12th Annual SAVE Report

Summary of priorities and progress

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Contents

1. About SAVE and this report	1
2. Priorities for Asian vulture conservation in 2023	2
2.1 Priorities for South Asia	2
2.2 Priorities for South East Asia	3
3. Overview of selected SAVE activities in 2022 3.1 Outstanding achievements/updates of 2022 3.2 Changes regarding SAVE Partners 3.3 Website 3.4 SAVE Annual Meeting	4 4 5 5 6
4. Progress Summary for Blueprint activities 2022 4.1 Advocacy 4.2 Captive breeding 4.3 Vulture Safe Zone implementation 4.4 Research and monitoring 4.5 Fundraising 4.6 Cambodia 4.7 Myanmar	7 7 8 8 9 9 10 10
5. Composition of the SAVE partnership	11-12
6. SAVE Partner Reports 6.1 Core partners 6.2 Associate partners	13 13-20 21-24
Annex 1. SAVE Blueprint for 2022 ***Annex 2. List of Acronyms and Abbreviations***	*i-vii* *viii*

1. About SAVE and this report

The SAVE consortium organisations share a common understanding to agree, prioritise and help implement the actions required to conserve Asia's Endangered vultures, based on sound scientific grounds. This document collates the reports against actions listed in the regional Blueprint for the Recovery of Asia's Globally Threatened Vultures by country partners.

Each action for each country has been assessed as completed, on track, some concerns, behind schedule or not applicable. These assessments have been agreed in consultation with SAVE Partners for the last year. Participants have had the opportunity to comment by correspondence on a circulated draft. We have compiled summary tables of these flags (traffic lights) for each activity and by country.

The top SAVE priorities for conserving South Asian vultures are highlighted, along with the separate list for South East Asia priorities, where the main threats are recognised as being different.

Acknowledgements

Special thanks to each of the SAVE partners for inputting into these reports, which are crucial for the scientifically based credibility and transparency of this process in generating the priorities for further actions to secure the future of Asia's vultures.

We take this opportunity to warmly thank all donors on the SAVE website (currently directed through RSPB donations) during the past year who have generously contributed their support.

2. Priorities for Asian vulture conservation in 2023

2.1 Priorities for South Asia in 2023

- Veterinary licences to be withdrawn for drugs known to be toxic to vultures: aceclofenac (a pro-drug for diclofenac), ketoprofen, nimesulide, flunixin & carprofen - based on good existing evidence that these NSAIDs are unsafe for vultures.
- Develop an effective system for the regulation of veterinary drugs, based upon safety-testing on vultures - and continue this for all current painkillers (NSAIDs) and for all potential new ones entering veterinary practice.
- Evaluate and publish information on safety to vultures of nimesulide in India as a priority, closely followed by other emerging veterinary NSAIDs.
- Identify additional vulture safe NSAIDs (alternatives for vets) and publicise such findings. Promote existing known vulture-safe NSAIDS.
- Major efforts urgently needed to address the immediate and increasing gap in funding for vulture conservation.
- Promotion of network and approach of 'Vulture Safe Zones' across South Asia with expansion to include trans-boundary cooperative efforts.
- Test the safety of Vulture-Safe (Release) Zones through 90+% annual survival of GSM tagged wild threatened vulture species in India for 50 vulture years in each area as first step ahead of prospective trial releases from captive breeding programme.
- Maintain the existing vulture conservation breeding programmes for Gyps vultures in South Asia.
- Further secure a safe environment (>100km radius area) in Nepal for final soft releases of captive vultures. Proceed with releases in India but only where similar sized areas have been shown to be safe; always employing satellite monitoring of released birds.
- Develop national reporting systems for as many vulture deaths as possible, from any cause, with written recording and data storage protocols and pathways for immediate transportation and reliable tissue analysis throughout the SAVE region.
- Trial poison-bait response training and awareness workshops for identified key areas within the region. These will aim to improve the recording and documentation of poisoning incidents and increase the accessibility of data on poisoning incidents.
- Use the Convention of Migratory Species' Vulture Multi-species Action Plan as a tool to promote these SAVE priority actions and engage with governments and to approach CMS for funding.
- Engage IUCN translocation expertise for guidance in relation to release programmes.
- Closely support National Vulture Recovery Committees and the Regional Steering Committee (RSC) in order to facilitate the urgent implementation of the 2012 Delhi Regional Agreement and SAVE priorities.

2.2 Priorities for South East Asia in 2023

- Implementation of a high-profile anti-poisoning campaign (across Cambodia).
- Follow-up poison-bait response training and awareness workshops for identified key areas within the region.
- More effective law enforcement within protected sites to halt forest conversion and hunting (targeted law enforcement patrols and nest guardians) and to protect priority vulture nesting areas.
- Effective spatial planning to retain the priority forest areas for vulture conservation, ensuring strong environmental impact assessments are carried out to prevent detrimental regional development projects (Cambodia).
- Effective implementation of Cambodia's veterinary diclofenac ban.
- Seek a veterinary diclofenac ban for Myanmar through awareness raising and advocacy.
- Programme and reporting of undercover pharmacy surveys to determine NSAID availability and usage trends.
- Vulture restaurants continue to be maintained at four priority sites (Cambodia) to continue population monitoring.
- Develop Vulture Safe Zone concept for Cambodia and Myanmar. Improve quantification of population impact of poisoning and other significant threats on important vulture populations in Cambodia through better data collection and analysis.
- Establish and publish baseline vulture monitoring data for Kachin (proposed VSZ) and Shan States of Myanmar.
- Support Cambodian Vulture Recovery Committee's involvement with the Regional Steering Committee (RSC) in order to facilitate the urgent implementation of SAVE priorities.
- Improve funding situation for vulture priorities in Myanmar and Cambodia.

3. Overview of selected SAVE activities in 2022

3.1 Outstanding achievements/updates

- Three important SAVE partner papers were formally published confirming 1) the toxicity of nimesulide to vultures and 2) Tolfenamic acid as a second safe drug for vultures alongside meloxicam, and 3) further evidence on aceclofenac converting to diclofenac almost immediately in buffaloes. Associated publicity through SAVE and endorsed by IVRI received global attention for all three.
- CMS Raptors MoU NSAIDs Working Group published an NSAIDs factsheet highlighting the threats to vultures.
- Vulture tagging training using thoracic cross-hatch methodology was conducted by SAVE experts in India and Bangladesh with further training planned in Nepal in 2023.
- Tagging plans for wild vultures (generating 50+ vulture years of closely monitored vulture survival data e.g. 25 birds tagged/monitored over 2 years, with 90+% survival and no NSAIDs mortality) was approved by SAVE TAC as a recommended approach prior to releasing any captive birds, especially where any doubts remain from undercover pharmacy survey results on veterinary NSAID use for a given area.
- The first wild WRV was tagged in Bangladesh, and already demonstrated trans-boundary movements spending most of its time in India.
- Vulture road transect surveys across Nepal again demonstrated ongoing slow but steady population recovery, further endorsing the first fully approved 'Vulture Safe Zone' declared in December 2021.
- Vulture road transect surveys across India were repeated after 7 years and will soon be published. These show population trends stabilised but remaining at post-decline depleted levels with no significant recovery. This is attributed to ongoing persistent veterinary use of toxic NSAIDs as demonstrated by undercover pharmacy survey results.
- Pharmacy survey results from Myanmar showed that diclofenac is now in widespread veterinary use there. Vulture and pharmacy survey work was completed despite logistical challenges, and key veterinarians engaged further in MVWG.
- The February 2021 national ban of veterinary ketoprofen in Bangladesh has already reduced ketoprofen use significantly from undercover pharmacy results there.
- Vulture surveys in Cambodia showed no improvement in the long term declines whilst the two tagged WRVs continue to spend most time in Laos.
- Poison baits incidents killed over 100 vultures in Assam, India.
- Trial releases of WRVs took place in West Bengal, India despite ongoing NSAIDs concerns, although survival has so far been good.
- In Pakistan, Secretary of Forests, Wildlife and Fisheries in Punjab Province remains supportive through DRAP of the banning of harmful drugs at least across Punjab Province following extensive WWF NSAID/pharmacy surveys across 36 districts.
- Five released birds bred in the wild in Nepal.
- A case was filed in Delhi High Court calling upon the government to ban aceclofenac, nimesulide and ketoprofen. Three hearings so far. No progress noted on the longstanding request for an aceclofenac ban filed in 2016.

- Arulagam initiated South India's first Vulture Safe Zone with a fresh grant approved from the Segre Foundation.
- The 12th SAVE AGM and Open Day was again held online January 2023 with national meetings prior to the main events. The presentations are available here.

