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NATIONAL VULTURE CONSERVATION STRATEGY & ACTION PLAN



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Abbreviations and Acronyms

AD	Agriculture Department
AJK	Azad Jammu and Kashmir
BLI	Bird Life International
BV	Bearded Vulture
CB	Conservation Breeding
CBOs	Community Based Organizations
CE	Critically Endangered
CV	Cinereous Vulture
DRAP	Drug Regulatory Authority of Pakistan
ES	Ecosystem
EV	Egyptian Vulture
Ex-situ	Off site (Out of Natural Habitat)
FATA	Federally Administered Tribal Areas
FD	Forest Department
GoP	Government of Pakistan
GV	Griffon Vulture (Eurasian)
H	High
HD	Health Department
HG	Himalayan Griffon
ID	Irrigation Department
IGF	Inspector General of Forests
INGOs	International Government Organizations
In-Situ	On site (In Natural Habitat)
IUCN	International Union for Conservation of Nature
IV	Indian Vulture
K-2	Karakorum Mountain
KPK	Khyber Pakhtunkhwa
L	Low
LC	Least Concern
LDs	Line Departments
M	Medium
MoCC	Ministry of Climate Change
MoH	Ministry of Health

NBSAP	Pakistan National Biodiversity Strategy and Action Plan
NGOs	Non-governmental Organizations
NP	National Park
NSAID	Non-steroidal anti-inflammatory drug
NT	Near Threatened
NVRC	Pakistan National Vulture Recovery Committee
pH	Power of Hydrogen
PhD	Doctor of Philosophy
PKR	Pakistani Rupee
PTV	Pakistan Television
pVSZs	Potential Vulture Safe Zones
QA & Lic	Quality Assurance and Licensing
RHV	Red Headed Vulture
RSC	Regional Steering Committee for Vulture Conservation
RSPB	The Royal Society for the Protection of Birds
SAVE	Saving Asia's Vultures from Extinction
SAZDA	Sindh Arid Zone Development Authority
SBV	Slender Billed Vulture
SFS	Safe Feeding Site
UK	United Kingdom
UNEP	United Nations Environment Program
USAID	United States Agency for International Development
VC&BC	Vulture Conservation and Breeding Center
VCBC	Vulture Conservation and Breeding Center
VCSAP	Vulture Conservation Strategy and Action Plan
VD	Veterinary Department
VFGs	Vulture Friendly Groups
VSZs	Vulture Safe Zone
WD	Wildlife Department
WRV	White Rumped Vulture
WWF-P	World Wide Fund for Pakistan
ZSP	Zoological Survey of Pakistan



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Executive Summary

Pakistan has a diverse landscape, biodiversity richness and its distribution. Altitude ranges from Arabian Sea to the second highest peak of the world, 'Mount K-2' which has a great influence on biodiversity richness. Pakistan hosts 670 species of birds with some species that are migratory in nature. Population of birds of Pakistan is facing decline and challenges due to habitat loss, poaching, illegal trade, climate change, lack of scientific management, research and monitoring.

The populations of vulture species have been declining because of Diclofenac, the drug used to treat livestock that was proved to be causing decline in vulture populations in 2004. Eight species of vultures can be found in Pakistan. Seven species of vulture are resident, and Red-Headed vulture is a vagrant. IUCN has categorized WRV, IV and RHV as Critically Endangered and EV as Endangered. Vultures are highly intolerant to the non-steroidal anti-inflammatory drug (NSAID) diclofenac, which they are exposed to through the consumption of carcasses of recently treated livestock. The governments of the vulture range states have banned use of veterinary 'Diclofenac' for livestock treatment and have registered an alternative drug Meloxicam.

More recent studies indicate that decline of vultures throughout South Asia has slowed, and possibly reversed, following the banning of veterinary diclofenac; however, all populations are small and therefore vulnerable. Other NSAIDs, like Aceclofenac and Ketoprofen, are also vulture-toxic and thereby also pose a threat to vultures. Therefore, continuation of efforts to complete the removal of diclofenac and other toxic NSAIDs from the vultures' food supply is essential.

The National Vulture Conservation Strategy and Action Plan has been prepared with the goal to restore viable wild populations of vultures in Pakistan. The twin objective is to strengthen the conservation of vultures in the wild and in captivity and to save vultures from the effect of NSAIDs and other toxic compounds.

The major priority actions are: i) Nation-wide population assessment, ii) policy and legal

frameworks, iii) ex-situ conservation, and iv) in-situ conservation. Similarly, the supporting actions are: i) Research and monitoring, and ii) communication and awareness. For each priority action area, issues are identified and strategies and activities are proposed.

The government ownership for vulture conservation actions in the provinces and engagement of conservation partners, civil societies and NGOs, and communities is essential to implement the measures sought in the strategy and action plan and to achieve its overall objectives.

This Vulture Conservation Strategy and Action Plan (2016-25) has been prepared based on the past learnings and also incorporates current conservation issues. This strategy and action plan may provide a platform to raise funds, generate financial and technical resources and eventually to implement the actions and materialize the objectives.

The Government of Pakistan is cognizant of the vulture decline and has initiated various measures that will continue to support vulture conservation in Pakistan. This includes establishment of a National Vulture Recovery Committee and being a part of the Regional Steering Committee on Vultures.

Pakistan National Vulture Recovery Committee has taken the lead for initiating the preparation of the National Strategy and Action Plan under a joint initiative by IUCN Pakistan and Baanhn Beli with the financial assistance of USAID – Small Grants Ambassador's Fund Program.



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SECTION 1:

INTRODUCTION AND BACKGROUND

1.1 Introduction

Nine species of vultures are found in Asia. They are the White-rumped Vulture (WRV-*Gyps bengalensis*), Indian (Long-billed) Vulture (IV-*Gyps indicus*), Himalayan Griffon (HG-*Gyps himalayensis*), Griffon (Eurasian) Vulture (GV-*Gyps fulvus*), Red-headed Vulture (RHV-*Sarcogyps calvus*), Egyptian Vulture (EV-*Neophron*

percnopterus), Cinereous Vulture (CV-*Aegypius monachus*), Slender-billed Vulture (*Gyps tenuirostris*) and the Bearded (Lammergeier) Vulture (BV-*Gypaetus barbatus*). Except the slender-billed vulture, the rest of the eight species of vultures are found in Pakistan (Table 1).

Three species of *Gyps* vultures are endemic to South and Southeast Asia. They are white-rumped vulture (*Gyps bengalensis*), Indian vulture (*Gyps indicus*) and slender-billed vulture (*Gyps tenuirostris*). All three species are threatened with global extinction after rapid population declines (Oaks et al. 2004; Swan et al. 2006; Das et al. 2010), which began in the mid-1990s. These species have been listed as Critically Endangered (CE) by IUCN, the highest level of endangerment in the wild.

In Pakistan, the population of WRV had declined by over 95% of its numbers in the early 1990s in most of its range (Murn et al. 2014). Veterinary use of the non-steroidal anti-inflammatory drug (NSAID) diclofenac is the major cause of these declines (Murn et al. 2014). Diclofenac has been used to treat symptoms of disease and injury in domesticated ungulates in many parts of the Indian subcontinent since the 1990s. There is a possibility that EV, RHV, BV have also been affected by diclofenac treated carcasses. (Cuthbert et al., 2006; Acharya et al., 2010).

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 (SAVE 2014).

When 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. A ban on veterinary use of diclofenac was issued on 17 March, 2005 in India. In May 2006, India circulated an order requiring the withdrawal of manufacturing licenses for veterinary formulations of diclofenac which was further strengthened in 2008 as an imprisonable offence to manufacture, retail or use diclofenac for veterinary purposes. More recently in late 2015, India also banned the multi-dose vials of diclofenac earlier available for human use. Pakistan and Nepal have also banned the drug for veterinary use in 2006 whereas it was banned in Bangladesh in 2010.

After ban of diclofenac (Pain et al. 2008) in Pakistan, field survey in 2010-11 showed very few vultures or nests, however recent surveys carried out between 2011 and 2014, have reported a slight increase in the number of active nests in Tharparkar colony (from 11 to 34) indicating expanding colony (Murn et al. 2014). Similar results have been found in case of Indian vulture in Karoonjhar hills, Tharparkar district (Chaudhry et al. 2012).

These facts clearly emphasize the importance of the need of vulture strategy and action plan to strengthen and synergize the ongoing vulture conservation work in Pakistan. This will facilitate relevant planning, including defining vision, objectives and actions. There was an assessment undertaken on existing relevant efforts. This is envisaged to help provincial and federal governments generate the resources for their long-term implementation through projects.

1.2 Background

1.2.1 Taxonomy

Nine species of vulture are found in Asia. All are representatives of old world vultures. They are categorized by Birdlife International (BLI) in the Family Accipitridae and Order Accipetriformes (BLI 2014).

