

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



February 2014

(Including 2015, 16, 17, 18 & 19 additions)

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, oriental white-backed vulture (*Gyps bengalensis*), long-billed vulture (*G. indicus*) and slender-billed vulture (*G. tenuirostris*), are the worst affected and are threatened with global extinction after rapid population declines, which began in the mid-1990s. They are listed by IUCN as Critically Endangered, the highest level of endangerment short of extinction in the wild. The oriental white-backed 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 these declines. 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 of the species tested, death occurred within a few days of treatment with a single dose of diclofenac and severe kidney damage and extensive visceral gout (accumulation of the excretory product uric acid) were observed 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.

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 oriental white-backed vulture, slender-billed vulture and red-headed vulture (*Sarcogyps calvus*) numbering hundreds of individuals in total. Diclofenac appears not to be 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. Hunters use poisoned bait to catch and kill quarry species such as waterbirds and poisoned bait is also used to kill problem dogs or cattle. 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 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 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.

Action to prevent the extinction of *Gyps* vultures in South Asia is coordinated by Saving Asia's Vultures from Extinction (SAVE), a consortium of eleven 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 see Appendix I.

Conservation actions undertaken so far, in addition to the 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, 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 a surplus of 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. Conservation actions taken so far include monthly supplementary feeding at up to seven 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

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

1. All vulture range states in the Indian subcontinent have banned the veterinary use of diclofenac.
2. Regular monitoring of NSAID residues in cattle carcasses shows that the level of diclofenac contamination of the vulture food supply has fallen substantially.
3. Safety testing identified a safe alternative drug, meloxicam, and monitoring of NSAID residues in cattle carcasses shows that its use has increased markedly in India. Veterinary meloxicam has become widely available in Nepal and Bangladesh.
4. Vulture Safe Zones, which were pioneered in Nepal, are being introduced in other states, expanded, tested and developed.
5. Population monitoring in Cambodia indicates that the small populations of vultures there are approximately stable.
6. Captive populations of all three of the endangered *Gyps* species have been established. The captive birds are surviving well and juveniles of all species have been bred in captivity.
7. In India, regular monitoring of vultures using the repeatable survey method of road transect counts shows that vulture declines have slowed or ceased. Evidence from vulture monitoring in Nepal, Pakistan and Bangladesh also indicates that the population declines there have slowed or reversed.

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 on 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 been eliminated yet. Diclofenac intended for human use is easy to obtain, and easy to misuse for the treatment of livestock because pharmaceutical companies market the drug in larger vials than are required for human medicine. 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. Other NSAIDs are also in legal use which may be harmful to vultures, but have not yet been tested.
6. Aceclofenac, an NSAID that is likely to be metabolised into diclofenac after being administered to cattle, is beginning to be used. It is likely to kill vultures that feed on contaminated carcasses.
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.

Actions for Advocacy, Awareness raising and Regulation at the national level (AD)				
Action Codes	Country	Actions	Lead Partner	By (end date)
AD1	Achieve the removal from the market of vials of diclofenac supposedly intended for human medicine in excess of 3 ml capacity.			
AD1	India	Propose restrictions on large vials to the Regional Steering Committee, National Vulture Recovery Committees (NVRs), governments and pharmaceutical industry. Establish the restrictions.	BNHS	Done
AD1	India	Proactive involvement (including providing technical assistance) in court case brought by Indian pharma company to uphold 2015 ban.	Arulagam	Done
AD1	India	Approach appropriate agencies accredited /recognised by concerned governments to undertake pharmacy surveys and produce reports related to the multi-dose vial issue		Done
AD1	India	Monitor availability of larger (<3ml) diclofenac vials	BNHS, Arulagam, Corbet Fndn, Neohuman Fndn, State Govts.	2020
AD1	Nepal	Seek ban	BCN	Done
AD1	Nepal	Monitor availability of larger (<3ml) diclofenac vials	BCN	2020
AD1	Pakistan	Make contact & take steps to prevent licensing through drug authorities.	WWF Pak SAVE	2020
AD1	Pakistan	Monitor availability of larger (<3ml) diclofenac vials	WWF Pak	2020
AD1	Bangladesh	Make contact & take steps to prevent licensing through drug authorities.	IUCN B'desh	Done
AD1	Bangladesh	Monitor availability of larger (<3ml) diclofenac vials	IUCN B'desh	2020
AD1	Cambodia	To achieve Govt. ban of veterinary diclofenac	CVWG	Done
AD1	Cambodia	Follow-up on the ban, Enforcement, collect baseline data, monitoring for large vial human diclofenac	CVWG	2020
AD1	Myanmar	Removal of diclofenac from the market and undercover survey for NSAIDs	MVWG	2020
AD1	Myanmar	Propose restriction on large vials of diclofenac to government	MVWG SAVE	2020
AD2	Achieve the banning of the veterinary use of ketoprofen, aceclofenac, Nimesulide, Carprofen, and Flunixin in India, Pakistan, Bangladesh, Nepal, Bhutan, Cambodia & Myanmar - First step to stop Government purchase or supply of all 5 NSAIDs			
AD2	SAVE	Discuss the issue with the Regional Steering Committee, all governments and pharmaceutical industry using research results.	SAVE	2020
AD2	SAVE	Make/update materials available on website specific to these NSAIDs	SAVE RSPB	2020
AD2	India	Seek bans for all 5 drugs for veterinary use – follow-up on process already initiated.	BNHS IVRI	2020

