purposes in 2006. However, despite this prompt beginning, there is still a long way to go. Five years after the ban, the amount of diclofenac in the food of wild vultures in India has fallen by about half. This is encouraging, but this level is still much too high for vulture populations to survive in the wild. Illegal dispensing and use of the drug on livestock remains widespread, with diclofenac now mainly derived from formulations intended for human use.

Vulture recovery will therefore depend upon successful implementation of the following actions:

1. We need conservation breeding of vultures collected from the wild. This is essential because the continuing delay in removing diclofenac from the food of wild vultures means that the species must be protected from contamination and bred in sufficient numbers to restock the wild when diclofenac and other drugs toxic to vultures can no longer enter their food supply. Conservation breeding centres have been established in India, Nepal and Pakistan as a result of the joint efforts of governmental and non-governmental organisations. Vultures taken from the wild have survived well in captivity and young vultures of all three of the critically endangered species have already been bred and reared successfully. However, continued and increased support from governments and donors is needed if these centres are to have the facilities and expertise they require to produce sufficient vultures for future re-establishment of wild populations.
2. We must proceed especially quickly to remove diclofenac and other drugs toxic to vultures from their food supply in areas where reasonable numbers of vultures still remain. Targeted community action is required to raise awareness, to replace diclofenac and other toxic drugs with the vulture-safe drug meloxicam or other drugs of proven safety, and to provide uncontaminated food in 'Vulture Safe Zones'. It may also be necessary to minimise other sources of vulture mortality or low breeding success, such as non-targeted poisoning. The concept of Vulture Safe Zones was pioneered in Nepal, where they are producing promising results. Several Vulture Safe Zones are now being established in India, with the engagement of local groups. However, vultures seek food over huge areas, covering thousands of square kilometres, so Vulture Safe Zones must be large and will often need to cross state or national borders. We need partnerships between government, at national and local levels, local community groups and conservation agencies to create, monitor and maintain more and larger Vulture Safe Zones.
3. We must complete the removal of diclofenac from the vulture food supply throughout the species' range so that birds can spread out from remaining populations protected in Vulture Safe Zones. This will require appropriate regulations, monitoring of their effectiveness and enforcement. As well as this, we must also prevent the replacement of diclofenac by other veterinary drugs that are also toxic to vultures. The drug ketoprofen was shown in 2009 to be toxic to vultures, and in consequence, its veterinary use has not been permitted in Nepal, but it is in widespread, increasing and unrestricted use on livestock in India. There are several other drugs in widespread veterinary use whose toxicity

to vultures is as yet unknown. Government agencies and the pharmaceutical industry need to develop a mechanism that ensures that all veterinary drugs used on animals available as food for vultures are not toxic at levels likely to be encountered by wild birds. In practice, this means establishing standards for acceptable levels of toxicity of veterinary drugs to vultures, safety testing of products on vultures, and withholding or withdrawing approval from those found to be toxic.

The catastrophic decline of vultures across Asia is of international concern.

To provide a strategic framework through which the problem can be addressed across national boundaries, the consortium SAVE was established in 2011.

The consortium consists of a partnership of organisations, all concerned with preventing the extinction of the three critically endangered species and achieving their recovery.

SAVE co-ordinates recovery efforts across vulture-range countries, provides scientific and other advice, and helps with publicity and fund-raising. It is not a legally constituted body and does not have an office or independent staff. It is open to new partners.

If you would like to become involved at any level, please consult the SAVE website or contact the SAVE partners in your country*.

*Oriental white-backed vulture *Gyps bengalensis*, long-billed vulture *Gyps indicus* and slender-billed vulture *Gyps tenuirostris* are all listed as Critically Endangered on the IUCN Red List. They occur as breeding residents in India, Nepal, Pakistan, Bangladesh, Myanmar, Bhutan and Cambodia. They also have non-breeding or marginal status in: Afghanistan, Laos, Thailand and Vietnam.