3.2 Changes regarding SAVE Partners:

Status of SAVE Partners
No changes approved during the year but three changes were approved by Board immediately following the meeting last year:

- BirdLife International was approved as a new Core Partner bringing the partnership to 25.
- The Cambodia BirdLife office membership was transferred to NatureLife Cambodia as a Project Partner.
- The composition of the Cambodia SAVE Core Partner also adjusted to include NatureLife Cambodia in the place of BirdLife Cambodia office, but also expanded to include 'Rising Phoenix'.

SAVE Chairman
Rhys Green since 8th annual SAVE meeting and will retire by rotation at the 12th annual meeting.

FACC Chairman
Uddin Ishtiaq Ahmad

TAC Chairman
Jemima Parry-Jones and Vibhu Prakash remain TAC Co-chairs.

SAVE Programme Manager
Chris Bowden continues in this role.

Board Representatives
No changes in 2022

TAC membership
No changes in 2022

FACC membership composition: Very sadly, Dr Ram Jakati died in 2022. Our condolences to his family and acknowledging his huge service to vulture conservation.

3.3 Website: www.save-vultures.org and social media

The website has largely been functioning well, following 2021 support funded by the RSPB. Mary Davies (RSPB) has led in updating content whilst Chris Bowden supplied much of the content/updates. At the end of 2022 ABM Sarowar Dipu, and his team have taken on an

active role in posting material and particularly active in posting for the SAVE Facebook and Twitter accounts.

3.4 SAVE annual open day

The **annual open day** meeting was held online on 24th January 2023 and 300 participants registered, with a peak of 140 participants online for the opening sessions.

Recorded presentations from the meeting are available on the SAVE website here and on our YouTube channel here.

4. Progress Summary for Blueprint activities 2022

4.1 Advocacy

ID	Objective	SAVE	India	Nepal	Bangladesh	Pakistan	Cambodia	Myanmar
AD1	Achieve the removal from the market of vials of diclofenac supposedly intended for human medicine in excess of 3 ml capacity.		Some concerns	On track	On track	Complete	Complete	Some concerns
AD2	Achieve the banning of the veterinary use of toxic NSAIDs: diclofenac, ketoprofen, aceclofenac, nimesulide, carprofen, and flunixin. Priorities defined by country.	Behind schedule	Some concerns	Some concerns	On track	Behind schedule	Some concerns	Behind schedule
AD3	Establish system and procedures by which veterinary drugs with unknown effects on vultures have their approval for veterinary use withheld or withdrawn until scientific testing on Gyps vultures establishes their safety at maximum likely exposure levels.	Behind schedule		Some concerns	On track	Behind schedule	Some concerns	Not yet started/applicable
AD4	Work with both the pharmaceutical industry and governments to identify, by a robust safety testing and approval process, NSAIDs that are safe for vultures. Currently meloxicam and tolfenamic acid are the only such drugs.	Some concerns	Some concerns					
AD5	Contribute, with government agencies and pharmaceutical companies, to maintaining pharmacovigilance and regulation of veterinary drugs, to prevent their negative effects on wild vultures.	Behind schedule	Some concerns	Some concerns	On track	Behind schedule	Not yet started/applicable	Some concerns
AD6	Establish a SAVE alert web-based system for veterinary drugs which combines information of levels of use from pharmacy surveys and analyses of cattle carcasses with results from safety testing to draw attention of govts to potentially hazardous drugs.	Behind schedule						
AD7	Improve/promote the availability of vulture-safe drugs and formulations thereby facilitating take up by veterinary practitioners.		Behind schedule	Some concerns	On track	Behind schedule	Behind schedule	Not yet started/applicable
AD8	Develop wider awareness-raising initiatives to highlight NSAIDs concerns and provide incentives acknowledgement of those taking positive steps.	Some concerns	Behind schedule	On track	On track			Behind schedule
AD9	Advocacy/ Awareness raising of emerging threats as well as NSAIDs		Some concerns	On track				
AD10	Attend/Facilitate national vulture steering meetings							
AD11	Update national Vulture Species Action Plan (including re-evaluation of main threats)			Behind schedule				Complete
AD12	Develop SAVE positions on key issues as highlighted by the CMS Vultures MSAP	Behind schedule						

4.2 Conservation breeding

ID	Objective	SAVE	India	Nepal	Bangladesh	Pakistan	Cambodia	Myanmar
CB1	Successful conservation breeding to agreed plan of WRV, LBV and SBV as relevant in India, Pakistan, and Nepal.	Some concerns	Some concerns	On track		On track		

4.3 Vulture Safe Zone implementation

ID	Objective	SAVE	India	Nepal	Bangladesh	Pakistan	Cambodia	Myanmar
VS1	Selection and initiation of new provisional Vulture Safe Zones/ Release Zones (pVSZs/VRZs)						On track	On track
VS2	Capacity building & local advocacy for network of pVSZ/VRZs		On track					
VS3	Maintenance and review of VSZs/VRZs	Some concerns	On track	On track	On track	On track	Not yet started/ applicable	Not yet started/ applicable
VS4	Release of captive-reared/captive-bred vultures in VRZs		Behind schedule	On track		On track		
VS5	Livestock management and husbandry training and free veterinary camps where appropriate in pVSZs and VSZs		Behind schedule			Some concerns		
VS6	Community-led vulture-based tourism in pVSZs and VSZs.			On track		On track		

4.4 Research and monitoring

ID	Objective	SAVE	India	Nepal	Bangladesh	Pakistan	Cambodia	Myanmar
RM1	Road transect surveys of vulture numbers, or otherwise other methods of population monitoring nationally and within VSZs		On track	On track	On track	Behind schedule	On track	Behind schedule
RM2	Monitoring and evaluating causes of death including NSAID contamination of wild vultures.	Behind schedule	Some concerns	Some concerns	On track	Behind schedule	On track	Behind schedule
RM3	Monitoring of NSAID contamination of ungulate carcasses in VSZs and more widely		Behind schedule					
RM4	Safety testing on captive vultures of NSAIDs of uncertain toxicity.	Some concerns	On track					
RM5	Monitoring of availability of NSAIDs for veterinary use in pharmacies and other outlets in VSZs and more widely		Behind schedule	Some concerns	On track	Behind schedule	Some concerns	Behind schedule
RM6	Develop method for GPS PTT vulture tracking and corpse recovery in VSZs.	On track						
RM7	Tagging programme of wild (and released) vultures (GPS PTTs) in pVSZs and Release Zones to monitor movements, survival and causes of death.		Some concerns	On track	On track	Some concerns	On track	Not yet started/ applicable
RM8	Estimation of the former and potential future value of the ecosystem services provided by wild vultures.	Some concerns						
RM9	Investigate factors affecting use of vulture-safe NSAIDs by veterinarians, paravets and livestock owners.	Some concerns						

4.5 Fundraising

ID	Objective	SAVE	India	Nepal	Bangladesh	Pakistan	Cambodia	Myanmar
FD1	Develop stronger fundraising capacity.	Some concerns	Behind schedule					

4.6 Cambodia

ID	Objective	Cambodia
CAM1	Monthly supplementary feeding in at least four sites	On track
CAM2	Safeguard nesting areas from logging and human predation	On track
CAM3	Increase sustainability of CVWG	On track
CAM4	Identify locations of WRV breeding sites	On track

4.7 Myanmar

ID	Objective	Myanmar
MYA1	Safeguard nesting areas from logging and human predation	Behind schedule
MYA2	Threat assessment	Behind schedule
MYA3	Increased sustainability of MVWG	On track

5. 2022 Composition of the SAVE Partnership

Website: www.save-vultures.org

Chair: Professor Rhys Green. Cambridge University Professor of Conservation Science.

Programme Manager (Coordinator) Chris Bowden, RSPB.

Core Partners (Board) - Bird Conservation Nepal, BNHS India, Bangladesh National Vulture Recovery Committee, International Centre for Birds of Prey, Myanmar Vulture Working Group, National Trust for Nature Conservation Nepal, Royal Society for the Protection of Birds, WWF Pakistan, Hawk Conservancy Trust BirdLife International and Cambodia Vulture Working Group.

BCN ICBP NTNC Pakistan

Project Partners – Zoological Society of London, Wildlife Conservation Society, The Peregrine Fund, BirdLife Cambodia

Project Partners (includes **Research & Govt. Partners) –** Indian Veterinary Research Institute, Bangladesh Forest Department, Department of National Parks & Wildlife Conservation (Nepal), Environmental Research Institute (UK), VULPRO & University of Pretoria (both South Africa).

