REPORT ON THE MID-TERM IMPLEMENTATION REVIEW OF THE MULTI-SPECIES ACTION PLAN TO CONSERVE AFRICAN-EURASIAN VULTURES (VULTURE MSAP)

Vulture MsAP

RAPTORS MOU

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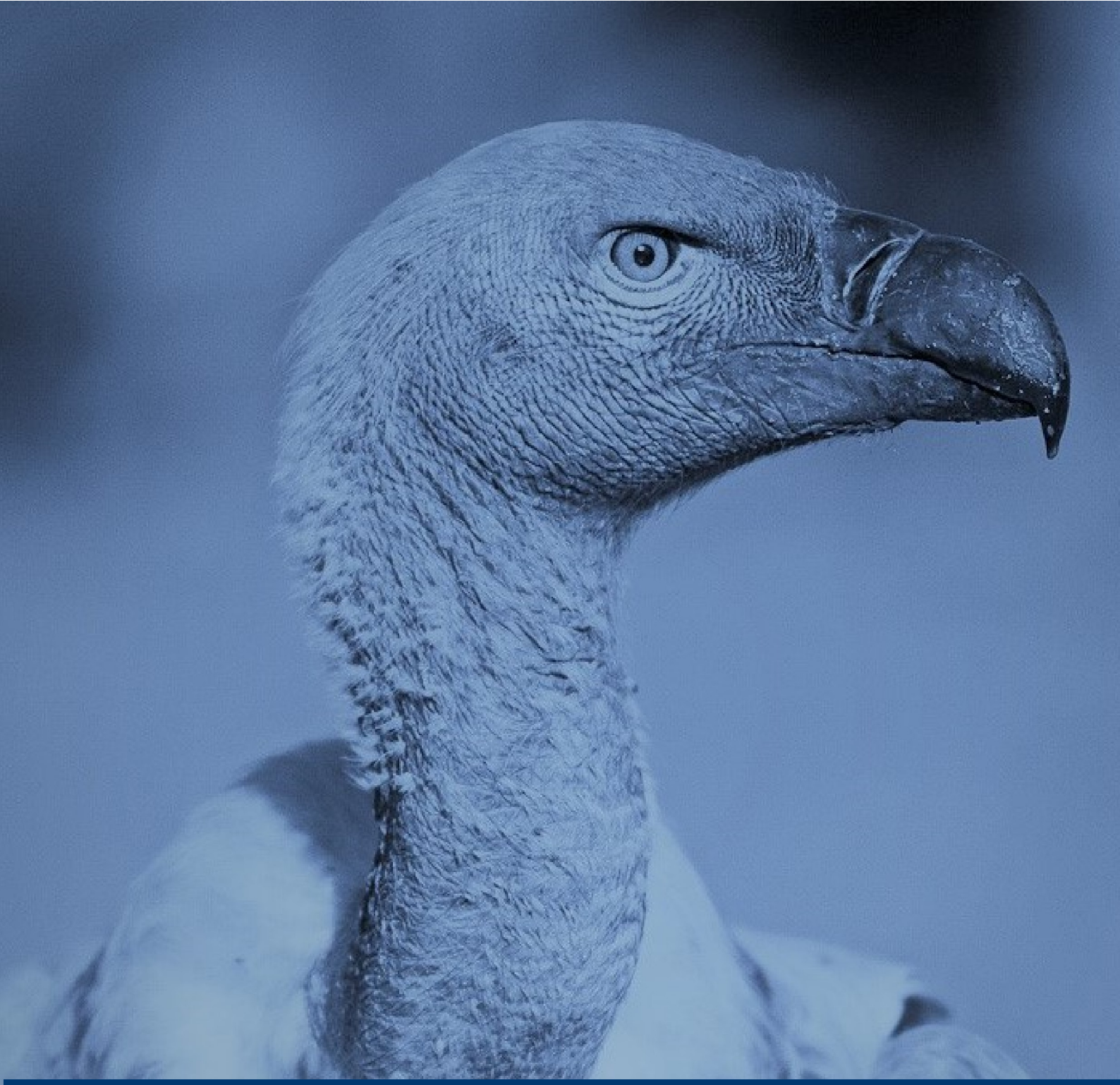

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Vulture MsAP

Overall project management
Umberto Gallo-Orsi, CMS Raptors MOU
Head of the Coordinating Unit
umberto.galloorsi@un.org

Compiled by
André Botha, Endangered Wildlife Trust
Project Leader, Mid-term Implementation Review of the CMS Vulture MsAP
andreb@ewt.org.za

Jane Doherty, Endangered Wildlife Trust
Project Intern, Mid-term Implementation Review of the CMS Vulture MsAP
janed@ewt.org.za

Jenny Weston, Royal Society for the Protection of Birds
Technical Advisor, Mid-term Implementation Review of the CMS Vulture MsAP
Jenny.Weston@rspb.org.uk

Jovan Andevski, Vulture Conservation Foundation
European Regional Coordinator and Technical Advisor, Mid-term Implementation Review of the CMS Vulture MsAP
j.andevski@4vultures.org

Roger Safford, BirdLife International
Senior Programme manager: Preventing Extinctions
Roger.safford@birdlife.org

José Tavares, Vulture Conservation Foundation
Chief Executive Officer
j.tavares@4vultures.org

Chris Bowden, Royal Society for the Protection of Birds
Asia Regional Coordinator, Mid-term Implementation Review of the CMS Vulture MsAP
Chris.Bowden@rspb.org.uk

Fadzai Matsvimbo, BirdLife International
Africa Regional Coordinator, Mid-term Implementation Review of the CMS Vulture MsAP
Fadzai.matsvimbo@birdlife.org

Lovelater Sebele, BirdLife International
Africa Regional Coordinator, Mid-term Implementation Review of the CMS Vulture MsAP
Lovelater.Sebele@birdlife.org

Ibrahim Al-Hasani, BirdLife International
Middle East Regional Coordinator, Mid-term Implementation Review of the CMS Vulture MsAP
Ibrahim.Alhasani@birdlife.org
Updated threat mapping

Rob Davies, HabitatInfo
Ralph Buij, The Peregrine Fund, Wageningen University
Leah Dunn, The Peregrine Fund
Evan Buechley, The Peregrine Fund
Chris McClure, The Peregrine Fund

Contributors/Respondents

List of contributors/respondents that submitted completed questionnaires can be found in Annex 10.1.

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Acronyms

API	Action Priority Score
BBU	Belief-based Use
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
COP	Conference of the Parties
EU	European Union
IS	Implementation Score
IVAD	International Vulture Awareness Day
LIFE	European Union's funding instrument for the environment and climate action
MOU	Memorandum of Understanding
MsAP	The Vulture Multi-species Action Plan
MTIR	Medium-term Implementation Review
NIS	National Implementation Score
NSAID	Non-Steroidal Anti-Inflammatory Drug
PS	Priority Score
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RIS	Regional Implementation Score
SAVE	Saving Asia's Vultures from Extinction
TEV	Total Economic Value
VCF	The Vulture Conservation Foundation
VSZ	Vulture Safe Zone

EXECUTIVE SUMMARY

INTRODUCTION

The Multi-species Action Plan for African-Eurasian Vultures (Vulture MsAP) was adopted at CMS COP12 in October 2017 and suggests appropriate actions to halt and eventually reverse the declines in populations of Old-World vulture species across the flyways. Its implementation framework recommends that the Vulture MsAP be reviewed six years into its 12-year implementation timeframe that will conclude in 2029.

In April 2023, the CMS Raptors MOU contracted the drafting partners of the Vulture MsAP to conduct a Mid-term Implementation Review (MTIR), to assess the scale of implementation across the range halfway through the implementation timeframe of the Vulture MsAP.

This document presents the findings of the MTIR process, which are based on feedback gathered from 106 respondents across the Vulture MsAP range. The feedback was collected through questionnaires, follow-up interviews and a review of reports and other relevant literature.

RESULTS

Threats

The prioritisation of threats as reflected in the Vulture MsAP has not changed. Nonetheless, the following aspects need to be better assessed and monitored:

- Intentional poisoning (or hunting) for belief-based use, bushmeat and trade is a more severe problem than appreciated in the past, especially in West Africa.
- The global shift to renewable energy, and consequent wind farm development, means that the collision risk for vultures will increase.
- Mortality from electrocution is also increasing in relative importance, partly associated with the switch to renewable energy.
- The decline in food availability for vultures in some parts of Europe may be relatively less important than in the past, presumably because of interventions in recent years.

As many of the species covered by the Vulture MsAP continue to decline, being aware of emerging and new threats is critical:

- Climate change is now better recognized as a threat operating through multiple avenues.
- Highly Pathogenic Avian Influenza has the potential to impact on populations of critically endangered and endangered vulture species that are already under pressure from other known threats.

Demographic trends

Census data in many countries remain scant, although there have been significant improvements in data availability (including trends) in some regions and countries.

Vulture populations are recovering slightly in some countries, particularly in Europe. Three main aspects are key to this:

- adequate conservation legislation;
- good engagement from government organisations, NGOs and research institutions; and
- significant allocations of funding, resulting in conservation actions

Many vulture populations are still declining at a precipitous rate, especially in Africa where data are especially scant and where monitoring is often difficult due to logistical and other constraints.

Implementation

The Vulture MsAP promotes the implementation of 124 Actions designed to help populations to recover to sustainable levels and covers policy and legislation, research and monitoring, education and awareness, and on-the-ground interventions. These Actions are designed to achieve 44 Results and 12 wider Objectives. Of the 124 Actions, 17 were identified as Essential, requiring immediate implementation.

To assess progress, Regional Implementation Scores were calculated for each region, based on respondents' assessments of their countries' progress with implementing the 124 required Actions. Scores can be between 1 (no progress) and 4 (Action fully completed) and are based on the average of all actions relevant to the countries within a particular region. There is significant variation between regions with higher scores achieved in Europe and South Asia, compared to elsewhere in the Vulture MsAP geographical scope. This highlights the effects on conservation of large funding programs, such as the European Union's LIFE programme, and the coordinated effort of the SAVE program, which account for 71% and 17% of all funds spent on vulture-specific conservation since 2017.

At this point in the Action Plan implementation timeframe, an average implementation score across the entire range of between 2-2.5 would have been expected, but it currently stands at only 1.61. In addition, progress with the 17 Actions identified as Essential in order to immediately address critical issues has only been marginally faster than with other Actions. This report calculated an Action Priority Index (meaning that action is now even more urgent) for 12 of the Essential Actions, whereas 11 of them should already have been completed by the time of this review.

Nonetheless, there has been considerable progress with developing enabling legislation, policy and protocols across several countries. A lack of policy was not seen by respondents as the main stumbling block to progress; a lack of funding was identified as the main constraint, followed by a lack of capacity to implement Actions and a lack of political will and engagement in support of these Actions.

CONCLUSIONS AND RECOMMENDATIONS

A significant amount of work has been done towards achieving the Results envisaged by the Vulture MsAP. This is testament to the efforts of many stakeholders, including the many NGOs whose efforts are often cited in this report.

The threats facing vultures are not subsiding and there is no room for complacency. As already mentioned, new threats are on the horizon and, in several Range States, the poor security situation compromises conservation.

Much more work needs to be done over the remaining 6 years of the Vulture MsAP to bring about a positive and substantial change in vulture populations across the range.

The main recommendations emerging for Range States, donors and other stakeholders from this report are:

1. **Strengthen political engagement and financial support**
   Greater engagement and financial support from Range State governments and major donor institutions are encouraged, especially in regions that have experienced challenges and insufficient support in this regard to date.

2. **Build capacity to implement conservation actions**
   Beyond political support and financial resources, enhanced capacity is required to implement conservation interventions, most importantly in terms of developing skilled staff, but also in terms of management systems, logistics, information technology and so forth.

3. **Focus on the implementation of Essential Actions**
   It is still important to pay particular attention to, and support, the 17 Essential Actions, where they are relevant to a particular country's context, to enable full implementation within the next 6 years. Scaling up interventions is urgent in some countries.

4. **Enable the establishment of the Implementation Framework proposed by the Vulture MsAP**
   Support the Coordinating Unit of the CMS Raptors MOU to acquire the resources for establishing the Implementation Framework and contracting the relevant staff capacity to coordinate work associated with the Vulture MsAP.

5. **Continue facilitating the Vulture Working Group and monitoring the Vulture MsAP**
   The CMS Secretariat, in line with Resolution 12.10 (Rev COP13), should continue to facilitate the Vulture Working Group and its associated structures and team of coordinators, including by continuing to encourage engagement, communication, cooperation and collaboration between the stakeholders. It is also important to coordinate and monitor the plan during the latter half of its implementation term to ensure its effective execution.

6. **Commence the review and update of the CMS Vulture MsAP – 2028/2029**
   To enable continuity and maintain momentum, it is important for the Signatories and Cooperating Partners of the CMS Raptors MoU with the support of the Coordinating Unit to already start planning and securing the resources for a review and update of the CMS Vulture MsAP before the expiration of its 12-year implementation timeframe in October 2029.

1 Introduction

In October 2017 at the 12th Conference of the Parties (COP12) to the Convention on the Conservation of Migratory Species of Wild Animals (CMS), held in Manila in the Philippines, the Multi-species Action Plan for African-Eurasian Vultures (Vulture MsAP) was formally adopted (Botha et al., 2017). It provides hope for the future and a road-map with suggested Objectives, Results and Actions to halt and eventually reverse the declines in the populations of 15 species of Old World vultures across the flyway.

The Vulture MsAP promotes the implementation of 124 different Actions designed to help populations to recover to sustainable levels, and covers policy and legislation, research and monitoring, education and awareness, and on-the-ground interventions. These Actions are designed to achieve 44 Results and 12 wider Objectives which, in turn, are designed to address the major threats facing vultures occurring in the region.

Of the 124 Actions, 17 were identified as Essential, requiring immediate implementation. These include 13 which were designed to address specific threats (although not all are applicable to every region (Table 1).

The Vulture MsAP covers a timeframe of 12 years (2017-2029) and its Implementation Framework recommends assessment of progress towards the achievement of its Objectives, Results and Actions on a regular basis. As the Vulture MsAP calls for a review every 6 years, the 14th Conference of the Parties (COP14) to be held in Samarkand, Uzbekistan in February 2024, provides the opportunity and represents the appropriate forum to present the outcomes of the review.

The CMS Raptors MOU Coordinating Unit engaged in 2023 with the Endangered Wildlife Trust, BirdLife International, the Royal Society for the Protection of Birds, the Vulture Conservation Foundation and HabitatInfo to coordinate and lead this process with extensive input from members of the IUCN Species Survival Commission's Vulture Specialist Group, Range State governments and CMS contact points.

This report reflects the results of the analysis of feedback received through the Mid-term Implementation Review (MTIR) process and should be seen not only as a measure of what has been achieved to date but, more importantly, an indication of where work should be targeted in the next 6 years to fully implement the objectives of the Vulture MsAP.

This report should be read in conjunction with the Vulture MsAP (Botha et al., 2017).

Table 1: The 14 Essential Actions in the Vulture MsAP, by Objective

Objective 1. To achieve a significant reduction in mortality of vultures caused unintentionally by toxic substances used (often illegally) in the control and hunting of vertebrates	
Action 1.1.1	**Conduct an overall situation analysis of wildlife poisoning associated with human-wildlife conflict, with special attention to vulture mortality: covering state of knowledge, drivers and motivations, poisons used (actually or potentially), analytical capacity, hotspots, knowledge gaps and best practice on reducing conflicts and related poisoning.**
Action 1.1.3	Implement awareness campaigns, specifically covering (a) negative impacts on vultures and other non-target species; (b) likely ineffectiveness of poisoning as a problem animal control technique; (c) impacts of poisoning on human and livestock health; and (d) legal alternatives to mitigate human-wildlife conflict.
Action 1.2.2	**Establish protocols and train and support relevant agency staff (conservation, rangers, police, judiciary) to rapidly respond to poisoning incidents including sharing best practice.**
Action 1.3.2	**Review, introduce and enforce strict penalties for illegal wildlife poisoning acts, sufficient to deter future poisoning.**
Objective 2. To recognise and minimise mortality of vultures by non-steroidal anti-inflammatory drugs (NSAIDs) and occurrence and threat of toxic NSAIDs throughout the range covered by the Vulture MsAP	
Action 2.1.2	**Prohibit or withdraw veterinary use of diclofenac, ketoprofen and aceclofenac for the treatment of livestock and substitute it with readily available safe alternatives, such as meloxicam in all Vulture MsAP Range States.**
Action 2.1.3	**Develop a formalised approval process before market authorisation is granted for all veterinary NSAIDs and seek to identify additional safe alternatives to NSAIDs toxic to vultures.**
Objective 3. To ensure that CMS Resolution 11.15 on the phasing out the use of lead ammunition by hunters is fully implemented.	
Action 3.1.4	**Promote the implementation of CMS Resolution 11.15 by all CMS Parties as well as voluntary lead ammunition bans in Vulture MsAP Range States which are not CMS Parties.**
Objective 4. To reduce and eventually to halt the trade in vulture parts for belief-based use.	
Action 4.2.1	**Initiate stakeholder engagement and dialogue with relevant stakeholders, publish and share research and monitoring results on belief-based use of vultures with relevant Government departments (e.g. Environment, Agriculture, Health) and other stakeholders to agree appropriate national actions.**
Objective 5. To reduce and eventually to halt the practice of sentinel poisoning by poachers.	
Action 5.4.1	Expand poisoning response training programmes to support conservation staff to rapidly respond to poisoning incidents
Objective 6. To substantially reduce vulture mortality caused by electrocutions linked to energy generation and transmission infrastructure	
Action 6.1.2	**Complete sensitivity mapping for Vulture MsAP range. Adding to existing analyses (e.g. Red Sea flyway) to identify areas where energy infrastructure poses greatest electrocution risks to vultures; combine tracking data, site prioritisation, vulture counts and other sources.**
Action 6.3.1	For new and existing energy infrastructure, promote the implementation of CMS guidelines by phasing out energy infrastructure designs that pose electrocution risk to vultures and other birds, and advocate retro-fitting with known bird-friendly designs within current maintenance schedules.
Objective 7. To substantially reduce vulture mortality caused by collisions linked to energy transmission and generation infrastructure.	
Action 7.1.2	**Complete sensitivity mapping for the entire Vulture MsAP range. Adding to existing analyses (e.g. Red Sea flyway) to identify areas where energy infrastructure poses greatest collision risks to vultures; combine tracking data, site prioritisation, vulture counts and other sources.**
Action 7.3.1	For new and existing energy infrastructure, promote the implementation of CMS guidelines by phasing out energy infrastructure designs that pose collision and electrocution risk to vultures and other birds, and advocate retro-fitting with known bird-friendly designs within current maintenance schedules
Objective 11: Support vulture conservation through cross-cutting actions that may contribute to mitigation of most or all threats	
Action 11.1.1	Census 2018-2019 + census 2028-2029 of all species to monitor the population size, breeding productivity, distribution and trends across the Vulture MsAP range.
Action 11.3.1	**Conduct a Total Economic Value (TEV) study of vultures which includes their role as providers of ecosystem services and in generating eco-tourism attraction.**
Action 11.4.4	Develop VSZ criteria and promote application and implementation of this approach to address all critical threats throughout the Vulture MsAP range.
Objective 12: Advance vulture conservation by effective promotion and implementation of the Vulture MsAP.	
Action 12.1.2	**Establish a Framework to coordinate implementation of the Vulture MsAP, including central and regional coordination units to facilitate implementation, support and review across the range.**

Note: As will become clear later, each Action in the Vulture MsAP is numbered according to first the Objective, and then the Result, that it fall under. Actions in bold were supposed to have been completed in the first 6 years of the Vulture MsAP.

2 Objectives of the review

The Mid-term Implementation Review of the Vulture MsAP had the following objectives:

- Obtain an overall assessment of the progress towards the implementation of all 124 recommended Actions under the 12 CMS Vulture MsAP Objectives.
- Estimate the overall effectiveness of the action plan to meet the planned population recovery objectives, using the latest available population estimates and trend.
- Determine an overall National Implementation Score (NIS) for each country and at sub-regional level across the range.
- Review and update priority threats for each region and obtain information on more pertinent and emerging threats from feedback received.
- Assess progress on implementation and achievements of results and actions under each of the 12 Objectives of the CMS Vulture MsAP.
- Determine an overall estimate of the funding sourced and spent on activities in support of the Vulture MsAP in all regions.
- Review and update a selection of threat analysis maps included in the 2017 Vulture MsAP.
- Collate all peer-reviewed research publications with a focus on Old World vultures published since the adoption of the Vulture MsAP in 2017, possibly to be made available as a reference source through various platforms following completion of the review.
- Make recommendations on steps needed to fully implement the Vulture MsAP in the remaining 6 years.

3 Methods

There are 12 Objectives within the Framework for Action for African-Eurasian Vultures. These each relate to a specific threat to vultures. These Objectives seek to achieve 44 Expected Results on the basis of 124 Actions: each Action is numbered according to the Result and Objective under which it falls. Not all Actions are relevant to all regions or Range States. The Vulture MsAP provides information on the regional relevance of each Action and suggests priorities at Range State level.

This report uses the method set out by Gallo-Orsi (2001) for BirdLife International to review action plan implementation. Using an online questionnaire, experts from Range States were asked to score each Action from the Framework for progress in their implementation (see Table 2 for scoring options and codes). Respondents were also asked whether outstanding Results were likely to be achieved in the remaining 6 years of the Plan. Data on threats facing vultures and species status were also collected.

After considerable effort identifying potential respondents and sending out reminders, 104 questionnaires were received back from 72 countries (Table 3). An additional 2 questionnaires provided regional responses.

This means that 54% of the countries or territories falling under the Vulture MsAP range (Annex 10.1) provided responses. However, some countries might be considered more important "core" states with significant breeding, wintering or passage populations, whereas several other countries might be called "marginal" (Annex 10.1). Questionnaires were received from 78% of the 90 core states, which can be considered a high response rate (but only 14% of the 36 marginal states). However, several

respondents left certain sections of their questionnaire blank. This means that the results presented in this report are not necessarily complete.

Table 2: Scoring options and codes for progress with implementation

Implementation	**Implementation score (IS)**
Action fully implemented, no further action required (100%)	4
Significant results, but work still to be done (51-75%)	3
Some work done, further action needed (11-50%)	2
Little or no work carried out (0-10%)	1
Not needed/not relevant for the Vulture MsAP Framework for Action*	0

* this meant the Action was not considered further for the purpose of this analysis

Table 3: Breakdown of country responses by region

Region	No. of countries	No. of respondents
North Africa	2	5
West and Central Africa	10	12
East Africa	7	13
Southern Africa	10	18
Middle East	11	14
Europe*	17	22
Central Asia	5	5
East Asia	3	4
South Asia	4	7
South East Asia	3	4
Total	72	104

*Türkiye is classified as part of Europe, as in the Vulture MsAP

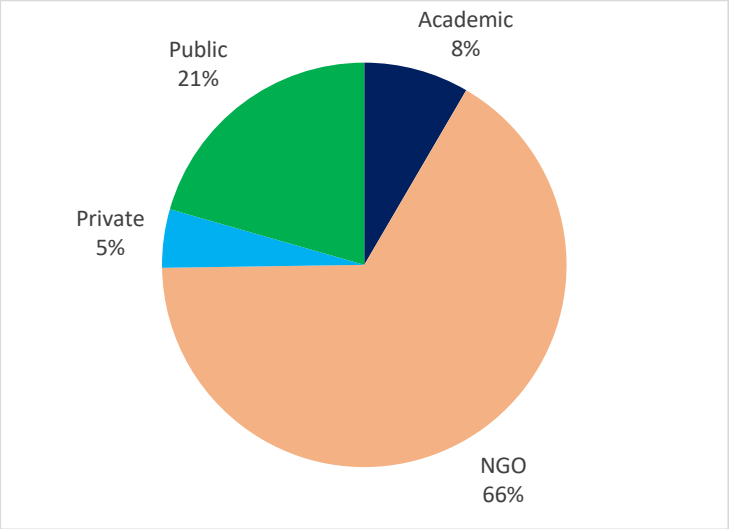


Figure 1: Type of organisation represented in responses
Note: 'Public' refers to Range State governments

Around two thirds of replies were submitted by NGOs (Figure 1). Around a quarter (22%) were from respondents working in government. This in itself suggests that government engagement in vulture conservation remains low, at least in some parts of the Vulture MsAP range.

Where more than one response was received for a country, this was considered by regional coordinators and an average score was assigned. Regional coordinators also ensured comparability across the range as well as highlighted any omissions and key areas of work. Responses received for a region, as opposed to an individual country, were included for the production of regional and plan-wide estimates only.

The Implementation scores provided by respondents were combined with priorities taken from Table 6 (Framework of Conservation Actions for African-Eurasian Vultures) in the Vulture MsAP and are defined in Table 4 below to give an Action Priority Index (API) for each Action in each country:

Action Priority Index [API] = Priority Score [PS] x ((4 – Implementation Score [IS]) ÷ 3)

Table 4: Definition of priority scores in the Vulture MsAP

Priority category	**Priority score (PS)**	**Priority scale of actions**
Essential/ Critical	4	Action needed to prevent a large decline in the population which could lead to the species or sub-species' extinction
High	3	Action needed to prevent a decline of ≥20% of the population in <20 years
Medium	2	Action needed to prevent a decline of <20% of the population in <20 years
Low	1	Action needed to prevent a local population decline or which is likely to have only a small impact on the population across the range

An API of 4 means the action should be high priority to advance in the next 6 years, as illustrated by Table 5. The lower the score the less urgent the action going forward.

Table 5: Range of possible API scores resulting from the combination of PS and IS scores

PS\IS	0	1	2	3	4
4	n/a	4	2.67	1.33	0
3	n/a	3	2	1	0
2	n/a	2	1.33	0.67	0
1	n/a	1	0.67	0.33	0

Source: Weston & Nikolov (2023)

An additional analysis was carried out to find the National Implementation Score (NIS) for each country, an average which combines the urgency of an action (that is, its priority) with its implementation level. Actions were only included for analysis where at least 20 responses had been received. NIS was calculated as:

NIS = ∑(PSxIS) ÷ ∑PS

The Priority Score (PS) for this part of the analysis was taken from the country-specific prioritisation in Table 6 of the Vulture MsAP. This was to ensure a more tailored approach to the national implementation scoring (as the PS used to calculate the API was available only on a regional, not country-specific, basis). Where a country-specific score was not available because of lack of information on the threat, for example, the priority score for the whole Result as from Table 6 in the Vulture MsAP was used, as described earlier.

The range of the NIS score is the same as for the IS score, with 1 representing little or no implementation or 4 representing full implementation. All lines with IS of 0 (and considered not relevant in that member state) were excluded from this exercise.

For the individual NIS, Actions which came under Objective 12 ("To advance vulture conservation by effective promotion and implementation of the Vulture MsAP") were not included in the calculation as they were primarily dependent on the CMS Raptors MOU and the Vulture MsAP Coordination Group. Regional Implementation Scores were also calculated using the same method.