Table 1: Classification of Vultures

Order	Family	Subfamily	Genus and Species
Falconiformes	Accipitridae (Old World Vultures). They are classified with the eagles, hawks, buzzards and kites	Gypaetinae	Palm nut vulture (<i>Gypohierax angolensis</i>), Lammergeier or bearded vulture (<i>Gypaetus barbatus</i>), Egyptian vulture (<i>Neophron percnopterus</i>) more related to genus <i>Pernis</i>
		Aegyptiinae	Lappet-faced vulture (<i>Torgos tracheliotus</i>), Eurasian black vulture (<i>Aegypius monachus</i>), white-headed vulture (<i>Trigonoceps occipitalis</i>), red-headed vulture (<i>Sarcogyps calva</i>), hooded vulture (<i>Necrosyrtes monachus</i>), and eight species in genus <i>Gyps</i> - griffon vulture (<i>Gyps fulvus</i>), Indian white-rumped vulture (<i>Gyps bengalensis</i>), Rüppell's vulture (<i>Gyps rueppelli</i>), long-billed vulture (<i>Gyps indicus</i>), slender-billed vulture (<i>Gyps tenuirostris</i>), Himalayan griffon vulture (<i>Gyps himalayensis</i>), white-backed vulture (<i>Gyps africanus</i>), and cape griffon (<i>Gyps coprotheres</i>)
Falconiformes, and now might become its own order of Cathartiformes	Vulturidae also called Cathartidae (New World Vultures – Diurnal raptors, birds of prey that aren't owls), moved into Ciconiiformes (storks, herons, ibises)		Turkey vulture (<i>Cathartes aura</i>), two species of yellow-headed vulture (<i>Cathartes melambrotus</i> , <i>C. burrovianus</i>), black vulture (<i>Coragyps atratus</i>), king vulture (<i>Sarcoramphus papa</i>), Andean condor (<i>Vultur gryphus</i>), and California condor (<i>Gymnogyps californianus</i>).

The vultures are from three groups of large scavenger birds with bare, featherless heads and a diet mainly of carrion. There are sixteen species of Old World vultures, seven species of New World vultures, and four known species of extinct teratorns. Old World and New World vultures are not closely related to each other. The terms "Old World" and "New World" are somewhat misleading, as the fossil records for both of these groups exist in both places, and no one is quite sure where either group originated. Teratorn fossils, meanwhile, are only found in the New World, and they probably arose there.

Old World vultures are found in Africa, Asia, and Europe. They are classified with the eagles, hawks, buzzards and kites in the family Accipitridae of the order Falconiformes. Within the family, the vultures are divided into two groups - subfamily Gypaetinae and subfamily Aegyptiinae. Sub-family Gypaetinae includes the palm nut vulture (*Gypohierax angolensis*), lammergeier or bearded vulture (*Gypaetus barbatus*), and Egyptian vulture (*Neophron*

percnopterus); according to DNA sequence comparisons, these are more closely related to the honey buzzards (genus *Pernis*) than to anything else in the family. Aegyptiinae, which includes the other thirteen Old World vultures, have an ancestor in common with a number of other non-vultures in the Accipitridae family, including Buteo (hawks), Aquila (eagles), Haliaeetus (sea eagles) and Circaetus (snake eagles). The thirteen Aegyptiinae vultures are: lappet-faced vulture (*Torgos tracheliotus*), Eurasian black vulture (*Aegypius monachus*), white-headed vulture (*Trigonoceps occipitalis*), red-headed vulture (*Sarcogyps calva*), hooded vulture (*Necrosyrtes monachus*), and eight species in genus *Gyps* - griffon vulture (*Gyps fulvus*), Indian white-rumped vulture (*Gyps bengalensis*), Rüppell's vulture (*Gyps rueppelli*), long-billed vulture (*Gyps indicus*), slender-billed vulture (*Gyps tenuirostris*), Himalayan griffon vulture (*Gyps himalayensis*), white-backed vulture (*Gyps africanus*), and cape griffon (*Gyps coprotheres*) (Table 1).

Table 2: Conservation Status and Estimated Population of Vultures in Pakistan

Vulture Species	Conservation Status Global-trend	Pakistan	Estimated Population in Pakistan (Year), Trend
1. White-rumped vulture- WRV (<i>Gyps bengalensis</i>)	Critically Endangered-decreasing	CE (2014)	102 (Nagarparker-2015) decreasing, 50 (AJK-2015) unpublished data
2. Indian (Long-billed) vulture-IV (<i>Gyps indicus</i>)	Critically Endangered-decreasing	CE	503 (2015-Nagarparker), decreasing
3. Himalayan Griffon, HG (<i>Gyps himalayensis</i>)	Near Threatened-stable	NT	Stable
4. Griffon (Eurasian) vulture (<i>Gyps fulvus</i>)	Least Concern-Increasing	Endangered (2014)	325 (Nagarparker-2014), Decreasing; 160 (AJK-2015)
5. Red-headed vulture, RHV (<i>Sarcogyps calvus</i>)	Critically Endangered-decreasing	CE	Tharparker-10 (N 2014), Decreasing
6. Egyptian vulture, EV (<i>Neophron percnopterus</i>)	Endangered-decreasing	LC (2013)	584 (Nagarparker-2015), (160 AJK, 2015) unpublished data Increasing
7. Cinereous vulture, CV (<i>Aegypius monachus</i>)	Near Threatened-decreasing	NT (2013)	Decreasing
8. Bearded (Lammergeier) vulture, BV (<i>Gypaetus barbatus</i>)	Near Threatened-decreasing	NT	Decreasing

New World vultures include the turkey vulture (*Cathartes aura*), two species of yellow-headed vulture (*Cathartes melambrotus*, *C. burrovianus*), black vulture (*Coragyps atratus*), king vulture (*Sarcoramphus papa*), Andean condor (*Vultur gryphus*), and California condor (*Gymnogyps californianus*). Most of these are found mainly in Central and South America, though turkey and black vultures range over a fair amount of North America as well. They are classified together in the family Vulturidae (also called Cathartidae), which started out in the order Falconiformes (diurnal raptors, birds of prey that aren't owls), then moved into Ciconiiformes (storks, herons, ibises), and now might become its own order of Cathartiformes.

1.2.2 Distribution of Vultures in Asia and Pakistan

Of the nine vultures found in Asia, Bearded vulture (BV), Cinereous vulture (CV), Egyptian vulture (EV) and Griffon vulture (GV) are

distributed in South Asia, Central Asia, Europe and Africa; Red headed vulture (RHV), Slender billed vulture (SBV) and White-Rumped Vulture (WRV) are distributed in South and South East Asia; and Himalayan Griffon (HG) is distributed in South and Central Asia (Table 3).

Of the nine species of vultures found in Asia, eight species are recorded in Pakistan.

Among the three critically endangered species; WRV is only observed in Sindh, Balochistan, Punjab and AJK provinces, while IV is only found in Sindh, mostly in Karonjhar hills of Tharparker district, and Punjab provinces and RHV only in Sindh province. Three other vulture species, namely CV, EV and GV are also found in the Tharparker area (Firdous et. al. 2016). In Punjab, EV, GV, WRV (Iqbal et al. 2011), and CV, BV, HG, and IV (GoP 2016) were found. In Balochistan, WRV, EV, GV and CV were observed in January 2011 to May 2011 (Iqbal et al. 2011). In Khyber Pakhtunkhwa (KPK), HG and BV were observed

Table 3: Distribution of Vultures in some Asian Countries

Species	Nepal	India	Pakistan	Cambodia	Bangladesh	Laos	Myanmar	Bhutan	Thailand	Viet Nam	Afghanistan	Iran	China	Mongolia	Kazakhstan	Tajikistan
1. White-rumped vulture, WRV (<i>Gyps bengalensis</i>)	P	P	P	P	P	P	P	P	P	P	P	P		A	A	A
2. Indian (Long-billed) vulture, IV (<i>Gyps indicus</i>)	P	P	P	A	A	A	A	A	A	A	P	A		A	A	A
3. Himalayan Griffon, HG (<i>Gyps himalayensis</i>)	P	P	P	P	P	A	P	P	P		P	A	P	P	P	P
4. Griffon (Eurasian) vulture (<i>Gyps fulvus</i>)	P	P	P	A	A	A	A	P	A	A	P	P	P	P	P	P
5. Red-headed vulture, RHV (<i>Sarcogyps calvus</i>)	P	P	P	P	P	P	P	P	P	P	A		P	A	A	A
6. Egyptian vulture, EV (<i>Neophron percnopterus</i>)	P	P	P	A	A	A	A	A	A	A	P	P	A	A	A	P
7. Cinereous vulture, CV (<i>Aegypius monachus</i>)	P	P	P	A	A	A	P	P	A	P	P	P	P	P	P	P
8. Bearded (Lammergeier) vulture, BV (<i>Gypaetus barbatus</i>)	P	P	P	A	A	A	A	P	A	A	P	P	P	P	P	P
9. Slender-billed vulture (<i>Gyps tenuirostris</i>)	P	P	A	P	P	P	P	A	P	P	A	A	A	A	A	A

in Tha-Kot and Pattan areas (Iqbal et al. 2011). In Gilgit-Baltistan, EV, BV and GV have been reported.

1.2.3 Ecology and Breeding Biology

Vultures are obligate scavengers. They inhabit areas in close proximity to villages and open areas (Gillbert et al. 2000; Prakash et al. 2003). They rely on carcasses of domestic animals for food source. Most of the vultures have bald heads and are devoid of feathers. Their keen eyesight helps them to locate the carcasses from a distance.

Egyptian Vulture (*Neophron percnopterus*) typically nests on ledges or in caves on cliffs, crags and rocky outcrops, but occasionally also in large trees, buildings, electricity pylons and exceptionally on the ground. They forage in lowland and mountain regions over open, often arid country and also scavenge in human settlements. Their presence has been recorded in Punjab, Balochistan, Sindh and southern parts of

KP. Their nests have been found in 3 pockets in 16 sq. Km. area in the AJK area (SAVE 2015).