SAVE Associates – Arulagam, Corbett Foundation, Neo Human Foundation, Prokriti O Jibon.

Key Supporting Agencies to SAVE objectives
Ministry of Environment, Forest and Climate Change (India)
Pakistan Forest Department
Forest Department, People's Republic of Bangladesh
Ministry of Forest and Soil Conservation, Nepal
Ministry of Agriculture Forestry & Fisheries (Cambodia)
Haryana State Forest Department
West Bengal Forest Department
Assam Forest Department
Madhya Pradesh Forest Department
Central Zoo Authority (India)
Nepal Department of National Parks & Wildlife Conservation
Forestry, Wildlife & Fisheries department, Punjab Province

Myanmar Ministry of Environmental Conservation & Forestry
IUCN Bangladesh Country Office

SAVE meets to review priorities (and update the Blueprint actions) each year, and has two sub-committees, which report to the annual meetings.
The current composition of these sub-committees is as follows:

SAVE Technical Advisory Committee (TAC)
Jemima Parry-Jones (Co-chair) - World expert raptor captive breeding & raptor biology
Vibhu Prakash (Co-chair) - Principal Scientist BNHS and renowned raptor biologist
Mohini Saini – Principal Scientist, Wildlife Section at Indian Vet Research Institute
Monirul Khan – Assoc Professor, Dept Zoology, Jahangirnagar Univ., Bangladesh
John Mallord – Senior Conservation Scientist, RSPB Centre for Conservation Science, UK
AM Pawde – Indian Veterinary Research Institute
Karikalan Mathesh – Indian Veterinary Research Institute
Mark Taggart – Snr Scientist, NSAIDs expert, Univ of Highland & Islands, UK
Ankit Bilash Joshi – Vulture Conservation Programme Officer, Bird Conservation Nepal
Campbell Murn – Head Conservation & Research, Hawk Conservancy Trust (UK)
Chris Parish – Director California Condor reintroduction, The Peregrine Fund (USA)
Nic Masters – Head of Veterinary Services, ZSL & London Zoo
Andrew Routh – Head Veterinarian, Durrell Wildlife Conservation Trust
Chiranjibi Prasad Pokheral - Project Chief of NTNC's Biodiversity Conservation Centre, Nepal
ABM Sarowar Dipu – IUCN Bangladesh & BNVRC
Vinny Naidoo – Univ of Pretoria, South Africa
Chandra Mohan – Indian Veterinary Research Institute
Rhys Green. Cambridge University Professor of Conservation Science

SAVE Fundraising, Advocacy and Communications Committee (FACC)
Uddin Ishtiaq Ahmad (Chair) – IUCN Bangladesh Country Rep, CCF B'desh Forest Dept. (retd)
Ram Jakati – Director Indira Gandhi Nati Forest Academy (retd) – Sadly deceased June 2022
Devendra Swarup – Director IVRI (retd) & NSAIDs & veterinary expert
BC Choudhury – Senior Scientist at Wildlife Institute of India (retd)
Jake Zarins – Species Recovery, RSPB (UK)
Anil Sharma – Ret'd Prin. Scientist & Incharge, Centre Wildlife Cons, Man., Disease Surveillance, IVRI
Enam Ul Haque – Founder Bangladesh Bird Club
Ishana Thapa – CEO BCN
Naiky Ny – BirdLife Cambodia
Vinayagan Dharmarajah – Regional Dir, BirdLife International Asia Secretariat
M. Jamshed Chaudhry – WWF Pakistan
Bivash Pandav – Director BNHS
Thiri Dae We Aung – Director BANCA, Myanmar
Neetu Mehta – BirdLife Asia Fundraiser
Chris Bowden – Globally Threatened Species Officer & Vulture Programme Manager, RSPB

Past Chairs
Prof Ian Newton (2011-2015)
Prof David Houston (2015-2018)

6. Partner reports

6.1Core partners

WWF-Pakistan

Highlights of progress towards SAVE Blueprint actions in 2022:

1. Information/dosiers about aceclofenac, ketoprofen, Nimesulide and Flunixin are collected from SAVE website and shared with Pharmaco-vigilance unit/complaint cell of DRAP.
2. Meeting was conducted with IGF, Chair National Vulture Recovery Committee for restructuring of the Committee and conduct the regular meetings of the Committee.
3. Changa Manga Captive breeding centre is maintained, 03 chicks successfully hatched and fledged from nests. Deworming of all vultures was conducted, aviary was repaired, students and other stakeholders visited aviary
4. IN Nagar Parkar VSZ, 20 awareness sessions were conducted with students at different schools and 12 sessions with communities to sensitize them about vulture conservation and other environmental issue and 10 veterinary practitioners were sensitized about harmful impacts of NSAIDs on vultures.
5. Population assessment surveys for OWBVs, LBVs and RHVs were carried out in 2022 in Nagar Parkar VSZ area. During vulture population assessment surveys in 2022, a total of 81 active nests of LBVs were observed and 287 individual vultures were observed. However, OWBVs and their active nests were not observed. One active nest of RHV was found, and 2 adult RHVs were observed.
6. Previously undercover surveys were conducted in Nagar Parkar VSZ at 12 pharmacies, however during 2022 it was extended, and 19 further pharmacies were surveyed. A total of 31 pharmacies were visited to check the availability of NSAIDs in VSZ. Veterinary diclofenac was not available at all veterinary pharmacies, however, Aceclofenac was available at 10, Ketoprofen & Flunixin at 19 pharmacies. These NSAIDs were not available at 12 pharmacies which were sensitized about harmful impacts of these drugs on vultures in previous years

Challenges to progressing SAVE actions:

The main challenge is the lack of Human resource available for field activities and reporting etc. Currently, The Pakistan Vulture Restoration Project (PVRP)- head is the only technical person to conduct advocacy, lobbying and in-situ field activities and reporting along with other organizational assignments and commitments. All the time of head PVRP in WWF-Pakistan is charged to other projects, (even 1% time of project head is not charged to PVRP) due to which, the head is overburden that affects project progress and sometimes delays in deliverables.

Structural/ Staffing changes:

Muhammad Jamshed Iqbal Chaudhry, Head PVRP
Abdul Ghaffar, Changa Manga Aviary Supervisor
Muhammad Sharif Anjum, Changa Manga Aviary Assistant
Muhammad Shraif, Changa Manga Aviary Watchman

Funding explored or received for SAVE activities:

1. HCT providing funds for running cost (aviary staff and vulture food and aviary maintenance etc) of Changa Manga aviary
2. HCT provided funds for field activities in Nagar Parkar VSZ
3. HCT agreed to provide funds for field activities in VSZ in AJ&K in 2023
4. Applied for funding in 2022 to Muhammad Bin Zayed Fund and couple of other donors but was not successful

Key contact:

Muhammad Jamshed Iqbal Chaudhry, Senior Manager Research and Conservation/Wildlife Practice Lead, WWF-Pakistan
Head Pakistan Vulture Restoration Project