4 Assessment of Threats

Respondents were asked to identify whether there are any significant changes to the relative regional prioritization of threats as presented in the Vulture MsAP (Figure 2). They were also asked to identify any new or emerging threats in their countries (the detailed data provided by respondents are recorded in Annex 10.2.1).

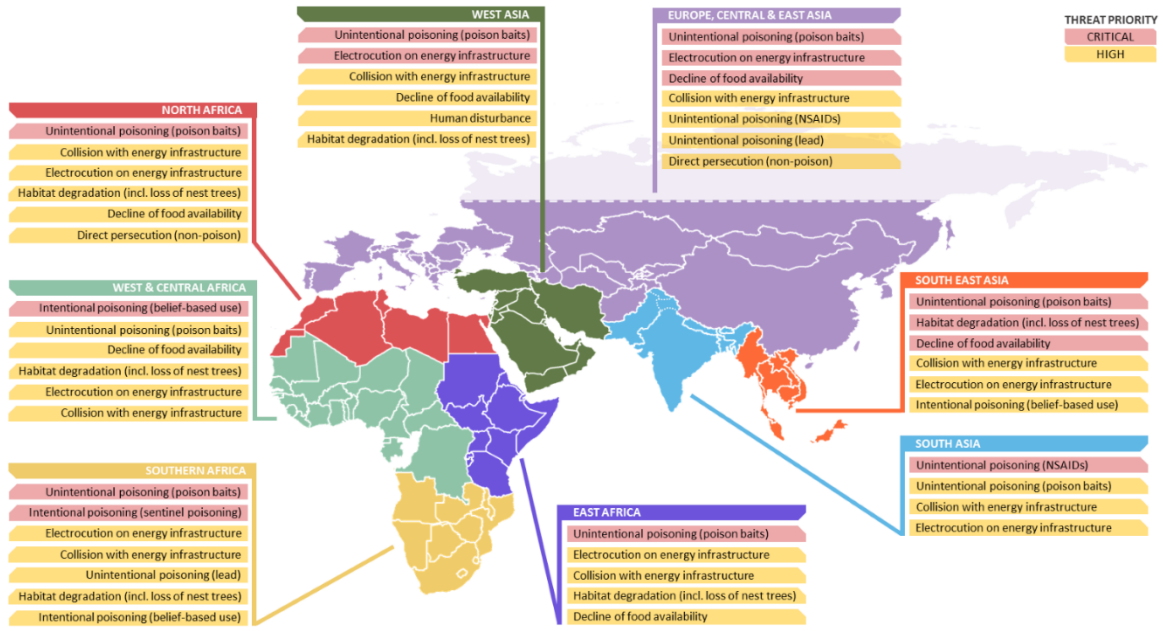


Figure 2: Map from the CMS Vulture MsAP (Figure 18 in Botha et al. (2017)) indicating critical and high priority threats facing African-Eurasian vultures)
Note: threats are categorized as critical or high but are not ordered within each category according to relative severity, as this varies by country

It is important to note that the Vulture MsAP provided very broad categories on priority threats across whole regions (and by species) but not by country. Several respondents noted different priorities within their own country, or changes in the relative importance of pre-existing threats, and these are reflected in Annex 10.2.1. The discussion here only considers whether priorities have changed across a region or flyway as a whole.

A last caveat is that, given the limited research on relative threat levels, it is difficult to know whether perceived changes reflect actual changes, or simply greater awareness of, pre-existing threats. Where scientific evidence to support this is missing, further research is required.

Respondents indicated that the critical and high priority threats identified in the Vulture MsAP still pertain as a general rule, although the relative importance of each threat may vary between countries or have changed within countries over time. Countries generally face multiple threats, some highly particular to their own contexts, but some general trends are discernible:

- Intentional poisoning (or hunting) for belief-based use, bushmeat and trade seems to be a more severe problem than appreciated in the past (Chandra et al., (in press)). This is well-documented in West Africa (Copsey et al., 2022, UNEP-WCMC, 2021) but was also raised as a concern for some other African regions further afield.
- Wind energy development (either constructed or proposed) is clearly a growing threat in most regions, reflecting the global move to renewable energy. More research is required to quantify the impact of collisions with turbines on vulture populations and other migratory soaring birds on these flyways, as well as on the effectiveness of mortality mitigation techniques (e.g., automatic detection tools of incoming birds for shut-down on demand).
- Electrocution is also increasing in relative importance as a cause of mortality, due to an increase in energy infrastructure, and partly associated with the switch to renewable energy. This is important in Eurasia as well as Africa.
- The decline in food availability for vultures in some parts of Europe may be relatively less important than in the past, presumably because of interventions in recent years.

As many of the species covered by the Vulture MsAP continue to decline, being aware of emerging and new threats is critical. Respondents and the MTIR working group have considered the following emerging threats which need to be monitored and further examined:

- Climate change was highlighted as a new threat, but the impacts of climate change are diffuse, difficult to measure and linked to more proximal causes, such as loss of habitat and food sources. Being able to quantify these impacts is likely to be an area of work going forward.
- The potential impact of Highly Pathogenic Avian Influenza (HPAI) on vulture populations has been recorded from various parts of the flyway, particularly from Spain, France (Duriez et al., 2023) and The Gambia (Camara, personal communication, 2023). Considering the impact that this disease has had on other populations of wild birds (at all levels of the food chain), it is important to be aware of the additional impact it may have on populations of critically endangered and endangered vulture species that are already under pressure from other known threats. The impact of the virus on the Critically Endangered Californian Condor in the United States in 2023 is a case in point (US Fish and Wildlife Service, 2023). Other emerging diseases, like West Nile Virus, have also killed wild vultures, and need to be taken in consideration (Loureiro et al., pre-print).

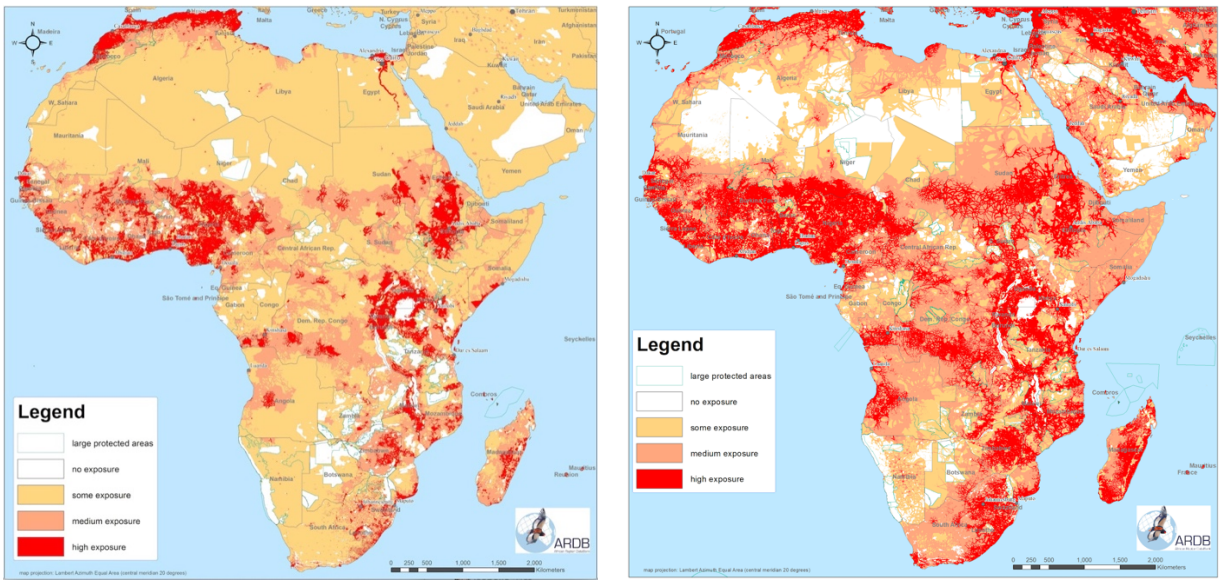
Finally, some respondents did not complete the threat section and some others replied that they did not know whether threats had changed. This suggests that there is no or limited research on the causes of declines in vulture species in some countries. While understanding of threats is evolving, further

research and monitoring is required to inform implementation strategies. The Vulture Conservation Foundation (VCF), for example, runs a Europe-wide vulture mortality database, that is key to evaluate the relative importance of mortality causes in that continent.

Further understanding would inform threat maps, as was previously completed for Africa in the Vulture MsAP. For this report, these threat maps were updated and are presented below. Larger-scale 2023 maps with metadata are available in Annex 10.2.2. As noted later, one of the recommendations of this report is that, in future, it would be useful to have similar maps for the rest of the Eurasian vulture range.

Figure 3 compares the exposure of vulture populations to human activities in Africa in 2017 and 2023. It is evident that the human footprint, and the potential exposure to a variety on anthropogenic threats, has expanded substantially since 2017.

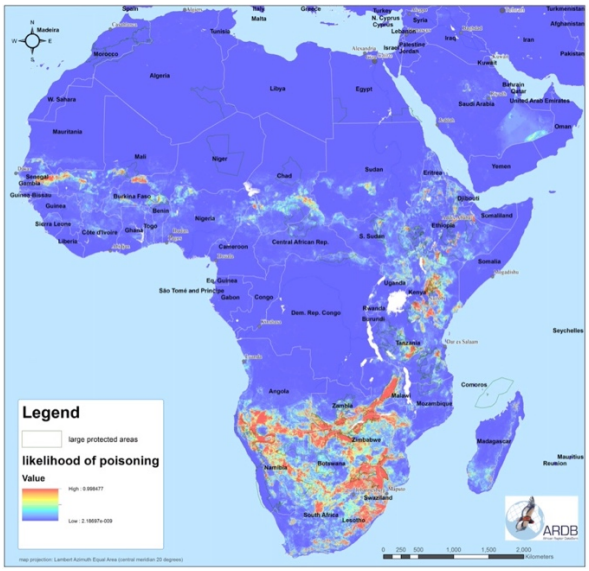
Figure 4 shows that the prediction of the 2017 map in terms of potential poisoning hotspots was fairly accurate, especially for Southern and East Africa. It may seem surprising that the likelihood of poisoning in West Africa is not as great as would have been suggested by the large-scale intentional poisoning in Guinea-Bissau of over 2,000 Hooded Vultures in 2020. However, this is because this was a single event in a single country, whereas the model used to develop the map incorporated a number of predictors, including strategies to avoid bias. Another map, which looks at belief-based use, highlights poisoning hotspots relating to this practice, reflecting the Guinea-Bissau incident amongst others (Figure 5): otherwise, this map is similar to the 2017 version, which is therefore not reproduced here.



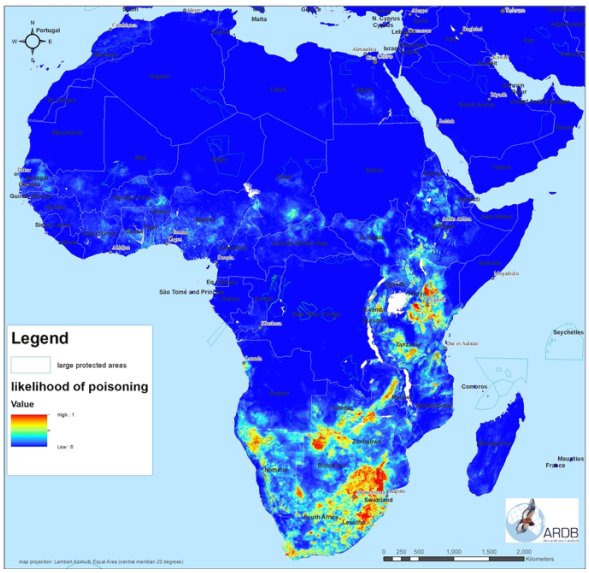
2017 **2023**

Figure 3: Threat maps for the African region indicating the threat of exposure of vulture populations to human activities and the anthropogenic threats associated therewith, from the Vulture MsAP (2017) and the review conducted for the MTIR in 2023

Note: The metadata for the 2023 map are available in Annex 10.2. Improved datasets allowed the model to be improved for Africa and also extended into the Arabian peninsula, which accounts for some of the changes since 2017.



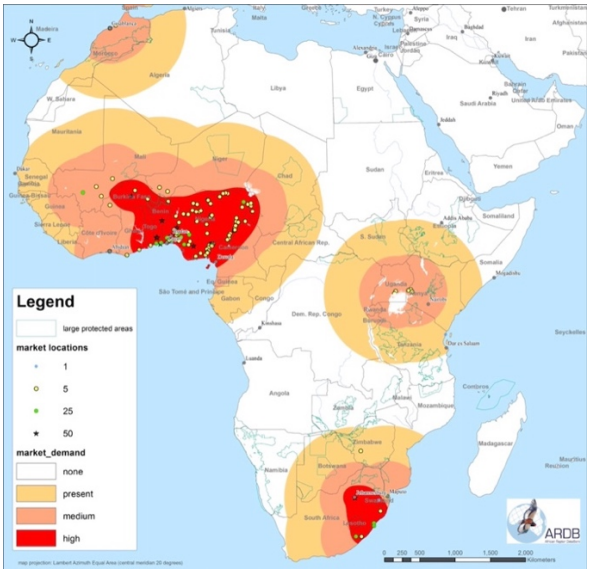
2017



2023

Figure 4: Threat maps for the African region indicating the threat of exposure of vulture populations to the likelihood of poisoning, from the Vulture MsAP (2017) and from the review conducted for the MTIR in 2023

Note: The metadata for the 2023 map are available in Annex 10.2. These include a detailed description of the indicators used, and the strategies deployed to avoid bias.



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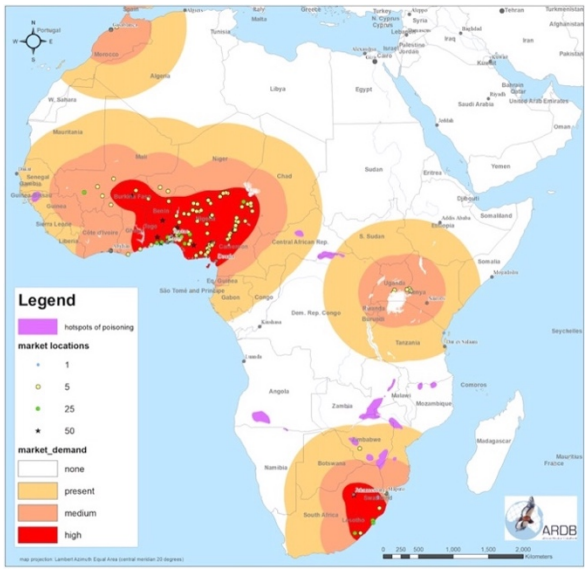
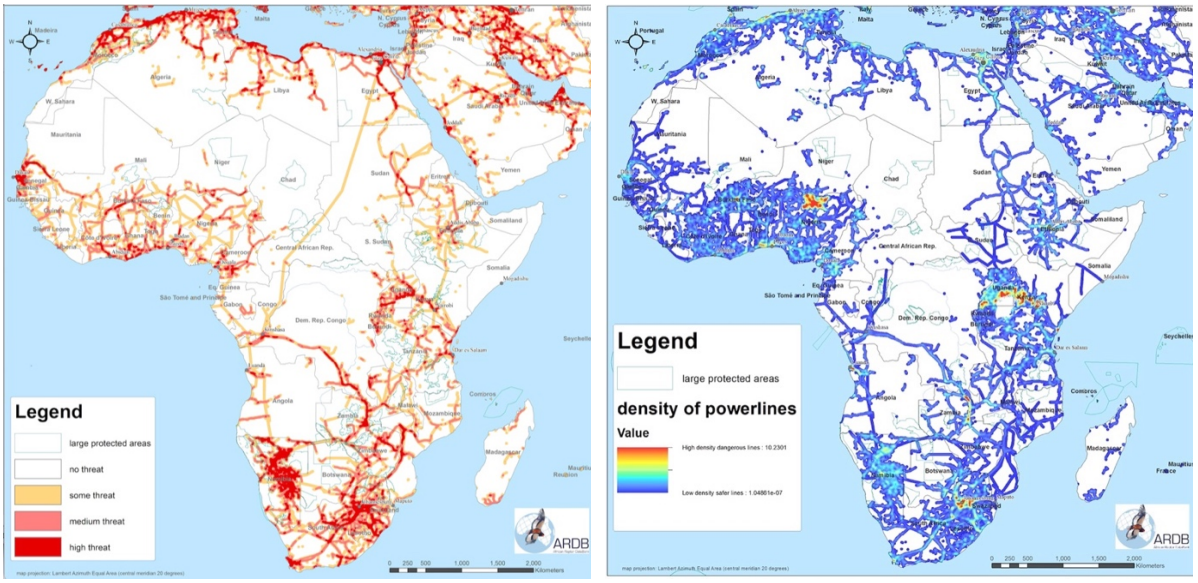


2023

Figure 5: Threat map for the African region indicating the threat of exposure of vulture populations to the likelihood of belief-based use, conducted for the MTIR in 2023. Known poisoning hotspots associated with belief-based use are indicated in this updated map and reflect the mass-poisoning in Guinea-Bissau in 2020.

Note: The metadata for the 2023 map are available in Annex 10.2.

In Figure 6, the 2023 map indicates extensive expansion of electricity networks in all regions in Africa with an increased associated risk.

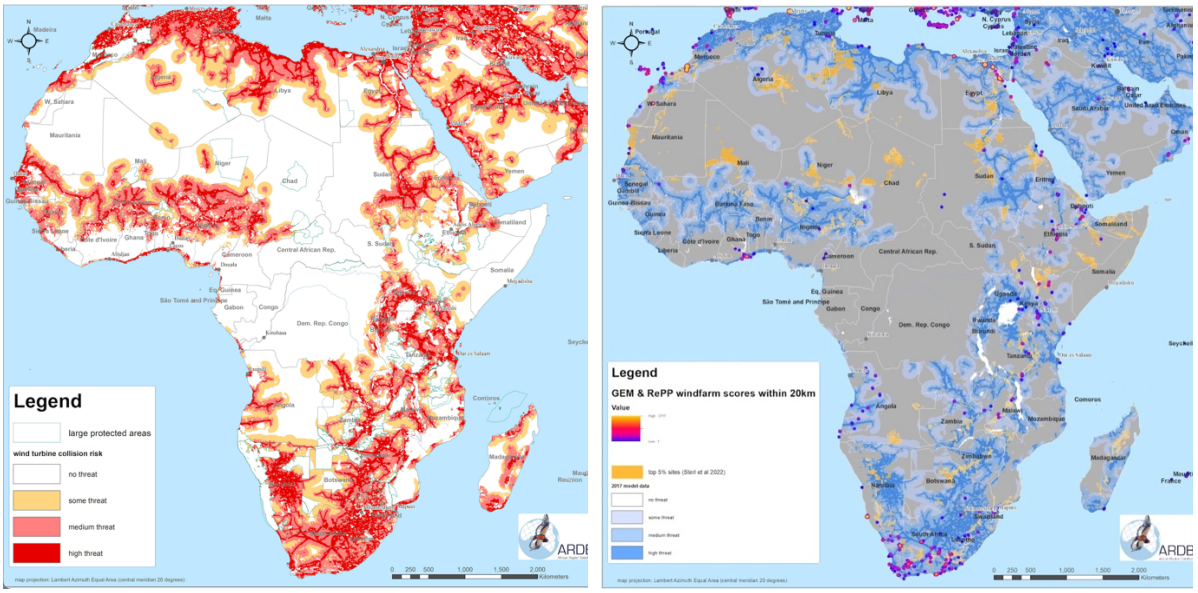


2017 **2023**

Figure 6: Threat maps for the African region indicating the threat of exposure of vulture populations to power-line networks and the associated risk of electrocution on energy infrastructure, from the Vulture MsAP (2017) and from the review conducted for the MTIR in 2023.

Note: The metadata for the 2023 map are available in Annex 10.2. They explain the system weightings given to different sorts of power lines.

In Figure 7, the 2023 map super-imposes the original model for collision risk (in blue) with two new datasets. The top 5% of areas which are best for siting wind farms are indicated in orange. The vivid, localised colours (ranging from purple to orange) are another over-lay, representing the risk posed by existing, under-construction and planned wind farms. The updated map indicates a significant increase in the developed, under-construction and planned wind farms in most regions, except central Africa, with an associated increased risk of impact on vultures in these areas.



2017 **2023**

Figure 7: Threat maps for the African region indicating the threat of exposure of vulture populations to wind turbines and the associated risk of collision, from the Vulture MsAP (2017) and from the review conducted for the MTIR in 2023.

Note: The metadata for the 2023 map are available in Annex 10.2. These also describe the adjustments to the 2023 map.

5 Biological Assessments

5.1 Overview

Annex 10.3.1 presents the current demographic status of each species, while Annex 10.3.2 presents all the demographic data submitted by respondents, by species. Although conducting a Full Census was identified by the Vulture MsAP as an essential activity (Action 11.1.1), this has not been carried out in all range states. As a result, the demographic trends over the past 10 years are not known for many countries, especially in Africa and parts of Asia (10 years is in any case a relatively short period within which to detect change, especially in long-lived species such as vultures). The data submitted as part of this overview were often incomplete: several respondents did not submit any data at all, while several submitted only partial data (not providing breeding population trend data, or only providing data for the areas where they work, for example). Nonetheless, for many others there are updated figures and useful notes about changes to the distribution of each species within countries (see Annex 10.3.2).

Further details on each species are provided below. The main themes arising from this review are that:

1. Census data in many countries remain scant, although there have been improvements in some regions and countries; in particular, population data for Europe is quite accurate, including trends.
2. Vulture populations are recovering in some countries, notably in Europe, particularly where government and NGO/research institutions have been engaged and significant funding has been allocated, resulting in significant conservation interventions;
3. Many vulture populations are still declining at a precipitous rate, especially in Africa. This is supported by newly published research which estimates that Hooded Vultures have declined by 67%, White-backed Vultures by 86%, Lappet-faced and White-headed by 90%, and Rüppell's Vultures by 97% over three generations, in the savannah areas of West, East and Southern Africa (Shaw et al., 2024). Declines are worst in West Africa. These percentages are far above the 30% used by the IUCN to identify species at risk of extinction.

5.2 Assessments by species

5.2.1 Bearded Vulture *(Gypaetus barbatus)*

The Bearded Vulture is a charismatic high-altitude species occurring along mountain ranges of the Old World. The species has experienced a global range contraction in the last century mainly due to unintentional poisoning and direct persecution. It is considered Near Threatened at a global level.

The species is generally increasing in Europe - countries such as Armenia, Austria, France, Greece, Italy, Spain and Switzerland reported an increase in their breeding populations. This suggests that a variety of conservation efforts, including reintroductions and reinforcements, are having a positive impact. According to the Vulture Conservation Foundation's latest population data for Europe, there were 465 breeding pairs of bearded vultures in this continent in 2021, up from around 100 in the 1980s (Terraube et al., 2022).

The Iraqi population may also be increasing, while the populations of Ethiopia and Kenya are stable. Populations may also be stable in China but the Central Asian countries of Kazakhstan and Kyrgyzstan,

Turkmenistan and Tajikistan identify declines. Syria (where the species probably does not breed any longer), Morocco, Lesotho and South Africa also note declines.
The trend data from several countries are scant, either because data were not submitted to the MTIR or because of inherent difficulties with monitoring over time. Thus, for example, there are insufficient data from South Asia to comment on the changing status of this species across the Himalayan range.

5.2.2 Egyptian Vulture *(Neophron percnopterus)*

The Egyptian Vulture has a northern breeding range across some of the southern European and North African countries through to Central Asia where it is mainly a summer breeding visitor. There are distinctive resident populations in South Asia which is joined by the migrant subspecies there in winter. Across the Sahel and parts of East Africa and Arabia the species is mainly a non-breeding visitor but also with small resident populations.

The Egyptian Vulture was listed as Endangered in 2007. It has been the subject of a specific Flyway Action Plan for the Conservation of Balkan and Central Asian Populations since 2016 (Nikolov et al., 2016) and, following its implementation via two large LIFE projects, the Balkan breeding population has stabilised (Weston & Nikolov, 2023). No change was recorded in the numbers of migratory birds at key monitoring sites, but a new spring migration monitoring site has been established in Egypt where 1,000 birds have been recorded (Noby et al., 2022). As part of the mid-term implementation review of the Egyptian Vulture Flyway Action Plan (Weston & Nikolov, 2023), additional important areas for the species were also confirmed for further protection and monitoring. However, the review confirmed that the species is locally extinct in Serbia and Romania.

Annex 10.3.2 combines the data from the Egyptian Vulture Flyway Action Plan with additional and updated information from the MTIR. The following trends emerge in countries that submitted data:

- an increasing population in Israel due to concerted conservation efforts (reintroduction, reinforcement, safe food availability and insulation of power lines) and colonisation of Sardinia;
- stable populations in parts of Europe (Albania, Bulgaria, France, Greece, Italy, North Macedonia, Portugal and Spain), Central Asia (Kazakhstan, Kyrgyzstan and Tajikistan), East Asia (Central Asia), South Asia (Pakistan), the Middle East (Oman) and Africa (Algeria, Ethiopia), although in some of these countries the populations have barely stabilised;
- declining populations in Armenia, India, Turkmenistan, the United Arab Emirates and South Sudan;
- the formerly resident population in Cabo Verde is now probably biologically extinct as no young individuals have been reported in the past few years; and
- the species is possibly extinct in Zimbabwe as there have been no published reports since the Vulture MsAP in 2017).

This mixed picture of substantial successes in halting past declines in several countries, at the same time as ongoing declines and continuing extinctions in others, reflects the impact that adequate financial allocations towards vulture conservation can have, as well as probably a variety of other socio-economic and political factors.

5.2.3 Red-headed Vulture *(Sarcogyps calvus)*

The Red-headed Vulture occurs in parts of South and South-East Asia, but is confined to relatively well forested areas, and at low densities, not being a colonial species. It has been listed as Critically Endangered since 2007.

Breeding population data were only received from two countries, Cambodia and Pakistan, although the main populations occur in India and Nepal. Cambodia identified a decline in the species whereas Pakistan reported that its small population is stable.

5.2.4 White-headed Vulture *(Trigonoceps occipitalis)*

The White-headed Vulture is found across Sub-Saharan Africa, except in the densely forested areas of Central Africa. It has been listed as Critically Endangered since 2015 and is largely confined to protected areas.

Of the 7 countries that provided trend data, only 2 (Ethiopia and Zambia) felt that the breeding population is stable. The remaining 5 (Chad, Guinea-Bissau, Malawi, Rwanda and South Africa) noted declines. A local extinction has occurred in one of the provinces of South Africa (KwaZulu-Natal) and the possibility of captive breeding is being explored. Generally the demographic figures – whether for breeding pairs or total population size – are very low, except for Mozambique (which has the greatest density of these vultures and is considered a stronghold) and Zambia.