AD2	India	Approach State Drug Controller/Animal Husbandry Director to stop Govt. supplies to vets and prohibits use by Govt vets. (refer to 2012 Delhi Declaration) – at least all VSZ initiatives to do this	BNHS Arulagam Corbet Fndn Neohuman Fndn	2020
AD2	India	Chase aceclofenac ban in 2020	BNHS	2020
AD2	India	Formally approach Drug Controller Gen (India) through IVRI. Request IVRI to provide technical input for joint recommendation with BNHS to prompt an advisory from DCGI on this as interim measure	BNHS IVRI	2020
AD2	India	Provide technical assistance and advice on the operation of the ban, using information from monitoring.	SAVE RSPB	2020
AD2	India	State level advocacy targeting Govt authorities including all state/provincial Animal Husbandry Depts to stop purchase target NSAIDs for vets	BNHS	2020
AD2	Nepal	Seek bans of all 5 drugs for veterinary use – follow-up on process already initiated. Approach State Drug Controller/Animal Husbandry Director to stop Govt. supplies to vets and prohibits use by Govt vets. (refer to 2012 Delhi Declaration) – at least all VSZ initiatives to do this	BCN	2020
AD2	Nepal	Provide technical assistance and advice on the operation of the ban, using information from monitoring.	SAVE RSPB	2020
AD2	Bangladesh	Seek bans for all 5 drugs for veterinary use – follow-up on process already initiated. Enforce ketoprofen/aceclofenac ban within VSZ as first step. Extending bans to whole-country bans is target for ketoprofen/aceclofenac in 2020. - Make contact and meet with pharmaceutical companies which are supplying target NSAIDs. - Hold meetings with Bangladesh DGDA to reinforce & extend ketoprofen ban to national level by 2020	IUCN B'desh	2020
AD2	Bangladesh	Provide technical assistance and advice on the operation of the ban, using information from monitoring.	SAVE RSPB	2020
AD2	Pakistan	Seek bans for all 5 drugs for veterinary use – follow-up on process already initiated. Enforce ketoprofen and aceclofenac ban within VSZ as first step. Extend these bans to national bans for ketoprofen and aceclofenac and expand on ban in VSZ to include all 5 drugs	WWF Pak	2020
AD2	Pakistan	Provide technical assistance and advice on the operation of the ban, using information from monitoring.	SAVE RSPB	2020
AD2	Pakistan	Approach Pakistan drug authorities requesting ban (even though not in use) Build on Provincial-level ban to extend to Federal level.	WWF Pak	2020
AD2	Cambodia	Removal of 5 target NSAIDs from the market and seek a ban / prevent licensing prior to entry to the market	CVWG	2020
AD2	Cambodia	Monitor availability and use of target NSAIDs	CVWG	2020
AD2	Myanmar	Removal of target NSAIDs from the market and seek a ban / prevent licensing prior to entry to the market	MVWG	2020

AD2	Myanmar	Monitor availability and use of target NSAIDs	MVWG	2020
AD3/4	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.			
AD3/4	SAVE	Initiate discussions with Regional Steering Committee, National Vulture Recovery Committees (NVRCs), govts and pharmaceutical industry. Establish procedures	SAVE	2020
AD3/4	SAVE	Write protocol and make this available on SAVE website. Provide and update technical assistance and advice on the operation of the procedures, using information from monitoring.	SAVE RSPB	2020
AD3/4	SAVE	Discuss with NVRCs and at Regional Steering Committee (RSC). Approach medicines regulatory authorities to request that any new veterinary medicine should be tested for safety to vultures prior to registration/release to market. [NB to amend wording here after discussion with drug authority representatives/experts]	SAVE	2020
AD3/4	SAVE	Explore the possibility of a moratorium on new (veterinary) NSAIDs	SAVE	2020
AD3/4	India	Explore the possibility of a moratorium on new (veterinary) NSAIDs	BNHS	2020
AD3/4	Nepal	Explore the possibility of a moratorium on new (veterinary) NSAIDs	BCN	2020
AD3/4	Bangladesh	Explore the possibility of a moratorium on new (veterinary) NSAIDs	BNVRC	2020
AD3/4	Pakistan	Explore the possibility of a moratorium on new (veterinary) NSAIDs	WWF Pak	2020
AD3/4	Cambodia	Explore the possibility of a moratorium on new (veterinary) NSAIDs	CVWG	2020
AD3/4	Myanmar	Explore the possibility of a moratorium on new (veterinary) NSAIDs	MVWG	2020
AD5	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 is the only such drug.			
AD5	India	Promote funding of IVRI safety testing and discuss revision of the list of drugs to be tested. Provide encouragement and technical advice.	SAVE BNHS RSPB IVRI	2020
AD5	SAVE	Agree on best approach to achieve robust safety testing, and to acknowledge any progress - through relevant national partners.	SAVE TAC	2020
AD5	SAVE	TAC with IVRI to promote next priority NSAIDs for testing [add agreed NSAIDs here tbc] [Letter to European drug company producing Flunixin from BL or SAVE on impact of Flunixin] – Vinny and Mark to provide further input	SAVE TAC BNHS IVRI RSPB	2020
AD5	SAVE	Complete testing, confirm and promote safety of tolfenamic acid [add to another action]	IVRI	2020