Bombay Natural History Society (BNHS)
Highlights of progress towards SAVE Blueprint actions in 2022:
Policy/Advocacy • A detailed dossier summarising the published scientific evidence on three known vulture-toxic drugs aceclofenac, ketoprofen and nimesulide was submitted to the Wildlife Division, (MoEF&CC), Govt. of India, in March 2022, suggesting regulation of the three drugs to the Drug Controller General of India. • BNHS, as a party to a Public Interest Litigation (PIL) seeking ban on the three afore-mentioned drugs filed in the Delhi High Court, provided all available scientific evidence of vulture-toxicity of these three drugs in June-July 2022. • BNHS as a Member to the Committee on Standard Operating Procedure (SoP) for Release of Captive-bred Vultures set up by the MoEF&CC, contributed to drafting the SoP during July – Sept 2022. • BNHS with support from the RSPB developed a proposal on tagging and monitoring of wild vultures to assess the safety of environment. The proposal has been submitted to the government of Madhya Pradesh in October 2022 and is currently under consideration. • BNHS is in discussion with the MoEF&CC to hold a high-level national vulture conservation meeting. The meeting shall tentatively be held in January 2023 under the Chairmanship of the Hon'ble Minister, EF&CC at Pinjore, Haryana. BNHS is in the process of developing a national level vulture conservation policy in consultation with the MoEF&CC & other related Ministries. pVSZs • In pVSZs advocacy and awareness raising was undertaken conducted with various stakeholders, namely, Forest Department, Animal Husbandry Department, Food and Drugs Administration, and District Administration at the state, circle and district levels for the effective implementation of the ban on veterinary diclofenac and apprising them about other vulture toxic NSAIDs. • Regularly monitoring of the vulture population took place in pVSZs through periodic road transects, nest census, and total counts at foraging sites to determine the trend in vulture population. • Conducted undercover pharmacy surveys across both pVSZ M.P., U.P. and Assam to evaluate the prevalence of various NSAIDs for cattle treatment. • Vulture carcasses analysis took place opportunistically. Breeding centres • Successful maintenance and breeding of captive population of Gyps vultures in the VCBCs. A colony aviary is under construction at VCBC Assam and a documentary is being filmed for VSZ there. Releases • In July 2022 ten captive-bred white-rumped vultures were released from VCBC, Raja bhat khawa. All released vultures were tagged with satellite tags. Since first release of captive bred vultures in 2021 no drug related mortality has been recorded. • On IVAD 2022, BNHS contributed to articles, and conducted local meetings and engagement events.
Challenges to progressing SAVE actions:
• Delay in acting upon suggestions / recommendations from the MoEF&CC despite submission of detailed documents and repeated follow-ups. Government funding issues
Structural/ Staffing changes:
Vibhu Prakash – Head of the Vulture Programme retired in October which means there will be significant changes in roles in the coming year
Funding explored or received for SAVE activities:
Funding received from Haryana State Forest Department through Centrally Sponsored Scheme – Species Recovery Programme towards the VCBC, Pinjore, following active persuasion from the Director, BNHS, with the Hon'ble Chief Minister.
Key contact:
Dr. Abhishek Ghoshal

Bird Conservation Nepal (BCN)

Highlights of progress towards SAVE Blueprint actions in 2022:

- On November 1, 2022, ten adult captive White-rumped Vultures were released into the wild with telemetry tags. In addition, 10 wild WRV (6 adults and 4 subadults) were tagged with telemetry tags and subjected to a clinical examination before being tagged. The last ten captive WRV from VCBC, Kasara were transferred to Release Aviary, Kawasoti on November 6, 2022, which will be released in March 2023.
- 76 districts of Nepal declared as vet diclofenac free until November 2022. This covers 146,454 square km of Nepal.
- 584 nests of six species of vultures were monitored, 400 of them were successful in hatching and fledging chicks while 184 of the nests failed. During this breeding season, seven captive-released vultures actively participated in breeding, with two of them successfully fledging their young in the wild.
- 16th Vulture Highway Transect Survey 2022 was undertaken as part of Nepal's annual vulture count after two years due to COVID lockdown. 505 individuals of six different vulture species were counted with 252 in the terai and 253 in the midhills. During the survey, 182 White-rumped Vulture individuals were counted in the Terai, whereas 86 were counted in the midhills which is higher than the previous surveys.
- 171 vet pharmacies were visited in nine different districts with active nesting colonies of vultures as a general survey. During the general pharmacy survey no diclofenac was recorded. A total of 278 drugs were recorded from this survey. During this survey, most of the active ingredient used in the market was Meloxicam with Paracetamol 77.06%, followed by Meloxicam 14.34%. However, the presence of the NSAIDs Nimesulide, and Ketoprofen raised concerns.
- Local governments continue to provide minimal support for some VSFS on their respective sites.
- The conservation awareness campaign was successfully conducted primarily focused on surrounding vulture nesting, foraging, and frequent movement sites in more than 15 districts. The initiative directly reached 2100 individuals.

Challenges to progressing SAVE actions:

- The banning of toxic drug (Ketoprofen and Aceclofenac) was initiated but is still in process. More efforts are required in governmental process in banning additional toxic drugs.
- There are still no labs that can precisely identify NSAIDs in Nepal.
- There are growing risks of vulture casualties by other threats particularly by transmission lines.
- Maintaining a regular food supply at the release site is still difficult as more captives are concentrated there.
- Sustaining VSFS/ Jatayu restaurants is difficult.
- Trans boundary issues

Structural/ Staffing changes:

None

Funding explored or received for SAVE activities:

- Community-based conservation of Critically Endangered vulture species in Western Nepal - Conservation Leadership Programme (CLP)
- Electrocution Risk Assessments in Vulture Safe Zone in Nepal - Asian Development Bank (ADB)

Key contact:

Ankit Bilash Joshi

Bangladesh Forest Department

Highlights of progress towards SAVE Blueprint actions in 2022:

- Bangladesh Forest Department is continuing the current vulture conservation project under the SUFAL project funded by the World Bank which was initiated in 2021. IUCN has been engaged to perform the activities of the project.
- Through the project, Bangladesh has been continuing the VSZ management work. The community-based Vulture Conservation Teams are active on the field. The Vulture Feeding Station and Vulture Rescue Centre is functional and holding regular meetings as well as assisting in nest monitoring, habitat protection, awareness, running the Vulture Feeding Station and Vulture Rescue Centre. A total of 19 cattle have been provided in the 2021-2022 and 2022-2023 breeding seasons so far. A total of 26 vultures were rescued and rehabilitated through the Rescue Centre.
- Bangladesh has banned ketoprofen country-wide in 2021, and we are working to ensure removal of all ketoprofen from the market through collaboration with pharma-companies, Drug Administration and Department of Livestock. Regular undercover pharmacy surveys are being conducted, and the last survey was conducted in 2021. The next survey will be conducted in December 2022. The undercover pharmacy results will be published after the next survey.
- Vulture nest protection and nest monitoring is ongoing. In Rema-Kalenga Wildlife Sanctuary (RKWS), a total of 14 nests were counted in 2021-2022 season, and 10 nests were successful (71.4%). In Sundarbans, 6 nests were discovered, and 4 were successful. Country-wide vulture population survey is also ongoing. Surveys of Nesting and roosting tress have been conducted in RKWS. A total of 193 trees were GPS marked and compared to initial study conducted in 2014, where 195 trees were counted. The loss of three trees have been due to natural reasons.
- The International Vulture Awareness Day has been celebrated in Bangladesh, where the Minister, Deputy Minister, and Additional Secretary to the Ministry of Environment, Forest and Climate Change were present as special guests. The day was also celebrated in local levels at the two VSZs. A total of 1000 awareness posters have been printed. There were other local awareness and advocacy programmes.
- On October 2022, experts from RSPB conducted capacity building training on satellite tagging, wing-tagging, and vulture handling. The first wild WRV was tagged on 20 October 2022 in Rema-Kalenga WS and the vulture is doing well and giving important data.

Challenges to progressing SAVE actions:

No major challenges.

Structural/ Staffing changes:

No changes

Funding explored or received for SAVE activities:

The last funding for vulture conservation in Bangladesh came through the FD's SUFAL Project funded by the World Bank. The project is due to end in March 2023.

Key contact:

Imran Ahmed, Conservator of Forests, Wildlife and Nature Conservation Circle, Bangladesh Forest Department.

Cambodia Vulture Working Group (CVWG)

Highlights of progress towards SAVE Blueprint actions in 2022:

- **National Coordination:** The CVWG continues to provide a platform for coordinating the national population monitoring, threat monitoring/mitigation, publishing annual reports and regular meetings, and some CVWG partners jointly conducted an event in 2022 during IVAD in which pro-vulture messages were an important component.
- **Poisoning Prevention:** In addition to continuing the surveying of vet-NSAIDs alongside PDAFF in four vulture provinces (no target NSAIDs have yet been recorded), following the finalisation of two poisoning case response protocols in 2021, training in application of the protocols at priority sites has started.
- **Nest Monitoring:** National collection of nest searching, monitoring and protection by partner organisations and following the development of a nest searching protocol in 2021, this protocol has been translated to Khmer and shared to all CVWG members, with specific training taking place at two sites so far.

Challenges to progressing SAVE actions:

- Institutional capacity and loose enforcement limit the control or oversight of imported veterinary drugs.
- Weak enforcement of laws regarding control of pesticides hamper efforts to restrict misuse resulting in illegal poisoning of wild/domestic animals, threatening vultures.
- Distribution of vultures is now heavily skewed to some sites, with low numbers in others, making decision-making processes more complicated.

Structural/ Staffing changes:

In 2021 some CVWG partner organisations went through transitional periods. The former coordinator/secretariat organisation BirdLife International Cambodia Programme becoming NatureLife Cambodia. NatureLife Cambodia has subsequently assumed BirdLife's roles and responsibilities within the CVWG, with the personnel involved remaining largely unchanged. The CVWG incorporated one new core-member in 2021/22, where Rising Phoenix has assumed responsibility and control of vulture conservation activities at the Siem Pang Wildlife Sanctuary site, the site in Cambodia that represents the majority of the White-rumped and Slender-billed Vulture populations.