5.2.5 Hooded Vulture *(Necrosyrtes monachus)*

The Hooded Vulture is resident throughout Sub-Saharan Africa. It has been listed as Critically Endangered since 2015.

Only 5 counties provided breeding population trend data. Two – Ethiopia and Tanzania – reported that their populations are stable, but three – Burkina Faso, Guinea-Bissau and Malawi reported that they were declining. Unpublished data from 2022 in Guinea-Bissau point to declines of over 80% since a 2016 baseline, following mass poisoning events in at least two cities in 2020, with at least 2,000 hooded vultures poisoned. In Malawi, the species now seems to be uncommon.

While the overall situation in South Africa is unclear, there is an increase in reporting rates for both adults and juveniles in the province of KwaZulu-Natal.

A respondent from Botswana noted that the range of the species should be extended further south within the country than indicated by the map in the Vulture MsAP.

5.2.6 Himalayan Griffon *(Gyps himalayensis)*

The Himalayan Griffon is distributed across the Himalayan range and adjacent countries, as well as further east to Mongolia and central China. The species has been listed as Near Threatened since 2014.

Only 3 of the 8 countries where the species is resident provided data. China and Kazakhstan report stable populations, with the population in China on the Tibetan plateau being particularly large.

Tajikistan reports a decline, however. There are no recent trend data from South Asia, despite earlier mixed trends documented from Nepal and India.

The respondent from Myanmar noted that the distribution map in the Vulture MsAP only indicates the species in the north, whereas it is in reality distributed throughout the country. The respondent from Laos indicated that it might be possible that the species is present in the country near the border. Note that these records away from higher altitudes are mainly immatures and subadults during the non-breeding season.

5.2.7 White-rumped Vulture *(Gyps bengalensis)*

The White-rumped Vulture still occurs across much of South Asia, and east through Myanmar to Cambodia and nearby in Laos. It was up-listed to Critically Endangered in 2000 and, since 1992, suffered the steepest decline among the Asian vultures, 99.9%. This was attributed mainly to diclofenac use in domestic cattle, a primary food source for the species. Populations in India have stabilised at the new low level (Prakash et al., 2024).

Nepal reports steady significant increases in the breeding population there over the past seven years (Galligan et al., 2020), whilst India reports a stabilised population. However, Myanmar, Cambodia and Pakistan all report ongoing declines of the small remaining populations there.

5.2.8 White-backed Vulture *(Gyps africanus)*

The White-backed Vulture is the most common and widespread vulture in Africa. Its range extends across West, East and Southern Africa, although vagrants have been noted in some North African, Southern European and Middle Eastern countries.

The species was up-listed to Critically Endangered in 2015. For this study, of the 20 countries where the species is known to be resident, 5 noted a decline (Ethiopia, Malawi, Mozambique (although this is a supposition based on poisoning incidents), South Africa (although the population is stable in some areas) and Tanzania. The respondent from Chad changed the status of the species from resident to non-breeding visitor, although it is not known whether this applies to the whole country or just a specific reserve.

The populations in Botswana and eSwatini could be stable. Zambia notes an increase. The remaining countries with resident populations did not provide data. This is of additional concern, because it suggests these populations are not well-monitored or only exist in small numbers.

5.2.9 Indian Vulture *(Gyps indicus)*

The Indian Vulture occurs mainly in India but there is also a small breeding population in Pakistan. It is also a scarce visitor to Nepal and Bangladesh. The species was listed as Critically Endangered in 2002.

Data were only received from India and Pakistan. In the former, the population has stabilised (Prakash et al., 2024), whereas in Pakistan the small breeding population is declining.

5.2.10 Slender-billed Vulture *(Gyps tenuirostris)*

The Slender-billed Vulture occurs from the northern parts of India through to Myanmar and Cambodia. The main population breeds in Assam, NE India, with a small population in Nepal and occasionally in Bangladesh. The species was listed as Critically Endangered in 2002 and is the old-world vulture having the smallest population overall.

Data were only received from Cambodia and Myanmar although there was some feedback also from India. The small population in Cambodia appears more or less stable, but for the population in Myanmar there is some suggestion of decline. In India it may be stabilizing, like the other Gyps species, but the data is insufficient to confirm this.

5.2.11 Cape Vulture *(Gyps coprotheres)*

The Cape Vulture mainly occurs in South Africa and Lesotho, but there are two substantial breeding colonies in Botswana and a tiny breeding population on the border of Mozambique and eSwatini. The species was formerly listed as Endangered but was down-listed to Vulnerable following an extensive re-assessment process in 2021 (BirdLife International, 2024). This is because this species is currently considered to be stable to increasing because of concerted conservation efforts by a wide range of partners and stakeholders within the species' range over more than 50 years.

Unfortunately, however, no updated demographic data were submitted to the MTIR for South Africa. It is the opinion of a couple of respondents that numbers are increasing in South Africa and possibly in Botswana and, in Lesotho, are either stable or increasing. Records of sightings may also be increasing in Zambia, although the species does not breed there.

5.2.12 Rüppell's Vulture *(Gyps rueppelli)*

The Rüppell's Vulture is distributed across the entire Sahel region as well as East Africa. In recent years it has been increasingly sighted on the Iberian Peninsula, with an average of around 70 birds crossing the Gibraltar straits every year from the several hundred that reach northern Morocco. Although a breeding population has not yet been confirmed in Europe, this is expected soon, particularly as the species has already hybridized with Eurasian Griffon in Spain (Muñoz, Ramírez & Real, 2024).

It is thought that this colonisation of Europe may have happened because of individuals following juvenile Griffon Vultures that spend the northern winter in West Africa, once they return to their breeding grounds in Europe.

The species has been listed as Critically Endangered since 2015 and the Vulture MsAP noted that in their historical range they are in steep decline. Unfortunately, almost no trend data were submitted by countries with breeding populations for the MTIR, so it is difficult to comment on whether the conservation status of this species shows signs of changing. However, the number of breeding pairs or total individuals seen annually in most countries is generally very low. An exception is Ethiopia which reports large numbers of breeding pairs and an increasing trend in population.

5.2.13 Griffon Vulture *(Gyps fulvus)*

The Griffon Vulture breeds in southern Europe, the Middle East, Central and East Asia. The species was thought to be extinct as a breeding species in North Africa, but restarted nesting in Morocco in 2021, and there is a small but stable breeding population in Algeria (Terraube et al., 2022). A significant proportion of the western European population (up to 20%) migrate from their breeding grounds south to the African continent during the non-breeding season.

The conservation status of the species has been listed as Least Concern since 1988, and it has benefited from a number of reintroduction and reinforcement programmes, notably in Bulgaria, France, Cyprus and Italy. Generally, the species is one of the better-documented species, with 22 of the 29 countries where resident populations are known, providing trend data.

Positive news for the species is that increasing populations are reported in 9 European countries (Andorra, Armenia, Bulgaria, France, Greece (mainly Crete), Italy, Portugal, Serbia and Spain) plus Israel, while populations are stable in Croatia, Cyprus, Kyrgyzstan, North Macedonia and Tajikistan. In Croatia, the species began nesting on the mainland in 2022, reportedly as a result of feeding stations. According to (Terraube et al., 2022), there were 30,438 – 41,984 breeding pairs in Europe in 2019 alone, with some countries (e.g., Spain) registering an increase of about 200% in the last 30 years.

Griffon Vultures do not seem to be doing as well in the rest of the Middle East and Central Asia, however, with Jordan, Kazakhstan, India, Syria, Turkmenistan and Türkiye reporting declining populations.

5.2.14 Cinereous Vulture *(Aegypius monachus)*

The Cinereous Vulture breeds in some southern European countries, the Middle East, Central Asia and East Asia. As a partial migrant, some individuals migrate south of their breeding range in the northern winter, as reflected by the large number of countries (29 out of 44) recording non-breeding populations, passage migrants or vagrants.

The Cinereous Vulture has been listed as Near Threatened since 2004 and is the subject of a 2018 Flyway Action Plan developed in parallel with the Vulture MsAP. From a historic low point, the population of Cinereous Vultures has been steadily recovering since the 1980s and the latest survey of the European populations shows an increasing trend in number of breeding pairs. Measures to protect wildlife from wildlife poisoning have resulted in a rapid recovery of the species in the Western population (Spain and Portugal). Efforts to reintroduce Cinereous Vultures began in France in the 1990s which has seen the species return to the south-western part of the country and respondents from Armenia, Bulgaria, France, Portugal and Spain reported increasing breeding populations over the past 10 years, although the increase is small in some cases. In Bulgaria the species has been re-introduced since 2018 and is now breeding for the first time in decades. In Greece and Kazakhstan, the breeding population seems to have stabilised. Increased sightings are reported in countries where the species over-winters or is a passage migrant and vagrant, such as in Switzerland, North Macedonia, Iraq and West Africa.

Unfortunately, the species is still declining in Kyrgyzstan, Tajikistan, Türkiye, Turkmenistan and Uzbekistan, while trend data for other breeding populations – in Iran, China and Mongolia – are not available. Despite the re-introduction success in Bulgaria, the Balkans remains an area where the species is confronted by many threats (Terraube et al., 2022).

5.2.15 Lappet-faced Vulture *(Torgos tracheliotos)*

Lappet-faced Vultures are distributed widely across Sub-Saharan Africa and in parts of the Middle East, except in densely forested areas in West and Central Africa. The species has been listed as Endangered since 2015.

Unfortunately, relatively little seems to be known about the species' demography, with only four of the 22 countries with known resident populations (Chad, Niger, South Africa and Zambia) able to provide some breeding pair data, although most of the data are incomplete. Trend data for breeding populations are therefore also scant, although South Africa and Tanzania identify a decline, eSwatini and Rwanda report that this formerly resident species has not been sighted for over a decade, and two years, respectively, and Malawi notes that the range of the species within the country has contracted. It is of concern that similar negative trends could be happening in other countries but are not identified because of lack of data.

However, a more positive situation persists in Ethiopia which has a stable population, while Zambia reports an increase in sightings (although it is not clear whether this corresponds to a growing population).

The population of the species in the Arabian Peninsula belongs to the subspecies *Torgos tracheliotos negevensis*, the Arabian Lappet-faced Vulture (Bruun, 1981). This subspecies is even more rare and threatened than the nominate one, found in sub-Sahara Africa, with only about 600 individuals left in only four countries: Saudi Arabia, Oman, Yemen and the United Arab Emirates (BirdLife International, 2023). Its conservation is therefore of huge importance and concern. Data from Oman collected during 2021 and 2022 will hopefully soon be able to shed some more light on the demography of Lappet-faced Vultures in that part of the Middle East.

6 Overall Implementation Review and Conservation Effort Assessment

Overall progress with the Vulture MsAP, financial investments in vulture conservation, and obstacles to implementation are reviewed in overall terms in this section: separate analyses by the Vulture MsAP Objectives are presented in the following section.

6.1 Implementation of the Vulture MsAP across Afro-Eurasia

Figure 8 shows the Regional Implementation Scores for all the Vulture MsAP Actions, incorporating all the data that were received. These Regional Implementation Scores (RIS) can be between 1 and 4 and are based on the average of all actions relevant to the countries within a particular region. The Figure shows significant variation between regions with higher scores achieved in Europe and South Asia, compared to elsewhere in the Vulture MsAP range. This highlights the effects on conservation of large funding programs, such as the European Union's LIFE programme, and the coordinated effort of the SAVE program (discussed later in this section).

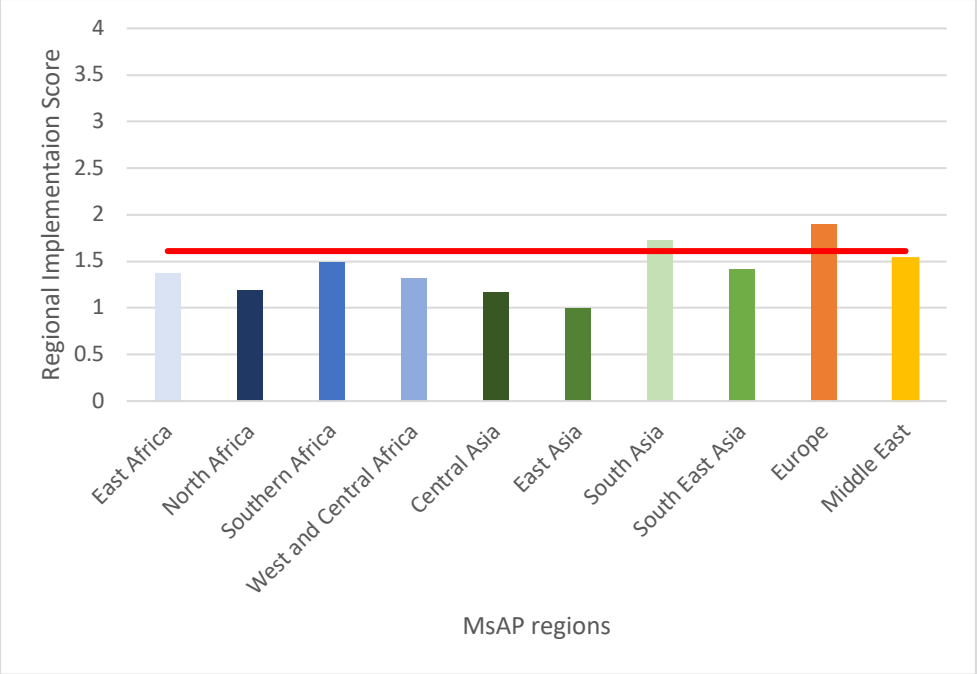


Figure 8: Mid-term Regional Implementation Scores (RIS) for the CMS Vulture MsAP across Afro-Eurasia
Note: red line = average RIS

At the halfway point of this Action Plan implementation timeframe an average implementation score of between 2-2.5 would have been expected, but it currently stands at only 1.61. This is a clear indication that more resources and engagement are required to meet the overall targets set for the implementation of actions over the next 6 years across all regions: this is discussed further later in this section.

The National Implementation Scores (NIS) for individual countries in Figure 9 again show that there is considerable variation between countries within individual regions. When progress is examined at this level, there are only a few countries that have assessed themselves as having achieved an IS above 2, and even fewer above 2.5.

When the score for the Actions categorized by priority for implementation is considered (Figure 10), it is evident that Essential actions have not been implemented more quickly compared to Medium or High Priority actions, as was recommended by the Vulture MsAP. However, it may be that some Essential actions require a suite of other actions to be in place before they can be implemented properly. Equally, some Essential actions may be harder to implement.

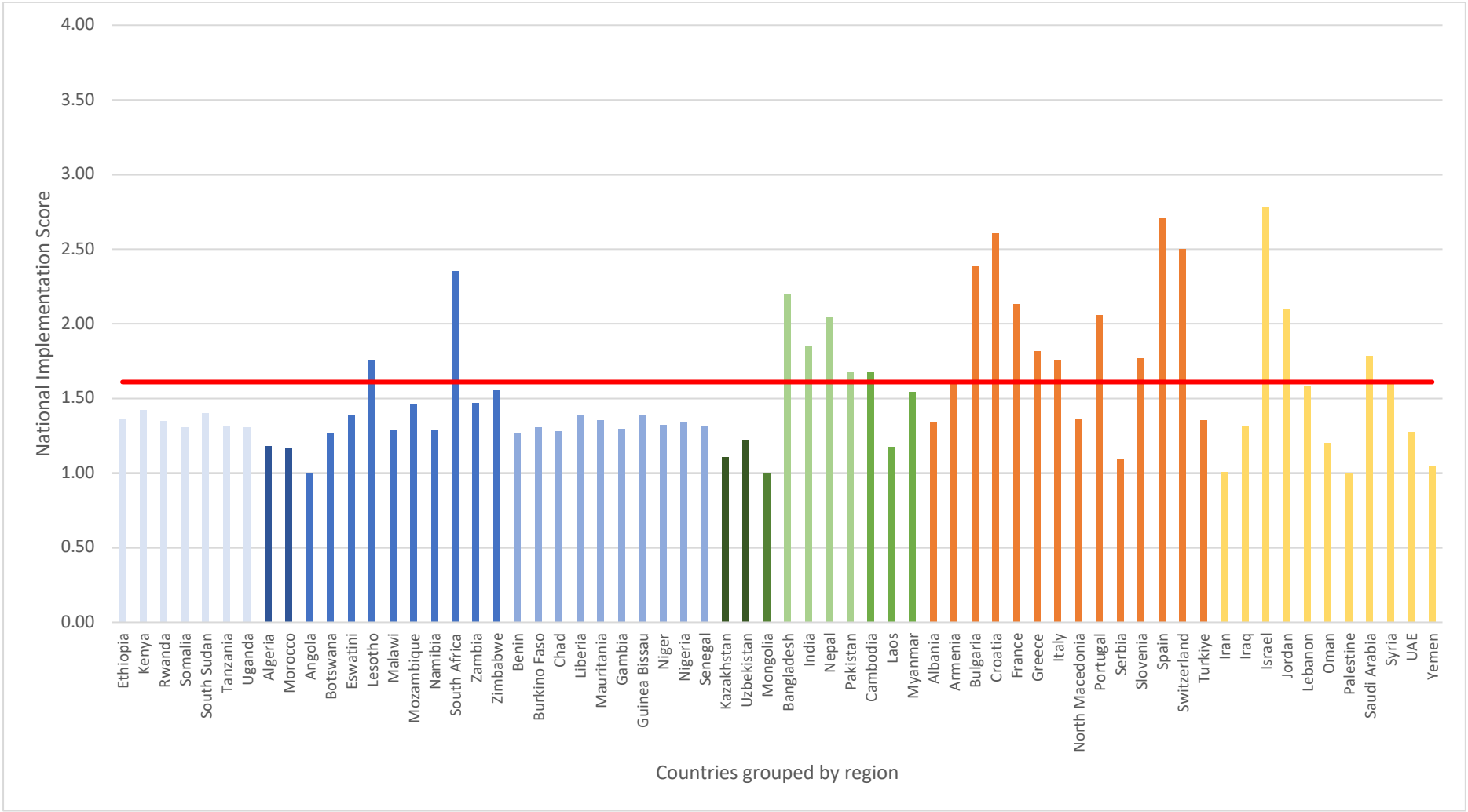


Figure 9: Mid-term National Implementation Scores (NIS) for the Vulture MsAP by country
Note: red line = average NIS; colour of bars indicates region (see Figure 8 for colour coding of regions)

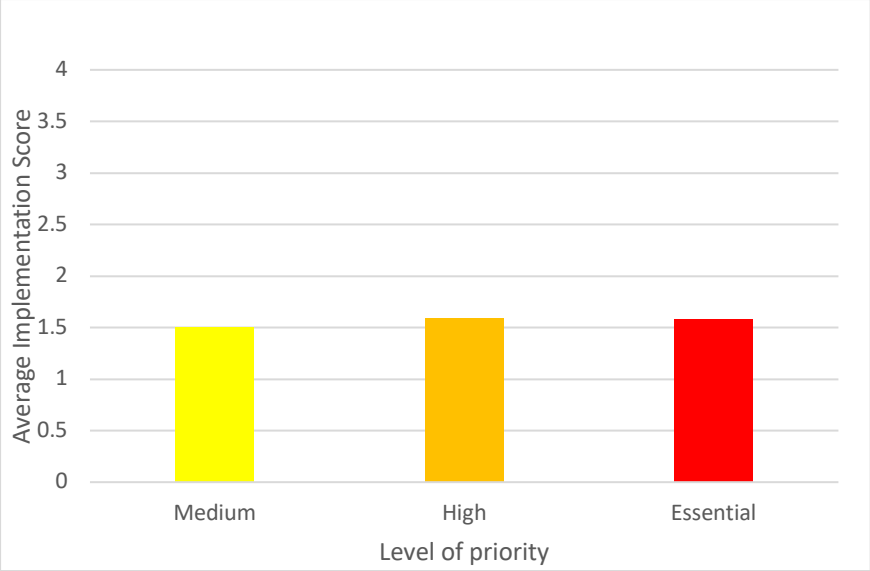


Figure 10: Average Implementation Score by priority of Action

Singling out the 17 Essential Actions, only Action 11.1.1 (conducting a census of demographic data) has achieved an Implementation Score of 2 (Figure 11). Because all these Actions have a Priority Score of 4, twelve of them have an Action Priority Score above 3 (three have an Action Priority Score above 3.5.), whereas the vision of the Vulture MsAP was that 11 of the Actions would already have been completed by this review.

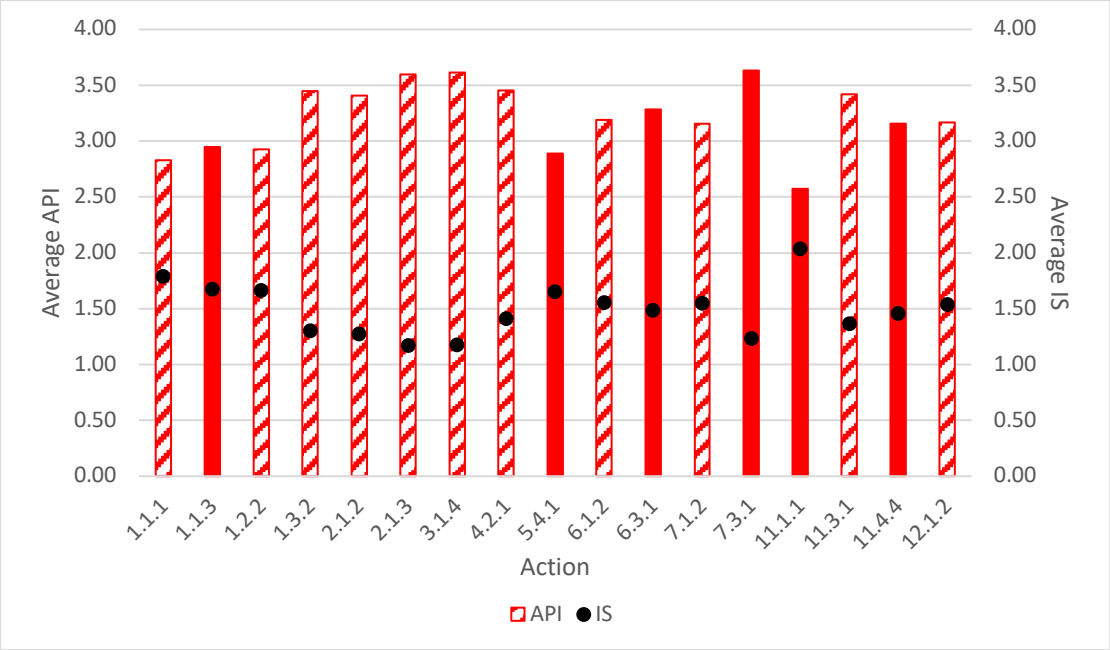


Figure 11: Average Implementation and Action Priority Scores, for each Essential Action
Key: hashed bars = Actions that should already have been completed; solid bars = Actions that need to be completed by the end of the Vulture MsAP period (2029)

Comparison of the average Implementation Scores for actions that should have been completed or be close to full implementation in the first six years of the Vulture MsAP, to actions intended to be implemented over the longer term, shows a small difference of about 0.5 (Figure 12). It would have been expected that the scores for actions to be implemented in years 1-6 should be significantly higher, and ideally completed at this point.

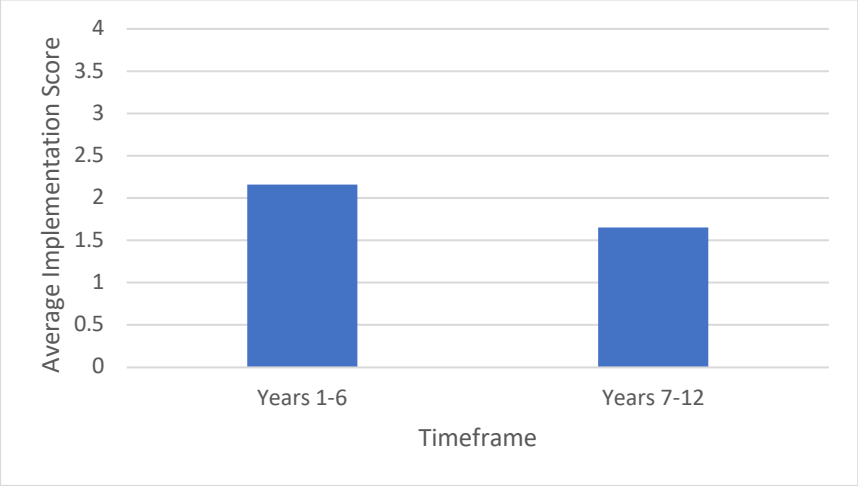


Figure 12: Average Implementation Score by timeframe

6.2 Policy-development, legislative change and enforcement in support of MsAP

Annex 10.4 summarises in detail the information provided by respondents on legislation, policies and protocols that have been developed since the adoption of the Vulture MsAP. Legislation, policies and protocols typically take considerable time and stakeholder engagement before they can be enacted and published, and therefore represent a significant effort in creating a legal and policy framework to support conservation.

Respondent feedback indicates that there have been reviews and improvement in legislation supporting vulture conservation in at least 27 Range States since the adoption of the Vulture MsAP. Changes included the improvement of conservation and protection status of vulture species and improvement in legislation to either prohibit or control the use of poison (discussed in more detail later). Another positive development has been the banning of the use of certain NSAIDs for veterinary use in Cambodia, India, Iran and Oman, but the legalisation of the use of rodenticides to control stray dogs in Cabo Verde raises concerns for the Egyptian Vulture population there.

A further development has been the tabling of a resolution to request an investigation on, and greater efforts to reduce, the illegal trade of vultures for belief-based use led by three West African countries at CITES COP18 in Geneva in 2019. An assessment was subsequently conducted, shared and used as guidance for the drafting of the West African Vulture Conservation Action Plan (Chandra et al., (in press)) that specifically focuses on addressing this threat across 15 countries in West Africa.

A further good development has been progress in the process to eventually ban lead from all hunting ammunition in the European Union (EU). From 15 February 2023 onwards, the use of lead ammunition became illegal in and around wetlands across all the EU's 27 countries, Liechtenstein, Iceland and

Norway. The ban on lead ammunition, a toxic element seriously affecting nature, wildlife and human health, is a meaningful step forward to protect the wildlife that falls victim to lead poisoning every year. The EU is now seeking the total phase-out of lead ammunition for hunting, including on terrestrial habitats, and this continues to be a priority to help restore the populations of vultures and other scavenging species. The EU Commission will prepare a legislative proposal and submit it to a vote by the EU Member States in the Committee on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) soon. Before any restriction can be adopted, the European Parliament and Council will review and examine it thoroughly.

With respect to policy guidance, 13 Range States have reported that Conservation Action Plans specifically focused on vultures or addressing one of more of the threats that impact them, such as poisoning or illegal killing, are in process or have been completed. Zimbabwe was the first African country to complete and have its National Vulture Action Plan ratified by government in 2018. Range States should be encouraged to consider steps and plan for the provision of resources towards the implementation of National Action Plans during the planning process to support successful implementation once plans have been completed and approved.