Griffon (Eurasian) Vulture (*Gyps fulvus*) is a species that is found to inhabit expansive open areas in a wide range of environments, from mountains to semi-arid areas, and their sightings are recorded regularly from areas around sea level up to about 3,000 m. Some birds are migratory, although many others are resident or nomadic. The nest is usually built on a rocky outcrop, with sheltered ledges or small caves preferred. (BLI 2015). It was found that the carcasses of domestic poultry were their primary food source in Mithi bypass area in Sindh Province (Firdous et al. 2016).

White Rumped Vultures (*Gyps bengalensis*) are found mostly in the plains. They are found in light woodland, villages, cities, and open areas and seen feeding on carrion. They have been found to roost communally and feed in large numbers. They are social characteristic and usually found in conspecific flocks. They breed in colonies in tall trees, often near human habitation. A growing

breeding population of WRV indicates the strong colonial tendencies in Nagarparker area of Tharparkar district, Sindh (Murn et al.2014). The tight nest-clustering characteristics favored by WBV demands a relatively small number of nests per tree if the available trees are of a suitable size, structure and spatial pattern. This suggests that an optimum level of nest tree clustering exists to support a range of colony sizes and nest densities in Nagarparker area (Murn et al.2014) and also advocates the need for conservation of nesting trees with the support of local people. The main breeding season of the WBV in Nagarpakar is from January to April (Murn et al.2014). Their populations are found in Sindh, Punjab, and Azad Jammu and Kashmir. Nesting colonies of WRV are recorded in Nagarparker area in Tharparkar district (SAVE 2014).

Red Headed Vulture (*Sarcogyps calvus*) frequents open country usually away from human habitation, well-wooded hills and dry deciduous forests with rivers, usually below 2,500 m.

Nesting sites of these birds have been recorded in tall trees. It is vagrant to Pakistan (Sindh) though native to neighboring countries like China; India; Nepal, etc. It was previously regularly sighted but now is uncommon. In 2015, vulture breeding and two nests were reported in Tharparkar, while in 2016 three nests were also reported (Firdous et al. 2016).

Cinereous Vulture (*Aegypius monachus*) inhabits forested areas in hills and mountains in Asia, where it occupies scrub and arid and semi-arid alpine steppe and grasslands up to 4,500m. It forages over many kinds of open terrain, including forest, bare mountains, steppe and open grasslands. Nests are built in trees or on rocks. It has been sighted in Sindh and Northern Pakistan (BLI 2013). Its diet consists mainly of carrion from medium-sized or large mammal carcasses, although snakes and insects have been recorded as food sources. It appears that breeding populations are more or less stable (Birdlife International 2016) where it is described



as scarce, although fluctuations in distribution and breeding success occur.

Indian (long-billed) Vulture (*Gyps indicus*) is found in cities, towns and villages near cultivated areas, and in open and wooded areas. This species feeds almost entirely on carrion, and often associates with WRV *Gyps bengalensis* when scavenging at rubbish dumps and slaughterhouses. Nesting colonies of IV are found in Karoonjhar hills, Sindh.

Himalayan Griffon (*Gyps himalayensis*) inhabits mountainous areas, mostly at 1,200- 4,500 m, but has been recorded up to 6,000 m (Ferguson-Lees and Christie 2006). In winter it moves lower down, with juveniles wandering into the plains.

Bearded (Lammergeier) Vulture (*Gypaetus barbatus*) is resident where it occurs, but has vast home ranges, and juveniles will wander even more widely than adults (Ferguson-Lees and Christie 2001). It occupies remote, mountainous areas, with precipitous terrain, usually above

1,000 m, and in particular areas where large predators such as wolves and Golden Eagles are present, and there are herds of mammals such as mountain goats, ibex, and sheep. The species forage over vast distances (up to 700 km in one day has been recorded), using a soaring flight, feeding on mainly carrion.

1.2.4 Status and Trends

Sindh Province: About 503 IV (*Gyps indicus*) were estimated in Karoonjhar hills of Tharparkar district (Table 4). About 103 individuals of WRV were reported from Nagarparker area of Tharparkar district. 584 EV were recorded in Nagarparker in 2015 (WWF Pakistan 2015) (unpublished data) and in Mithi bypass area alone, about 150 EV were recorded (Firdous et. al. 2016).

The maximum roost count found was of 145 birds in two sites with approximate age proportions of 60% adults, 14% sub-adults and 25% juveniles and estimated population of 180 individuals in Nagarparker area of Tharparkar

Table 4: Status of Vultures in some Asian Countries

Species	Nepal	India	Pakistan	Cambodia	Bangladesh	Myanmar
1. White-rumped vulture, WRV (<i>Gyps bengalensis</i>)	1000-2000	Declined	102 (NP) De., 50 (AJK-2015)	171	260	62
2. Indian (Long-billed) vulture, IV (<i>Gyps indicus</i>)	Unknown		503 (2015-NP), De.			
3. Himalayan Griffon, HG (<i>Gyps himalayensis</i>)	<100000		89 Stable in the range states			
4. Griffon (Eurasian) vulture (<i>Gyps fulvus</i>)	Unknown		325 (NP-2014), De.; 160 (AJK-2015)			
5. Red-headed vulture, RHV (<i>Sarcogyps calvus</i>)	200-400	10000	NP-10 (N2014), De.			
6. Egyptian vulture, EV (<i>Neophron percnopterus</i>)	300-1000		584 (2015) (160 AJK.2015)			
7. Cinereous vulture, CV (<i>Aegypius monachus</i>)	Unknown		Decreasing			
8. Bearded (Lammergeier) vulture, BV (<i>Gypaetus barbatus</i>)	<500		Decreasing			
9. Slender-billed vulture (<i>Gyps tenuirostris</i>)	50-75			51		21

district (Murn et al.2014). Murn et at. (2014) showed increase of the White backed vulture roost count of 39 birds in 2011 to 145 birds, more than three times increase in 3 years.

In Punjab, a total of 51 EV, 61 GV and only four WRV were observed in December 2010 to April 2011 (Iqbal et al. 2011).

In Balochistan, a total of 47 EV, 08 GV and only four CV were observed in January 2011 to May 2011 (Iqbal et al. 2011).

In Khyber Pakhtunkhwa (KPK), a total of 25 HG were observed only from February 22, 2011 to May 15, 2011 from Tha-Kot and Pattan areas (Iqbal et al. 2011).

In AJK, EV population was around 160 individuals in 2015 (WWF Pakistan 2015) but was only 68 in 2013. WRV population was around 60 individuals in 2015 (WWF Pakistan 2015) which was only around 30 in 2013 (SAVE 2015).

A total of 43 WRV, 55 LBV, 457 EV (*Neophron percnopterus*), 167 GV (*Gyps fulvus*), 03 RHV (*Sarcogyps calvus*), 07 CV (*Aegypius monachus*), and 89 HG (*Gyps himalayensis*) were observed covering about 77 sites across Pakistan including protected areas, irrigated plantations, etc. (WWF Pakistan 2011).

1.2.5 Assessment of Threats

i. NSAIDs: The use of a pain killer (non-steroidal anti-inflammatory drug) for treating livestock containing “Diclofenac Sodium” has been identified as the main cause of recent decline in vulture populations. Continuous use of diclofenac has declined, but it has not been eliminated yet. The 2016 survey in 11 villages of Nagarparkar Taluka indicated diclofenac to pose the largest threat (32%) (Firdous et. al. 2016). 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. Both Voren and Voltaren contain diclofenac sodium as an ingredient which is freely available in the markets of Pakistan. As both contain diclofenac sodium, they are toxic to vultures. These freely available NSAIDs need to be restricted for veterinary use. The veterinary use of other NSAIDs (Ketoprofen aceclofenac, flunixin and Nimesulide) known to be toxic to *Gyps* vultures is legal and has increased. Another NSAID, also in legal use, which may be harmful to vultures, is Nimesulide (Cuthbert et al. 2016). These NSAIDs are likely to be metabolized into diclofenac after being administered to cattle, and are beginning to be used. They are likely to kill vultures that feed on contaminated carcasses.

ii. Poisoning: 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.

iii. Food Security: The other contributing factor to the loss of vultures is the availability of food in the form of carcasses. Due to improved animal husbandry, livestock mortality has been reduced. Moreover, the shortage of food for vultures due to removal of carcasses by traders in some areas of Tharparkar has been reported. The survey conducted in Tharparkar

area has revealed that 90% of the time, the dead livestock carcasses were thrown away, in 8% of the cases villagers buried their carcasses and only 2% of them handed over to skimmers (Firdous et al. 2016). 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.

- iv. Habitat loss: In some areas, the sparse remaining populations of vultures are threatened by loss or disturbance of nest sites through tree-felling or development (SAVE 2014), for fodder and fuel wood need in dry period (April-June). The forests are like small islands in rapidly growing population, and logging, timber theft, fuel wood, grazing indirectly increases pressure on vulture habitat (GoP/MCC 2015).
- v. Coordination, regulatory and monitoring mechanism: 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. Monitoring and enforcement of banned drugs and misuse of human use diclofenac for livestock treatment are the other areas of concern.