AD6	Contribute, with government agencies and pharmaceutical companies, to maintaining pharmacovigilance and regulation of veterinary drugs, to prevent their negative effects on wild vultures.			
AD6	India	Initiate discussions with Regional Steering Committee, national committees, governments and pharmaceutical industry. Establish procedures.	BNHS	2020
AD6	Nepal	Initiate discussions with Regional Steering Committee, national committees, governments and pharmaceutical industry. Establish procedures.	BCN	2020
AD6	Bangladesh	Initiate discussions with Regional Steering Committee, national committees, governments and pharmaceutical industry. Establish procedures.	IUCN B'desh	2020
AD6	Pakistan	Initiate discussions with Regional Steering Committee, national committees, governments and pharmaceutical industry. Establish procedures.	WWF Pak	2020
AD6	Cambodia	Initiate discussions with Regional Steering Committee, national committees, governments and pharmaceutical industry. Establish procedures.	CVWG	2020
AD6	Myanmar	Initiate discussions with Regional Steering Committee, national committees, governments and pharmaceutical industry. Establish procedures.	MVWG	2020
AD6	SAVE	Proposed procedure/s to be developed and shared.	SAVE	2020
AD7	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	SAVE	Operate system and provide advice to the Regional Steering Committee, governments and pharmaceutical industry	SAVE	2020
AD7	SAVE	Establish system within SAVE. (System established 2016.) Operate system and provide advice to the Regional Steering Committee, governments and pharmaceutical industry.	SAVE TAC	2020
AD7	SAVE	Add SAVE website feature on this (include updates on pharmacy surveys) All partners to alert SAVE of any changes & post on website	SAVE	2020
AD7	SAVE	SAVE: Improve prominence on SAVE website & update information.	SAVE	2020
AD8	Improve the availability of more effective vulture-safe drugs and formulations thereby facilitating take up by veterinary practitioners			
AD8	India	Contact and sensitisation of pharma industry (approach major companies for support). Sensitise drug regulation authorities to take appropriate steps to favour production of well formulated veterinary meloxicam. Share and publicise good practice examples among SAVE and more widely for companies (e.g. Bangladesh) able to demonstrate better (e.g. neutral pH etc.) meloxicam formulations and alert Govts to this aspect. Sensitise more companies on this.	BNHS SAVE	2020

AD8	India	Request Director of IVRI to recommend Tolfenamic Acid to MoEFCC and Veterinary Council of India. Publicise results of main report on tolfenamic acid (available on MoEFCC website/SAVE dossier). Check on Tolfenamic acid formulations that they are being used and accepted by vet community all countries	SAVE BNHS	2020
AD8	Nepal	Contact and sensitisation of pharma industry (approach major companies for support). Sensitise drug regulation authorities to take appropriate steps to favour production of well formulated veterinary meloxicam.	BCN	
AD8	Nepal	Publicise results of main report on tolfenamic acid (available on MoEFCC website/SAVE dossier)	BCN SAVE	2020
AD8	Nepal	Check on tolfenamic acid formulations that they are being used and accepted by vet community all countries	BCN	2020
AD8	Bangladesh	Contact and sensitisation of pharma industry (approach major companies for support). Sensitise drug regulation authorities to take appropriate steps to favour production of well formulated veterinary meloxicam.	IUCN B'desh	2020
AD8	Bangladesh	Publicise results of main report on tolfenamic acid (available on MoEFCC website/SAVE dossier)	IUCN B'desh	2020
AD8	Bangladesh	Check on tolfenamic acid formulations that they are being used and accepted by vet community all countries	IUCN B'desh	2020
AD8	Pakistan	Contact and sensitisation of pharma industry (approach major companies for support). Sensitise drug regulation authorities to take appropriate steps to favour production of well formulated veterinary meloxicam.	WWF Pak	2020
AD8	Pakistan	Publicise results of main report on tolfenamic acid (available on MoEFCC website/SAVE dossier)	WWF Pak	2020
AD8	Pakistan	Check on Tolfenamic acid formulations that they are being used and accepted by vet community all countries	WWF Pak	2020
AD8	Cambodia	Contact and sensitisation of pharma industry (approach major companies for support). Sensitise drug regulation authorities to take appropriate steps to favour production of well formulated veterinary meloxicam.	CVWG	2020
AD8	Cambodia	Publicise results of main report on tolfenamic acid (available on MoEFCC website/SAVE dossier)	CVWG	2020
AD8	Cambodia	Check on Tolfenamic acid formulations that they are being used and accepted by vet community all countries	CVWG	2020
AD8	Myanmar	Contact and sensitisation of pharma industry (approach major companies for support). Sensitise drug regulation authorities to take appropriate steps to favour production of well formulated veterinary meloxicam.	MVWG	2020
AD8	Myanmar	Publicise results of main report on tolfenamic acid (available on MoEFCC website/SAVE dossier)	MVWG	2020