Protocols with regard to the improved management and investigation of poisoning incidents have been a significant focus in several countries across the flyway, particularly in Europe, where vultures are now legally protected across the whole European range. Details on further actions to combat poisoning are described in Section 7.1.

6.3 Financial investment in vulture conservation

Full implementation of the Vulture MsAP is entirely dependent on funding, and it is clear from respondents' comments discussed below that funding has been the primary limiting factor since the Vulture MsAP's adoption. Most actions within the Framework require financial resources, governmental engagement and long-term commitment, often based on the availability of financial resources in the Range States.

According to the data collected through the MTIR online questionnaire and additional publicly available information for Europe (LIFE Programme, 2023), there was an investment of at least USD64,718,467 (nominal prices) in vulture-specific conservation projects across the entire Vulture MsAP range from adoption (2017) to this implementation review (2023) (Figure 13). The actual investment could be significantly higher, as data are missing from several Range States, and especially as the figure does not include budgets for broader conservation efforts (such as protected areas) which provide huge benefits to vultures (Shaw et al., 2024). In addition, due to limitations in the data received, prices are expressed in nominal terms (i.e., not adjusted for inflation).

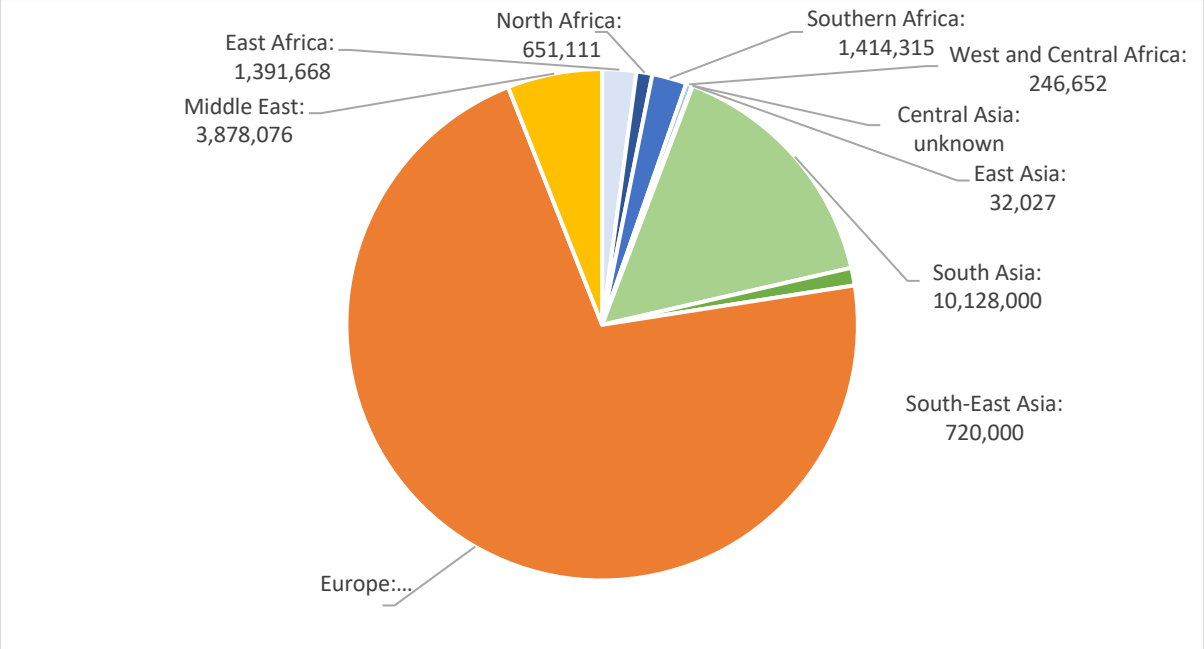


Figure 13: Financial investment in vulture conservation since the adoption of The Vulture MsAP, by region (US dollars (nominal prices), using the official World Bank exchange rate to convert local currencies for 2022)

Almost three-quarters of the funding (71% or just over USD46 million) was provided and invested in Europe. Of this, about 70% was contributed by the European Union through the LIFE Programme. Over the last 30 years, an average of USD 8,000,000 has been invested annually in vulture conservation in Europe, primarily focused on EU member states. As expected, this funding is concentrated in vulture strongholds such as Spain, Portugal, France, Italy, Bulgaria, and Greece, targeting threats like wildlife poisoning and collisions with, or electrocution by, energy infrastructure, along with significant investments in vulture reintroduction and reinforcement projects.

South Asia received the next highest proportion of funding at 16% (just over USD 10 million) due to SAVE projects, which also funded projects in South-East Asia to the tune of USD 720,000 (an additional 1% of total funding). Very little data were received from Central and East Asia and so it is not possible to comment on funding levels there.

The third best funded region was the Middle East which received 6% of the total (almost USD 4 million), with up to 70% of this funding allocated to Lebanon and Saudi Arabia for initiatives targeting collisions, electrocution, other vulture threats and research.

Southern and East Africa each represent a significant investment of 2% of the total. Southern Africa saw almost USD 1.5 million, with 45% of this invested in South Africa. In East Africa, almost 90% of the USD 1,391,668 total was invested in Tanzania. There is a notably lower investment in North Africa (1% of the total) and in West and Central Africa (less than 1%), but this is potentially due to a lack of data.

While acknowledging missing data in this survey, the available information nevertheless provides a picture of the overall scale of financial investments across the Vulture MsAP regions, and hence the level of engagement by government authorities and donors. The level of this engagement reflects the successful Vulture MsAP implementation in some regions and countries, notably in Europe and South Asia, ultimately resulting in positive trends in some vulture populations.

Financial investment in vulture conservation across the Vulture MsAP geographical scope is not just a commitment to preserving a unique group of bird species but an investment in the health and stability of entire ecosystems, and on strengthening essential ecosystem services. By addressing the complex challenges vultures face, funding initiatives which enable scavengers to thrive benefits both wildlife and human communities.

6.4 Respondents' perceptions of the Vulture MsAP implementation

Following their assessment of progress in achieving the various Actions and Results (reported in detail in a later section), 61 respondents expressed their overall opinions about the implementation of the Vulture MsAP in their country (they were able to give more than one response). Only 8% of 78 responses (half of these from Europe) expressed satisfaction with the implementation of the Vulture MsAP (Figure 14). Two countries (Israel and Spain) pointed out that this was partly because vulture conservation had started a long time before the Vulture MsAP and therefore not all progress could be ascribed to it.

By way of contrast, the majority of replies acknowledged that there were efforts in their country to implement the Vulture MsAP, but felt that these were hampered by a lack of the essential ingredients to ensure success. Lack of adequate financing (42% of responses), lack of capacity (20% of responses) and lack of commitment from the relevant stakeholders (17% of responses) were identified as the main impediments to success. Some replies explicitly mentioned government stakeholders as lacking commitment, which relates to another 5% of replies identifying lack of policy as an impediment. One respondent expressed the difficulties they face as, *"it takes constant engagement and refresher training to maintain interest in vulture conservation work."* Lack of policies to support conservation is not seen as the main stumbling block, however, which supports the evidence of considerable progress in developing legislative and policy frameworks in many countries described in earlier paragraphs.

4% of replies felt that the Vulture MsAP was too ambitious for their country to implement, with one respondent noting that the interventions that fall under the Vulture MsAP affect several sectors, making it very difficult for one single entity to co-ordinate all actions. The additional 4% of replies stating that the Vulture MsAP is not relevant to their country can be taken to mean that there has not been sufficient engagement with the Vulture MsAP within their country (see analysis below).

Respondents were also asked to rate their own institution's level of engagement in the implementation of the Vulture MsAP (Figure 15). 10% of 59 respondents said their institution was not engaged at all, while another 48% felt there was only some engagement with implementation just initiated. This means that over half of respondents' institutions had limited involvement with the Vulture MsAP interventions. On the other hand, 42% of institutions had made significant (17%) or some (25%) progress.

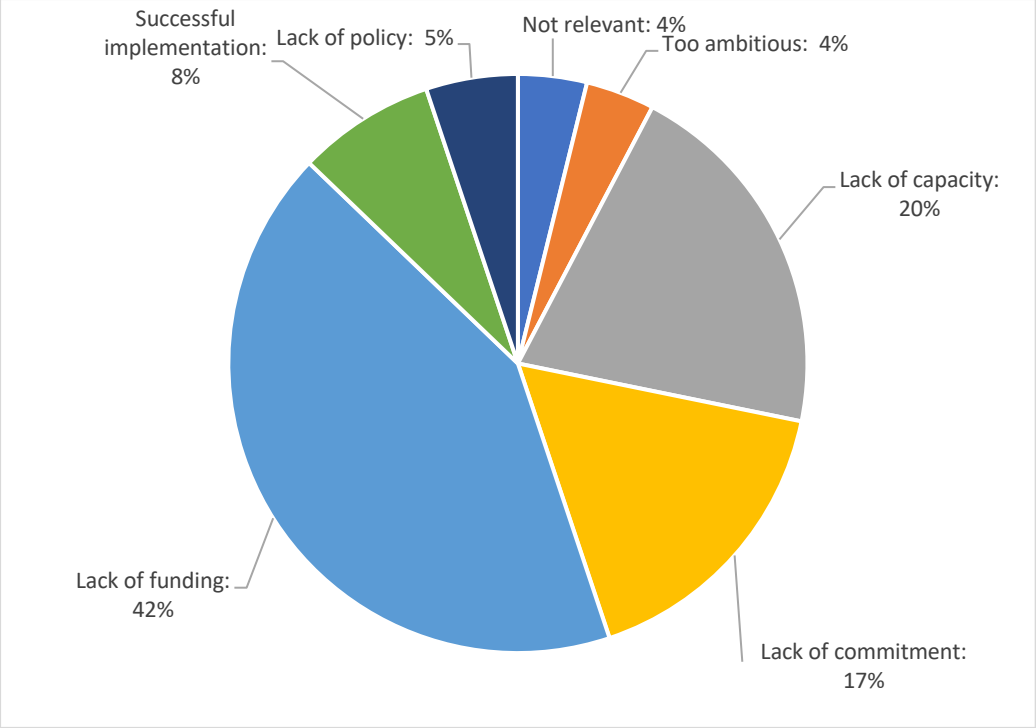


Figure 14: Opinions about why the implementation of the Vulture MsAP has not been completely successful
Note: n=78 replies from 61 respondents

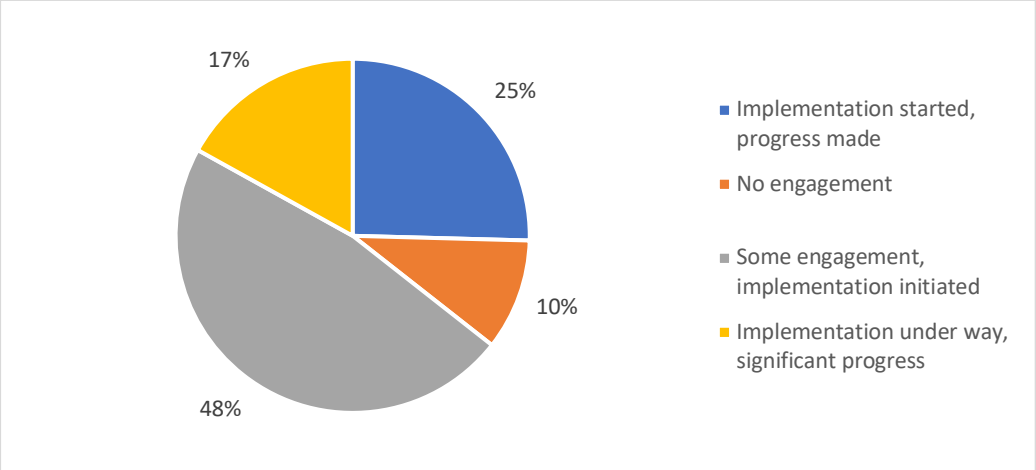


Figure 15: Respondents' views on the level of engagement of their institution in Vulture MsAP interventions
Note: n = 59 respondents

7 Implementation of Individual Objectives

7.1 Implementation of Objective 1: Achieve a significant reduction in mortality of vultures caused unintentionally by toxic substances used in the control and hunting of vertebrates

Objective 1		
Result 1.1: Improved understanding and awareness of human-wildlife conflicts and associated impacts on vultures to inform more effective mitigation approaches.		
Action 1.1.1	All regions	**Conduct an overall situation analysis of wildlife poisoning associated with human-wildlife conflict, with special attention to vulture mortality: covering state of knowledge, drivers and motivations, poisons used (actually or potentially), analytical capacity, hotspots, knowledge gaps and best practice on reducing conflicts and related poisoning.**
Action 1.1.2	All regions	Collect, collate (e.g. via database) and share basic standardised information about poisoning incidents at national, regional and Vulture MsAP-wide levels.
Action 1.1.3	All regions	Implement awareness campaigns, specifically covering (a) negative impacts on vultures and other non-target species; (b) likely ineffectiveness of poisoning as a problem animal control technique; (c) impacts of poisoning on human and livestock health; and (d) legal alternatives to mitigate human-wildlife conflict.
Result 1.2: Conservation authorities, local communities and other stakeholders take collaborative action to tackle unintentional poisoning directed at vertebrate control		
Action 1.2.1	Africa; Central Asia; Europe; Middle East	**Promote poison-free alternatives to mitigate human-wildlife conflict and predator control measures e.g. improved livestock management techniques, legal selective trapping and crop protection methods.**
Action 1.2.2	Africa; Central, South and South-East Asia; Europe; Middle East	**Establish protocols and train and support relevant agency staff (conservation, rangers, police, judiciary) to rapidly respond to poisoning incidents including sharing best practice.**
Action 1.2.3	Africa; Central and South-East Asia; Europe; Middle East	Improve protected area management to prevent poisoning incidents in and around park boundaries (buffers around protected areas and better enforcement of park boundary integrity), encouraging local communities to form or join local wildlife stewardship programmes.
Action 1.2.4	Africa; Central, South and South-East Asia; Europe; Middle East	**Review, improve and implement compensation and/or livestock insurance schemes where appropriate for vulnerable local communities in response to depredation of livestock by wildlife.**
Action 1.2.5	Africa; Central and South-East Asia; Europe; Middle East	**Improve benefit-sharing of conservation revenue from protected areas with local communities to increase the benefits derived from wildlife and therefore discourage poisoning.**
Action 1.2.6	Africa; Central and South-East Asia; Europe; Middle East	**Increase capacity and resources of local wildlife and law enforcement authorities to respond to human-wildlife conflict incidents rapidly and effectively.**
Action 1.2.7	Africa; Central Asia; Europe; Middle East	**Engage positively with agrochemical producers to investigate methods to repel non-target species from consuming poisons.**
Action 1.2.8	Africa; Central, South and South-East Asia; Europe; Middle East	Investigate and promote vulture-safe protocols and guidelines for vertebrate control for the disposal of carcasses at dumpsites e.g. sterilisation and vaccination programmes for feral dog control, and including improving management practices at dumpsites for vultures.
Result1.3: Legal and policy measures respond to causes and impact of unintentional poisoning directed at vertebrate control.		
Action 1.3.1	All regions	Review, develop and significantly increase enforcement of appropriate legislation to control, ban or restrict the sale, storage, distribution, use and disposal of toxic chemicals used in the indiscriminate killing of wildlife.
Action 1.3.2	All regions	**Review, introduce and enforce strict penalties for illegal wildlife poisoning acts, sufficient to deter future poisoning.**
Action 1.3.3	All regions	**Implement environmental Agreements, resolutions and mandates (e.g. CMS + Bern-Tunis Action Plan, CBD).**

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

As shown in the threat assessment map (Figure 2), one of the most substantial threats to vultures is the use of poison baits in the control of predators and problem animals. This is reflected in the number of Essential Actions contained within this Objective and the fact that so many of the Actions were planned to be completed within the first 6 years of the Vulture MsAP. Box 1 provides some examples of projects which fall under Objective 1, for countries which provided some description of their activities.

Figure 16 shows none of the Actions for this Objective are, on average, more than 50% complete, as the IS scores all fall below 2. It is worrying that this includes the very first (and Essential) Action 1.1.1, a situation analysis of the extent and reasons for unintentional vulture poisoning. This means that many countries do not yet know the level and dynamics of this threat, a situation that needs to be resolved urgently, as one respondent explained for their own country:

> *"[This Objective] is achievable assuming a dedicated effort is put in place for research and implementation. Little to no research has been done to tackle this issue, and it is unlikely action will be taken prior to research. There are no known current or future research plans focused on intentional or unintentional poisoning directed at vertebrate control. The extent and reasons for poison use by local farmers and communities must be understood."*

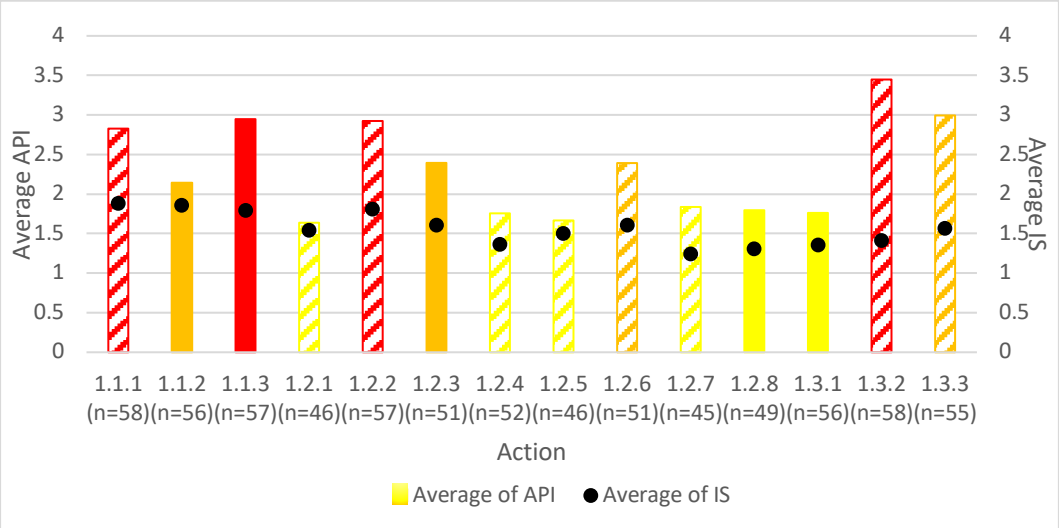


Figure 16: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 1
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

Nonetheless, overall, there does seem to have been an attempt to focus on higher, rather than lower, priority interventions. The exception that stands out is limited progress with introducing and enforcing stricter penalties for illegal wildlife poisoning (Action 1.3.2). This seems to be the Action with the most immediate need for strengthening, both because it has the highest API, but also because it is an Action that should already have been completed (relevant legislative changes, policies and protocols that have been introduced in some countries appear in Annex 10.4). Achieving legislative change, and improved enforcement, is particularly difficult as it involves a range of government sectors, requiring engagement with many stakeholders and generating the political will to introduce changes, and capacity-building for coordination and implementation. All of these processes can take time. As one respondent expressed it, *"The main issue [with] poisoning is that several agencies are responsible and managing components of the work. This is really challenging."* Echoing an earlier point, another respondent added that, *"There is a lot of knowledge gaps that need to be addressed before legislation,*

law enforcement and community engagement can be improved.". Good progress in Europe on this with the Wildlife Crime Academy can be a good model for others to replicate.

Strengthening awareness campaigns (Action 1.1.3) and providing protocols and training for rapid response to poisoning incidents (Action 1.2.2) are the other two Actions that stand out in Figure 16 as requiring urgent attention. One respondent noted that, despite putting considerable effort into awareness campaigns in their country, large parts of the population have probably still not been reached, while another noted that awareness needs to be followed up with interventions to change practices on the ground: these comments highlight the complexity of Action 1.1.3.

Looking at regional differences (Figure 17), Europe stands out as having the lowest API, followed by Southern Africa (for Result 1.1 and 1.2) and East Asia (for Result 1.3, although this is a very small sample). This means that they have progressed further with addressing these problems than other regions. However, unintentional poisoning is not a critical threat in West and Central Africa, unlike in other regions which may explain why it has received relatively less attention.

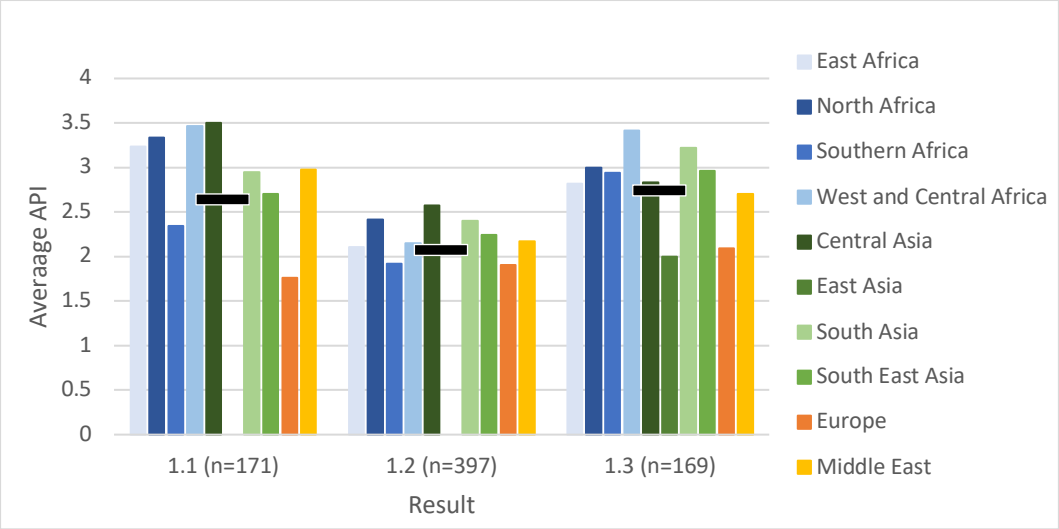


Figure 17: Average Action Priority Index (API) by Region and Result, for Objective 1
Key: horizontal black bar = average API

Figure 17 suggests that, overall, there has been more progress in tackling Result 1.2 (the on-the-ground conservation interventions), which is commendable, despite the shortfall with Action 1.2.2 described above. The progress can be ascribed to the implementation of a range of initiatives to combat wildlife poisoning in Europe, including the establishment and successful completion of 2 Wildlife Crime Academy training cycles in Spain that up-skilled conservation and law enforcement staff from 15 (mainly Balkan) countries in improved management, investigation and prosecution of poisoning incidents in 2022 and 2023. Detailed wildlife poisoning management protocols are available and have been shared widely in both Europe and Africa. The continuation of the Wildlife Crime Academy, and its expansion to cover countries outside Europe, will be key to continued progress in this area.

In Africa, more than 7,000 individuals have been trained in the rapid identification, response to, and management of, wildlife poisoning incidents in 18 countries and numerous sites have drafted and implemented poisoning response strategies that seem to have a positive impact at local level. Kenya was the first country in Africa to adopt a national Wildlife Poisoning Response Protocol in 2019. Wildlife Poisoning Response Training was also conducted at two sites in Cambodia in 2020 and there are plans to expand this to India and Nepal.

In Kenya, the Coexistence Co-op have also initiated a successful programme working in communities to assist with the construction of predator-proof enclosures for livestock and other measures to protect crops (Result 1.2), as well as creating awareness among thousands of community members about the risks associated with the use of poison baits. This initiative is also being expanded to Tanzania. Similar initiatives, especially with regard to greater awareness of the use of poison baits and the consumption of poisoned wildlife products, have also been introduced in 6 countries in the Southern African Development Community (SADC) region, to date reaching many communities bordering large national parks and other protected areas. In Southern Africa, there have been recent initiatives to establish protocols for the treatment and release of poisoning victims that survive poisoning incidents, resulting in significant reductions of mortalities of vultures and other wildlife at incidents that are detected early.

Many countries seem to have legislation in place to regulate the use of chemicals and prosecute irresponsible or intentional use that causes harm to the environment and wildlife in particular, but the effective implementation and enforcement thereof is often lacking in many countries (Result 1.3). In Europe, actions to target the judiciary sector are now starting, also within the framework of the Wildlife Crime Academy, and this needs to be further strengthened.

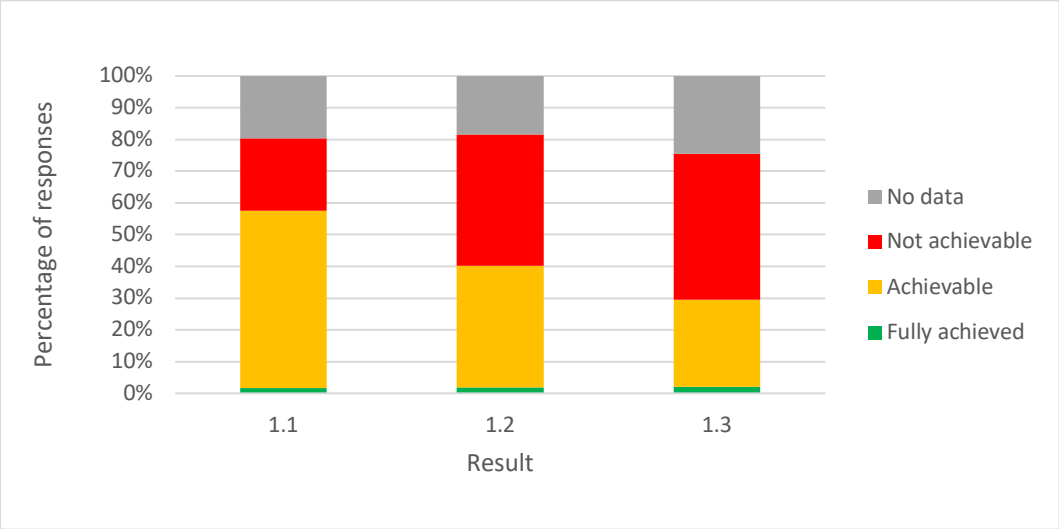


Figure 18: Percentage achievability of Objective 1 Results in the remaining 6 years of the Vulture MsAP
Note: n = 66 for Result 1.1, n = 65 for Result 1.2, n= 66 for Result 1.3

Lastly, when asked whether they thought that Objective 1 results could be achieved by the end of the Vulture MsAP (that is, within the next 6 years), respondents were generally not hopeful (Figure 18). Just under 60% felt that Result 1.1 would be achieved, and only 40% Result 1.2. Only a third believed Action 1.3 would be achieved. Around a fifth of respondents felt there was not enough data to know whether results could be achieved which, in itself, suggests that progress is likely to be too slow. One respondent made the point that it will be difficult to achieve change at a national scale unless interventions extend beyond protected areas. Another reflected on how difficult it is to implement these sorts of interventions: *"In my country there are security challenges, a lack of skilled employees and required materials are not available."*

Box 1: Examples of projects implemented under Objective 1, where these were provided by respondents*

Balkan states
BalkanDetox LIFE project is implemented in Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Greece, the Republic of North Macedonia and Serbia, to tackle illegal wildlife poisoning by raising awareness and strengthening national capacities (https://balkandetoxlife.eu/hr/project/progress/). The LIFE SWiPE project ("Successful Wildlife Crime Prosecution in Europe") provides an overall picture of wildlife crime at the European scale. It identified the scale and commonality of problems arising along the enforcement chain, gaps in current practices, reasons for successfully investigated cases leading to prosecution, and common issues along the enforcement chain leading to failed prosecution. It profiled solutions and best practice approaches from relevant countries, and provided national and EU-level policy recommendations. There were pilot cases in several countries, with best practice examples regarding monitoring birds, demonstrating sniffer dogs and training existing dog units to detect wildlife crime, using applications for reporting crimes, fostering better inter-agency cooperation, developing a criminalistics education module, and establishing a wildlife crime hub (https://stopwildlifecrime.eu/about-the-project/, https://stopwildlifecrime.eu/news/).