1.2.6 Ecological and Socio-Cultural Importance of Vultures

Ecological Importance:

The vultures are the largest scavengers for removing carrion and reduction in their numbers has caused the malfunction of ecological equilibrium and increase in the number of putrefying bodies which may become a site of nutrition for disease carrying vectors (Prakash et al. 2003). It leads the other scavengers to dead animals (Sekercioglu 2006) and also acts as a source of sanitation by scavenging the dead bodies. Because of the continuous reduction in

vulture population and a consequent increase in feral dogs, the disease risk for humans and animals associated with it has also increased. In India, an increased number of feral dogs is observed with increasing cases of rabies. Of the reported 60,000 rabies cases by the World Health Organization, 50% occur in India alone. Because of the decline in vulture species, the food resource available to dogs has increased since the 1990's causing a significant increase in the number of dog species in the absence of inter-species competition. The Asian Vulture crisis has resulted in an increase in feral dog population which is the major consumer of carcasses in urban areas in India (Markandya et al. 2008) and the main reservoir of diseases such as rabies (Sudarshan et al. 2007). The number of feral dogs has increased from 60 to 1200 over the time span of nine years recorded from 1992 to 2001 over a carcass dump site (Prakash et al. 2003). The growth in feral dog numbers in absence of sufficient vulture populations will contribute to the risks associated with rabies transmission where it is estimated to have added \$34 billion to healthcare costs in India between 1993 and 2006 (Markandya et al. 2008). Vultures also freely dispose off organic waste in towns. EV, for example, consumed up to 22% of annual waste in towns on Socotra off the Horn of Africa (Gangoso et al. 2013).

The environment cleaning incurs huge costs to villages, towns, municipalities and protection of vultures can support expedited cleaning service provided by nature.

South Asian vultures have developed some dynamic bodily functions such as urinating which will kill the bacteria on their legs which come in contact with the carcasses while feeding (Liyas 2014). They have ability to detoxify the bacterial matter of the carcasses and decomposing bodies. The digestive serums of a vulture's stomach rate 1 on the pH scale which not only kills bacteria but also the most resistant spores hence rendering them ineffective in causing infection (Houston and Cooper 1975). Vultures

are bio-monitors or bio-indicators as small changes in the environment may bring drastic changes to their population sizes.

Based on the recommendations of the South Asian Regional Steering Committee (RSC) for Vulture Conservation, IUCN has recently completed a study on valuating the scavenging services that were provided by vultures. The study valued the scavenging services provided by vultures, and concluded that it makes financial sense to invest in captive breeding and release vultures in the wild (augmenting their wild population and specifically in Vulture Safe Zones or wilderness landscapes that are devoid of the harmful NSAID drugs) for their scavenging services, as compared to replacing these services with technological solutions as provided by the state. The study reported that the value of a single vulture is anywhere between PKR 2,491,208 (USD 23,763) and PKR 10,93,931 (USD 10,434) based only on their scavenging role in an ecosystem.

Socio-economic Importance: The vulture is a socially accepted bird in Pakistan. It does not have any negative connotation and the local communities support it by providing trees for nesting and breeding in Nagarparker area, and in rest of the country these birds are treated at the same level. A perception survey of a small area was conducted in 2015-16. The survey which included 108 people in 11 villages in Tharparkar district, (49%) identified that the vulture played an important role in removing carcasses, (30%) people referred to the role of vultures to protect humans from disease whereas (20%) people attached religious value to vultures (Firdous et al. 2016).

There is recognition that the dead carcasses will be consumed by vultures and this is the reason that most of the villagers do not hand them over to skinners for money (Firdous et al. 2016). Therefore, the Vulture is being clearly valued as a unique scavenger bird that removes dead and rotting carcasses from the areas around human

settlements and thus provides a vital ecosystem service.

Vultures are also special due to their spiritual, cultural and historical significance. Zoroastrianism is one religion that gives importance to vultures in their rituals. Zoroastrians or Parsis leave the corpses of the dead in Towers of Silence to be consumed by vultures. However, the use of Diclofenac resulting in significant decline of vulture populations has led to followers of this faith starting to cremate the dead (Prakash et al. 2003).

1.3 Conservation Measures Across the Asia Region

SAVE: Saving Asia's Vultures from Extinction (SAVE, Estb. 2011), a consortium of eleven organizations with established expertise in vulture conservation, is coordinating to prevent the extinction of *Gyps* vultures in South Asia. After the identification of NSAIDs as the primary cause of vulture declines in South Asia, conservation efforts including the ban of veterinary diclofenac (Pain et al. 2008), the establishment of conservation breeding centers (Murn et al. 2008; Bowden et al. 2012), the identification of safe alternative veterinary drugs (Swarup et al. 2007), efforts to remove diclofenac from the environment (Swan et al. 2006; Cuthbert et al. 2011) and the establishment of Vulture Safe Zones (Chaudhary et al. 2012) were carried out. Evidence shows that these conservation efforts are beginning to be successful, with residues of diclofenac in livestock carcasses having fallen in some areas (Cuthbert et al. 2011) resulting in the slowing of the rate of population decline for WRV, and reversing IV decline (Prakash et al. 2012; Chaudhry et al. 2012).

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 (SAVE 2014).

Activities including 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 have been conducted so far.

1.3.1 India

To achieve the removal from the market of vials of diclofenac supposedly intended for human medicine in excess of 3 ml capacity, ban has been imposed (Gazetted ban on July 17, 2015) on human diclofenac injectable formulations in packaging larger than 3 ml vials.

To achieve the banning of the veterinary use of Ketoprofen, Tamil Nadu Animal Husbandry department (September 2015) successfully stopped all government supply of Ketoprofen to veterinary officers, and for the three districts (which have small vulture populations), immediate instructions were issued by the Animal Husbandry Director to strictly stop all use of Ketoprofen and return existing stocks to headquarters.



Conservation breeding of WRV, LBV and SBV at VCBC Pinjore is successful and has 214 vultures including 107 Long-billed Vultures, 76 White-backed Vultures, 29 Slender-billed Vultures and two Himalayan Griffons. 39 nestlings including 14 White-backed vultures, 21 Long-billed vultures and 4 Slender-billed vultures hatched and successfully fledged which is the highest number of nestlings fledged in a year recorded so far.

Conservation breeding of WRV, LBV and SBV at VCBC Rajabhatkhawa is progressing and has 108 vultures including 71 White-backed Vultures, 21 Long-billed Vultures and 16 Slender-billed Vultures. Conservation breeding of WRV and SBV at VCBC Rani is progressing well with 45 White-backed and 35 Slender-billed vultures.

Conservation breeding of WRV at VCBC Bhopal is in its second year and housed there are 7 White-backed vultures (shifted from Pinjore) and 13 Long-billed vultures.

Bombay Natural History Society (BNHS) and the Royal Society for the Protection of Birds (RSPB) are currently working in pVSZs in Assam, Central Gujarat, Southern Gujarat, Uttar Pradesh and Madhya Pradesh for LBV. Madhya Pradesh VSZ is now confirmed as encompassing a breeding area for LBV. Capacity building, nest monitoring, and pharmacy surveys have been conducted. Project by BNHS and Forest department is working for the establishment of Vulture Safe Zone in Bundelkhand, Madhya Pradesh.

Availability of diclofenac in pharmacies in some Indian pVSZs (i.e. Gujarat and Assam) is low, and it is hoped that the recent multi-dose ban will reduce prevalence markedly. An encouraging aspect in the maintenance and review of VSZs in India is that more engagement and adherence to VSZ guidelines by NGOs and state Governments outside the earlier SAVE network is leading to a wider effect of these initiatives.

The first pre-release aviary has been constructed next to the Vulture Conservation Breeding Center,

Pinjore as a first step to transfers of captive-bred vultures to holding aviaries in VSZs. Overt and covert pharmacy surveys continue in pVSZs in India. Diclofenac was extracted from live cattle samples collected for tissue analysis in India.

1.3.2 Nepal

For the conservation of vultures in Nepal, both in-situ and ex-situ conservation has been practiced. The Government of Nepal banned production and use of veterinary diclofenac in 2006; prepared and implemented the Vulture Conservation Action Plan for Nepal (2009-13); and prepared the Vulture Conservation Action Plan for Nepal (2015-19), which is in implementation phase (DNPWC, 2015). Bird Conservation Nepal and Royal Society for the Protection of Birds, UK initiated an integrated approach for the conservation of vultures, which involves advocacy, education, monitoring, research, captive breeding, supplementary feeding and site protection to help for the implementation of Vulture Conservation Action Plans. In 2008, a Vulture Conservation Breeding Center was established in Chitwan National Park. Conservation breeding of WRV at Vulture Conservation Breeding Center, Chitwan is progressing satisfactorily with 57 vultures (including juvenile birds). Juvenile vulture hatched in 2015 is doing well. Bird Conservation Nepal and Royal Society for the Protection of Birds, UK pioneered the idea of Vulture Safe Zone, working with local communities to establish Diclofenac-Free Districts (DFD) and community managed Vulture Safe Feeding Sites (VSFS) (Paudel et al. in press). The provisional Vulture Safe Zone in Nepal covers more than half of the country with essentially no diclofenac available. In response, vulture populations are stable and nest numbers are likely to be increasing (Paudel et al. in press).

1.3.3 Bangladesh

The multi-dose human diclofenac is not produced or used for veterinary purpose in Bangladesh. Bangladesh National Vulture Recovery Committee (BNVRC) has circulated letter to Ministry of Home

Affairs requesting to take necessary actions against illegal drug entering in Bangladesh from India. Awareness activities and campaigns are ongoing to raise awareness among people not to use human diclofenac for veterinary use.

Bangladesh National Vulture Recovery Committee has led the banning process of Ketoprofen through a formal letter sent to the Ministry of Environment and Forests and other relevant ministries of the Government and formal banning is under process.

Another initiative is to improve the availability of more effective meloxicam formulations, thereby facilitating take up by veterinary practitioners. Two drug companies, RENATA Limited and ACME Limited, have already shown their interest and commitment towards vulture conservation. Both companies produce harmful drugs for vultures and they are interested to produce 'good' meloxicam if they get the formulation details.

The population survey of vultures has been carried out in 26 districts through field survey (22 districts), and a total of 260 individual vultures were recorded.