AD8	Myanmar	Check on Tolfenamic acid formulations that they are being used and accepted by vet community all countries	MVWG	2020
AD9	Develop wider awareness-raising initiatives to highlight NSAIDs concerns and provide incentives acknowledgement of those taking positive steps.			
AD9	India	Initiate system to support e.g. cattle shelters & dairy cooperatives that ensure only vulture-safe NSAIDs are used. (e.g. kite-mark/certification system).	Arulagam SAVE Associates	2020
AD9	India	General national awareness programme perhaps using a celebrity as a front person	BNHS SAVE Associates	2020
AD9	Bangladesh	Initiate system to support e.g. cattle shelters & dairy cooperatives that ensure only vulture-safe NSAIDs are used. (e.g. kite-mark/certification system).	BNVRC	2020
AD9	Bangladesh	Develop/promote progress achieved in Bangladesh (labelling) & Tamil Nadu (District ketoprofen bans) initiatives	SAVE SAVE Associates	2020
AD9	Myanmar	Consider initiatives generating awareness with pharmacies, drug distributors, vets, farmers	MVWG	2020
AD9	India	Dialogue with drug companies identified producing good formulations (meloxicam, tolfenamic acid)	BNHS SAVE	2020
AD9	Bangladesh	Dialogue with drug companies identified producing good formulations (meloxicam, tolfenamic acid)	BNVRC	2020
AD9	SAVE	Establish SAVE pharma working group involving initially companies that produce good formulations or showing interest in supporting	SAVE	2020
AD10	Develop SAVE positions on key issues as highlighted by the CMS Vultures MSAP			
AD10	SAVE	Circulate position statements and report at annual meeting [Note Research needs also to be added in research and survey section]	SAVE TAC	2020
AD10	SAVE	update CMS annually on SAVE/Blueprint Updates	SAVE	2020

Actions for Conservation Breeding (CB)				
Action Codes	Country	Actions	Lead Partner	By (end date)
CB1	Conservation breeding of OWBV, LBV and SBV at VCBC Pinjore (India).			
CB1	India	Maintain the captive population in good health. Produce as many fledglings as possible of all three species, using artificial intervention as appropriate, but with less emphasis on OWBV and more on SBV and LBV, using artificial incubation for those species if appropriate. Transfer of surplus immatures to release programme.	BNHS	2025
CB1	SAVE	Propose optimum vulture numbers to be held at centre for each species	SAVE TAC	2020
CB2	Conservation breeding of OWBV, LBV and SBV at VCBC Rajabhatkhawa (India).			
CB2	India	Maintain the captive population in good health. Produce as many fledglings as possible of all three species (subject to sufficient aviary space). There should be special emphasis on SBV, using artificial incubation for that species if appropriate. Transfer of surplus immatures to release programme.	BNHS	2025

CB2	SAVE	Propose optimum vulture numbers to be held at centre for each species	SAVE TAC	2020
CB3 Conservation breeding of OWBV and SBV at VCBC Rani (India).				
CB3	India	Maintain the captive population in good health. Produce as many fledglings as possible of both species (subject to sufficient aviary space). There should be special emphasis on SBV, using artificial incubation for that species if appropriate. Transfer of surplus immatures to release programme.	BNHS	2025
CB3	India	Complete second and add third colony aviary in Assam centre	BNHS	2020
CB3	SAVE	Propose optimum vulture numbers to be held at centre for each species	SAVE TAC	2020
CB4 Conservation breeding of OWBV at VCC Changa Manga (Pakistan).				
CB4	Pakistan	Maintain the captive population in good health. Produce as many fledglings as possible by natural methods and artificial incubation as necessary. Transfer of birds to release programme as appropriate. Maintain target of 5 to 10 fledglings per year aimed for release.	WWF Pak	2025
CB5 Conservation breeding of OWBV at VCBC Chitwan (Nepal).				
CB5	Nepal	Maintain the captive population in good health. Produce as many fledglings as possible by natural methods. Transfer some captive-reared birds to release facility	NTNC	2023
CB5	Nepal	Update the release plan (ongoing) in consultation with national partners, with plans to release captive-bred birds when less than 2 years old, maintaining best breeding birds but releasing others. All this subject to ongoing safety-evaluation of the environment and annual review. Continue with above for new release plan (5 year plan).	DNPWC BCN	2020
CB5	SAVE	Propose optimum vulture numbers to be held at centre for each species	SAVE TAC	2020
CB6 Conservation breeding of OWBV and LBV at CZA centres (India).				
CB6	India	Training of staff and preparation of facilities Transfer of captive-bred OWBV and LBV from VCBC Pinjore.	BNHS	2020
CB6	India	Maintain the captive population in good health. Produce as many fledglings as possible by natural methods.	MOEFCC CZA	2020
CB6	India	Transfer captive-bred birds to release facility or other centres.	CZA	2025
CB6	India	Update release plan annually.	CZA	2025
CB7 Conservation breeding of OWBV in Bangladesh.				
CB7	Bangladesh	Consider the development of a VCBC in Bangladesh. [This has been considered, and decided not to do so]	BNVRC	Done
CB8 Conservation breeding of OWBV & LBV at VCBC Bhopal (India)				
CB8	India	Establish & maintain a captive population in good health – primarily through supply and exchanges of subadult birds from other existing centres.	BNHS	2020
CB8	SAVE	Propose optimum vulture numbers to be held at centre for each species	SAVE TAC	2020