Cambodia
Training on investigating poisoning has been done. There is collaboration between stakeholders to monitor poisoning cases.

Ethiopia
Many human-wildlife conflict workshops and meetings were held in different parts of the country for awareness-raising in communities. A Human-Wildlife Conflict Training Manual was produced to be distributed around protected areas for training of the different segments of the community.

India
Compensation mechanisms were trialled in southern India.

Italy
Anti-poison dog units have been strengthened and currently 15 of these work across the country. In 2019 an internet portal on illegal animal poisoning was launched. (https://avvelenamenti.izslt.it/)

Malawi
Roughly 200 rangers across the country have received training on Wildlife Poison Response. Malawi: To date, together we have trained roughly 200 rangers across the country. However, a lot of work is still needed - for example, there is very little capacity in country to determine poisons used at these sites which hampers prosecutions efforts. LWT has been working in communities to understand what poisons are commonly used around the house as these are most likely also used on wildlife.

Mozambique
Mitigation of human-wildlife conflict is a significant focus in the Niassa Special Reserve, Gorongosa National Park, and at other sites. 192 conservation and law enforcement staff have been trained in 5 of the largest protected areas to reduce the impact of poisoning between 2016-2023.

Niger
A large sensitization campaign was undertaken among a wide range of people (from authorities to local leaders, hunters and farmers) to explain the impact poison use could have on wildlife, livestock and people. The sensitization campaign was done through personal meetings, focus groups and interviews on local radios, which is the most used media channel in the area. In total 2,444 people were directly involved and 394,444 were reached through all communication channels. The next steps should be to lobby for, and support, the implementation of the alternative methods following the protocols already developed under the project.

Tanzania
Recent arrests related to vulture poisoning and the collection of vulture parts demonstrates heightened awareness and concern regarding vulture conservation. Rapid response training related to poisoning has been provided to more than 300 rangers and other park officials, but limited road infrastructure and other resources still limit the timeliness of responses.

Rwanda
Vulture surveys and monitoring revealed the status of vultures and the threats they face, leading to organized awareness campaigns to educate communities about the ecological importance of vultures.

Saudi Arabia
The size of protected areas with vulture populations was increased from 4.3% in 2016 to 16.8% of the country in 2023, and a large fine for killing an endangered species was introduced. Unintentional poisoning is not a major problem, however.

Senegal
There was awareness-raising through posters and hosting radio broadcasts on the poisoning of wild animals and vultures in the intervention areas of the SOS - VAUTOUR project.

Zambia
Staff have been trained in wildlife poisoning response over a period of 5 years, including an improved awareness of human-wildlife conflicts. Radio talks have also been done, as well as social media campaigns, as part of community engagement to improve the awareness of human-wildlife conflicts and associated impacts on vultures.

*legislative and policy changes are summarized in Section 6.2

7.2 Implementation of Objective 2: Recognise and minimise mortality of vultures by non-steroidal anti-inflammatory drugs (NSAIDs) and occurrence and threat of toxic NSAIDs throughout the range covered by the Vulture MsAP

Objective 2		
Result 2.1: Awareness raising and regulation of veterinary NSAID use at national levels is adequate and implements CMS Resolution 11.15		
Action 2.1.1	All regions	**Situation analysis and publication of results regarding availability and use of NSAIDs in all Vulture MsAP Range States (including analysis of national laboratory capacity to detect NSAIDs either in country or through external links).**
Action 2.1.2	All regions	**Prohibit or withdraw veterinary use of diclofenac, ketoprofen and aceclofenac for the treatment of livestock and substitute it with readily available safe alternatives, such as meloxicam in all Vulture MsAP Range States.**
Action 2.1.3	All regions	**Develop a formalised approval process before market authorisation is granted for all veterinary NSAIDs and seek to identify additional safe alternatives to NSAIDs toxic to vultures.**
Action 2.1.4	All regions	**Establish government-backed alert system across the Vulture MsAP range to identify potentially dangerous veterinary drugs already in use, based on use levels from pharmacy surveys, cattle carcass analysis and drug safety testing results.**
Action 2.1.5	Europe, Central Asia, Middle East, South Asia	Carry out robust and mandatory safety testing on vultures and develop a formalised approval process before market authorisation is granted for veterinary NSAIDs. (Aim is to identify NSAIDs and other veterinary pharmaceuticals that are safe for vultures).
Action 2.1.6	South Asia	Assess consumer requirements and improve availability of effective meloxicam formulations and other identified non-toxic drugs to facilitate stronger uptake by veterinary practitioners and livestock owners.
Action 2.1.7	All regions	**Awareness-raising initiatives aimed at veterinarians and potential consumers across the Vulture MsAP range.**
Result 2.2 Vulture populations are maintained and/or restored by establishment of Vulture Safe Zones (VSZs)		
Action 2.2.1	South Asia	**Maintain and review network of VSZs (with emphasis on NSAIDs issue) in India, Nepal, Pakistan and Bangladesh and develop VSZ criteria for application as an approach in addressing other critical threats in other regions.**
Action 2.2.2	South Asia	**Promote development and implementation of new VSZs through drafting and dissemination of guidelines for identification and selection.**
Action 2.2.3	South Asia	**Undertake capacity-building and local advocacy to promote VSZs.**
Action 2.2.4	South Asia	Monitor availability of NSAIDs for veterinary use in VSZs across South Asia and more widely.
Result 2.3 Vulture Safe Zones are monitored		
Action 2.3.1	South Asia	Monitor wild vulture populations and breeding success in VSZs.

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Unintentional poisoning through the veterinary use of non-steroidal anti-inflammatory drugs (NSAIDs) is a threat across the Vulture MsAP range, but a particularly critical threat to vultures in South Asia. Well before the Vulture MsAP was adopted, diclofenac was the first NSAID shown to be toxic to scavenging birds and had already been banned for veterinary use across the main South Asian vulture Range States (Bangladesh, India, Nepal and Pakistan). However, compliance was not universal, human diclofenac formulations available in multi-dose vials were still being used on livestock, while a range of other NSAIDs had become available, at least some of which were believed to be comparably toxic to vultures, while others had not been safety-tested. In regions other than South Asia, little progress had been made; indeed, diclofenac had been licensed for veterinary use in two key European vulture Range States, Spain and Italy. The value of safety-testing experiments had been shown when it was established that meloxicam (and, most recently, tolfenamic acid) are both safe alternatives to diclofenac.

Box 2 provides some examples of projects which fell under Objective 2 during the Vulture MsAP, for countries which provided some description of their activities. Figure 19 shows that, on average, none of the Actions for this Objective are more than 50% complete, as the IS scores all fall below 2, with the exception of Action 2.3.1, which scores just over 2. This includes Actions 2.1.2 and 2.1.3 which are 'Essential' activities. However, these combined scores conceal great variation in progress among Range States, with some having achieved some highly significant successes.

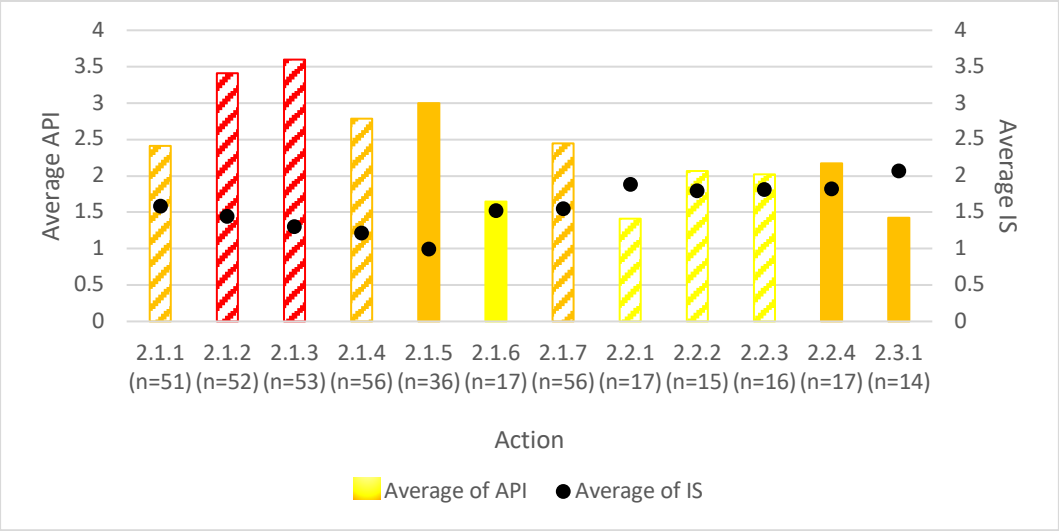


Figure 19: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 2
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

Surveys and analysis of results regarding availability and use of NSAIDs in Vulture MsAP Range States (Action 2.1.1) has taken place in several countries where NSAIDs are a potential threat to vultures but their prevalence in veterinary use was often uncertain, for example, Myanmar; however, no systematic review of national laboratory capacity to detect NSAIDs is known. Following earlier authorization of veterinary use of diclofenac in Spain, surveys in Spain (the only country where a specific monitoring programme is in place) have shown that this toxic NSAID is present in some carcasses of domesticated animals available to foraging vultures, but has not caused any vulture mortality to date. The NSAID flunixin has also been found in some dead Griffon vultures with post-mortem signs of gout and kidney failure in Spain.

Awareness-raising and regulation of veterinary NSAID use (Action 2.1.2) has improved very significantly in several of the Range States where this threat had been highest. By 2022, fully gazetted bans on the manufacture, sale and use of veterinary diclofenac had been added in Cambodia, Iran and Oman, and other countries were considering a similar ban. Scientific evidence has proven that ketoprofen, nimesulide, aceclofenac, and probably flunixin are similarly toxic to vultures (other veterinary NSAIDs exist but are untested) but these NSAIDs had not been banned on a national scale, with two major exceptions: Bangladesh became the first country to ban ketoprofen for veterinary use nationwide in 2021 and some Indian states had prohibited government supply of selected toxic NSAIDs to their veterinary services. Then, in August 2023, a highly significant step was taken in India when both aceclofenac and ketoprofen were banned for veterinary use. These are vital decisions, directly boosting vulture conservation efforts where implemented, but also setting a precedent for other governments to follow.

All countries lack mandatory safety-testing of NSAIDs on vultures, a formalised approval process before market authorization, or alert system across the Vulture MsAP range to identify potentially dangerous veterinary drugs already in use (Actions 2.1.3 and 2.1.4). However, progress has included a government-sponsored safety-testing programme partially underway in India, with complementary work in South Africa (Action 2.1.5). Most recently, tolfenamic acid has been shown to be safe to *Gyps* vultures at concentrations likely to be encountered in cattle carcasses (Chandramohan et al., 2022), so two vulture-safe NSAIDs are now known. Testing of nimesulide in South Africa and most recently in India has demonstrated the toxicity of this drug to vultures (Galligan et al., 2022, Nambirajan et al., 2021). Paracetamol testing is also underway, and nearing completion. However, further NSAID safety-testing on raptors is required as only the NSAIDs mentioned above have been tested so far. As part of a webpage and factsheet on NSAIDs and the threat they pose to vultures, the Raptors MOU has proposed a simple decision-making process in the form of a flow-chart (Figure 20) (Raptors MOU, 2023).

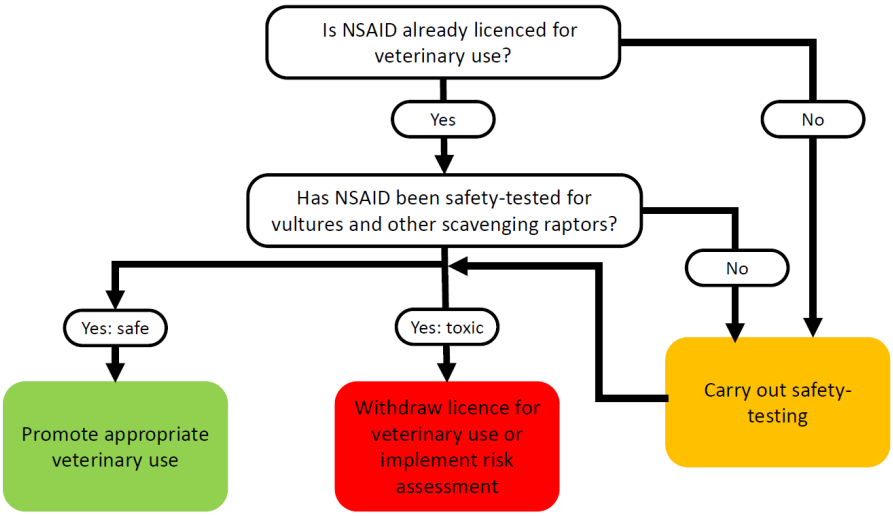


Figure 20: Suggested approval process before market authorization is granted for veterinary NSAIDs. Source: Raptors MOU (2023)

Promotion of the uptake of meloxicam (Action 2.1.6) has largely taken place in Range States that have already banned one or more other veterinary NSAIDs; following safety-testing (Action 2.1.5), this Action could presumably be amended to include promotion of tolfenamic acid as an additional vulture-safe NSAID, along with any other drugs that might in future be found to be safe for vultures (if cost-effective as veterinary medicines).

The CMS Raptors MOU web-page and factsheet on NSAIDs and vultures (see also Action 2.1.5) combines information sources up to mid-2022 and is an important awareness-raising initiative aimed at government and other veterinarians and potential consumers across the Vulture MsAP range (Action 2.1.7) (Raptors MOU, 2023). Individual Range States have also included such actions in their national programmes, as shown by the implementation score (among the higher scores for Actions under this Objective).

Result 2.2, with 4 Actions forming a set concerning establishment of Vulture Safe Zones (VSZs), was confined to South Asia as a priority in the Vulture MsAP, with a primary focus on reduction of the

NSAIDs threat; implementation scores are close to 50% for all Actions, reflected in strong and exemplary progress in the South Asian Range States. A particularly significant milestone was reached in Nepal where, for the first time, a Vulture Safe Zone was declared (based on scientific evidence) to be 'fully safe' for vultures; monitoring (Result 2.3 with single Action 2.3.1, also part of the overall protocol for VSZ management) showed that the vulture population at the site had stopped declining and began to increase over several successive recent years.

An important elaboration of Action 2.2.1 has been the development of VSZ criteria for application as an approach in addressing critical threats in other regions. Adequate area-based approaches at scale, without the need for a VSZ approach, were considered to be available in Europe, but in Africa, where even the largest Protected Areas are too small to encompass the whole home ranges of vultures, criteria for application of the VSZ approach are being developed and field trials are underway in several Southern African Range States. Likewise, in Cambodia, some threat reduction approaches that could be considered as part of a Vulture Safe Zone are being evaluated.

Comparing regional indices for Objective 2 (Figure 21), Result 2.1, which concerns all regions, shows South Asia having the lowest API; this means, as would be hoped given the well documented and high level of the threat there, that this region has progressed further with addressing these problems than other regions. East, West and Central Africa provided Action data for Results 2.2 and 2.3 (even though these were prioritized only for South Asia), both indicating less progress, in accordance with the uncertainties over the level of threat from NSAIDs in these regions.

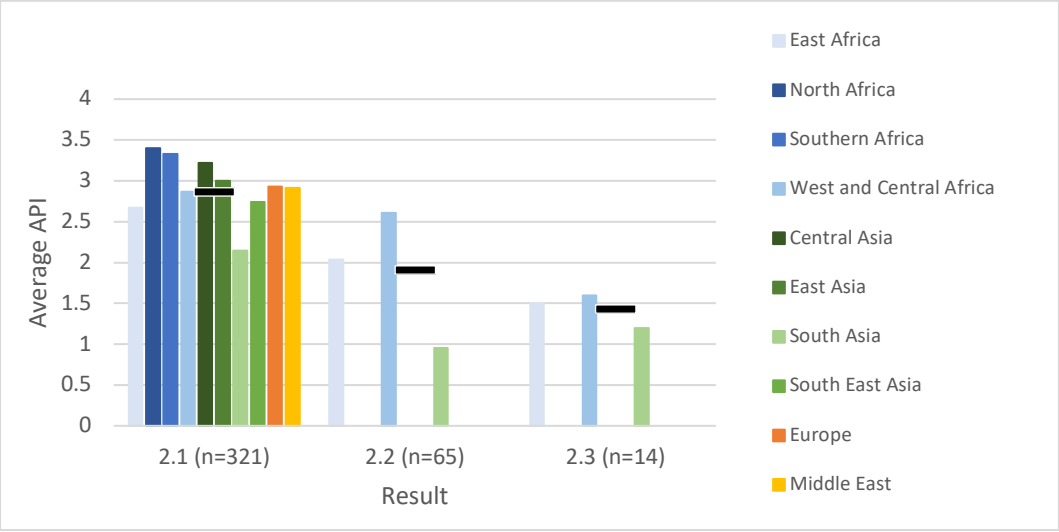


Figure 21: Average Action Priority Index (API) by Region and Result, for Objective 2
Key: horizontal black bar = average API

When asked whether they thought that Objective 2 results could be achieved by the end of the Vulture MsAP (that is, within the next 6 years), respondents were moderately hopeful (Figure 22). For example, two thirds of respondents believed that vulture populations would be maintained and/or restored by establishment of Vulture Safe Zones (Result 2.2). However, this was from a sample size of 6 dominated by South Asian countries; elsewhere the prognosis among the 61 respondents for Result 2.1, including countries where the priority of this Result was much lower, was only one-third positive. This may suggest that countries engaging strongly on this issue have reason to believe that their efforts can be successful.

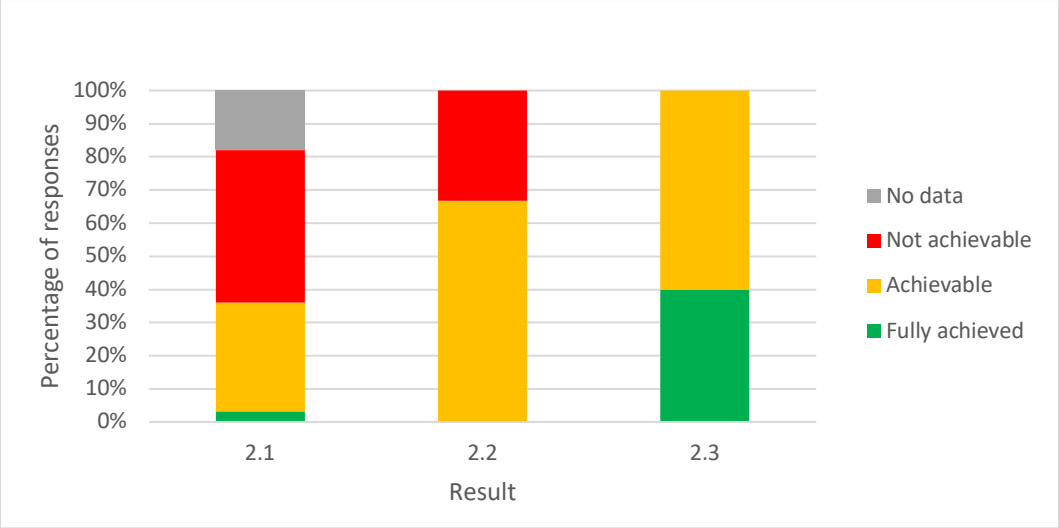


Figure 22: Percentage achievability of Objective 2 Results in the remaining 6 years of the Vulture MsAP
Note: n = 61, 6 and 5, for Result 2.1, Result 2.2 and Result 2.3, respectively

Box 2: Examples of projects implemented under Objective 2, where these were provided by respondents

Bangladesh
Community based Vulture Safe Zone Management in Bangladesh (2016-2018): achievements included banning of ketoprofen in two Vulture Safe Zones (ketoprofen was the most widely-used veterinary NSAID and in 2021 Bangladesh became the first country to ban it country-wide), and continued management of VSZs through a community-based Vulture Conservation Team. Assessing risk of veterinary NSAIDs to Critically Endangered vultures (2019-2020): achievements included undercover pharmacy surveys country-wide, and publication of results in preparation.
India
The Vulture Conservation Breeding Program is at four locations, two leading to trials of reintroductions to the wild: these are linked to Vulture Safe Zone and Vulture Reintroduction Zone programs, although toxic NSAID levels remain at levels of some concern.
Pakistan
The Pakistan Vulture Restoration Project, an ongoing project working with both in-situ and ex-situ conservation initiatives, has a strong basis in tackling the NSAID threat, with: population surveys; work with the livestock sector including surveys of veterinary stores for unsafe drugs (including undercover surveys); and advocacy to help develop dossiers for regional authorities towards implementing drug bans.
Nepal
Reducing levels of diclofenac to negligible levels has been linked to steady ongoing increases in wild populations throughout the MsAP period. The breeding and release programme was brought to a conclusion based on these positive outcomes, and the single breeding centre was closed, with all birds being released and monitored with satellite tracking devices and a response team. The one toxic NSAID that remains a concern at low levels in Nepal is nimesulide.
Niger
As part of a flyway scale project on conservation of the Egyptian Vulture, investigations in 2018 found little regulation or control of veterinary medicines, which were in any case not widely used, but diclofenac was proven to be in use in the Maradi region. This is important given the paucity of information of diclofenac use in Africa.

*legislative and policy changes are summarized in Section 6.2

7.3 Implementation of Objective 3: Ensure that policies on the phasing out the use of lead ammunition is implemented throughout the Vulture MsAP range

Objective 3		
Result 3.1: Mitigation measures in place to reduce the impact of lead poisoning on vultures.		
Action 3.1.1	East, North and Southern Africa; Central and South-East Asia; Europe; Middle East	**Quantify impacts of lead poisoning on populations of vultures and conduct regular lead and other heavy metal screening in vultures.**
Action 3.1.2	East, North and Southern Africa; Central Asia; Europe; Middle East	Advocate for policy, legislation and action to reduce known risks of lead poisoning to humans and wildlife.
Action 3.1.3	East, North and Southern Africa; Central, East and South-East Asia; Europe; Middle East	**Awareness raising among relevant stakeholders, especially decision makers.**
Action 3.1.4	East, North and Southern Africa; Asia; Europe; Middle East	**Promote the implementation of CMS Resolution 11.15 by all CMS Parties as well as voluntary lead ammunition bans in Vulture MsAP Range States which are not CMS Parties.**
Action 3.1.5	East, North and Southern Africa; Asia; Europe; Middle East	**Promote best practices and cost-effective alternatives to lead ammunition.**

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Vultures and other animals often ingest lead directly when they consume hunted carcasses that contain ammunition fragments, or indirectly from lead incorporated by the animals on which they feed. This results in lethal and sub-lethal toxicity. Lead ammunition is thus an important source of mortality for raptor species and especially scavengers worldwide (Monclús, Shore & Krone, 2020). The potential effects of lead on vulture demography could be a silent threat causing long-term population declines that are difficult to detect. In Europe this has hampered decades of conservation efforts and funding aimed at restoring raptor and vulture populations. Thus, the return of Bearded Vultures to the Alps is often cited as a success but the population remains vulnerable, and lead intoxication is often detected in mortalities recorded across this mountain range. A recent economic evaluation estimated that the negative impacts of the continued use of lead ammunition on people, wildlife and the environment costs the European Union between €383 million to €960 million per year (Pain, Mateo & Green, 2019).

Box 3 provides examples of projects which fell under the Vulture MsAP's Objective 3 that seeks to phase out the use of lead ammunition. Figure 23 shows that, on average, none of the Actions for this Objective are near 50% complete, as the IS scores all fall far below 2. This holds true for all the Actions, including those that should have been completed within the first six years of the Vulture MsAP. It is worrying, but perhaps understandable, that very little progress has been made with Action 3.1.4, which seeks to encourage the banning of lead ammunition, as this is a contentious issue. From respondents' comments, limited progress in some cases may be due to lack of research on the extent of the problem. However, lead poisoning is not a problem in all countries, due to local factors.

Looking at regional differences (Figure 24), the various regions are reasonably similar in the level of their APIs. South Asia has the highest API for this Objective, but this could be because lead poisoning is not an essential, or even high, priority for this region. There has been some progress in parts of Europe, however. Denmark and the Netherlands banned the use of lead ammunition decades ago and, from 15 February 2023 onwards, the use of lead ammunition became illegal in and around wetlands across all the 27 EU countries, Liechtenstein, Iceland and Norway. This is a meaningful step forward to protect the wildlife that falls victim to lead poisoning every year. The EU is now seeking the total phase-

out of lead ammunition for hunting, including on terrestrial habitats, and this continues to be a priority to help restore the populations of vultures and other scavenging species. The EU Commission will prepare a legislative proposal and submit it to a vote by the EU Member States in the REACH Committee soon. Before any restriction can be adopted, the European Parliament and Council will review and examine it thoroughly.