Conservation breeding of WRV in Bangladesh is in preliminary stage. There are 39 vultures (4 White-rumped vultures, 33 Himalayan Griffon vultures and 2 Cinereous vultures) present in different zoos and safari parks of Bangladesh. Small-scale steps are being taken for conservation breeding in Bangabandhu Safari Park and Dhaka Zoo.

Bangladesh government has declared two Vulture Safe Zones (VSZs) on December 23, 2014 by gazette notification. Under the Wildlife (Conservation and Security) Act, 2012, they have been declared as specialized 'landscape zones' recognized within the Wildlife Act. These VSZs share a boundary with India. For its management, a three-tiered institutional mechanism, which includes already formed RSC (Regional Steering Committee), BNVRC (Bangladesh National Vulture

Recovery Committee) and local level conservation team named as Vulture Conservation Team (VCT), has been set up. White-rumped Vulture Conservation in Bangladesh Project in collaboration with Bangladesh Forest Department has formed six Village VCTs in different areas. Vulture Feeding Station in Rema-Kalenga Wildlife Sanctuary and Safe Food Supply to Vultures has been constructed. Awareness campaign, awareness material distribution, celebration of vulture conservation day, conservation plantation, and interaction with veterinarians are in progress.

The undercover pharmacy survey of 235 pharmacies was carried out at the local drug stores in 22 districts (out of 64 districts) during April-September 2014. Population and nesting surveys of vultures continue in pVSZs. Monitoring of White-rumped vulture population was carried out in 2014 and 2015 in Rema-Kalenga Wildlife Sanctuary by VCT members.

1.3.4 Cambodia

Two main project sites, Western Siem Pang and Preah Vihear Protected Forest have been providing supplementary food (vulture restaurant) more than once per month due to the high number of vultures and low density of natural carcasses available in the forest. These two main sites support the highest number of nests found in each year. Census of vulture restaurant is conducted five times a year. Nesting areas are safeguarded from logging by law enforcement. Vulture nests are protected from human predation through regular monitoring in nesting season. Monitoring of veterinary drug sales through household and pharmacy in the seven project sites was conducted in January 2015. Survey across target project areas was conducted to detect and receive information of any incidental poisoning and take intervention on time to raise awareness on the effect of using poisoning drugs to kill birds and wildlife. To increase sustainability of Cambodian Vulture Conservation Project, two universities - Panasastra University of Cambodia



and Royal University of Phnom Penh - and one local organization, Sam Veasna Center have played an important role to support and assist in project activities including student support for ground survey, thesis research, integrated experience and knowledge into university capacity building program and promote ecotourism to support vulture restaurant activities.

1.3.5 Pakistan

Pakistan has given priority to biodiversity conservation by establishing protected area (PA) network. As of 2015, Pakistan has declared 29 protected areas, 22 of these are under supervision of respective provincial governments and remaining are in private care (Ankara University 2010). Pakistan has more than 670 species of birds, of which one third are water birds, with most of these being migratory species.

Government of Pakistan is protecting the vultures and their remaining populations by giving highest priority to prevent its decline. A ban on veterinary use of diclofenac has been imposed in 2006 (Annex III). In 2012, Ministry of Climate Change, Government of Pakistan formed National Vulture Recovery Committee (NVRC) to improve coordination on conservation and protection of vultures and fast track and improve the initiatives and provide support to national and regional level conservation efforts.

Ministry of Climate Change, Sindh Wildlife, Punjab Wildlife, IUCN Pakistan, and WWF Pakistan are actively engaged in collaboration at regional level, such as saving south Asian vultures from extinction (SAVE). WWF Pakistan is working in vulture conservation in Sindh and Punjab. IUCN Pakistan and Baanhn Beli have started to work in vulture conservation recently, focusing on Vulture Core Zone in Sindh.

WWF-Pakistan has established a breeding facility in Changa Manga Forest, roughly 80 km southwest of Lahore, Punjab on a land provided by Punjab Wildlife and Parks Department, Government of Pakistan. This facility has the capacity to hold 30 birds, is 38 m long and increases in width from 14 m to 27.5 m. The aviary contains live tree perches with roosting and nesting ledges, which also provides shade and shelter for birds. Four breeding aviaries were added in 2009. In 2007, 11 vultures were brought into the center; five were collected as chicks from nests during the 2005/2006 breeding season, one collected during the 2006/2007 season. The remaining five are older remainders of the captive population used during diclofenac toxicity testing work by the Peregrine Fund (Oaks et al. 2004). They hatched during the 2002/2003 breeding season. All birds have identification rings and microchip implants (Murn et al. 2008). In 2015, clutch size of 3 eggs was hatched but the chicks did not survive. Currently there are 15 adult vultures in the Changa Manga center.

Vulture Conservation in Nagarparker area includes conservation actions and social development of community. A vulture safe zone has been demarcated by WWF Pakistan in Nagarparker area. Baanhn Beli and IUCN Pakistan have jointly launched “National Vulture Conservation Strategy Project” in order to fast track the conservation activities and develop national level policy document on vulture conservation and mobilized communities in vulture safe zone by forming Vulture Friendly Groups (VFGs) for monitoring and conservation of vultures. Main activities include veterinary care, undercover survey and livestock management in vulture safe zone. Continued awareness and capacity building activities are being carried out for different groups, including media, communities, stakeholders, partners, implementers and managers. In addition, regular monitoring of remaining populations of vulture species is being carried out for recording their numbers and nests.

Large vials of human diclofenac are not marketed in Pakistan. Dialogue has been initiated with representatives of Drug Regulatory Authority of Pakistan (DRAP) to ban other harmful drugs. DRAP has agreed to ban other harmful drugs on provision of sufficient scientific evidences in the form of dossiers to DRAP. IUCN Pakistan is closely coordinating with Regional Vulture Recovery Committee, SAVE and RSPB for developing these dossiers.

The amended Drugs Act, 1976 for Punjab province has made it mandatory by law for the drug manufacturer to specify on labeling that the drug is intended for human use only.

To improve the availability of more effective meloxicam formulations, thereby facilitating take up by veterinary practitioners, testing samples of six different meloxicam formulations from Pakistan in the UK have shown high pH levels and osmolarity that needed improvement. ICI-Pakistan, has taken steps to improve the formulation of meloxicam in its product named ‘Melonac’. This has improved the formulation. Samples from other meloxicam producing companies including Leads Pharma, SJ & G Fazul Ellahie, Selmore Pharma, Star Labs and Breeze Pharma were also sent to the UK for testing. These will be approached to improve their meloxicam formulations as well, using the example of ICI-Pakistan.

Conservation efforts are continuing in the VSZ such as *Gyps* population assessment, improving the community based livestock management practices for reducing mortality and supporting livestock welfare through improved livelihoods, while providing vultures safe NSAIDs and enhancing awareness amongst the school children and women regarding the importance of vultures. Livestock Assessment surveys, stakeholder workshops and focused group discussions were conducted in the villages around the *Gyps* vulture colonies. Meetings were also conducted with local veterinarians from

different villages to understand the prevalent diseases in the area. Awareness raising sessions and trainings were conducted along with veterinary camps. Undercover surveys of the veterinary stores in the Sindh province as well as AJK were carried out earlier this year to check the availability of NSAIDs in 2015. The survey was conducted at Nagar Parkar in 2014 and 2015. A survey of six districts was carried out in Azad Jammu & Kashmir region of Pakistan in 2014 & 2015.

1.4 Review of National Biodiversity Legislation

Pakistan National Biodiversity Strategy and Action Plan (NBSAP) 2015

NBSAP has a provision to designate representative forest areas of special importance for biodiversity as Forest Biodiversity Reserves and effectively manage them by integrating them with the wider landscapes.

There has not been a comprehensive national assessment of biodiversity, its status, and trends in Pakistan, and some efforts have been made to conserve the species that are threatened with extinction.

Strategies proposed include, among others, improved knowledge relating to biodiversity, its values, functioning, status and trends and improving conservation status of known threatened species. These strategies and actions have a clear mandate for threatened faunal

species and vultures could be a candidate species for these recovery plans on the basis of the severe decline this species has faced in the last two decades. The creation of national parks in Nagar Parkar area and integration of landscape management along with India in Sindh and Punjab provinces are within the framework of NBSAP. The provincial Biodiversity Strategies and Action Plans also include measures for protection and conservation of endangered species, including vultures.

Provincial Legislation

In the Khyber Pakhtunkhwa Wildlife and Biodiversity Act, 2015 vultures are placed in the third schedule as Protected Animals which shall neither be hunted nor possessed. Unlawful hunting of vultures may result in penalization with a minimum of Rs.10, 000 - 45,000 fine or two weeks to two years imprisonment or both; plus the value of wild animal or property or one-two months imprisonment in lieu thereof.

In the Sindh Wildlife Protection Ordinance 1972, the species has been declared "Protected" (Not allowed for hunting) and is listed in the Schedule II of Sindh Wildlife Protection Ordinance 1972. Seventeen species of mammals have been declared protected whereas 12 families of birds, including vultures, have been declared protected.

Vultures are listed as protected animals under the third schedule of provincial wildlife legislation of Punjab, Balochistan, Azad Jammu and Kashmir and Northern Areas.



SECTION 2:

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OBJECTIVE AND ACTION PLAN

2.1 Goal

Restore viable wild populations of all species of vultures in Pakistan.

2.2 Objectives

- To strengthen the conservation of vultures in the wild and captivity.
- To save vultures from the effect of NSAIDs and other toxic compounds.