Actions for Vulture Safe Zones Implementation (VS)				
Action Codes	Country	Actions	Lead Partner	By (end date)
VS1	Identification and selection of new provisional Vulture Safe Zones (pVSZs) in India, in particular for LBV.			
VS1	India	Collect information and select pVSZs. Completed	BNHS	Done
VS2	Capacity building & local advocacy of prov. Vulture Safe Zones (pVSZs) India.			
VS2	India	Develop capacity in pVSZs.	BNHS NeoHuman Fndn Arulagam	2020
VS3	Selection of pVSZs in India suitable for conversion to full VSZs.			
VS3	India	Selection and conversion of pVSZs to full VSZs based upon undercover pharmacy monitoring data and monitoring of fates of tagged vultures. Focus on proposed release areas & transboundary areas VSZs and review current emphasis (prioritise Haryana, UP, Bihar, Gujarat, Tripura, Meghalaya, W Bengal, Jharkhand)	BNHS NeoHuman Fndn Arulagam SAVE	2020
VS3	India	Review selection/process & then again review in 2019, 2021. (2017 MP Reviewed)	BNHS SAVE	2020
VS4	Maintenance and review of VSZs in India			
VS4	India	Continue VSZ implementation. Potential removal of VSZ status if monitoring shows that conditions have changed.	BNHS SAVE TAC	2020
VS5	Release of captive-bred vultures in VSZs in India.			
VS5	India	Transfers of captive-bred vultures to holding aviaries in VSZs.	BNHS, Indian State Govts	2020
VS5	India	Releases of first captive-bred vultures in VSZs.	BNHS, Ind State Govts	2020
VS6	Maintenance and review of VSZs in Nepal.			
VS6	Nepal	Continue VSZ implementation and expansion	NNVRC, BCN	2020
VS7	Release of captive-reared & captive-bred vultures in VSZs in Nepal.			
VS7	Nepal	Releases of captive-reared OWBV not likely to breed from VCBC.	NNVRC, BCN, NTNC	Done
VS7	Nepal	1-2 Releases of captive-bred OWBVs each year. Numbers released subject to annual review, taking release success & numbers of birds bred into account.	NNVRC, BCN, NTNC	2023
VS8	Identification & selection of additional pVSZ Pakistan.			
VS8	Pakistan	Develop capacity	WWF Pakistan	2020
VS8	Pakistan	Continuing: progress, monitoring and meetings with provincial wildlife department to declare as pVSZ. Identified as AJK. 2020 One more could be identified (Changa Manga)	WWF Pakistan	2020
VS9	Maintenance & review of VSZs in Pakistan.			

VS9	Pakistan	Continue VSZ implementation and expansion. [Fundraising still required 2020 to support, in process]. Activities underway. 2020 continue implementation and expansion – currently smaller than standard VSZ.	WWF Pakistan	2020
VS10	Release of captive-bred vultures in VSZs in Pakistan			
VS10	Pakistan	2022 Pakistan: Releases of captive-bred vultures in VSZs	WWF Pakistan	2024
VS11	Livestock management and husbandry training in pVSZs and VSZs in Pakistan			
VS11	Pakistan	Continue to implement training programme.	WWF Pak Parkar Fndn	2020
VS12	Free veterinary camps in pVSZs and VSZs in Pakistan.			
VS12	Pakistan	Continue to implement programme. [Ongoing] 2020 reinforce links with UVAS in Lahore	WWF Pak ICI Pakistan, Lahore Uni Vet School	2020
VS13	Community-led vulture-based tourism in pVSZs and VSZs in Nepal and Pakistan.			
VS13	Nepal	Continue to implement programme in Nepal (after ensuring viability and ensuring no disturbance).	BCN	2025
VS13	Pakistan	Creating nature clubs at schools. [Rather than tourism, emphasis is on outreach around breeding centre. Progress with nature clubs in VSZ at Nagar Parkar] Ongoing Sindh. Proposed for AJK	WWF Pak	2020
VS14	Identification and selection of pVSZs and VSZs in Bangladesh.			
VS14	Bangladesh	Identify and select pVSZs.	BNVRC	Done
VS15	Implementation of pVSZs in Bangladesh.			
VS15	Bangladesh	Continue to implement VSZ programme for two main VSZs.	IUCN B.desh BNVRC	2020
VS16	Identify pVSZs in Cambodia			
VS16	Cambodia	2019: develop VSZ concept with areas proposed or decide if this approach is not relevant for Cambodia at CVWG meeting(s)	CVWG SAVE	2020
VS17	Implementation of pVSZs in Cambodia			
VS17	Cambodia	Continue to implement VSZ programme. [to add specific actions here in future] 2020: TAC to support define VSZ criteria for Cambodia	CVWG SAVE	2020
VS18	Identify pVSZs in Myanmar			
VS18	Myanmar	Myanmar: collect information and select sites for pVSZs	MVWG	2020
VS19	Maintenance & review of VSZs in Myanmar			
VS19	Myanmar	Continue VSZ implementation and expansion.	MVWG	2023
VS19	Myanmar	Proposal submitted to government for formal nomination of VSZ	MVWG	2020
VS20	Livestock management and husbandry training in pVSZs and VSZs in Tamil Nadu			
VS20	India	Implement training programme.	Arulagam	2022

Actions for Vulture Safe Zone Monitoring (ZM)

Action Codes	Country	Actions	Lead Partner	By (end date)
--------------	---------	---------	--------------	---------------