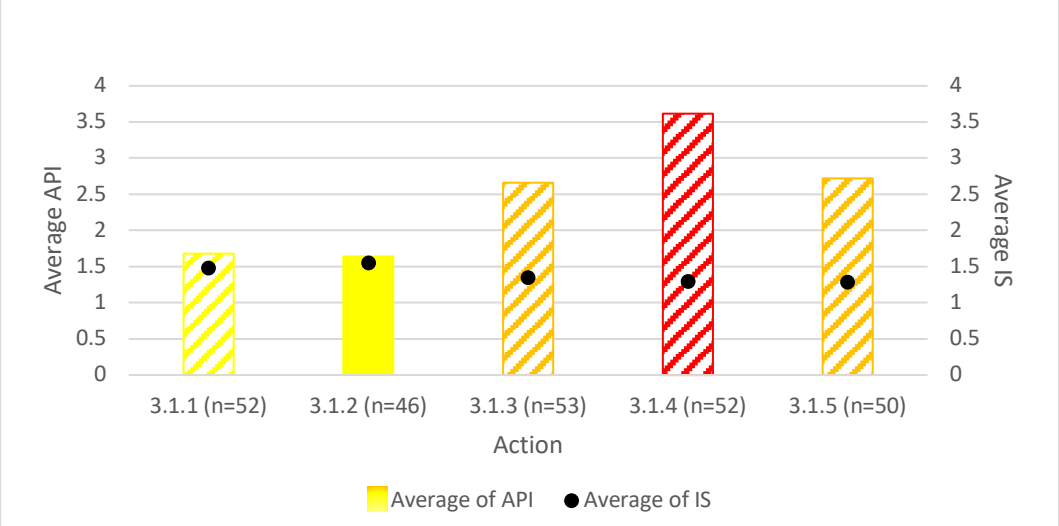


Figure 23: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 3
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

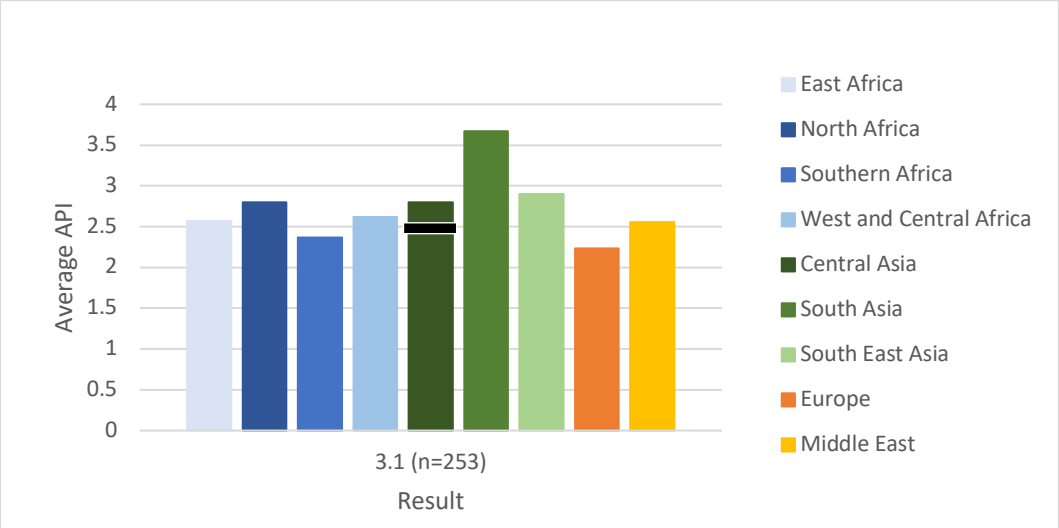


Figure 24: Average Action Priority Index (API) by Region and Result, for Objective 3
Key: horizontal black bar = average API

When asked whether they thought that Objective 3 results could be achieved by the end of the Vulture MsAP (that is, within the next 6 years), respondents were generally not hopeful (Figure 25). Only around one-third felt that Result 3.1 would be achieved. About a quarter of respondents felt there was not enough data to know whether results could be achieved which, in itself, suggests that progress is likely to be too slow.

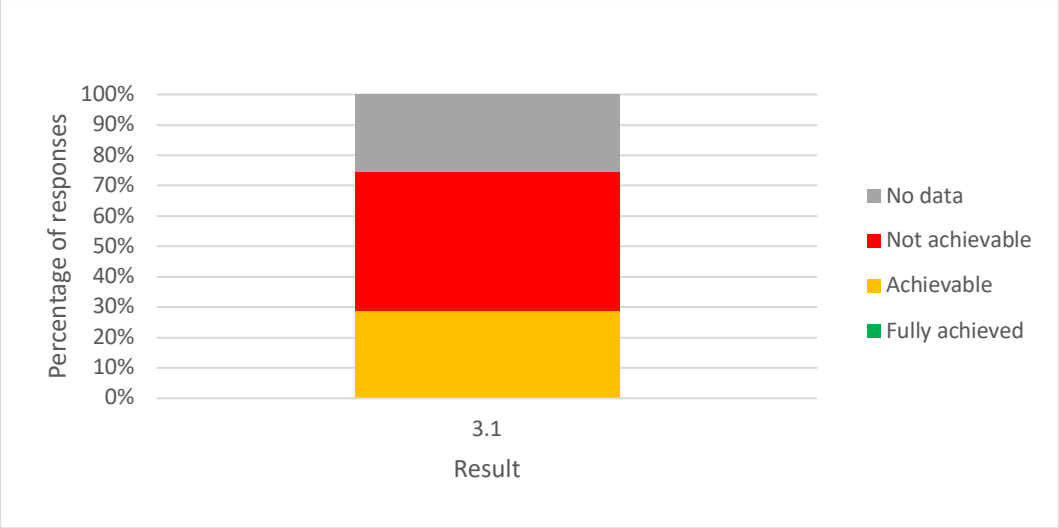


Figure 25: Percentage achievability of Objective 3 Results in the remaining 6 years of the Vulture MsAP
Note: n = 55

Box 3: Examples of projects implemented under Objective 3, where these were provided by respondents*

Croatia
In order to preserve and improve the current state of the Griffon Vulture population in Croatia, the five-year LIFE SUPport project began in January 2023. By promoting the use of lead-free ammunition and increasing the capacity of competent institutions to combat the poisoning of wild animals, cases of vulture poisoning will be prevented. An important reason why herdsmen are giving up livestock farming is the damage caused to their herds by jackals, which is also the reason for setting up poisonous baits that often kill Griffon Vultures as well. The project aims to significantly reduce threat by using methods such as different types of fences, the use of dogs and cooperation with hunters

Israel
Hundreds of vultures are sampled each year for lead and other heavy metals. Acute poisoning is very rare (less than 2 cases/year). There are more chronic blood levels in some Griffon Vultures and there is a strong correlation in these birds with collision with powerlines.

Italy
An international study was carried out analysing carcasses of large avian scavengers from France, Switzerland, Austria and Italy to assess the incidence of lead poisoning. Other studies were undertaken to evaluate lead contamination of tissues in game species.

Oman
Studies and awareness-raising on lead poisoning, particularly in children, exist. In November 2021, a workshop titled 'Prevention of Occupational Exposure to Lead Poisoning' was organised by the Ministry of Health in line with the International Lead Poisoning Prevention Week. These efforts appear to be primarily focused on humans.

Portugal
Analysis has shown an increased number of reported cases (e.g. birds that enter rescue/recovery centres). There is important regional work (e.g. the cross-boundary park, Tejo Internacional). There are still no game estates that have banned lead - reduction of lead ammunition use is mainly due to EU regulations. Testing of alternatives to lead ammunition is in place.

South Africa
A National Lead Task Team has been established. A range of protocols have been drafted, and research conducted on the impact and scale of the threat to vultures and other wildlife.

Tanzania
Lead testing was implemented in Tanzania but for a small number of individuals (<50 birds). It generally showed low levels of lead exposure. Changes to LeadCare Analyzer have led to field kits no longer being available and thus no further testing has been conducted. It remains unclear if lead exposure is a significant threat to vultures in Tanzania. During the workshops for establishing the East African Wildlife Poisoning Response Network with different stakeholders from different countries, the concept of the threat to vultures of consuming lead ammunition fragments present in carcasses to vultures was introduced and representatives became aware.

Zambia
Activities include awareness-raising amongst stakeholders and decision-makers, a review of legislation regarding poisoning, and the development of a national poisoning response protocol document.

Zimbabwe
There was attendance at the first Lead Workshop in January 2023 to formulate the Regional Lead Action Plan. Zimbabwe will soon be in the process of identifying interested stakeholders and meetings will be held before the end of the year (2023) to address issues around lead.

*legislative and policy changes are summarized in Section 6.2

7.4 Implementation of Objective 4: Reduce and eventually halt the trade in vulture parts for belief-based use

Objective 4		
Result 4.1: Improved understanding of the trade in vultures and their parts informs improved conservation approaches		
Action 4.1.1	West and Central, East and Southern Africa; East and South-East Asia	**Conduct overall situation analysis on belief-based use of vultures and their body parts, to include: current state of knowledge, best practices for tackling the trade, body parts used, market turnover rates, how vultures are acquired, key markets, socio-economic drivers of the trade and trade pathways.**
Action 4.1.2	West and Central, East and Southern Africa	**Assess population effects on vultures of trade from body parts for belief-based use.**
Action 4.1.3	West and Central, East and Southern Africa	**Assess policies, laws and regulations governing the use, sale, distribution and disposal of poisons and illegal use of agro-chemicals used to poison wildlife, especially vultures, for belief-based use.**
Action 4.1.4	West and Central, East and Southern Africa	**Investigate and test best practices to eliminate the trade in vulture parts for belief-based uses.**
Action 4.1.5	West and Central, East and Southern Africa	**Determine protocols for sampling and promote the establishment or use of suitable facilities to do advanced and accurate toxicological assessment of samples in range countries.**
Action 4.1.6	West and Central, East and Southern Africa	**Identify human health impacts of use and consumption of vulture body parts for belief-based use.**
Result 4.2: Governments, local communities and other stakeholders understand scale and impact of trade in and belief-based use of vulture body parts		
Action 4.2.1	West and Central, East and So West and Central, East Africa and Southern Africa	**Initiate stakeholder engagement and dialogue with relevant stakeholders, publish and share research and monitoring results on belief-based use of vultures with relevant Government departments (e.g. Environment, Agriculture, Health) and other stakeholders to agree appropriate national actions.**
Action 4.2.2	West and Central, and Southern Africa, East Africa and Southern Africa.	Implement multi-media awareness campaigns to highlight negative (human health and ecological) impacts of belief-based use of vulture body parts; target public (especially suppliers, traditional healers, religious leaders, consumers and youth), using research results.
Result 4.3: All appropriate policy instruments and legal measures are established and/or aligned to reduce belief-based use of vulture body parts.		
Action 4.3.1	West and Central, East and Southern Africa	**Train customs and law enforcement officers to identify vultures and their body parts to enable effective confiscation and enforcement actions, particularly at borders.**

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Belief-based use (BBU) of vultures has a long history with many African cultures and is carried out in West, East and Southern Africa, with West Africa being the hotspot of the practice. The mass killing of vultures in 2020 in Guinea-Bissau was the worst ever mass killing of vultures registered in the world, with more than 2,000 Hooded Vultures found dead, poisoned to feed the illicit trade on vulture parts associated with traditional beliefs. Unfortunately, these killings continued, albeit at a slower rate, with further poisoning episodes uncovered as recently as 2022 (Vulture Conservation Foundation, 2021).

Figure 26 shows that although there are activities being conducted in each of the actions to address belief-based use, implementation of actions has been below what would have been expected by this stage. Although implementation is still patchy on the African landscape, a number of countries, which include Niger, Guinea Bissau, Nigeria, Senegal, Tanzania, The Gambia, South Africa, and Zimbabwe, have started working on reducing belief-based use. Action 4.1.1 (conducting a situation analysis) and the essential action 4.2.1 (initiating stakeholder engagement) have been the most extensively implemented actions. However, the Essential Action 4.2.1 still has the highest API.

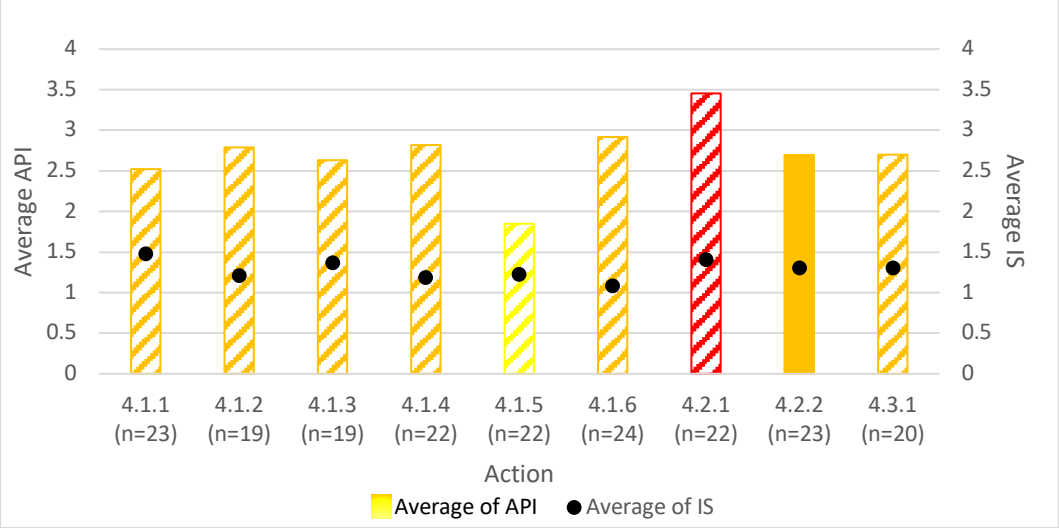


Figure 26: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 4
Key: red = essential, orange = high, yellow = medium; hashed = should already have been complete

The CITES and CMS Secretariats are collaborating to address the BBU of vultures and the related trade of vultures and their parts by, first, producing a review of trade and poisoning of vultures in West Africa (UNEP-WCMC, 2021). Second, they are supporting specific decisions directed to CITES and CMS Partes, scientific bodies and Secretariats to ensure that, amongst other actions, proper legislation is in place and enforced, vultures are incorporated in the West Africa Strategy on Combatting Wildlife Crime, and demand-reduction strategies are implemented.

A development to note in West Africa has been the development of the West Africa Vulture Action Plan (Chandra *et al.* in prep.). This is a major step in multilateral collaborative stakeholder engagement to respond to threats to vultures in the region. More work is yet to be done to understand the distribution of belief-based use in-country across the continent as well as how to address it, thus, the particularly high API for Essential Action 4.2.1.

Of the few countries implementing actions to address the challenge, many are still investigating pathways to engage stakeholders. Nigeria and Zimbabwe are the only two countries that have managed to make strides through engaging traditional healers and working with them to identify alternatives to vulture medicine. In Zimbabwe, the Traditional Medicines Practitioners Council under the Ministry of Health and Child Welfare has been engaged. The Council is responsible for all traditional healers in the country. The Zimbabwe Council of Churches has also been engaged after it was discovered that some churches were also using vulture parts. The results of their work are yet to be shared and used to develop national actions. The engagement of traditional healers to get their buy-in in vulture conservation seems to be an important activity in addressing belief-based use. Thus, understanding the channels of their engagement in each of the countries is important. Engaging the government to also help address the challenge through the implementation of existing policies which protect vultures is also a priority.

Action 4.1.1. has been addressed in the above-mentioned countries through market surveys to observe and record vulture parts which are being sold, as well as to understand their uses, sources and the drivers of trade. A study has been conducted in Niger focusing on understanding the role of hunters in the supply of vulture parts. In East Africa, the scale of impact of belief-based practices on vultures is not well understood with very limited information about the trade of vultures in Rwanda,

highlighting the need to promote research to understand the impacts of trade of vultures. In Tanzania, the work is still in its infancy with a study initiated to better understand motivations for trade in vulture parts. Market surveys have been conducted in Nigeria, South Africa and Zimbabwe amongst other countries. This action has the highest implementation score as a number of countries are making strides at understanding the trade.

The implementation of Action 4.1.2 requires a good understanding of the level of offtake for belief-based use. South Africa has conducted research to understand the rate of off-take and the economic value of belief-based use to traders and healers. Although other countries have conducted market surveys to see what vulture parts are being sold, the level of offtake is not yet understood. This is an important action as it will provide information on the level of harvesting. An accurate figure from each country can only be obtained from a thorough investigation involving traders and healers from different walks of life, for the estimate to be accurate.

A few respondents indicated that their country has no capacity to assess policies and laws governing the use, sale and distribution of poisons used to kill vultures for BBU (Action 4.1.3). Whilst this particular threat is largely an African problem, the implementation of actions around this has increased with some work having been done in Malawi on training, and Customs in Oman and Mozambique receiving training from CITES and other relevant organisations to ban the export of all wildlife body parts, which could apply to vultures. In countries like Zimbabwe the policy protecting vultures exists within the Parks and Wildlife Act listing vultures as specially protected, but does not mention the threat of belief-based use. The implementation of existing policies thus needs to be improved and in some cases the policies themselves need to be improved.

The use of plant-based alternatives has largely been proffered as a solution to reduce the demand for vulture parts. This has been tested in Nigeria, culminating in the production of a guide to the plants that can be used as substitutes. Zimbabwean traditional healers have also developed a list of alternatives. The level of adoption of these substitutes needs to be verified.

It is believed that some of the vulture parts used in belief-based use are sourced through poisoning of birds. Samples obtained from poisoning sites are sent to labs to determine the chemical used to poison them (Action 4.1.5). Going forward, it is essential to obtain samples from traditional markets and have them tested for poison and the level of toxicity as well. This is because there is a concern around human health related to the consumption of vulture body parts for belief-based use.

The implementation of Action 4.2.2 has largely been in Western and Southern Africa. This has been through the production of awareness material which was shared with traditional leaders and the public. Other social media platforms such as Twitter and Facebook have been used to inform the public of the work being done to reduce belief-based use as well as to communicate the impact of the threat on the vulture population. Zimbabwe has also been engaging journalists on the subject, resulting in a number of radio programmes and articles in print media. Although a lot of work has been done to understand belief-based use in South Africa, it has largely been communicated through scientific publications which are only accessible to scientists (Manqele, Selier & D, 2023, Mashele, Thompson & Downs, 2021).

Action 4.3.1 (training for appropriate border control) is essential to help reduce both local and intra-African trade in vulture parts. Little has been done to implement this action, but Nigeria and Zimbabwe have engaged law enforcement agencies, and Mozambique has trained customs officers, in vulture and vulture parts identification.

Comparing regional indices for Objective 4 (Figure 27), surprisingly the Result 4.1 API index for Southern Africa is at par with that of South-East Asia and the Middle East. It is not surprising that West and Central Africa have the highest API for this particular result, indicating the level of threat of belief-based use to vultures in the sub-region.

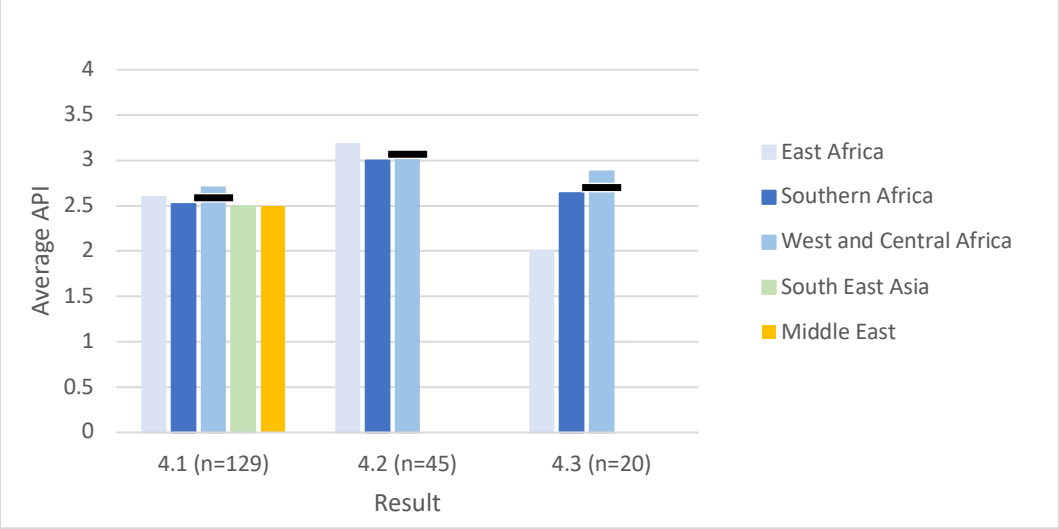


Figure 27: Average Action Priority Index (API) by Region and Result, for Objective 4
Key: horizontal black bar = average API

In terms of achieving Objective 4 within the remaining years of the Vulture MsAP, almost 60% of respondents anticipate that there will be an improvement in the understanding of the trade in vultures and their parts to inform conservation approaches (Figure 28). More than 60% of respondents think that Result 4.2 is likely to be achieved within the last six years.

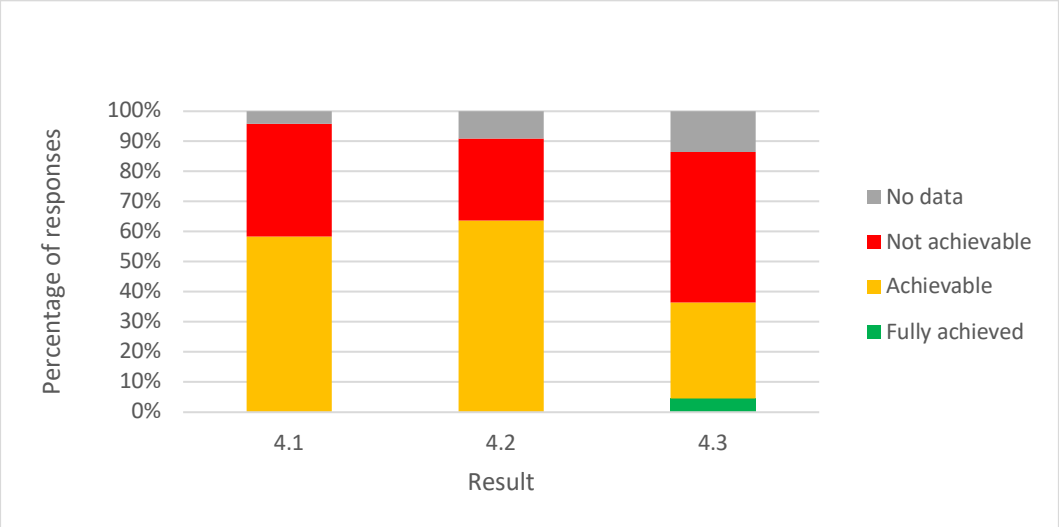


Figure 28: Percentage achievability of Objective 3 Results in the remaining 6 years of the Vulture MsAP
Note: n = 25, 22 and 22, for Result 4.1, Result 4.2 and Result 4.3, respectively

7.5 Implementation of Objective 5: Halt declines in vulture populations associated with sentinel poisoning by poachers

Objective 5		
Result 5.1: Review existing policy and legislation to identify barriers to successful prosecution of wildlife crime offenders.		
Action 5.1.1	East and Southern Africa	Barriers to prosecuting offenders of wildlife crime are understood.
Result 5.2: Information on sentinel poisoning incidents is properly collected, managed and shared.		
Action 5.2.1:	East and Southern Africa	Develop new, or support existing, poisoning- and poaching-related databases, and link them where possible.
Action 5.2.2	East and Southern Africa	Confirm or identify poaching hotspots (especially of elephants) and determine sites to focus action to reduce risk or impact to vultures whose ranges overlap with hotspots.
Result 5.3: Governments, local communities and other stakeholders understand scale and impact of sentinel poisoning.		
Action 5.3.1	East and Southern Africa	Raise awareness of law enforcement, judiciary and public through targeted campaigns on the link between elephant and bushmeat poaching and vulture declines.
Result 5.4: Conservation authorities, communities and others take collaborative action to respond to or prevent poisoning incidents.		
Action 5.4.1	East and Southern Africa	Expand poisoning response training programmes to support conservation staff to rapidly respond to poisoning incidents.
Action 5.4.2	East and Southern Africa	**Identify and provide effective sustainable (alternative) livelihoods to encourage people to move away from poaching (e.g. recruit poachers into law enforcement).**
Action 5.4.3	East and Southern Africa	**Enhance capacity to sample and analyse poisons used in elephant and bushmeat poaching among relevant national institutions.**
Action 5.4.4	East and Southern Africa	Increase capacity and resources for effective law enforcement to tackle elephant and bushmeat poaching within Protected Areas.
Action 5.4.5	East and Southern Africa	Enhance networking and coordination between initiatives on vulture conservation and preventing elephant poaching between conservation practitioners, researchers, Governments and elephant anti-poaching groups.
Action5.4.	East and Southern Africa	Conservation authorities, communities and others take collaborative action to respond to or prevent poisoning incidents.
Result 5.5: Legal and policy measures respond to causes and impact of poaching on vultures and are enforced.		
Action 5.5.1.	East and Southern Africa	**Introduce and enforce severe penalties on those found guilty of carrying out illegal wildlife poisoning events, treating those that impact on vultures and on other fauna with equal seriousness.**
Action 5.5.2.	East and Southern Africa	**Develop and enforce legislation to control, ban or restrict the sale, storage, distribution, use and disposal of toxic chemicals used in elephant and bushmeat poaching.**

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Sentinel poisoning is the poisoning of carcasses by poachers to prevent the soaring behaviour of vultures attracting anti-poaching law enforcement units. This Objective is limited in the Vulture MsAP to East and Southern Africa, yet 4 West African countries provided responses and therefore these data are presented here. Because of the limited geographic range, the number of responses to each question is much lower than for other Objectives.

There has been an interesting change in trends associated with this threat since the drafting and adoption of the Vulture MsAP was completed in 2017. The prevalence of ivory poaching seems to have declined significantly in East and Southern Africa since 2018 and comparatively fewer sentinel poisoning incidents associated with ivory poaching have been recorded over the last three years. The reasons for this are still unclear, but the result has been to reduce the prevalence of vulture poisoning associated with ivory poaching. However, there have been several incidents of apparent sentinel

poisoning associated with bushmeat poaching in certain parts of southern Africa since 2020. These have resulted in significant vulture mortalities in areas such as the Greater Limpopo Transfrontier Conservation Area in Southern Africa.

Box 4 provides examples of projects which fell under the Vulture MsAP's Objective 5. Figure 29 shows that, on average, most of the Actions for this Objective are less than 50% complete, as the IS scores all fall below 2. Most progress has been made with Action 5.2.2, the identification of sentinel poisoning hotspots. This is thanks to the establishment of the African Wildlife Poisoning Database that captures and collates all available data on sentinel- and other poisoning incidents. These data are used to identify poisoning hotspots and were used in the updated poisoning threat maps for Africa contained in this report (see Figure 5).