2.3 Priority Actions

2.3.1 Nation-wide Population Assessment

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
Status of vultures is not known and not updated periodically	Devise periodic survey and monitoring in all the vulture bearing provinces	Conduct national vulture survey periodically for vulture species in all potential provinces.	H	✓	✓	Wildlife departments, Zoological Survey of Pakistan, INGOs/NGOs
		Monitor wild vulture population & breeding success	H	✓	✓	Wildlife departments, Zoological Survey of Pakistan, INGOs/NGOs

2.3.2 Policy and Legal Frameworks

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility	
Weak implementation of the ban on diclofenac and regulation of other harmful NSAIDs	Establish ban on NSAIDs such as diclofenac vials of 3 ml+ capacity, Ketoprofen & Aceclofenac	Regulate human use diclofenac vials of 3 ml+ capacity, e.g. Propose & establish restriction	H	✓		Ministry of Climate Change, Ministry of Health, DRAP	
		Impose ban on veterinary use of Ketoprofen, Aceclofenac, Flunixin and Nimesulide	H	✓		MoCC, MoH, DRA, (NGOs)	
		Sharing information on the veterinary manufacturers of Aceclofenac, Ketoprofen, Flunixin and Nimesulide					
		Ensure Monitoring and enforcement of ban through wildlife and livestock departments and by visiting dispensaries in different cities/regions	H	✓	✓	Wildlife department and Livestock Department, DRA	
		Ensure availability of cheap and safe alternate drugs for veterinary use. Improve formulation/potency of Meloxicam	H	✓	✓	Ministry of Health and Drug Regulation Authority (DRAP) plus Pharma companies	
		Facilitate through MoCC for an effective system of regulation of veterinary drugs by Ministry of Health, based upon safety-testing on vultures initiated and underway for all current painkillers (NSAIDs) and for all potential new ones entering veterinary practice	M	✓	✓	MoCC, MoH,	
Diclofenac prepared for human use is being used by vet practitioners	Control the misuse of human diclofenac in veterinary use	Work for label “only for human use” on diclofenac vials.	H	✓		MoH and Drug Regulation Authority	
		Improve the availability of meloxicam formulations on cheap rates to facilitate better take up by veterinary practitioners	H	✓	✓	MoH and Drug Regulation Authority & Pharma Companies	

2.3.3 Ex-situ Conservation

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
Captive breeding is not fully successful to produce expected hatchlings	Strengthen conservation breeding of <i>Gyps</i> vultures in Pakistan	Maintain captive population of vultures	H	✓	✓	Wildlife Departments, INGOs/NGOs
		Enhance capacity of wildlife departments in vulture breeding through learning from successful breeding experiences from neighboring countries	H	✓	✓	Wildlife Departments, INGOs/NGOs
		Incorporate learning experience for breeding in Changa Manga and other such potential areas	H	✓		Wildlife Departments, INGOs/NGOs
		Establish Vulture Conservation and Breeding Center in Tharparkar area	M	✓		Sindh Wildlife Department, INGOs/NGOs
		Share the findings of potential VCBC to Regional Vulture Recovery Committee and other stakeholders and finally to national vulture recovery committee.	M	✓	✓	Wildlife Departments, INGOs/NGOs
		Prepare VCBC Management guideline	M	✓		Wildlife Departments, INGOs/NGOs

2.3.4 In-situ Conservation (including Vulture Safe Zones)

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
Vulture nesting trees and habitats are not properly protected	Strengthen protection of vultures habitats	Recognize the nest trees and create incentives for protection of trees locally for breeding season	H	✓	✓	Wildlife Departments, Forest Departments, Local Governments, INGOs/NGOs
		Support rangeland improvement program in Tharparkar area	M	✓	✓	Sindh Forest Department, INGOs/NGOs
		Continue support on digging wells/Tarai/Small Dams to support to improve fodder crops and water for livestock	H	✓	✓	Irrigation Departments, Local Governments, INGOs/NGOs
		Establish a rescue center for vultures and laboratories	H	✓	✓	Wildlife Departments and Veterinary Departments, INGOs/NGOs
Weak implementation of vulture conservation activities in VSZ	Identify potential proposed Vulture Safe Zone while maintaining existing Vulture Safe Zone	Maintain, review and notification of VSZ in Tharparkar area	H	✓	✓	Sindh Forest and Wildlife and MoCC Departments, Livestock Department, Health Department, Irrigation Department, Local Department, INGOs/NGOs
		Facilitate guarding breeding sites of vultures during the breeding season in Vulture Safe Zone	H	✓	✓	Sindh Wildlife Department, INGOs/NGOs
		Avoid disturbance to vultures during breeding season in Vulture Safe Zone in Tharparkar	H	✓	✓	Sindh Wildlife Department, INGOs/NGOs
		Assess potential of proposed VSZ in AJK and in other provinces and notification of pVSZs and management of the same	H	✓		Wildlife Departments and Zoological Survey of Pakistan, MoCC INGOs/NGOs
		Assess proposed extension of VSZ towards Umarkot district	H	✓		Sindh Wildlife Department, Zoological Survey of Pakistan, INGOs/NGOs
		Livestock Management & Husbandry training in proposed VSZs	M	✓		Livestock departments, INGOs/NGOs
		Free veterinary camps (Deworming)	M	✓	✓	Livestock departments and INGOs/NGOs

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
		Assess the VSZ parameters and provide the information for the processing of extension of existing VSZ to Umarkot district through NVRC	H	✓	✓	Sindh Wildlife Department, Zoological Survey of Pakistan, INGOs/NGOs
		Introduce community-led vulture based ecotourism	M	✓	✓	Wildlife Departments, Tourism Departments, INGOs/NGOs and Private Sector
		Partner with district level institutions and get support from elected representatives for the management in Vulture Safe Zones	H	✓	✓	District line Departments, Elected representatives NGOs/INGOs
Establishment of Alternate VSZ	Facilitate the implementation of additional VSZ	Identify vulture safe feeding sites for drier periods/emergencies (Food scarcity and other possible threats including toxins, disturbances & habitat degradation)	M	✓		Wildlife Departments, Local Governments, INGOs/NGOs, Livestock Department, Local Government
		Release captive bred WRV in VSZ	M		✓	Wildlife Departments, INGOs/NGOs
		Potential VSZ needs to be identified	H		✓	Wildlife Departments, ZSP, INGOs/NGOs

Supporting Activities

2.3.5 Research and Monitoring						
Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
Causes of death of vultures are not known	Monitor cause of death & NSAID contamination in wild vultures	Monitoring cause of death & NSAID contamination of wild vultures	H	✓	✓	Livestock and Veterinary Departments, Wildlife Departments, ZSP Drug Regulatory Authority, Poultry Research Institute, Academia, INGOs/NGOs
		Investigate factors affecting use of vulture safe NSAIDs by veterinarians, para-vets, and livestock owners	H	✓		Livestock and Veterinary Departments, Wildlife Departments, Drug Regulatory Authority, Poultry Research Institute, Academia, INGOs/NGOs
NSAIDs harmful to vultures are still available in the market	Regularly monitor the availability of NSAIDs in Pakistan	Monitor availability of NSAIDs for veterinary use in pharmacies & other outlets	H	✓		Livestock and Veterinary Departments, Wildlife Departments, Drug Regulatory Authority, Poultry Research Institute, Academia, INGOs/NGOs
		Assess the risks and effects on adult WRV mortality (such as NSAID poisoning)	H	✓	✓	Livestock and Veterinary Departments, Wildlife Departments, Drug Regulatory Authority, Poultry Research Institute, Academia, INGOs/NGOs
Effective implementation of ban on diclofenac is weak		Complete removal of veterinary use of diclofenac and other harmful non-steroidal anti-inflammatory drugs from the environment	H	✓	✓	Livestock and Veterinary Departments, Wildlife Departments, Drug Regulatory Authority, Poultry Research Institute, Academia, INGOs/NGOs

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
		Assess residual quantities of diclofenac remaining in livestock carcasses and their threat to vultures	H	✓	✓	Livestock and Veterinary Departments, Wildlife Departments, Drug Regulatory Authority, Poultry Research Institute, Academia, INGOs/NGOs
Long-term research to understand ecological aspect of vultures is limited	Conduct research and monitoring on ecology aspect of vultures	Study the seasonal movement of vultures including trans-boundary areas by tagging at least one individual per species	M	✓	✓	Zoological Survey of Pakistan, Wildlife Departments, Academia, INGOs/NGOs
		Conduct ecological studies of vultures in safe zone areas and interaction with humans including breeding success, dispersal and determining the impact of mortality on existing population	M	✓	✓	Zoological Survey of Pakistan, Wildlife Departments, Academia, INGOs/NGOs
		Initiate vulture expert groups involving professionals	M	✓	✓	Zoological Survey of Pakistan, Wildlife Departments, Academia, INGOs/NGOs
		Establish biodiversity data resource center encompassing vulture section along with Vulture Conservation and Breeding Center at other identified sites	L	✓		Zoological Survey of Pakistan, Wildlife Departments, Academia, INGOs/NGOs
		Study the range management system in Tharparkar area to facilitate improvement of the status of rangelands	M	✓		Forest Department, Agriculture Department, Sindh Wildlife Department, Academia, SAZDA, INGOs/NGOs
		Study on immigrant WRV for its long-term conservation and survival	M	✓		Wildlife Departments Academia, Zoological Survey of Pakistan INGOs/NGOs
		Monitor WRV colony in Nagarparker area to determine breeding success	H	✓	✓	Sindh Wildlife Department, Zoological Survey of Pakistan Academia, INGOs/NGOs
		Assess dispersal behavior of WRV from Nagarparker area to adjacent areas	M	✓	✓	Sindh Wildlife Department, Zoological Survey of Pakistan Academia, INGOs/NGOs