Funding explored or received for SAVE activities:

On 1 July 2021, NatureLife Cambodia receive a grant from Critical Ecosystem Partnership Fund (CEPF) for three years. This funding allows NatureLife Cambodia to play an active role as CVWG coordinator, organize CVWG meetings, develop the annual vulture report, facilitate nationwide vulture census, monitor poisoning cases, capacity building, and finalize monitoring protocols.

CVWG core members including Rising Phoenix, WWF, WCS, and NatureLife Cambodia confirm that they have funding to cover the cost of vulture conservation activities in Siem Pang, Lomphat, Chhep, Eastern Plain, and Mekong Flooded Forest for 2022.

Key contact:

Ms. Ny Naiky

Myanmar Vulture Working Group (MVWG)
Highlights of progress towards SAVE Blueprint actions in 2022:
The comprehensive pharmacy surveys for the Conservation of Asian Vultures in Indawgyi Lake Wildlife Sanctuary, Kachin State, was conducted to assess the availability of NSAIDs and to advocate and raise awareness on the impact of NSAIDs within government departments, veterinary bodies and villagers. The project area includes twenty villages in three townships. where there have been records of vultures and cattle slaughterhouses. We found that instead of veterinary surgeons, the Community Animal Health Workers (CAHWs) were the main animal healthcare providers in the Indawgyi Lake Wildlife Sanctuary, and they have been prescribing Panagesic and Diclofenac to treat domestic animal diseases. CAHWs also did not know about Meloxicam and how it is used. Thus, we distributed 30cc Meloxicam injection bottles to the CAHWs and farmers to use instead of Diclofenac and Panagesic. Meanwhile, we engaged the communities by sharing about the ecological value of vultures, the threats they face from Diclofenac and other NSAIDs, and introduced the use of Meloxicam. We conducted three MVWG meetings mainly for discussion of population monitoring in potential vulture conservation areas, comprehensive pharmacy survey and consultation for advocating of relevant governments to propose the removing of diclofenac in potential Vulture Safe Zone. The national meeting was conducted in November to discuss SAVE reporting, share the results of pharmacy survey in Kachin state and status of population monitoring in Kachin state. We also discussed the future plan and fundraising for the vulture conservation in Myanmar with all members. We submitted the activities report and SAVE Blueprint 2022 to SAVE.
Challenges to progressing SAVE actions:
Security of survey team due to political issues in Kachin state.
Structural/ Staffing changes:
No change
Funding explored or received for SAVE activities:
BANCA received two grants; one is received the funding (9990 Euro) from ASAP through BirdLife International for the comprehensive pharmacy survey in Indawgyi Wildlife Sanctuary, Kachin State. Another one is from Critical Ecosystem Partnership Fund (CEPF) (36916 USD) for food supply for vulture species and capacity building of local conservation groups and awareness raising of vulture conservation in southern and northern Shan state. It is providing from May 2022 to April 2024. Inn Chit Thu, community-based organisation received the funding for population monitoring in Kachin state provided by Oriental Bird Club.
Key contact:
Thiri Da Wei Aung

RSPB
SAVE Coordination – currently provided by Royal Society for the Protection of Birds includes the position of SAVE Programme Manager (Chris Bowden), but this role is further supported by Mary Davies and Jake Zarins in Blueprint compilation, SAVE meetings planning (Open day, main meeting, and national level meetings). There is also significant support for the FACC and TAC functions and meetings. This is in addition to technical support and training provided to several SAVE partners by John Mallord. Other staff at RSPB also support outputs mentioned above.
Highlights of progress towards SAVE Blueprint actions in 2022:
The hosting and facilitation of the online 2021 SAVE meeting with an updated format of the SAVE Blueprint Recovery Plan was a major success. SAVE reports were circulated and the overall programme of work was mostly completed despite the travel restrictions and constraints due to Covid. In India, the breeding programme (mainly Assam), vulture safe zone work and the road transects survey were among the more prominent key areas primarily supported by RSPB through BNHS. In Nepal, similar actions were supported including vulture release and tagging work which were central along with the breeding programme drawing towards a successful closure. Publication of safety-testing work on vultures (nimesulide and tolfenamic acid) was a key scientific output where RSPB support was crucial. Further mainly technical support for partners in Bangladesh, Myanmar, Cambodia and to a smaller extent Pakistan was provided, and mainly through SAVE outputs.
Challenges to progressing SAVE actions:
Funding uncertainties for the wider breeding programme in India has constrained other work that had been planned. The Vulture Emergency fund set up to counter any immediate funding crises had to be utilised due to a major shortfall from the Haryana Government to BNHS, so this has already been exhausted. Closer engagement with the Indian government would also help enormously to get the required implementation and particularly to progress the steps towards stronger veterinary drug regulation that are such a high priority aim. Functioning of national level government vulture committees is needed here. The government-led regional steering committee (RSC) can potentially play a role here in progressing this and enhancing engagement of all the relevant Ministries.
Structural/ Staffing changes:
Increased support/capacity from RSPB has been helpful with Mary Davies giving more time to the Blueprint, the Open day and related coordination-related activities. Chris Bowden remained as coordinator, but also Jake Zarins stepped up for logistics planning etc particularly for the upcoming SAVE meeting.
Funding explored or received for SAVE activities:
The Disney Conservation Fund grant supported most of the ongoing Uttar Pradesh Vulture Safe Zone work, channelled via RSPB to BNHS. All other support was from core RSPB funds. There are no major applications currently pending. The Brown Source Trust funded Madhya Pradesh VSZ. Rufford has contributed to the VEF.
Key contact:
Chris Bowden

ICBP
Highlights of progress towards SAVE Blueprint actions in 2022:
Due to the inability to travel and get to the countries involved over the last few years, ICBP have not been able to contribute as much as usual. Online meetings have been attended and responding to queries through TAC.
Challenges to progressing SAVE actions:
COVID
Structural/ Staffing changes:
The ICBP has gone through massive changes, with Jemima Parry-Jones now the only member of staff, almost all the birds have been found new homes and we are no longer open to the public. This removes many of the responsibilities of being open, but also the income from visitors. There will be a second member of staff by December allowing more time and the ability to travel to those meetings that are not online. Asa result of these changes we are focusing only on conservation breeding, consultation and assisting in conservation projects worldwide where appropriate. We hope to be able to provide grants at a later date, but that is not for the immediate time being.
Funding explored or received for SAVE activities:
Sadly, none at this time
Key contact:
Jemima Parry-Jones

6.2 Associate partners

Arulagam
Highlights of progress towards SAVE Blueprint actions in 2022:
• 'Arulagam' continued its campaign among the various stakeholders through webinars and Clubhouse. These programs reached ~2800 public, 18 veterinary doctors, 40 forest frontline staff and 400 students. • Based on the report submitted by Arulagam, the office of the director of drug control, Tamil Nadu state has registered over 104 cases against suppliers, manufacturers, and retailers for the misuse of diclofenac. This is the first time we are aware that those contravening the bans are being prosecuted. • The 'Arulagam' has been included as a partner in the IUCN SSC ASAP in 2021. • Bharathidasan Subbaiah, has been inducted as a member of the Tamil Nadu State Wildlife Board, Department of Environment, Climate Change and Forest (DoECCF). • State Vulture Conservation Committee, has been formed under the DoECCF, with Bharathidasan Subbaiah inducted as a member of the committee. • A coffee table book titled, 'In Search of Vulture' written by S. Bharathidasan, the reporting author, was released in January 2022. • On the eve of the Centenary death anniversary of legendary poet and freedom fighter Subramania Bharathiar, the 'Arulagam' commemorated his memory by linking with vulture conservation. A multilingual board was erected at Government Museum to spread the message among tourists on vulture conservation. More than 6000 people listened to the audio message. • 6 popular articles and 4 scientific articles were published during this period.
Challenges to progressing SAVE actions:
The pandemic situation restricted our ongoing campaign activities. • Funding priorities were given to Covid relief work, and we were running the project with a shortage of funds. Bigger organisations dominate our project area and execute vulture work without following the Blueprint. • Policy level changes are needed to address toxic NSAIDs available.
Structural/ Staffing changes:
Unable to retain staff due to limited funds during pandemic period.
Funding explored or received for SAVE activities:
Vulture Safe Zone work was taken forward by 'Arulagam' in Tamil Nadu with the support of the Rufford Foundation and Van Tien Hoven Foundation. 'Arulagam' has been awarded £5000 for the fifth consecutive year by the Rufford Foundation. We were also selected as one of the 100 grass root level organisations across India by the 'Edelgive Foundation' in 2022 for non-programmatic support.
Key contact:
Bharathidasan Subbaiah

The Corbett Foundation

Highlights of progress towards SAVE Blueprint actions in 2022:

Given below are activities undertaken by The Corbett Foundation in 2022:

• On September 02, 2022, The Corbett Foundation released a poster on vulture conservation and awareness (Marathi language) in collaboration with Maharashtra Forest Department on the occasion of International Vulture Awareness Day 2022. The poster was released by Shri. B Venugopal Reddy, IAS, Principal Secretary (Forest) in the presence of Dr. Y. L. P. Rao, PCCF (HoFF) Maharashtra, Shri. Sunil Limaye, PCCF (Wildlife) & CWLW, Maharashtra, Shri. Shailesh Tembhurnekar, PCCF (CAMPA). Around 1,000 copies of this poster will be circulated across Maharashtra through the forest department, animal husbandry department, NGOs, local communities and nature lovers.