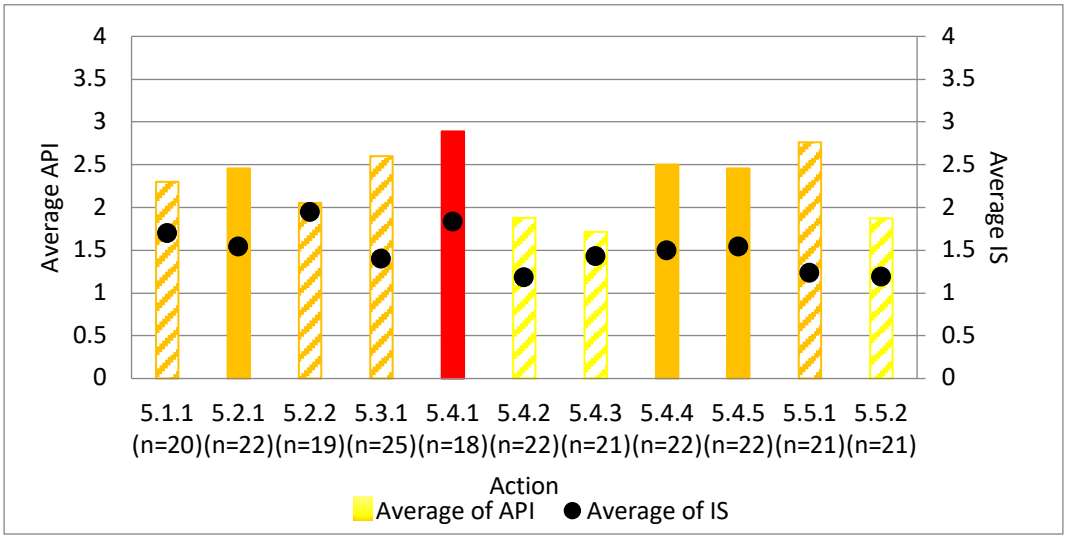


Figure 29: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 5
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

Good progress has also been made with Action 5.4.1, the training of staff in rapid response to poisoning incidents. More than 7,000 individuals have been trained across 18 countries in the rapid identification, response to, and management of, wildlife poisoning incidents, including those caused by sentinel poisoning. Numerous sites have drafted and implemented poisoning response strategies that seem to have had a positive impact at local level. This is good progress as this is one of the Actions that was not expected to be completed before the end of the first 12 years. Nonetheless, one respondent identified inadequate training as a remaining obstacle in their country, providing this example: *"Some of this [training] is being done already but it needs to improve country wide. Our largest issue is that rangers were encountering poisoning across protected areas but unable to identify it as poisoning due to a lack of training (i.e,. one ranger told us "one time I found 4 vultures together just dead, and we didn't know what happened so we just kept moving on with our patrol"). Therefore, outreach work with rangers and training is needed … so that we can first ensure that poisoning incidents are identified and then reported appropriately."*

When comparing regions, Southern Africa appears to have made more progress, as their APIs are generally lower (Figure 30). When asked whether they thought that Objective 5 results could be achieved by the end of the Vulture MsAP (that is, within the next 6 years), respondents were more hopeful than for other Objectives, with 70% or more feeling positive (Figure 31). This was not the case for Result 5.5, however, with only 30% feeling that the introduction and enforcement of penalties for sentinel poisoning could be achieved.

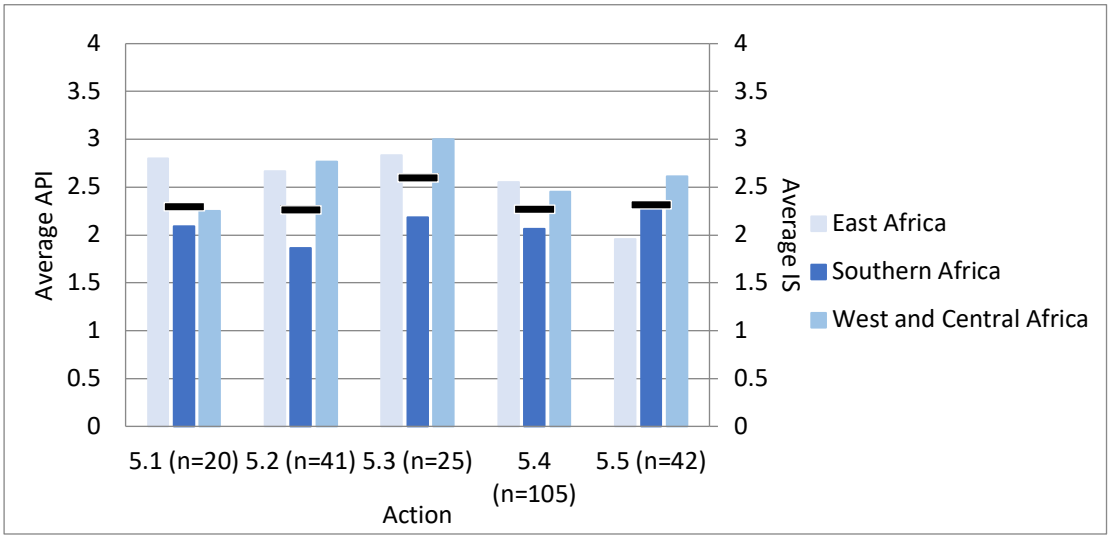


Figure 30: Average Action Priority Index (API) by Region and Result, for Objective 5
Key: horizontal black bar = average API

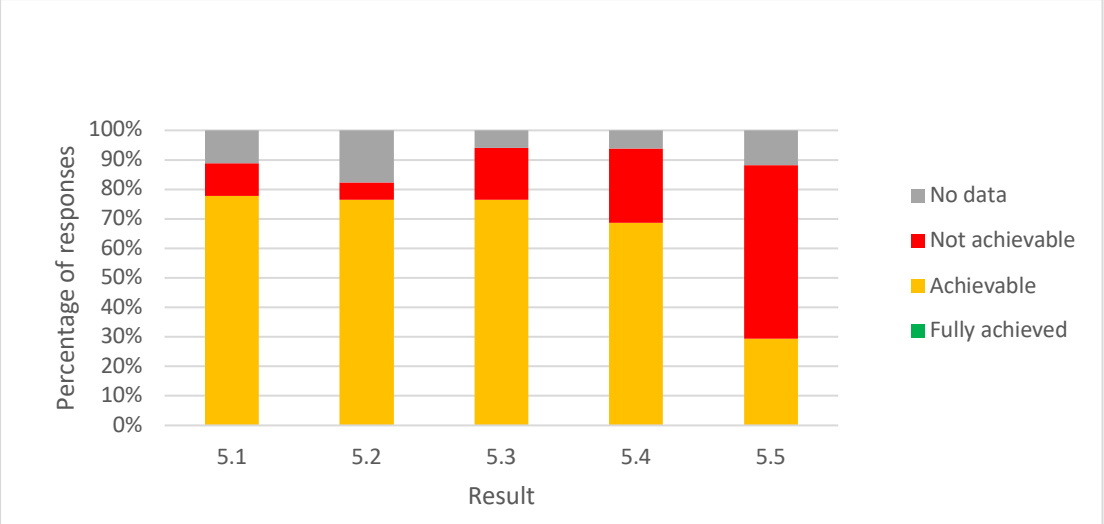


Figure 31: Percentage achievability of Objective 5 Results in the remaining 6 years of the Vulture MsAP
Note: n = 18, 17, 17, 16 and 17, for Result 5.1, Result 5.2, Result 5.3, Result 5.4 and Result 5.5, respectively

Box 4: Examples of projects implemented under Objective 5, where these were provided by respondents*

Rwanda
The 15 main locations utilized by vultures, and the most prevalent threats at each location, were identified in a Vulture Survey Report in 2022. There are no elephant poaching cases in Rwanda, but poaching for bushmeat is a problem. Some work has been done to involve ex-poachers in conservation (through recruitment and revenue sharing). This reduced some threats posed by wildlife poachers in general. However, vultures are still vulnerable to other environmental crimes.

Tanzania
Bushmeat poaching linked to sentinel poisoning has been identified as an issue and data related to this has been shared with the African Poisoning Database. Perpetrators of poisoning associated with conflict, bushmeat hunting, and belief-based use have been arrested in Tanzania, so legal and policy measures do not appear to be the main barrier to enforcement in Tanzania. Analysis of samples to identify specific pesticides used are not required for legal action in Tanzania so improving laboratories has not been emphasized as a mitigation technique. Many NGOs are working to address elephant and bushmeat poaching and vulture conservation groups work closely with these. However the scale of the issues is great and response times to potential poisoning incidents identified via tagged vultures are slowed by resource limitations and road networks.

*legislative and policy changes are summarized in Section 6.2

7.6 Implementation of Objective 6: Reduce vulture mortality caused by electrocutions linked to energy transmission and generation infrastructure

Objective 6		
Result 6.1: Current vulture mortality and sensitivity in relation to electrocution is understood, including population impacts and hotspots.		
Action 6.1.1	All regions	Determine baseline impact of electrocution on energy infrastructure at appropriate levels (e.g. total population, sub-region, country or subnational) for each species within the Vulture MsAP range using standard monitoring protocols.
Action 6.1.2	All regions	**Complete sensitivity mapping for Vulture MsAP range. Adding to existing analyses (e.g. Red Sea flyway) to identify areas where energy infrastructure poses greatest electrocution risks to vultures; combine tracking data, site prioritisation, vulture counts and other sources.**
Action 6.1.3	Africa; Central Asia; Europe; Middle East	Develop standardised monitoring protocols which included guidance on access to data and data sharing, and conduct long-term monitoring of impacts of energy infrastructure, both for proposed and existing networks.
Result 6.2: Public and private sector support and promote adoption of vulture-friendly energy infrastructure.		
Action 6.2.1	All regions	**Promote the use of bird-friendly energy technology as set out in CMS guidelines on energy infrastructure (Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region; draft Renewable Energy Technologies and Migratory Species: Guidelines for Sustainable Deployment).**
Action 6.2.2	Africa	**Develop a Pan-African Energy Task Force probably as a subgroup of the CMS Energy Task Force and engage with energy developers operating in Africa to ensure risk to vultures from planned energy infrastructure is minimised.**
Action 6.2.3	Africa; Central Asia; Europe; Middle East	**Engage with donors of large energy infrastructure developments to ensure responsible energy developments and allocation of project resources to enable long-term monitoring.**
Action 6.2.4	Africa; Central Asia; Europe; Middle East	Advocate adoption of minimum standards by all energy infrastructure developers that ensures all future energy infrastructure adopts bird-friendly technologies and designs, and enforces phasing-out of old risk-prone technologies.
Action 6.2.5	Africa; Central Asia; Europe; Middle East	Create, or identify existing, national energy associations and engage them to support vulture-friendly power grids both pre- and post- construction.
Result 6.3: Energy infrastructure (electricity power grids) impacts on vultures are reduced by implementation of improved designs		
Action 6.3.1	All regions	For new and existing energy infrastructure, promote the implementation of CMS guidelines by phasing out energy infrastructure designs that pose electrocution risk to vultures and other birds, and advocate retro-fitting with known bird-friendly designs within current maintenance schedules.
Action 6.3.2	All regions	**Ensure full implementation of mitigation measures in all protected areas containing vulture populations within the Vulture MsAP range.**
Action 6.3.3	All regions	**Improve planning of routing and construction of new power lines and promote the use of underground options where appropriate.**
Action 6.3.4	All regions	**Assess the effectiveness and durability of mitigation measures to prevent electrocution.**
Action 6.3.5	All regions	**Ensure the monitoring and maintenance of anti-electrocution measures and replacement when necessary.**
Action 6.3.6	All regions	**Conduct training and capacity building to support implementation of guidelines and minimum standards, including monitoring.**

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Electrocution (that happens in medium-tension lines) is rapidly emerging as a major mortality cause for vultures, and in some countries (e.g. Spain) it is becoming the major threat that is killing vultures. This situation is either because other important mortality causes are being effectively mitigated (e.g. poison baits in Spain), and/or because there is more awareness and monitoring around the energy infrastructure, this resulting in more identification of electrocution mortality. In addition, the amount

of energy infrastructure is actually increasing, due to the switch to renewables, or due to widespread electrification of countries (e.g. in Africa).

Mitigating electrocution is a relatively simple and straightforward approach, and involves several strategies: constructing new lines with bundled cables and/or the right pylons, correcting existing infrastructure with insulators, and burying lines (Actions 6.1, 6.2 6.3 in the Vulture MsAP).

The electrocution of large birds throughout the energy infrastructure network is also a problem for the utilities themselves, and therefore the industry has been collaborating with conservation NGOs in many countries across the range to mitigate this problem. Consequently, many of the Actions 6.1, 6.2 and 6.3 are under implementation, at least in some Range States. National or regional programmes to insulate cables or modify pylons have been implemented, but this applies to a very small part of the medium-tension network, and is therefore only scratching the surface. These efforts will pale when faced with the significant expansion of the energy infrastructure currently under construction or planned.

The long-term and sustainable solution for this threat involves legally linking the costs of mitigating electrocution to the business model – in order words, making utilities liable for the damage to biodiversity. This is already the case in some European countries (e.g. Spain and Hungary), using the legal framework of the EU Environmental Liability Directive.

Training of teams involved with retrofitting pylons and lines against electrocution (Action 6.3.6) has also been highlighted of key importance for the future, as there is some evidence that some of the mitigation work being carried out is sometimes ineffective.

Figure 32 shows that, on average, all of the Actions for this Objective are less than 50% complete, as the IS scores all fall below 2. This is of concern as most of the Actions were already supposed to have been completed. The IS for the most critical Actions, 6.1.2 (sensitivity mapping) and 6.3.1 (retrofitting and phasing out risky energy infrastructure designs), is only around 1.5, although it is only Action 6.1.2 that should already have been completed at this point. Both these Actions have the highest APIs. This probably reflects the problem of scale - while actions are being implemented, they apply to only a small percentage of the electricity network.

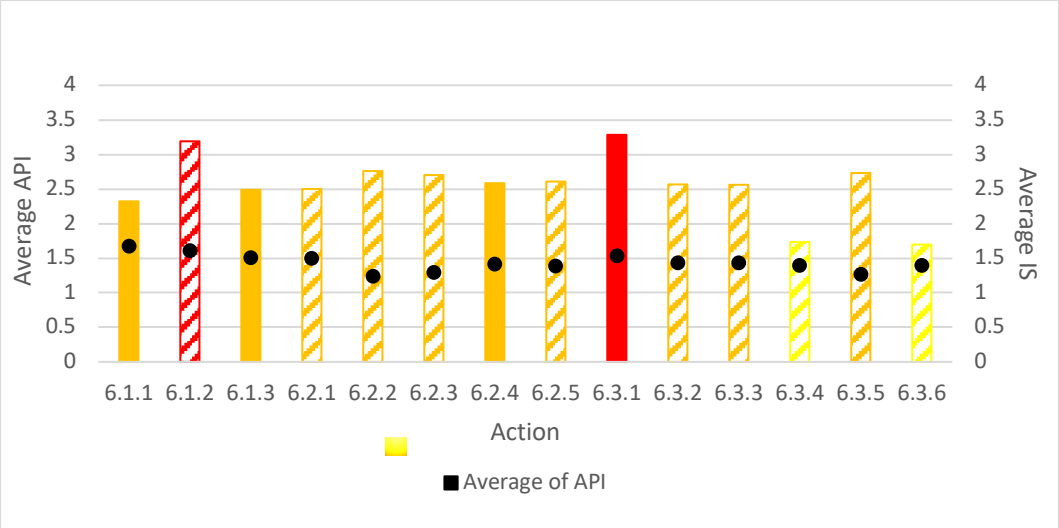


Figure 32: Average Action Priority Index (API) by Region and Result, for Objective 6
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

As might be expected when comparing regions (Figure 33), Europe and the Middle East have made the most progress, consequently with lower APIs.

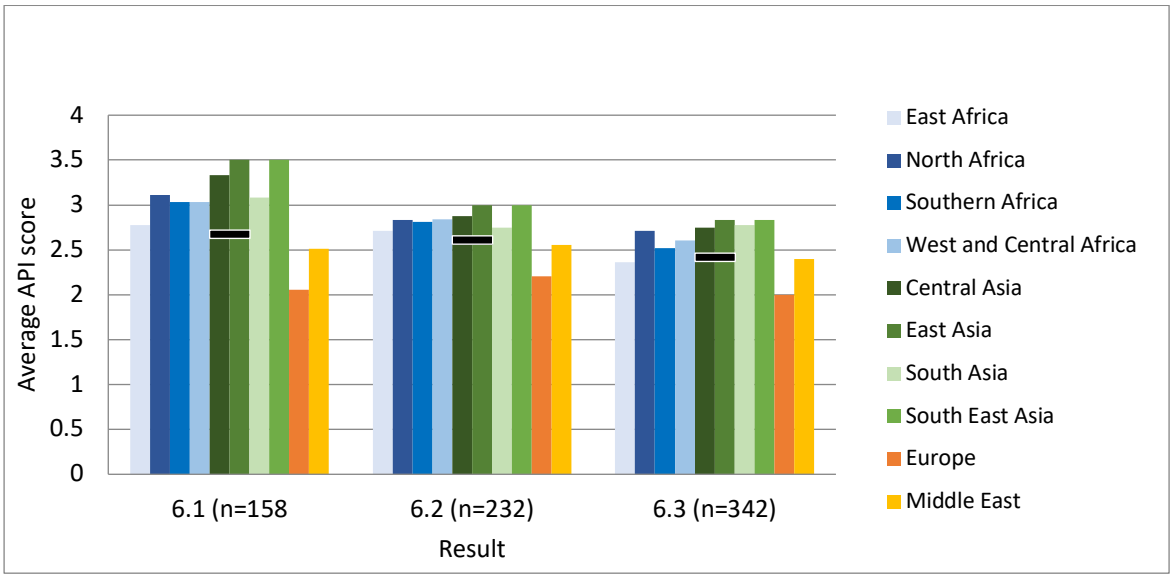


Figure 33: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 6
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

When asked whether they thought that Objective 6 results could be achieved by the end of the Vulture MsAP (that is, within the next 6 years), respondents were not very hopeful than for other Objectives, with less than 50% feeling positive about the achievability of each Result (Figure 34). Only 30% of respondents felt that energy infrastructure would be made safe (Result 6.3) by the end of the Vulture MsAP – again, reflecting the challenge of the scale of the work needed.

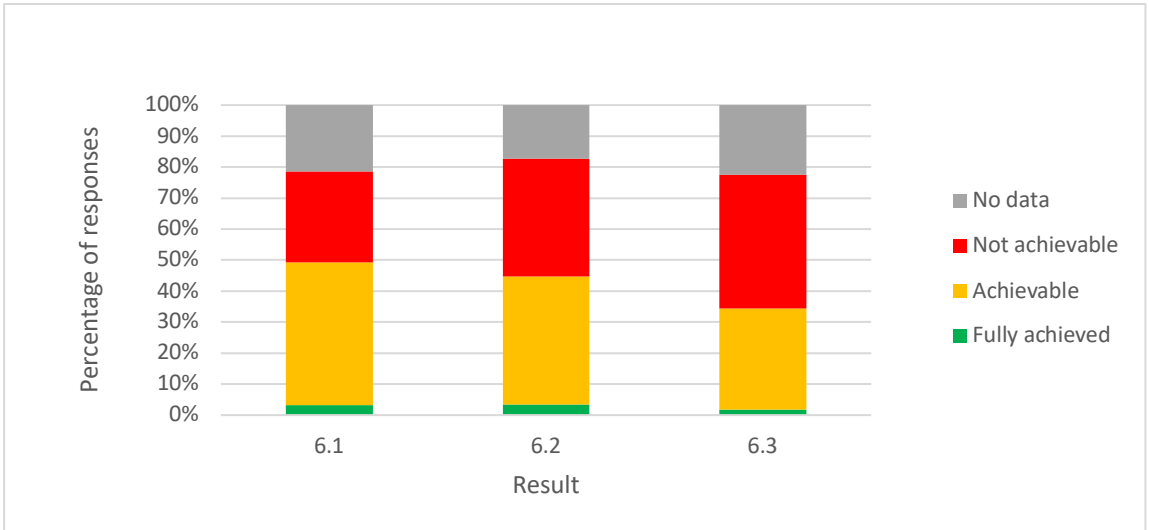


Figure 34: Percentage achievability of Objective 6 Results in the remaining 6 years of the Vulture MsAP
Note: n = 61, 58 and 58, for Result 6.1, Result 6.2 and Result 6.3, respectively

7.7 Implementation of Objective 7: Reduce vulture mortality caused by collisions linked to energy transmission and generation infrastructure

Objective 7		
Result 7.1: Current vulture mortality and sensitivity in relation to collision understood, including population impacts, hotspots and improved designs.		
Action 7.1.1	All regions	Determine baseline impact of collision on energy infrastructure at appropriate levels (e.g. total population, subregion, country or subnational) for each species within the Vulture MsAP range, using standard monitoring protocols.
Action 7.1.2	All regions	**Complete sensitivity mapping for the entire MsAP range. Adding to existing analyses (e.g. Red Sea flyway) to identify areas where energy infrastructure poses greatest collision risks to vultures; combine tracking data, site prioritisation, vulture counts and other sources.**
Action 7.1.3	Africa; Central Asia; Europe; Middle East	Develop standardised monitoring protocols which included guidance on access to data and data sharing, and conduct long-term monitoring of impacts of energy infrastructure, both for proposed and existing networks.
Action 7.1.4	Africa; Central and East Asia; Europe; Middle East	Conduct long-term monitoring of impacts of energy infrastructure, both for proposed and existing networks and investigate effective on-site mitigation techniques to reduce vulture fatalities. Explore methods to better capture collision data.
Result 7.2: Public and private sector support and promote adoption of vulture-friendly energy infrastructure.		
Action 7.2.1	All regions	**Promote the use of bird-friendly energy technology as set out in CMS guidelines on energy infrastructure, targeting a set of decision-makers in key countries where this is known to be an issue (Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region; draft Renewable Energy Technologies and Migratory Species: Guidelines for Sustainable Deployment).**
Action 7.2.2	All regions	Use existing tools (e.g. sensitivity maps) to ensure appropriate site selection of wind farms and other energy infrastructure, avoiding areas of high risk and vulnerability e.g. vulture colonies.
Action 7.2.3	Africa	**Develop a Pan-African Energy Task Force probably as a subgroup of the CMS Energy Task Force and engage with energy developers operating in Africa to ensure risk to vultures from planned energy infrastructure is minimised.**
Action 7.2.4	All regions	**Engage with donors of large energy infrastructure developments to ensure responsible energy developments using appropriate guidelines (International Finance Corporation Standards) and allocation of project resources to enable long-term monitoring.**
Action 7.2.5	All regions	Promote the phasing-out of old risk-prone technologies, and support investigations in the improvement of risk-prone designs, e.g. replacing current wind turbines with blade-less designs.
Action 7.2.6.	All regions	**Create, or identify existing, national energy associations and engage them to support vulture-friendly power grids both pre- and post- construction.**
Result 7.3: Energy infrastructure (electricity power grids) impacts on vultures are reduced by implementation of improved designs.		
Action 7.3.1	All regions	For new and existing energy infrastructure, promote the implementation of CMS guidelines by phasing out energy infrastructure designs that pose collision and electrocution risk to vultures and other birds, and advocate retro-fitting with known bird-friendly designs within current maintenance schedules.
Action 7.3.2	All regions	Advocate adoption of correct minimum standards by all energy infrastructure developers that ensures all future energy infrastructure adopts bird-friendly technologies and designs.
Action 7.3.3	All regions	**Ensure full implementation of mitigation measures in all protected areas containing vulture populations within the Vulture MsAP range.**
Action 7.3.4	All regions	**Improve planning of routing and construction of new power lines and promote the use of underground options where appropriate.**
Action 7.3.5	All regions	**Assess the effectiveness and durability of mitigation measures to prevent collision.**
Action 7.3.6	All regions	**Ensure the monitoring and maintenance of anti-collision measures and replacement when necessary.**
Action 7.3.7	Africa; Central Asia; Europe; Middle East	**Conduct training and capacity building to support implementation of guidelines and minimum standards, including monitoring.**

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Collision with electricity lines is less of a mortality cause for vultures when compared with electrocution, and has straightforward solutions, in the form of anti-collision devices that can be put on lines (with varying degrees of efficacy). More research is required to quantify the impact on vulture populations and flyways, and on finding effective mortality mitigation tools (e.g., automatic detection of incoming birds to wind-energy installations leading to shut-down on demand). Being able to quantify these impacts is likely to be an area of work going forward.

In the meantime, collision with wind-farms is locally a significant mortality factor, and has been demonstrated to have had population level impacts in a number of sites (e.g. Egyptian vultures in southern Spain (Carrete et al., 2009, Sanz-Aguilar et al., 2015)). Further, this particular threat is fast increasing in scope and intensity, as the number of planned wind farms will increase exponentially across the Vulture MsAP range in the next few years due to the climate change emergency.

Here, prevention of mortality – making sure that windfarms are not built in risky areas for vultures, is key, and therefore Action 7.1.2 remains crucial. This Action is largely happening across many sites and Range States, but the recent push because of climate change for faster approval of windfarm projects (and, therefore, with less compulsory safeguards), means that the number and scope of projects will always outpace sensitivity risk mapping efforts.

With the fast and inevitable development of wind energy, developing, testing and implementing new technologies to reduce mortality widely will be key (Actions 7.3.2 and 7.3.5). New technologies, including automatic detection of incoming birds using cameras and Artificial Intelligence, have good potential, but need to be tested and validated, and then mainstreamed.

Overall, Implementation Scores are low for this Objective, hovering around 1.5 (Figure 35), despite most of the Objectives supposed to having been completed by this time. Like the previous Objective, the IS is low, even for the most critical Actions, 7.1.2 (sensitivity mapping) and 7.3.1 (implementing guidelines to make energy infrastructure safer). As with the previous Objective, Europe and the Middle East seem to have made better progress, with lower APIs (Figure 36). The assessment of the achievability of this Objective is similar to that for Objective 6, with only around a third of respondents feeling that the Results will be achieved by the end of the next 6 years (Figure 37), probably reflecting the current huge expansion of the windfarm network.