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
		Assess the effectiveness of Vulture Safe Zone against the risks to vultures from diclofenac	H	✓	✓	Sindh Wildlife Department, Zoological Survey of Pakistan Academia, INGOs/NGOs
Ecosystem services provided by vultures to society are not valued	Evaluation of potential ecosystem services provided by vultures	Estimation of the former & potential future value of the ecosystem services by wild vultures	H	✓		Sindh Wildlife Department, Zoological Survey of Pakistan Academia, INGOs/NGOs
		Compare the ecosystem service provided by vultures in wild resident vulture area and compare with vulture loss area to estimate the services that may have been received free if vultures could be reestablished	M	✓	✓	Sindh Wildlife Department, Zoological Survey of Pakistan Academia, INGOs/NGOs

2.3.6 Communication and Awareness Strategy

Issues	Strategy	Actions	Priority	5 yrs	10yrs	Responsibility
Limited Awareness in policy makers, veterinary practitioners and others	Strengthen advocacy & awareness focusing proposed VSZ & VSZ	Communication on broader scale from community to policy makers, & pharmaceutical companies	H	✓	✓	MoCC, Wildlife Departments, Information Departments, Academia, Media (Print and Electronic), INGOs/NGOs
		Work with communities such as vulture friendly groups for raising awareness in the community	H	✓	✓	Wildlife Departments, INGOs/NGOs
		Produce awareness materials in local language and use them in the different awareness events regularly in the identified areas, mainly to stop diclofenac use	H	✓		Wildlife Departments, Education Departments, Livestock Department, Information Department, INGOs/NGOs
		Persuade veterinary doctors/practitioners working in the vulture areas to stop the use of Diclofenac type products. Publish annual reports.	H	✓		Livestock Department, Drug Regulatory Authority and Ministry of Health, Wildlife Departments, INGOs/NGOs
		Broadcast messages on Radio and Television	H	✓	✓	PTV/Radio Pakistan and private radio and TV channels

2.4 Institutional Framework

2.4.1 National Vulture Recovery Committee

National Vulture Recovery Committee (NVRC) was formed in Pakistan in 2012 to streamline the recovery of vultures and foster the regional and global collaboration in saving the Asian vultures for which the 13 membered NVRC has been formed (Annexure-II).

2.4.2 Role of Government Institutions

The coordination at central, regional and global level; formation of legislation and policy and monitoring roles are to be conducted by central government through Ministry of Climate Change (MoCC). The Inspector General Forests (IGF), MoCC chairs the National Vulture Recovery Committee, which is responsible for coordinating and guiding the recovery of threatened vulture species in Pakistan. In this regard, the coordination, support through appropriate policy and legislation, channelizing of funds, lobbying for the regulatory and controlling roles with Ministry of Health and Ministry of Livestock & Veterinary are expected to be done by MoCC. The Ministry of Health has the role to regulate the misuse of human vials of drug 'diclofenac' for veterinary use. Similarly, the testing of negative effect of other NSAIDs which are indicated as potential threats to vultures and imposing a ban on their veterinary use are to be done by DRAP under Ministry of Health.

The government agencies such as Departments of Forests, Wildlife, Livestock & Veterinary, Department of Health Services and Department of Drug Regulation Authority have to play a significant role in protection, awareness, coordination and implementation of conservation and management activities for the vultures in the wild and in captivity. Local and district level political institutions can play a vital role to increase the awareness on vultures, especially on

the scavenging and cleaning services provided by vultures and leveraging through funding.

2.4.3 Role of Research Institutions and Academia

Research institutions of the government and academia can play a significant role by generating the information and knowledge which are very essential to understand the benefit to the implementers and general public. Faculties and students of science, anthropology, zoology, environment, veterinary science, and forestry can play a very significant role for carrying out long term monitoring research to make vulture recovery functional and more effective.

2.4.4 Role of Civil Society

IUCN Pakistan has taken deep interest in collaborating with all the relevant stakeholders to enhance the work, coordination and cooperation on vulture conservation at all the five levels, i.e. at the local community level, cooperation with civil societies and IUCN members, at provincial government level with wildlife departments, at national level with the central and federal Government of Pakistan through National Vulture Recovery Committee, at regional level with South Asian countries learning from regional experiences from neighboring countries and bringing in the international experience through IUCN's Commission on Species Survival and Vulture Specialist Group. IUCN is providing support locally to provinces through its program offices.

INGOs (IUCN & WWF) have roles to design and implement vulture conservation actions identified in NVCS & AP in collaboration with the federal and provincial government departments. NGOs are becoming alliance partners to support the work of WWF and IUCN. Parker Foundation is working on vulture conservation with WWF and IUCN in Nagarparkar, Sindh. Baanhn Beli, WWF and IUCN who are working with local community

based organizations, including Parker Foundation, may further strengthen community based vulture conservation work. Baanhn Beli has formed Vulture Friendly Groups (VFGs) in the Vulture Safe Zone in Nagarparker, who are the members of other civil society institutions and registered with local government to conduct the social and conservation activities. Local social, educational and political institutions are also playing a role at their respective levels. The NGOs and civil society in general are key to sharing the information among the different communities and city residents, such as ecosystem services provided by vultures and threats to their conservation. They can help educate the members of society through different means.

2.4.5 Role of the Private Sector

Private sector partners are engaged in many different activities. If they are well informed on the values of vultures and the threats to vulture conservation, the private sector can not only help support the activities, but can also engage in its conservation.

2.5 International Collaboration

2.5.1 The South Asia Regional Vulture Recovery Committee (RSC)

In 2012, IUCN established an Asia Regional Steering Committee on vultures represented by the four governments of vulture range countries (Bangladesh, India, Pakistan and Nepal), IUCN, relevant UN Agencies and other relevant organizations and research institutions. The Regional Steering Committee will serve as the umbrella body to guide and oversee vulture conservation and recovery efforts in all four countries. The formation of National Vulture Recovery Committees in member countries has been one of the follow-up actions of RSC to improve national and regional level coordination for saving the endangered vulture species.

2.5.2 Saving Asia's Vultures from Extinction (SAVE) Network

SAVE is coordinating the activities that are of pressing need by helping find appropriate institutions and individuals, finding resources to run the activities and helping range countries and supporting institutions to implement the prioritized activities. SAVE is providing the common platform to learn, share experiences and discuss the priorities in range countries and helping in the implementation of the activities. Research findings and experiences gained in captive breeding in other countries could be very useful for Pakistan. SAVE has developed a Regional Blueprint for Recovery of South Asia's Gyps Vultures.

2.5.3 Collaboration with other Range Countries

Range countries are implementing vulture conservation activities. Pakistan can learn from the successful activities implemented by other range countries. For example, the learning from the success of captive breeding center in Pinjore, India can be very useful to improve the breeding success in Changa Manga, Punjab. The establishment of vulture safe feeding site (VSFS) with the active participation of local communities has been successfully implemented in Nepal which can be useful and replicated in Nagarparker area, Tharparkar, Sindh, Azad Jammu Kashmir and at potential sites in Punjab and other provinces. Similarly, awareness and capacity building can be the other relevant activities to learn for the effective recovery of vultures in Pakistan.

2.5.4 Collaboration with International Organizations

International organizations are potential partners for collaboration in any aspect including expert engagement, joint fund raising and research.

2.6 Monitoring the Implementation of the Plan

Action Plans, and their implementation mechanisms, are very useful to help identify and prioritize the activities that are to be carried out in given time, in order to achieve the set outputs and targets. They also provide clear pictures, and rationales and alert the implementing agencies to perform the prioritized activities in an efficient manner. Ministry of Climate Change can monitor the plans and their implementation in broader indicators such as improvement in the status of the threatened vultures and success of breeding in captive facility. Provincial wildlife departments and other related government departments of the respective provinces can monitor the implementation of the planned activities jointly. The periodic review and monitoring of status of implementation of the action plan may be undertaken by NVRC.

2.7 Budget

An indicative budget for five years has been estimated to be about Pakistani rupees 1109 million with 82% for the priority actions of objective one and the remaining 18% for the priority actions of objective two (Table 5). Currently, IUCN Pakistan, WWF Pakistan, and local NGOs are utilizing their resources and capacity to implement the vulture conservation activities. Thus, the implementation of this Vulture Conservation Strategy and Action Plan will require to be implemented with the support of active ownership of governments' provincial wildlife departments and support of other collaborative agencies, philanthropists, private sector and individuals to generate necessary resources for its implementation (Annexure-I).