• On September 08, 2022, The Corbett Foundation held a meeting with the Principal Secretary (Forest) and have urged the Forest Department to write to concerned agencies about the restricted use of NSAID that have been proved to be harmful to vultures and promote the use of vulture-safe veterinary drugs.

• A poster on vulture conservation and awareness (in Hindi language) was published by The Corbett Foundation in collaboration with Uttarakhand Forest Department on September 03, 2022. The Corbett Foundation will circulate this poster widely throughout the state for a wider outreach.

• Kedar Gore, Director, The Corbett Foundation wrote an article on the issues of vulture conservation in Maharashtra Times dated September 04, 2022.

• Dr. Naveen Pandey, Deputy Director, The Corbett Foundation wrote an article on vulture conservation in Saevus magazine, Sep-Dec 2022 issue.

• The Corbett Foundation has been a technical partner to Gujarat Forest Department in satellite tagging of six species of resident and migratory vultures since October 2020. After collecting the data, a research paper titled 'Home Range, Movement and Activity Patterns of Six vulture Species Using Satellite Telemetry in Saurashtra landscape, Gujarat, India' has been published. The research paper is available on the below link https://www.mdpi.com/2673-4133/3/4/35/pdf?version=1666089781

Challenges to progressing SAVE actions:

• Lack of sufficient political will in restricting the use of NSAID (apart from diclofenac) that are harmful to vultures

• Lack of awareness among the local communities and paravets operating at the village levels about the use of vulture-safe NSAIDs

• Incidences of secondary poisoning of vultures is a matter of grave concern

• Lack of funding opportunities to undertake long-term research of vultures and nation-wide awareness campaign

Structural/ Staffing changes:

Not applicable

Funding explored or received for SAVE activities:

No grants received in 2022 for vulture conservation work

Key contact:

Kedar Gore, Director, The Corbett Foundation

Prokriti O Jibon Foundation (Nature and Life Foundation)

Highlights of progress towards SAVE Blueprint actions in 2022:

Prokriti O Jibon Foundation (POJF) as a SAVE associate has conducted some activities focusing in the SAVE Blueprint in 2022. Our working area was in VSZ management and mass awareness sector in close collaboration with the Ministry of Environment, Forests and Climate Change in Bangladesh.

Communication for Conservation:
We have conducted 3 knowledge sharing campaign in 2022 at the Vulture Safe Zones (VSZ) for Vulture conservation in Bangladesh with multiple stakeholders. The major issues were sustainable management of VSZ, use of safe drug and motivation of the veterinary practitioners.

Mass Awareness through Mass Media:
We have produced an animated film on vulture conservation and telecasted through satellite television channels. We have also produced a television discussion program on 'Conservation of Vultures in Bangladesh' to promote the massages. The foundation also telecasted 2 television news on different issues for vulture conservation.

International Vulture Awareness Day 2022 Celebration:
Prokriti O Jibon Foundation in association with IUCN Bangladesh & Bangladesh Forest Department celebrated International Vulture Awareness Day 2022 at 4 regions of Bangladesh.

Challenges to progressing SAVE actions:

Our main challenge was inadequate funding. We have conducted the activities from our own fund. If funding sources are available, we can perform much broader activities according to SAVE Blueprint.

Structural/ Staffing changes:

Not applicable.

Funding explored or received for SAVE activities:

No Fund or grant has been received by Prokriti O Jibon Foundation for SAVE activities.

Key contact:

Muqeed Majumdar Babu
Chairman, Prokriti O Jibon Foundation
Shamim Ahmed
Program Manager, Prokriti O Jibon Foundation

Neo Human Foundation

Highlights of progress towards SAVE Blueprint actions in 2022:

1. **STATUS REPORT OF VULTURE IN HAZARIBAG DISTRICT (HPVSZ), JHARKHAND (2022):** A survey for the status of vultures in Hazaribag District was done, supported by Hazaribag West Forest Division. In **Hazaribag district, the number of White-rumped Vultures was 112, Indian Vulture 26, and Himalayan Vulture 36 were recorded.** No nesting was observed this year in Hazaribag District.
2. **STATUS REPORT OF VULTURE IN KODERMA DISTRICT (HPVSZ), JHARKHAND (2022):** Koderma Forest Division supported the survey, monitoring, and awareness programme in Koderma District. Koderma district is located towards the north of Hazaribag, and its boundary is shared with Bihar state. Data analysis revealed the presence of 4 species of Vulture from the Koderma District. The number of White-rumped Vultures was 40 (±5), Indian vultures was 65 (±5), Egyptian vulture was 5 (±2), and migratory Himalayan Vultures was 28 (±5).
   In Koderma District, 2 nesting colonies (Urwan and Pathalgadda) were identified during the study period (February 2022 & March 2022). A total of 9 nests and 6 nestlings were recorded from the identified colonies
   Although the vulture population is low in Hazaribag District, its presence in the Koderma district indicates that the Vulture movement has taken place from the Hazaribag area to the Koderma district, and the overall population is stable. Therefore, there is an urgent need for further surveys and tagging of vultures to monitoring their movement pattern in the area.
3. Analysis of data from Hazaribag, Koderma, Ranchi, and Khuti districts revealed the presence of about **250 (±10) White-rumped Vulture**s, **80 (±5) Indian Vulture, Egyptian vulture was 45 (±5)**, **and Himalayan vulture about 65 (±5) from HPVSZ, Jharkhand.** So, the total vulture can be estimated between 425-450 in HPVSZ, Jharkhand. The number has increased in Jharkhand.
4. Further, an awareness programme is regularly conducted by NHF to create a vulture safe zone, particularly in Hazaribag and Koderma.
5. A vulture restaurant has also been set up at the Gumo carcasses disposal site (Koderma District) by Koderma Forest Division. We are working out for the safe dumping of carcasses free of NSAID.
6. We are also pursuing top forest officials to have MoU with BNHS at the earliest for Vulture Conservation Breeding Centre, Muta, Ormanjhi, Ranchi

Challenges to progressing SAVE actions:

The main challenges are financial, administrative, and technical.
Since the movement of vultures in recent years has increased in pVSZ, monitoring vultures has become a challenge due to insufficient human resources and financial support.
Safe disposal of cattle carcasses at Gumo Vulture Restaurant (dumping site), free of NSAIDs, in Koderma district.

Structural/ Staffing changes:

Insufficient human resources

Funding explored or received for SAVE activities:

1. Small grant received from Hazaribag West Forest Division for a survey of Vultures in Hazaribag District (2022).
2. A small grant was received for a survey, monitoring, and awareness programme in Koderma District, by Koderma Forest Division (2022).

Key contact:

Dr. Satya Prakash (President-Neo Human Foundation)

Annex 1. SAVE Blueprint 2022

A Blueprint for the Recovery of Asia's Globally Threatened Vultures

February 2023

The Current State of South Asia's Vultures

Twenty years ago, there were tens of millions of vultures in the Indian subcontinent. They provided a valuable ecosystem service by disposing of millions of tonnes of waste carrion from dead cattle each year. Now they, and the services they provided, are nearly all gone. Three species of *Gyps* vultures endemic to South and Southeast Asia, white-rumped vulture (*Gyps bengalensis*), long-billed vulture (*G. indicus*) and slender-billed vulture (*G. tenuirostris*), are the worst affected, but red-headed vulture (*Sarcogyps calvus*) is listed by IUCN as Critically Endangered and Egyptian vulture (*Neophron percnopterus*) is Endangered. All five species are threatened with global extinction after rapid population declines, which began in the mid-1990s. The white-rumped vulture population in India in 2007 was estimated at one-thousandth of its level in the early 1990s.