ZM1 Monitoring movements, survival and causes of death of wild vultures with GPS PTTs in pVSZs and VSZs				
ZM1	India	Seek permits for OWBV capture and tagging of wild vultures in VSZs. Initial tagging trials & monitoring/recovery system in place for any mortalities for autopsy.	BNHS Nat Vult RC	2020
ZM1	Nepal	Seek permits for OWBV capture and tagging of wild vultures in VSZs. Initial tagging trials & monitoring/recovery system in place for any mortalities for autopsy.	DNPWC BCN	2020
ZM1	Bangladesh	Seek permits for OWBV capture and tagging of wild vultures in VSZs. Initial tagging trials & monitoring/recovery system in place for any mortalities for autopsy.	BFD IUCN B'desh	2020
ZM1	Pakistan	Seek permits for OWBV capture and tagging of wild vultures in VSZs. Initial tagging trials & monitoring/recovery system in place for any mortalities for autopsy.	WWF Pak	2020
ZM1	Cambodia	Initiate monitoring with tagging as option in future (with support from TAC)	CVWG SAVE TAC	2020
ZM1	Myanmar	Initiate monitoring with tagging as option in longer-term future	MVWG	2022
ZM2 Monitoring of survival and causes of death of released vultures with GPS PTTs in pVSZs and VSZs.				
ZM2	India	Tag all captive-reared and captive-bred vultures prior to release with GPS tags. Monitor to identify foraging sites, recover corpses and establish cause of death.	BNHS	2020
ZM2	Nepal	Tag all captive-reared and captive-bred vultures prior to release with GPS tags. Monitor to identify foraging sites, recover corpses and establish cause of death.	BCN	2020
ZM2	Nepal	Plan further releases to 2024. Ongoing.	DNPWC BCN	2023
ZM3 Monitoring of movements, survival and causes of death of released vultures with GPS PTTs in pVSZs and VSZs in Pakistan.				
ZM3	Pakistan	Tag all released captive-bred vultures. Monitor to identify foraging sites, recover corpses and establish cause of death.	WWF Pak	2024
ZM4 Monitoring of availability of NSAIDs for veterinary use in representative samples of pharmacies and other outlets in pVSZs and VSZs.				
ZM4	India	Conduct undercover surveys of outlets for veterinary drugs. Record NSAIDs offered for use for veterinary purposes. Identify the provenance and vial size of diclofenac and date of manufacture offered for veterinary use.	BNHS Arulagam NeoHuman Fndn	2020
ZM4	Nepal	Conduct undercover surveys of outlets for veterinary drugs. Record NSAIDs offered for use for veterinary purposes. Identify the provenance and vial size of diclofenac and date of manufacture offered for veterinary use.	BCN	2020

ZM4	Bangladesh	Conduct undercover surveys of outlets for veterinary drugs. Record NSAIDs offered for use for veterinary purposes. Identify the provenance and vial size of diclofenac and date of manufacture offered for veterinary use.	IUCN B'desh	2020
ZM4	Pakistan	Conduct undercover surveys of outlets for veterinary drugs. Record NSAIDs offered for use for veterinary purposes. Identify the provenance and vial size of diclofenac and date of manufacture offered for veterinary use.	WWF Pak	2020
ZM4	Cambodia	Conduct undercover surveys of outlets for veterinary drugs. Record NSAIDs offered for use for veterinary purposes. Identify the provenance and vial size of diclofenac and date of manufacture offered for veterinary use.	CVWG	2020
ZM4	Myanmar	Conduct undercover surveys of outlets for veterinary drugs. Record NSAIDs offered for use for veterinary purposes. Identify the provenance and vial size of diclofenac and date of manufacture offered for veterinary use.	MVWG	2020
ZM5	Monitoring of wild vulture populations and breeding success in pVSZs and VSZs in India, Pakistan, Bangladesh, Nepal, Myanmar & Cambodia.			
ZM5	India	Conduct surveys over representative areas of the zone, including nest counts and/or road transect surveys, as appropriate.	BNHS Arulagam NeoHuman Fndn Corbett Fndn	2020
ZM5	Nepal	Conduct surveys over representative areas of the zone, including nest counts and/or road transect surveys, as appropriate.	BCN	2020
ZM5	Bangladesh	Conduct surveys over representative areas of the zone, including nest counts and/or road transect surveys, as appropriate.	IUCN B'desh	2020
ZM5	Pakistan	Conduct surveys over representative areas of the zone, including nest counts and/or road transect surveys, as appropriate.	WWF Pak	2020
ZM5	Cambodia	Conduct surveys over representative areas of the zone, including nest counts and/or road transect surveys, as appropriate.	CVWG	2020
ZM5	Myanmar	Conduct surveys over representative areas of the zone, including nest counts and/or road transect surveys, as appropriate.	MVWG	2020

Actions for Research and Monitoring (RM)				
Action Codes	Country	Actions	Lead Partner	By (end date)
RM1	Develop method for GPS PTT vulture tracking and corpse recovery in VSZs.			
RM1	India	Complete tagging and recovery tests on RHV and LBV. Evaluate corpse recovery using simulated tagged corpses. Test tag attachment methods on captive Gyps.	RSPB BNHS	Done
RM1	India	Begin tag deployment on Gyps vultures in pVSZs and VSZs.	RSPB BNHS	Done