Table 5: Indicative Budget of Vulture Conservation Strategy and Action Plan for Pakistan

Objectives	Priority Actions	Indicative Budget (5 yrs in PKRs) 'Million PKRs'
Objective 1: To strengthen the conservation of vultures in the wild and captivity	Nation-wide Population Assessment	60
	Ex-situ Conservation	708
	Research and Monitoring	110
	Communication and Awareness	30
Objective 2: To save vultures from the effect of NSAIDs and other toxic compounds	Policy and Legal Frameworks	91
	Research and Monitoring	60
	Communication and Awareness	50
	Grand Total	1109

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Annexes

Annex I: Action Plan Summary with Indicative Budget for Five Years, VCSAP, Pakistan

Objective 1. To strengthen the conservation of vultures in the wild and captivity			
	Actions	Indicative Budget (5 yrs in million PRs)	Lead organizations
Nation-wide Population Assessment			
1.1	Conduct national vulture survey periodically for other vulture species in all potential provinces	30.00	WD, ZSP, INGOs/NGOs
1.2	Monitor wild vulture population & breeding success	30.00	
Ex-situ Conservation			
1.3	Maintain captive population of vultures	25.00	Wildlife Departments, INGOs/NGOs
1.4	Enhance capacity of wildlife departments in vulture breeding through learning from successful breeding experiences from neighboring countries	30.00	WD, INGOs/NGOs
1.5	Incorporate learning experience for breeding in Changa Manga and other such areas	10.00	WD, INGOs/NGOs
1.6	Establish VC&BC in Tharparkar and other potential areas	100.00	Provincial WD, INGOs/NGOs
1.7	Share the finding of potential VCBC with regional vulture recovery committee and other stakeholders and finally with national vulture recovery committee	5.00	WD, INGOs/NGOs
1.8	Prepare VCBC management guideline	1.0	Punjab FD, WWF Pak
1.9	Recognize the nest trees and create incentives for protection of trees locally for breeding season	100.00	WD, FD, Local Governments, INGOs/NGOs
1.10	Support rangeland improvement program in Tharparkar area	50.00	Sindh FD, INGOs/NGOs
1.11	Continue support on digging well to support to improve fodder crops and water for livestock	50.00	Irrigation Departments, Local Governments, INGOs/NGOs
1.12	Establish rescue centers for vultures and laboratories	50.00	WD, VD, INGOs/NGOs
1.13	Maintain & review VSZ in Tharparkar area	10.00	Sindh FD, Sindh WD, LDs, HD, ID, Local Department, INGOs/NGOs
1.14	Facilitate guarding breeding sites of vultures during the breeding season in Tharparkar area and other parts of the country	50.00	WD, INGOs/NGOs
1.15	Assess potential of proposed VSZ in AJK and in other provinces and notification and management of the same	60.00	WDs, ZSP, INGOs/NGOs

	Actions	Indicative Budget (5 yrs in million PRs)	Lead organizations
1.16	Assess proposed extension of VSZ towards Umarkot district	1.0	Sindh WD, ZSP, INGOs/NGOs
1.17	Livestock Management & Husbandry training in pVSZ & VSZ	50.00	LDs, INGOs/NGOs
1.18	Free veterinary camps (Deworming)	50.00	LDs, INGOs/NGOs
1.19	Assess the VSZ parameters and provide the information for the processing of extension of existing VSZ to Umarkot district through NVRC	1.00	Sindh WD, ZSP, INGOs/NGOs
1.20	Introduce community led vulture based ecotourism	20.00	WDs, Tourism Depts, LDs, INGOs/NGOs, private sector
1.21	Partner with district level institutions and get support from elected representatives for the management of Vulture Safe Zones	10.00	District Line Departments, Elected representatives, INGOs/INGOs
1.22	Identify vulture safe feeding sites for drier periods/emergencies	30.00	WD, Local Governments, INGOs/NGOs LD, Local Govts
1.23	Release captive bred WRV in VSZ	5.00	WDs, INGOs/NGOs
Research and Monitoring			
1.24	Study the seasonal movement of vultures including trans-border areas by tagging at least one individual per species	10.00	ZSP, WDs, Academia, INGOs/NGOs
1.25	Continue ecological study of vultures in safe zone and interaction with humans including breeding success, dispersal and determining the impact of mortality in the existing population	15.00	
1.26	Initiate vulture study group involving college and university students	5.00	
1.27	Establish biodiversity data resource center encompassing vulture section along with Vulture Conservation and Breeding Center and at other identified sites	30.00	
1.28	Study the range management system in Tharparkar area to facilitate improvement of the status of rangelands	5.00	FD, AD, Sindh WD, Academia, SAZDA, INGOs/NGOs
1.29	Study on immigrant WRV for its long-term conservation and survival	10.00	WD, Academia, ZSP, INGOs/NGO
1.30	Monitor WRV colony in Nagarparkar area to determine breeding success	10.00	Sindh WD, ZSP, Academia, INGOs/NGOs
1.31	Assess dispersal behavior of WRV from Nagarparkar area to adjacent areas	5.00	
1.32	Assess the effectiveness of Vulture Safe Zone against the risks to vultures from Diclofenac	5.00	

	Actions	Indicative Budget (5 yrs in million PRs)	Lead organizations
1.33	Estimation of the former & potential future value of the ecosystem service by wild vultures	10.00	Sindh WD, ZSP, Academia, INGOs/NGOs
1.34	Compare the ecosystem service provided by vultures in wild resident vulture area and compare with vulture loss area to estimate the services that may have been received free if vultures could be reestablished	5.00	
Communication and Awareness			
1.35	Communication in broader scale from community to policy makers & pharmaceutical companies	10.00	MoCC, WD, Information Departments, Academia, Media, INGOs/NGOs
1.36	Work with communities, such as vulture friendly groups, for raising awareness in the community	20.00	WD, INGOs/NGOs
Objective 2. To save vultures from the effect of NSAIDs and other toxic compounds			
Policy and Legal Frameworks			
2.1	Regulate human use diclofenac vials of 3 ml+ capacity, eg. Propose & establish restriction	5.00	MoCC, MoH
2.2	Impose ban on veterinary use of Ketoprofen & Aceclofenac	5.00	MoCC, MoH
2.3	Ensure monitoring and enforcement of ban through wildlife and livestock departments	20.00	WD, LD
2.4	Ensure availability of cheap and safe alternate drugs for veterinary use	50.00	MoH and DRA + Pharma companies
2.5	Facilitate through MoCC for an effective system of regulation of veterinary drugs by Ministry of Health, based upon safety-testing on vultures initiated and underway for all current painkillers (NSAIDs) and for all potential new ones entering veterinary practice	5.00	MoCC, MoH
2.6	Work for label “only for human use” on diclofenac vials	1.0	MoH
2.7	Improve the availability of more effective meloxicam formulations to facilitate better take up by veterinary practitioners	5.0	VD, MoH
Research and Monitoring			
2.8	Monitoring cause of death & NSAID contamination of wild vultures	10.00	LD, VD, WDs, DRA, Poultry Research Institute, Academia, INGOs/NGOs
2.9	Investigate factors affecting use of vulture safe NSAIDs by veterinarians, para-vets, and livestock owners	10.00	
2.10	Monitor availability of NSAIDs for veterinary use in pharmacies & other outlets	10.00	LD, VD, WD, DRA, Poultry Research Institute, Academia, INGOs/NGOs
2.11	Assess the risks and effects of adult WRV mortality (such as NSAID poisoning)	10.00	

	Actions	Indicative Budget (5 yrs in million PRs)	Lead organizations
2.12	Complete removal of veterinary use of diclofenac and other harmful non-steroidal anti-inflammatory drugs from the environment	10.00	
2.13	Assess residual quantities of diclofenac remaining in livestock carcasses and threat to vultures	10.00	
Communication and Awareness			
2.14	Produce awareness materials in local language and use them in the different awareness events regularly in the identified areas mainly to stop diclofenac use	20.00	WD, Education Departments, LD, Information Department, INGOs/NGOs
2.15	Create awareness among veterinary doctors/practitioners working in the vulture areas to mainly stop the use of Diclofenac type medicines. Publish annual reports.	20.00	LD, DRA, Ministry of Health WD, INGOs/NGOs
2.16	Broadcast messages through TV and Radio	10.00	PTV and Radio Pakistan and Private TV and Radio channels

AD=Agriculture Department, FD=Forest Department, WD=Wildlife Department, VD=Veterinary Department, HD=Health Department, ID= Irrigation Department, ZSP=Zoological Survey of Pakistan, DRA= Drug Regulation Authority

Annex II: Composition of National Vulture Recovery Committee, Pakistan

SN	Representative	Status
1	Inspector General Forests, Ministry of Climate Change, Islamabad	Chair
2	Conservator Wildlife, Khyber Pakhtunkhwa	Member
3	Secretary, Forest, Wildlife and Environment Department, Gilgit-Baltistan	Member
4	Director General Wildlife, Punjab	Member
5	Conservator, Sindh Wildlife Department	Member
6	Conservator, Balochistan Wildlife Department	Member
7	Conservator Wildlife FATA	Member
8	Director, Wildlife & Fisheries, Muzaffarabad, AJK	Member
9	Director, Zoological Survey of Pakistan, Ministry of Climate Change, Islamabad	Member
10	Director (QA & Lic), Drug Regulatory Authority of Pakistan (DRAP), Ministry of National Regulation & Services, Islamabad	Member
11	Representative of Ministry of National Food Security and Research, Islamabad	Member
12	A Representative of International Union for Conservation of Nature and Natural Resources (IUCN)	Member
13	A Representative of World Wide Fund for Nature (WWF-Pakistan)	Member

Annex III: Notification by Ministry of Health imposing a ban on veterinary use of Diclofenac

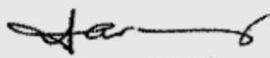
Government of Pakistan
Ministry of Health

Islamabad, the 31st October 2006.

NOTIFICATION

S.R.O. (I)/2006:- Whereas in the opinion of the Registration Board the public interest so requires and in exercise of the powers conferred by clause (b) & (d) of sub-section (11) of Section 7 of the Drugs Act, 1976 the said Board is pleased to notify the cancellation of the registration of all the veterinary drugs containing "Diclofenac" as active ingredient except drugs registered exclusively for export purpose.

(No.F.8-1/2004-Reg-I).


 (Dr. Farnaz Malik)
 Drugs Controller

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