Veterinary use of the non-steroidal anti-inflammatory drug (NSAID) diclofenac is the major cause of the declines in *Gyps* vulture populations. Diclofenac has been used to treat symptoms of disease and injury in domesticated ungulates in many parts of the Indian subcontinent since the 1990s. The effects of diclofenac have been studied experimentally on captive individuals of three of the global total of eight *Gyps* vulture species. In all the species tested, death occurred within a few days of treatment with a single low dose of diclofenac, associated with severe kidney damage. Extensive visceral gout (accumulation in tissues of the excretory product uric acid) and necrosis of kidney tissues were observed at post-mortem. The kidneys of vultures that died in these experiments showed similar pathology to that found in the majority of vulture carcasses collected from the wild since the declines began. A large-scale survey of the amount of diclofenac in liver tissue from carcasses of domesticated ungulates available as food to vultures in India in 2004 – 2005 showed that the prevalence and concentration of the drug at that time was more than sufficient to cause the observed rapid population declines which were occurring then.

Veterinary use of diclofenac was banned in India, Pakistan and Nepal in 2006, in Bangladesh in 2010 and in Cambodia in 2019. Use of diclofenac has declined markedly since then in some areas but has changed very little in others. Diclofenac has partly been replaced in veterinary use by the vulture-safe NSAID meloxicam. In India, the prevalence of diclofenac in cattle carcasses has declined most in areas where the prevalence of meloxicam has increased most, indicating a beneficial switch in some regions. However, some other NSAIDs which have replaced diclofenac in veterinary practice in the region have been shown to be toxic to vultures.

There are important differences between Southeast Asia and the Indian subcontinent in the problems faced by vulture populations. Cambodia still supports small but stable remnant populations of white-rumped vulture, slender-billed vulture and red-headed vulture (*Sarcogyps calvus*), numbering hundreds of individuals in total. Diclofenac has been less widely used for veterinary purposes in the Southeast Asian countries where surveys have been conducted, including Cambodia and Myanmar. Most recorded vulture deaths in Cambodia are attributed to accidental poisoning when poison bait, which is usually a pesticide, is placed with the intention of killing other species. Hunters use poisoned bait to catch and kill quarry species such as waterbirds and poisoned bait is also used to kill problem dogs and wild carnivores which threaten livestock and also to kill problem cattle. This activity is illegal, but enforcement to prevent it is difficult. Cambodia's vultures are also thought to be chronically food limited. Populations of wild ungulates on whose carcasses they previously relied upon have undergone severe declines. The free-ranging herds of domestic bovids that replaced them are now also declining, as a result of the mechanisation of agriculture. Infrastructure development and illegal logging are increasingly bringing people into remote areas where vultures remain.

Conservation Responses

Soon after research had indicated the severity of the effects of diclofenac on vulture populations, the governments of India, Pakistan and Nepal commenced actions to prevent the contamination of vulture food supplies with the drug. India's National Board for Wildlife recommended a ban on veterinary use on 17 March 2005. In May 2006, a directive from the Drug Controller General of India was circulated to relevant officials, requiring the withdrawal of manufacturing licences for veterinary formulations of diclofenac. This directive was further strengthened in 2008, when it was gazetted, and made an imprisonable offence to manufacture, retail or use diclofenac for veterinary purposes. Similar measures were introduced in Pakistan and Nepal at about the same time. Veterinary use of diclofenac was banned in Bangladesh in 2010 and in Cambodia in 2019. Its continued legal use as a medicine for humans has made access to veterinary diclofenac difficult to regulate, especially because some pharmaceutical companies produce vials of diclofenac ostensibly for human use but containing a quantity of the drug suitable for dosing cattle. The Government of India acted to ban the production of these large vials of diclofenac in 2015.

In 2006, the veterinary NSAID meloxicam was identified by safety-testing research to be safe for vultures. Safety-testing studies in 2020 suggests that another drug, tolfenamic acid, is also sufficiently safe to be provisionally recommended. However, some other NSAIDs which have replaced diclofenac in veterinary practice in the region have been shown by safety-testing studies to be toxic to vultures. These include aceclofenac, which is converted to diclofenac in cattle by their metabolic processes, ketoprofen, nimesulide and flunixin. Scientific evidence has been published in international peer-reviewed journals about the toxicity to vultures of these drugs, but they all remain approved for legal veterinary use in all range states, except for Bangladesh, where veterinary use of ketoprofen has now been banned nationally. Research has shown that replacement of diclofenac with meloxicam has been most effective in Nepal, where a coordinated awareness-raising programme succeeded in reducing the availability of diclofenac in pharmacies to a very low level by 2012. Road transect surveys have shown a marked recover of vulture populations in Nepal since that time.

SAVE

Action to prevent the extinction of *Gyps* vultures in South Asia is coordinated by Saving Asia's Vultures from Extinction (SAVE), a consortium of 24 organisations with established expertise in vulture conservation, which was established in 2011. The national and state governments of the four vulture range states in the Indian subcontinent are engaged in conservation measures through national action plans and are linking their activities through the Regional Steering Committee for Vulture Conservation (RSC), set up to implement the recommendations of the inter-governmental Declaration on Vulture Conservation within the region in May 2012. For more details of the composition and function of SAVE visit www.save-vultures.org.

Conservation actions undertaken so far, in addition to advocacy for restrictions on diclofenac use, include surveys to measure the effectiveness of the ban on veterinary diclofenac, regular surveys of vultures to measure their population trends, awareness-raising to make the ban more effective, advocacy for enforcement of the ban, contact with the pharmaceutical industry, testing to establish which veterinary drugs are safe and which are harmful to vultures, advocacy with government drug regulatory authorities to ban toxic drugs and improve approval procedures, advocacy with government agriculture departments to reduce state support for the purchase of vulture-toxic but legal veterinary NSAIDs, the creation of Vulture Safe Zones in which intensive campaigns are undertaken to remove toxic NSAIDs from the food supply of the remaining small populations of wild vultures, and conservation breeding to provide a secure captive population and captive-bred birds for reintroductions.

Vulture conservation measures in Cambodia differ from those employed in the Indian subcontinent because the threats are different, especially in the absence of a significant threat from diclofenac. For Myanmar, where engagement has been more recent, actions are also under review as the threats there are less well understood. Conservation actions taken so far in Cambodia include monthly supplementary feeding at up to four sites in the north and east of the country, nest protection and advocacy against inappropriate use of agricultural chemicals as poisons.

There is Hope for South Asia's Vultures

Conservation actions have achieved substantial success and have resulted in the following major achievements.

1. All vulture range states in the Indian subcontinent, and most recently in Cambodia have banned the veterinary use of diclofenac.
2. In India, the government has banned the production of large vials of diclofenac, ostensibly for human use, to prevent their illegal misuse for the treatment of cattle.
3. In India, monitoring of NSAID residues in cattle carcasses shows that the level of diclofenac contamination of the vulture food supply has fallen substantially. Similar studies are in progress in Bangladesh.
4. Safety testing identified one safe alternative drug, meloxicam, and a second, tolfenamic acid has also recently been identified as being safe. Monitoring of NSAID residues in cattle carcasses shows that meloxicam's use has increased markedly in the region and that diclofenac levels in cattle carcasses declined most where meloxicam increased most.
5. Vulture Safe Zones, which were pioneered in Nepal, are being introduced in other states, and are being expanded, tested and developed. In Nepal, they cover most of the terai regions of the country and have resulted in replacement of diclofenac, mostly by vulture-safe meloxicam. In Bangladesh, Vulture Safe Zones have been given formal gazetted legal status.
6. Population monitoring in Cambodia indicates that the small populations of vultures there are approximately stable or declining slowly.
7. Captive populations of all three of the endangered *Gyps* species have been established and have grown through captive breeding. The captive birds are surviving well and second generation (F2) birds are now also breeding. Releases have been initiated in Nepal and India.
8. In India, regular monitoring of vultures using the repeatable survey method of road transect counts shows that vulture declines have slowed or ceased, whilst in Nepal vulture populations have increased consistently since 2012. Evidence from vulture monitoring in Pakistan and Bangladesh also indicates that the population declines there have slowed or reversed.
9. Efforts to address the threat of poison baits are at an early stage with trial poison response training held recently in Cambodia. This is seen as an initial step for further development in the other range countries.

What remains to be done?