RM1	Nepal	Complete tagging and recovery tests on RHV and LBV. Evaluate corpse recovery using simulated tagged corpses. Test tag attachment methods on captive Gyps.	RSPB BCN	Done
RM1	Nepal	Begin tag deployment on Gyps vultures in pVSZs and VSZs.	RSPB BCN	Done
RM1	SAVE	Produce harnessing and wing-tagging guides.	RSPB	2020
RM1	SAVE	Continue development of corpse recovery method.	BNHS BCN RSPB	2020
RM2	Road transect surveys of vulture numbers in India. (NB South India isn't included here. Needs action to follow-up)			
RM2	India	Conduct surveys using same methods as in previous surveys.	BNHS RSPB	Annually
RM2	India	Extend surveys to include South India	tbc	2020
RM2	India	Publish results of the survey done in the previous year.	BNHS RSPB	Annually
RM3	Road transect surveys of vulture numbers in Nepal.			
RM3	Nepal	Conduct survey using same methods as in previous surveys. Western lowland surveys annually. Midhills and East-West highway survey every four years (done in 2018). 2020: Next annual survey to be conducted.	BCN RSPB	Annually
RM4	Vulture population monitoring in Pakistan, Bangladesh, Cambodia and Myanmar.			
RM4	Bangladesh	Conduct annual surveys.	BNVRC IUCN B'desh BFD	Annually
RM4	Pakistan	National survey planned for 2018 (but funds not available) Hoped for in 2019, but still funding dependent. Follow up from 2010 survey. 2020: compartmentalize annual surveys in specific areas instead of National survey	WWF Pakistan	2020
RM4	Cambodia	Conduct annual census. Quarterly coordinated feeding counts continued.	CVWG	Annually
RM4	Myanmar	Establish methodology and ensure baseline surveys carried out.	MVWG	2020
RM5	Monitoring of NSAID contamination of ungulate carcasses in northern India and Nepal.			
RM5	India	Complete current round of sample collection in several states. Measure concentrations of all NSAIDs potentially hazardous to vultures	BNHS IVRI	2020
RM5	India	Publish NSAID monitoring results and expected effects on vulture death rates.	RSPB BNHS	2020
RM5	Nepal	Complete current round of sample collection in several states. Measure concentrations of all NSAIDs potentially hazardous to vultures.	RSPB BCN	2020
RM5	Nepal	Publish NSAID monitoring results and expected effects on vulture death rates.	RSPB BCN	2020
RM6	Monitoring of causes of death and NSAID contamination of wild vultures in India, Pakistan, Nepal, Cambodia & Bangladesh.			

RM6	India	<p>Create database to document circumstances of death of vultures.</p> <p>Collect as many dead wild and released vultures as possible.</p> <p>Conduct post-mortem examinations to determine causes of death.</p> <p>Take liver and kidney samples and determine concentrations of all NSAIDs known to be in veterinary use and pesticides and other poisons.</p> <p>Trial methods to detect NSAIDs and other poisons in bone and other hard tissues.</p> <p>Retain carcasses frozen for future use.</p> <p>Publish the results periodically.</p> <p>2020 develop methods for acquiring data for database (e.g. searching at roosts, sniffer dogs?)</p>	SAVE BNHS RSPB	2020 Annually
RM6	Nepal	<p>Create database to document circumstances of death of vultures.</p> <p>Collect as many dead wild and released vultures as possible.</p> <p>Conduct post-mortem examinations to determine causes of death.</p> <p>Take liver and kidney samples and determine concentrations of all NSAIDs known to be in veterinary use and pesticides and other poisons.</p> <p>Trial methods to detect NSAIDs and other poisons in bone and other hard tissues.</p> <p>Retain carcasses frozen for future use.</p> <p>Publish the results periodically.</p> <p>2020 develop methods for acquiring data for database (e.g. searching at roosts, sniffer dogs?)</p>	BCN RSPB	2020 Annually
RM6	Bangladesh	<p>Create database to document circumstances of death of vultures.</p> <p>Collect as many dead wild and released vultures as possible.</p> <p>Conduct post-mortem examinations to determine causes of death.</p> <p>Take liver and kidney samples and determine concentrations of all NSAIDs known to be in veterinary use and pesticides and other poisons.</p> <p>Trial methods to detect NSAIDs and other poisons in bone and other hard tissues.</p> <p>Retain carcasses frozen for future use.</p> <p>Publish the results periodically.</p> <p>2020 develop methods for acquiring data for database (e.g. searching at roosts, sniffer dogs?)</p>	IUCN B'desh RSPB	2020 Annually
RM6	Pakistan	<p>Create database to document circumstances of death of vultures.</p> <p>Collect as many dead wild and released vultures as possible.</p> <p>Conduct post-mortem examinations to determine causes of death.</p> <p>Take liver and kidney samples and determine concentrations of all NSAIDs known to be in veterinary use and pesticides and other poisons.</p> <p>Trial methods to detect NSAIDs and other poisons in bone and other hard tissues.</p>	WWF Pak THC	2020 Annually

		Retain carcasses frozen for future use. Publish the results periodically. 2020 develop methods for acquiring data for database (e.g. searching at roosts, sniffer dogs?)		
RM6	Cambodia	Create database to document circumstances of death of vultures. Collect as many dead wild and released vultures as possible. Conduct post-mortem examinations to determine causes of death. Take liver and kidney samples and determine concentrations of all NSAIDs known to be in veterinary use and pesticides and other poisons. Trial methods to detect NSAIDs and other poisons in bone and other hard tissues. Retain carcasses frozen for future use. Publish the results periodically. 2020 develop methods for acquiring data for database (e.g. searching at roosts, sniffer dogs?)	CVWG	2020 Annually
RM7	Safety testing on captive vultures at Pinjore of NSAIDs of uncertain toxicity. Needs updating from previous discussion.			
RM7	India	Obtain wild Himalayan griffon vultures and house in captivity for safety testing programme.	BNHS	2020 ongoing
RM7	India	Conduct testing of four NSAIDs. Apply to test four more NSAIDs.	IVRI BNHS	2020 Ongoing
RM7	India	Review safety testing programme and decide on testing needs.	SAVE TAC	Annually
RM7	India	Continue testing programme as NSAIDs posing potential hazards are identified by the SAVE alert system (see timeline AD6).	IVRI BNHS	Annually
RM8	Monitoring of availability of NSAIDs for veterinary use in pharmacies and other outlets in India, Nepal, and Bangladesh other than in VSZs.			
RM8	India	Complete current round of undercover and open pharmacy surveys linked with sampling of ungulate carcasses (see RM5)	BNHS	Annually
RM8	India	Publish NSAID availability monitoring results.	BNHS RSPB	every 2 years
RM8	Nepal	Complete current round of undercover and open pharmacy surveys linked with sampling of ungulate carcasses (see RM5)	BCN	Annually
RM8	Nepal	Publish NSAID availability monitoring results.	BCN RSPB	every 2 years
RM8	Bangladesh	Complete current round of undercover and open pharmacy surveys linked with sampling of ungulate carcasses (see RM5)	IUCN B'desh	Annually
RM8	Bangladesh	Publish NSAID availability monitoring results.	IUCN B'desh RSPB	every 2 years
RM9	Monitoring of availability of NSAIDs for veterinary use in pharmacies and other outlets in Pakistan.			
RM9	Pakistan	Conduct undercover surveys of outlets for veterinary drugs. Record NSAIDs offered for use for veterinary purposes. Identify the provenance and	WWF Pak HC	2020 Ongoing

		vial size of diclofenac offered illegally for veterinary use. [Pharmacy surveys ongoing]		
RM10	Estimation of the former and potential future value of the ecosystem services provided by wild vultures.			
RM10	SAVE	Conduct a survey of costs of cattle carcass disposal, feral dog control and other ecosystem service measurements. Based on IUCN India paper, VSG to have standard statement on role of vultures in disease ecology. Current best knowledge of role of vultures in ecosystem function is inconclusive. Update SAVE website with relevant publications.	SAVE	2021
RM11	Investigate factors affecting use of vulture-safe NSAIDs by veterinarians, paravets and livestock owners.			
RM11	SAVE	Conduct questionnaire studies, choice experiments and other investigations, as appropriate.	SAVE TAC	2020
RM11	SAVE	Exploit potential for collaboration with social scientists who could pursue some of this work. TAC identify means to achieve this, e.g. SAVE website, engage with pharma groups.	SAVE TAC	2020

Actions for Fundraising (FR)				
Action Codes	Country	Actions	Lead Partner	By (end date)
FR1	Develop stronger fundraising capacity.			
FR1	SAVE	1. Identify national focal points for fundraising. 2. FACC to meet 4 times/year and develop further actions. Actions to be proposed and agreed through FACC during 2020.	SAVE	2020
FR1	SAVE	Develop sustainable funding approaches for each country/state. Identify broader set of fundraising opportunities (e.g. GEF regional multi-country)	SAVE	2020 Ongoing

Actions for Cambodia (CAM)				
Action Codes	Country	Actions	Lead Partner	By (end date)
CAM1	Monthly supplementary feeding in at least four sites			
CAM1	Cambodia	Provide at least one dead cow per month at vulture restaurants.	CVWG	2020 Ongoing
CAM2	Improve population monitoring			
CAM2	Cambodia	Census vulture restaurants in March, June, September and December.	CVWG	2020 Ongoing
CAM3	Safeguard nesting areas from logging			
CAM3	Cambodia	Check all known nest locations, improve law enforcement at key sites.	CVWG	2020 Ongoing
CAM4	Protect vulture nests from human predation			
CAM4	Cambodia	Evaluate effectiveness of nest protection across sites. Continue nest protection if found to be effective	CVWG	2020
CAM5	Monitor sales of veterinary drugs at key sites			
CAM5	Cambodia	Quarterly monitoring of veterinary drug sales at key sites.	CVWG	2020

CAM5	Cambodia	2020: Support government focal point on diclofenac ban implementation.	CVWG	2020
CAM6	Increase sustainability of CVWG			
CAM6	Cambodia	Integrate vulture conservation activities into other NGO activities. Develop sustainable financing where possible Evaluate CVWG activities and effectiveness Nationalize management of CVWG	CVWG	
CAM7	Assess mortality due to non-NSAID threats			
CAM7	Cambodia	Training workshop on poison baits Learning from other SAVE partners and African countries	CVWG	
CAM8	Identify locations of WRV breeding sites			
CAM8	Cambodia	Satellite tagging of 2+ WRVs to lead to breeding areas	CVWG	2020

Actions for Myanmar (MYA)				
Action Codes	Country	Actions	Lead Partner	By (end date)
MYA1	Nesting site protection and law enforcement			
MYA1	Myanmar	Nest site identification and protection.	MVWG	2020 - Ongoing
MYA2	Public awareness raising			
MYA2	Myanmar	Work with communities, develop media locally and nationally	MVWG	2020 - Ongoing
MYA2	Myanmar	2020 IVAD with Yangon Zoo	MVWG	2020
MYA3	Restaurant site for environmental tourism			
MYA3	Myanmar	Start restaurant	MVWG	2022
MYA4	Threat assessment			
MYA4	Myanmar	Questionnaires (mainly pharmacy focused), focus group discussion at two sites.	MVWG	2020
MYA5	Update Myanmar vulture species action plan			
MYA5	Myanmar	Plan to be updated and aligned with SAVE blueprint and Vulture MSAP Done	MVWG	2020
MYA6	Regular meetings of MVWG			
MYA6	Myanmar	2 meetings per year	MVWG	2020 - Ongoing