These are all hopeful signs, but the following serious concerns remain:

1. Vulture populations are precariously small and will remain vulnerable to adverse events until numbers have increased substantially. This vulnerable period will be lengthy because the low natural reproductive capacity and long duration of immaturity of vultures means that, even under the most favourable conditions, the shortest period in which a wild vulture

population can double in size is about ten years. The rate of the recent population decline was much more rapid than the most rapid possible rate of increase, with the population of the species most strongly affected by diclofenac halving every year in India and Pakistan. Even when diclofenac has disappeared, conditions may not permit the maximum possible rate of recovery because of other problems caused by the vulture decline (see points 2 and 3 below) and effects of other NSAIDs (see points 5 - 7 below).

2. In the Indian subcontinent, the disappearance of vultures has led to cattle carcasses being disposed of in ways, such as burial, that may restrict the availability of carrion as food for a recovering vulture population in the future. In Southeast Asia, low populations of wild and domesticated ungulates continue to limit the small vulture populations there.
3. Increases in populations of feral dogs and other predators, caused by enhancement of their carrion food supply in the absence of vultures, may be increasing the frequency of predation of livestock and, as a response, the deliberate placement of poison baits in carcasses to kill the predators. This in turn leads to unintended poisoning of vultures. Large populations of feral dogs and other species of scavengers give rise to other problems, such as an increased risk of dog bites and rabies in humans and other types of disease and public nuisance. Dealing with these problems imposes substantial extra costs on government agencies and charities.
4. Contamination of cattle carcasses with diclofenac has declined, but it has not yet been eliminated. Diclofenac intended for human use is easy to obtain, and easy to misuse for the treatment of livestock. Consequently, carcasses of wild vultures continue to be found with traces of diclofenac in their tissues and post-mortem findings continue to indicate that diclofenac poisoning was the cause of death.
5. The veterinary use of another NSAID (ketoprofen) known to be toxic to *Gyps* vultures is legal and has increased. Published evidence shows that aceclofenac, ketoprofen, nimesulide and flunixin are toxic to vultures, but they remain in legal veterinary use in several key countries. Other NSAIDs are also in legal use which may be harmful to vultures but have mostly not yet been tested.
6. Aceclofenac, a legally approved NSAID that is metabolised into diclofenac after being administered to cattle, is being used. It is highly likely to kill vultures that feed on contaminated carcasses in exactly the same way that diclofenac does.
7. There is no coordinated, well-established and efficient regulatory mechanism by which legal restrictions are imposed upon veterinary drugs known to cause harm to vultures or on those whose effects have not yet been studied.
8. In some areas, the sparse remaining populations of vultures are threatened by loss or disturbance of nest sites through tree-felling or development.

Overarching actions

Advocacy	
AD1	**Achieve the removal from the market of vials of diclofenac supposedly intended for human medicine in excess of 3 ml capacity.**
AD2	**Achieve the banning of the veterinary use of toxic NSAIDs: diclofenac, ketoprofen, aceclofenac, nimesulide, carprofen, and flunixin. Priorities defined by country.**
AD3	**Establish system and procedures by which veterinary drugs with unknown effects on vultures have their approval for veterinary use withheld or withdrawn until scientific testing on Gyps vultures establishes their safety at maximum likely exposure levels.**
AD4	**Work with both the pharmaceutical industry and governments to identify, by a robust safety testing and approval process, NSAIDs that are safe for vultures. Currently meloxicam and tolfenamic acid are the only such drugs.**
AD5	**Contribute, with government agencies and pharmaceutical companies, to maintaining pharmacovigilance and regulation of veterinary drugs, to prevent their negative effects on wild vultures.**
AD6	**Establish a SAVE alert web-based system for veterinary drugs which combines information of levels of use from pharmacy surveys and analyses of cattle carcasses with results from safety testing to draw attention of govts to potentially hazardous drugs.**
AD7	**Improve/promote the availability of vulture-safe drugs and formulations thereby facilitating take up by veterinary practitioners.**
AD8	**Develop wider awareness-raising initiatives to highlight NSAIDs concerns and provide incentives acknowledgement of those taking positive steps.**
AD9	**Advocacy/ Awareness raising of emerging threats as well as NSAIDs**
AD10	**Attend/Facilitate national vulture steering meetings**
AD11	**Update national Vulture Species Action Plan (including re-evaluation of main threats)**
AD12	**Develop SAVE positions on key issues as highlighted by the CMS Vultures MSAP**
Captive breeding	
CB1	**Successful conservation breeding to agreed plan of WRV, LBV and SBV as relevant in India, Pakistan, and Nepal.**
VSZ implementation	
VS1	**Selection and initiation of new provisional Vulture Safe Zones/ Release Zones (pVSZs/VRZs)**
VS2	**Capacity building & local advocacy for network of pVSZ/VRZs**
VS3	**Maintenance and review of VSZs/VRZs**
VS4	**Release of captive-reared/captive-bred vultures in VRZs**
VS5	**Livestock management and husbandry training and free veterinary camps where appropriate in pVSZs and VSZs**
VS6	**Community-led vulture-based tourism in pVSZs and VSZs.**

Research and monitoring	
RM1	**Road transect surveys of vulture numbers, or otherwise other methods of population monitoring nationally and within VSZs**
RM2	**Monitoring and evaluating causes of death including NSAID contamination of wild vultures.**
RM3	**Monitoring of NSAID contamination of ungulate carcasses in VSZs and more widely**
RM4	**Safety testing on captive vultures of NSAIDs of uncertain toxicity.**
RM5	**Monitoring of availability of NSAIDs for veterinary use in pharmacies and other outlets in VSZs and more widely**
RM6	**Develop method for GPS PTT vulture tracking and corpse recovery in VSZs.**
RM7	**Tagging programme of wild (and released) vultures (GPS PTTs) in pVSZs and Release Zones to monitor movements, survival and causes of death.**
RM8	**Estimation of the former and potential future value of the ecosystem services provided by wild vultures.**
RM9	**Investigate factors affecting use of vulture-safe NSAIDs by veterinarians, paravets and livestock owners.**
Fundraising	
FD1	**Develop stronger fundraising capacity.**
Cambodia	
CAM1	**Monthly supplementary feeding in at least four sites**
CAM2	**Safeguard nesting areas from logging and human predation**
CAM3	**Increase sustainability of CVWG**
CAM4	**Identify locations of WRV breeding sites**
Myanmar	
MYA1	**Safeguard nesting areas from logging and human predation**
MYA2	**Threat assessment**
MYA3	**Increased sustainability of MVWG**

Annex 2. List of Acronyms and Abbreviations

BCN	Bird Conservation Nepal
BCam	BirdLife Cambodia
BFD	Bangladesh Forest Department
BNHS	Bombay Natural History Society
BNVRC	Bangladesh National Vulture Recovery Committee
CCF	Chief Conservator of Forests
CVWG	Cambodia Vulture Working Group
CWW	Chief Wildlife Warden
CZA	Central Zoo Authority (India)
DFO	District Forest Officer
DGDA	Directorate General of Drug Administration (Bangladesh)
DLS	Department of Livestock Services (Bangladesh)
DNPWC	Department of National Parks and Wildlife Conservation (Nepal)
FACC	Fundraising, Advocacy and Communications Committee (of SAVE)
HCT	Hawk Conservancy Trust (UK)
ICBP	International Centre for Birds of Prey (UK)
IFS	Indian Forest Service
IUCN Bng	International Union for the Conservation of Nature Bangladesh
IUCN India	International Union for the Conservation of Nature India
IUCN Nep	International Union for the Conservation of Nature Nepal
IVRI	Indian Veterinary Research Institute
LBV	Long-billed Vulture (Gyps Indicus)
MEF	Ministry of Environment & Forests (Bangladesh)
MoEFCC	Ministry of Environment, Forests & Climate Change (India)
MVWG	Myanmar Vulture Working Group
NTNC	National Trust for Nature Conservation (Nepal)
OWBC	Oriental white-backed vulture (white-rumped vulture, G. bengalensis)
PCCF	Principal Chief Conservator of Forests
RHV	Red-headed vulture
RSPB	Royal Society for the Protection of Birds (UK)
SBV	Slender-billed vulture (Gyps tenuirostris)
TAC	Technical Advisory Committee (of SAVE)
TPF	The Peregrine Fund (USA)
VCBC	Vulture Conservation Breeding Centre
WCS	Wildlife Conservation Society
WRV	White-rumped vulture (Gyps bengalensis)
WWFPak	WWF Pakistan
ZSL	Zoological Society of London