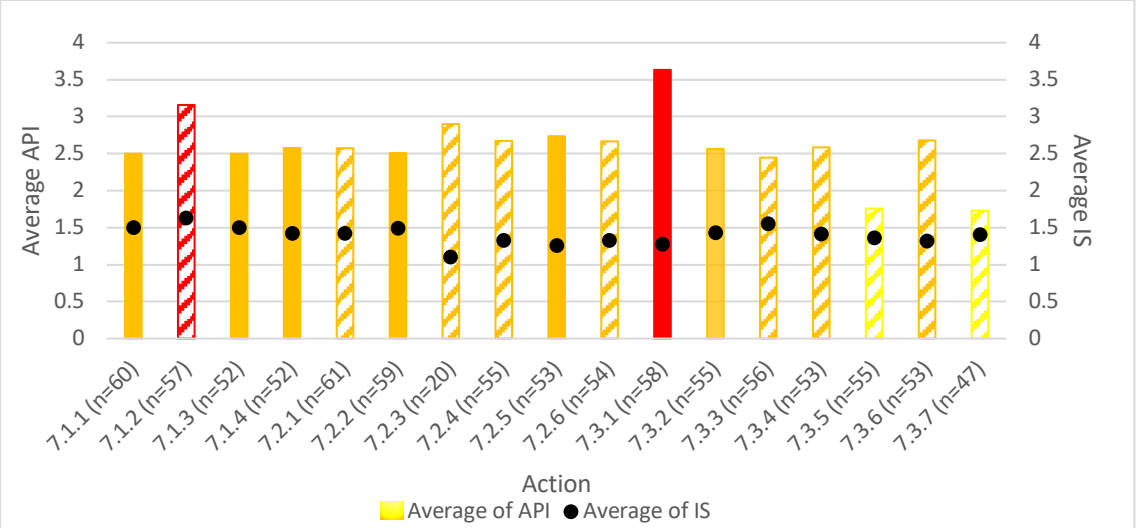


Figure 35: Average Action Priority Index (API) by Region and Result, for Objective 7
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

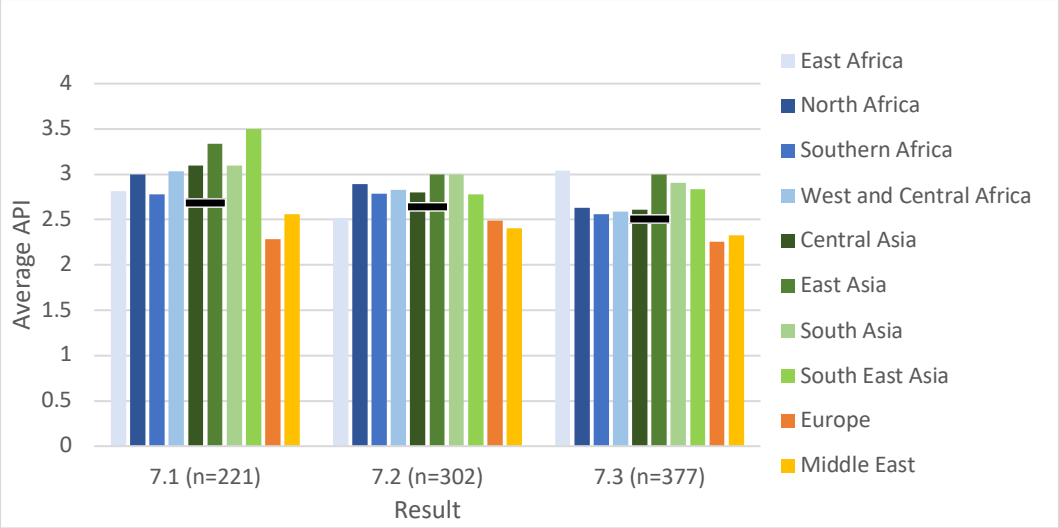


Figure 36: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 7
Key: horizontal black bar = average API

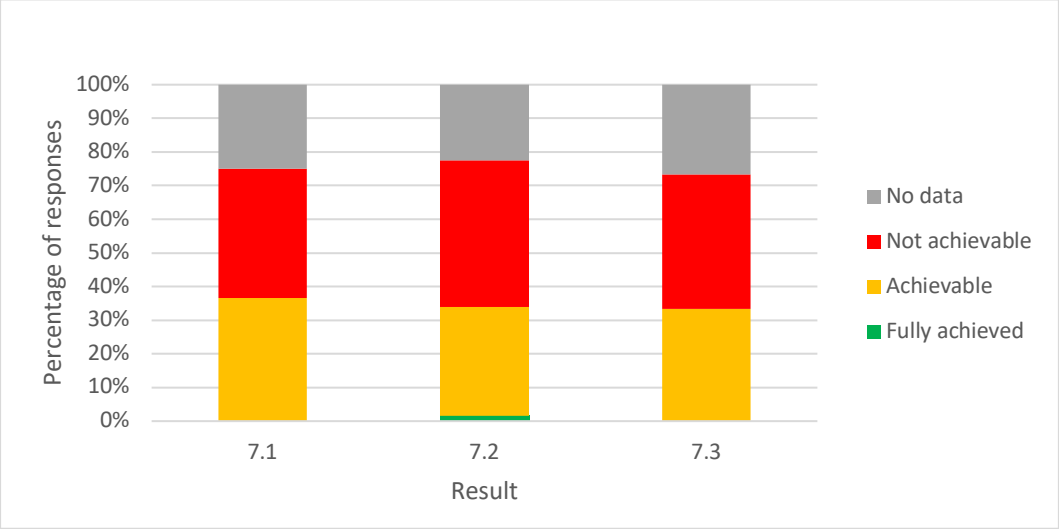


Figure 37: Percentage achievability of Objective 7 Results in the remaining 6 years of the Vulture MsAP
Note: n = 60, 62 and 60, for Result 7.1, Result 7.2 and Result 7.3, respectively

7.8 Implementation of Objective 8: Ensure or increase availability of poison-free food and water for vultures to sustain populations

Objective 8		
Result 8.1: Increase understanding of role of food availability in vulture declines.		
Action 8.1.1	All regions	**Investigate changes in food availability (and water availability and quality - where applicable), quality and distribution for vultures at a range of spatial scales (foraging patterns of fledglings and breeding adults), and any resulting impacts on vulture populations.**
Action 8.1.2	All regions	**If vulture food shortage is confirmed, identify drivers with specific reference to ungulate declines and stricter sanitation at abattoirs (proposed root causes), hunting practices and social and socioeconomic changes (husbandry practices).**
Result 8.2: Where appropriate, develop and implement country-specific or more local strategies to ensure food availability.		
Action 8.2.1	Africa; Central, South and South-East Asia; Europe; Middle East	**Identify and promote scavenger-friendly veterinary/sanitary regulations (regarding carcass disposal) and waste management practices and make sure that the food provided is safe (e.g. not contaminated with pesticides and NSAIDs, etc.).**
Action 8.2.2	Africa; Central, South and South-East Asia; Europe; Middle East	Promote and implement measures to restore wildlife populations in protected areas, with special attention to benefiting vultures by conserving existing wild ungulate and predator populations and maintaining protected area networks.
Action 8.2.3	East, West Africa and Central, and Southern Africa; East and South-East Asia; Middle East	Promote scavenger-friendly traditional land use practices such a mobile pastoralism.
Action 8.2.4	North Africa, West Africa, East Africa, Southern Africa, Europe/Central Asia, Middle East	Develop clear goals and science-based guidance and methods to support any supplementary feeding strategies (e.g. vulture restaurants), including ensuring resources to cover operational costs for sites for 5–12 years.
Action 8.2.5	Africa; Central Asia; Europe; Middle East	**Training & capacity building in the management of feeding sites (food sustainability, both natural and supplementary).**

Note: Bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Availability of food is key for scavengers. In some parts of the Vulture MsAP range (e.g., Europe), the availability of carcasses for vultures has improved markedly in the last few years, both due to adequate regulations that allow for dead domestic livestock to be made available (with certain conditions) to vultures, but also because of the increase in some areas of wild ungulates and/or of the carcasses of wild ungulates made available through hunting practices. This aspect has been key in Europe, and partly explains the huge increase of vulture populations in many European countries, notably in Spain, where food availability is now not a limiting factor.

However, in many other areas (e.g., North Africa and the Middle East), lack of food still appears to be a major limiting factor, as there are very few wild ungulates and/or carcasses of domestic livestock available to scavengers.

Implementation scores are low for Objective 8 across all the Actions, hovering around 1.5 (Figure 38). Europe seems to have been most successful in achieving Result 8.1 (understanding food and water shortages and their drivers) (Figure 39). Only half of respondents felt that this Objective is achievable in the remaining 6 years (Figure 40).

In some projects, notably reinforcement and reintroduction projects, and in some areas, adequately managed supplementary feeding points have been key to helping species or populations recover and/or expand to certain areas, but supplementary feeding can also have negative impacts, notably favoring some species over others, or acting as a point of transmission of diseases (e.g., Highly Pathogenic Avian Influenza).

Actions 8.1.1 and 8.1.2 are still important for deciding on the relevance of developing a strategy that includes supplementary feeding strategies. Action 8.2.1 (development of scavenger-friendly veterinary/sanitary regulations and waste management practices) also remains key.

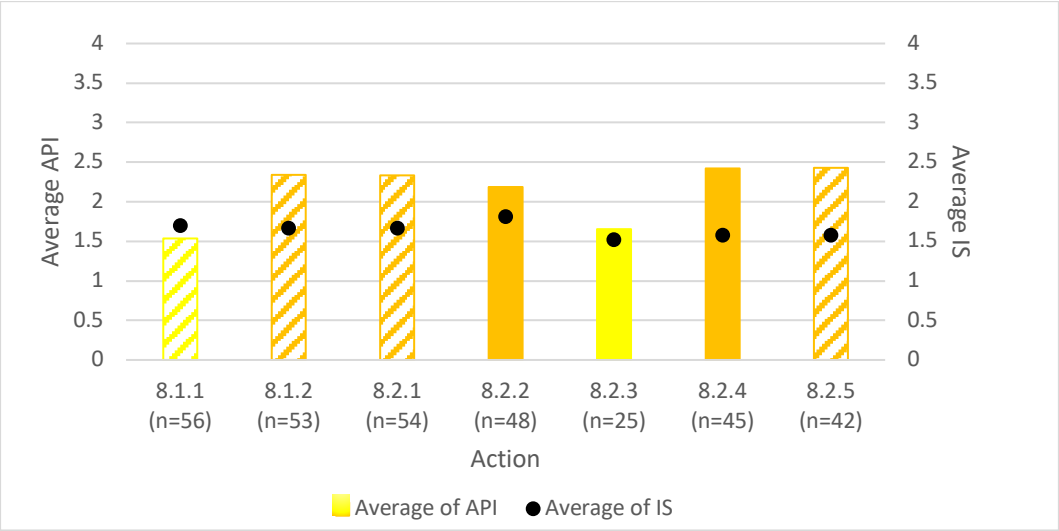


Figure 38: Average Action Priority Index (API) by Region and Result, for Objective 8
Key: orange = high, yellow = medium; hashed = should already have been completed

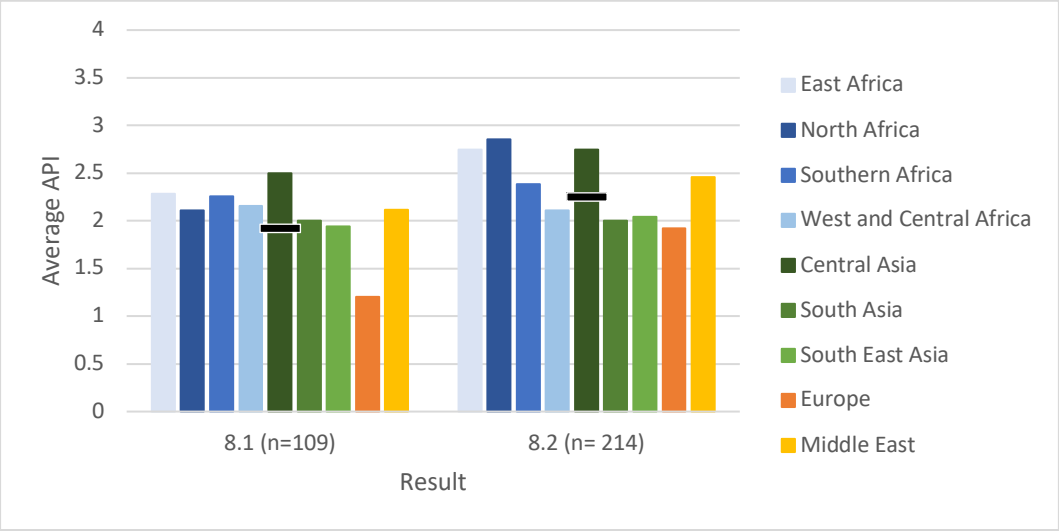


Figure 39: Average Action Priority Index (API) by Region and Result, for Objective 8.
Key: horizontal black bar = average API

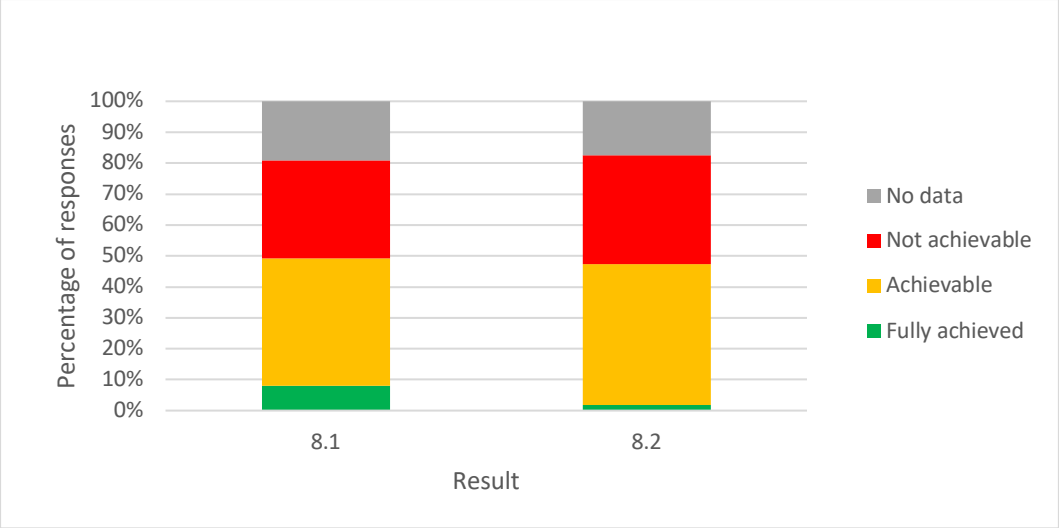


Figure 40: Percentage achievability of Objective 8 Results in the remaining 6 years of the Vulture MsAP

Note: n = 63 and 57 for Result 8.1 and Result 8.2, respectively

7.9 Implementation of Objective 9: Ensure availability of suitable habitat for vultures to nest, roost and forage

Objective 9		
Result 9.1: Nesting sites used by vultures conserved.		
Action 9.1.1	All regions	**Investigate and identify key nesting and roosting areas (where not known) and assess availability in relation to nesting habitat destruction – working with local communities to show importance and impact to vulture populations.**
Action 9.1.2	Africa; Central and South Asia; Europe; Middle East	**Review legislation and promote recognition and conservation of key breeding and roosting sites for vultures (establish new protected areas).**
Action 9.1.3	East, West and Central, and Southern Africa,; Central Asia; Europe; Middle East	Establish reforestation schemes and woodlots to increase vulture nesting habitat and reduce human pressure for fuel and construction timber.
Result 9.2: Rangelands conserved as suitable habitat for vultures.		
Action 9.2.1.	Africa; Central Asia; Europe; Middle East	Promote sustainable management of rangelands through holistic land management (farm, mining concession etc.) to ensure healthy environment for vultures e.g. cattle grazing rotation to reduce degradation and traditional mobile pastoralism.
Action 9.2.2.	Africa; Central Asia; Europe; Middle East	Integrate knowledge of vulture habitat requirements into land or ecosystem management for rangelands, Protected Areas etc.
Action 9.2.3.	All regions	Include vultures as part of biodiversity planning and indicator systems in conservation and/or development (e.g. mining) projects.

Note: Bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Vultures generally tolerate or adapt to changes in tree or cliff-ledge availability as suitable nest sites, even when optimum conditions may not be achieved. Habitat changes on a wider scale influencing the ultimate availability of mammals (domestic or wild) that then die and become available as part of the vulture food chain are generally longer-term changes, and it may be one of numerous other factors that determine the resultant food availability factor in addition to the habitat changes themselves.

Threats relating to food safety (and potentially power infrastructure) that affect adult survival therefore tend to have higher direct impacts on vulture populations, and this presumably explains why the Vulture MsAP did not identify any critical or high priority Actions for this Objective (Figure 41). This may also account for why the last four Actions have an IS of less than 1.5, especially as they are all Actions that are only expected to be completed in the next 6 years. However, Actions 9.1.1 (identifying suitable nesting areas) and 9.1.2 (reviewing legislation), which should already have been completed by all countries, have IS scores of 2 or less. Nonetheless, the APIs for these Actions are very low, reflecting their relatively low priorities compared to other Objectives.

The Raptors MOU has catalogued more than 7,200 sites of international significance for raptors across Africa-Eurasia, with over 1,300 of these being crucial for vultures. Protecting these sites could greatly enhance the survival prospects of numerous vulture species. The importance of protected areas for vultures (and raptors in general) has been underscored yet again in a recent study by Shaw et al. (2024).

At a regional level, South Asia and Europe have made better progress with lower APIs, at least for Result 9.2 (Figure 42). Less than 60% of respondents felt that Result 9.1 will be achievable within the next 6 years, and only just under 40% felt this for Result 9.2 (Figure 43).

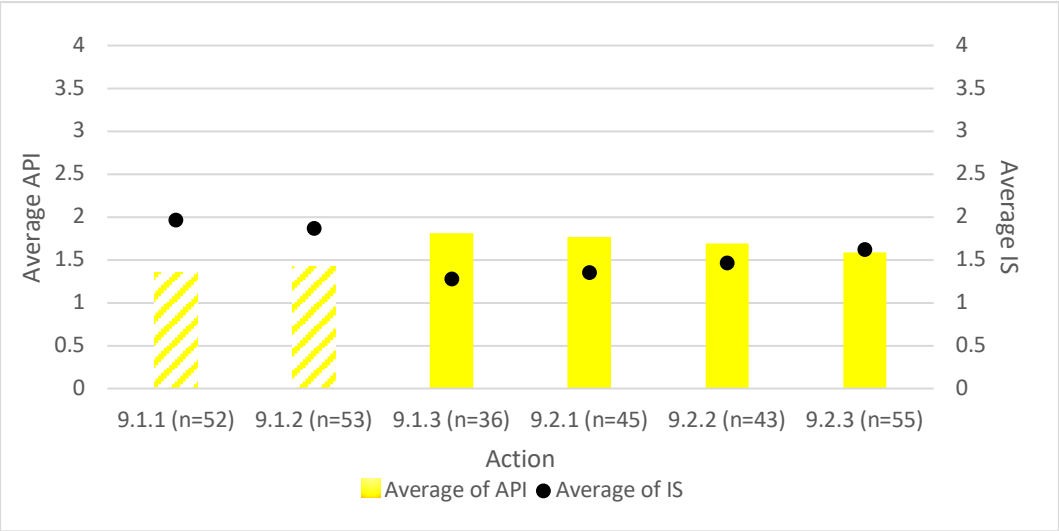


Figure 41: Average Action Priority Index (API) by Region and Result, for Objective 9
Key: yellow = medium; hashed = should already have been completed

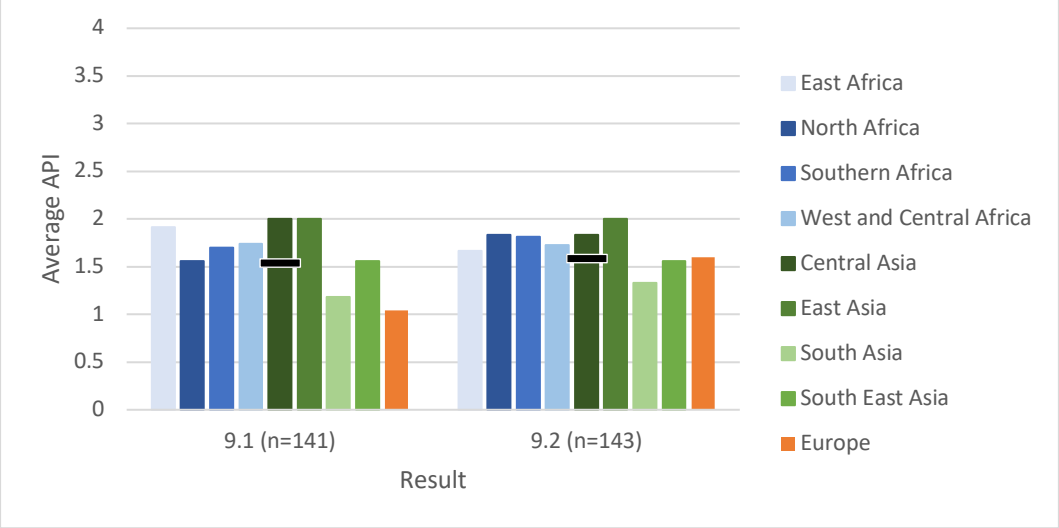


Figure 42: Average Action Priority Index (API) by Region and Result, for Objective 9
Key: horizontal black bar = average API

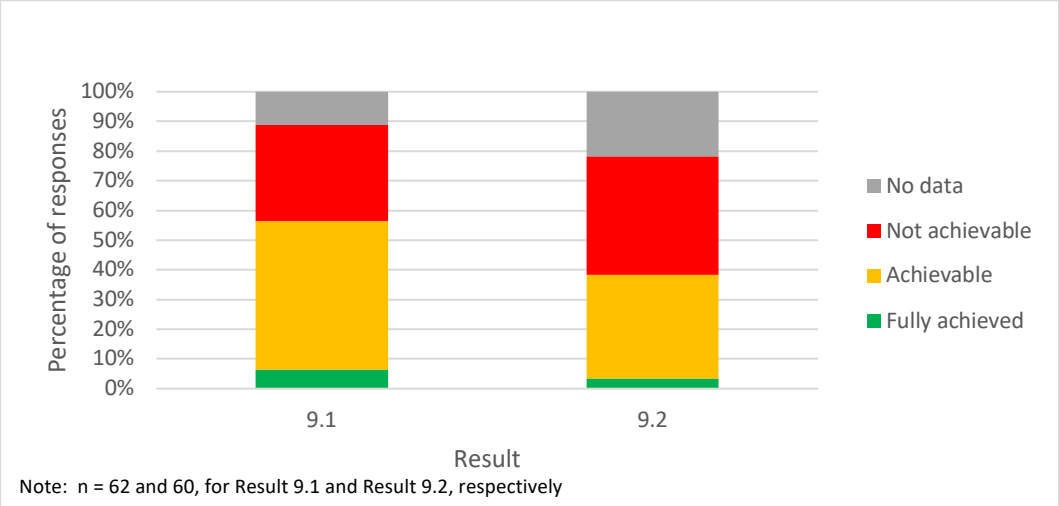


Figure 43: Percentage achievability of Objective 9 Results in the remaining 6 years of the Vulture MsAP
Note: n = 62 and 60, for Result 9.1 and Result 9.2, respectively

7.10 Implementation of Objective 10: Reduce direct persecution and disturbance caused by human activities

Objective 10		
Result 10.1: Reduced mortality caused by direct persecution		
Action 10.1.1	Africa; Central Asia; Europe; Middle East	Seek species protection legislation and policies to protect species from persecution and disturbance to be enacted in all Vulture MsAP Range States
Action 10.1.2	All regions, except South Asia.	Assess the motivation behind the direct persecution of vultures and engage with relevant stakeholders to promote alternative approaches or interventions.
Action 10.1.3	All regions	Aim to ensure that appropriate legislation is in place and effectively enforced to prevent direct persecution of vultures.
Result10.2: Increase breeding success by reducing disturbance.		
Action 10.2.1.	All regions, except South Asia.	Implement public awareness campaigns to highlight activities that cause disturbance to vultures at breeding and roosting sites and how to avoid or mitigate it.
Action 10.2.2.	All regions	Determine scientifically based guidelines to reduce the impact of disturbance for each species in the Vulture MsAP range.
Action 10.2.3.	All regions	Improve control of infrastructure development at or near breeding sites (including use of EIA's and other relevant studies).

Note: The regions where the Actions are relevant are indicated.

For this Objective, all Actions are considered high priority. Some relate to legislation, including protection of vultures from persecution as was all Environmental Implementation Assessment requirements, with progress on these issues summarised in Annex 10.4.

Implementation Scores hover around 2, except for Action 10.2.2 (developing guidelines to reduce disturbance) which is below 1.5 (Figure 44). This is why this Action has the highest API in the Figure. When looking regionally, the API for most regions is relatively low compared to some other Objectives, especially for South Asia (where it was lower priority) and Europe for Result 10.1 (Figure 45). This is likely due to the fact that this threat is considered a much lower risk compared to the unintentional poisoning of vultures and the impact of NSAIDS (in South Asia) as addressed in Objectives 1 and 2. Less than 60% of respondents felt that Result 10.1 will be achievable within the next 6 years, and only just under 40% felt this for Result 10.2 (Figure 46).

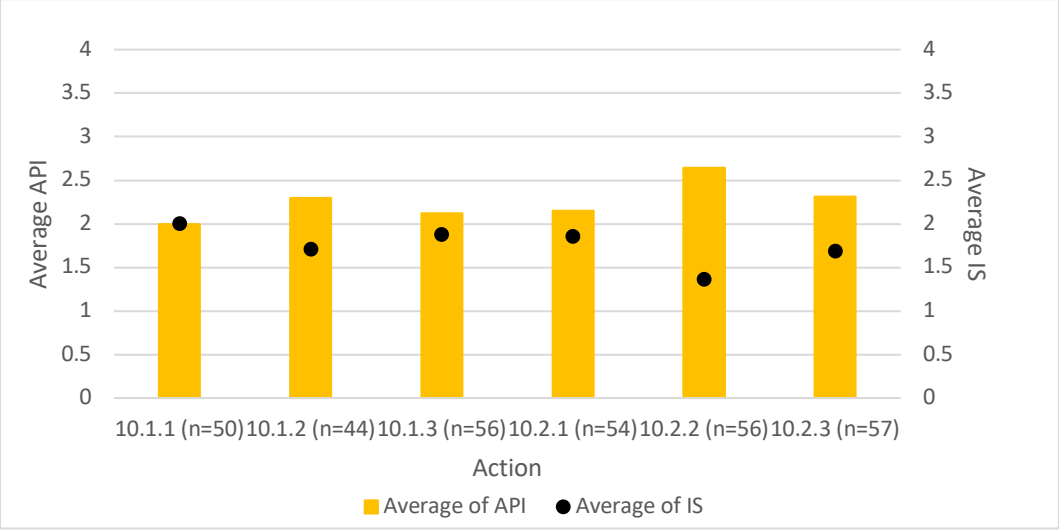


Figure 44: Average Action Priority Index (API) by Region and Result, for Objective 10
Key: orange = high

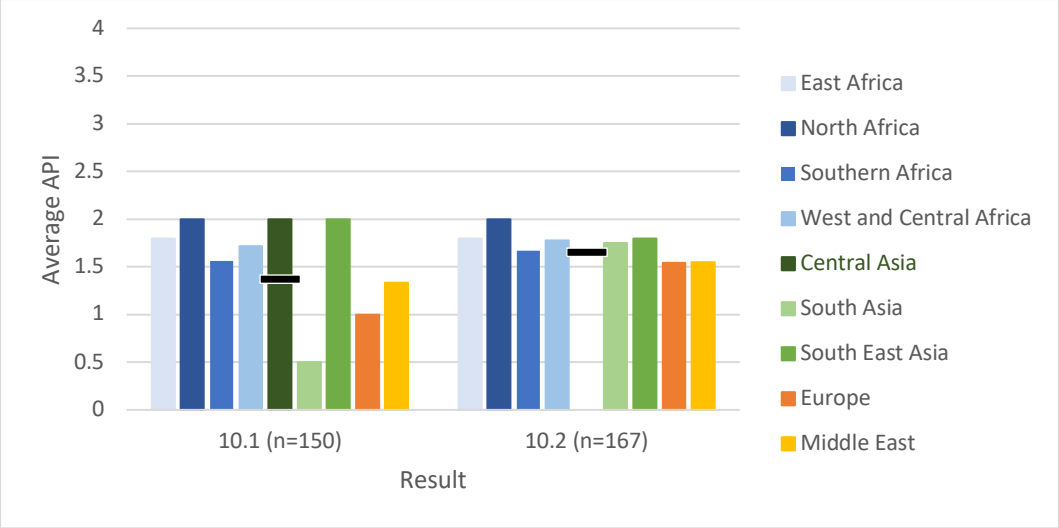


Figure 45: Average Action Priority Index (API) by Region and Result, for Objective 10
Key: horizontal black bar = average API

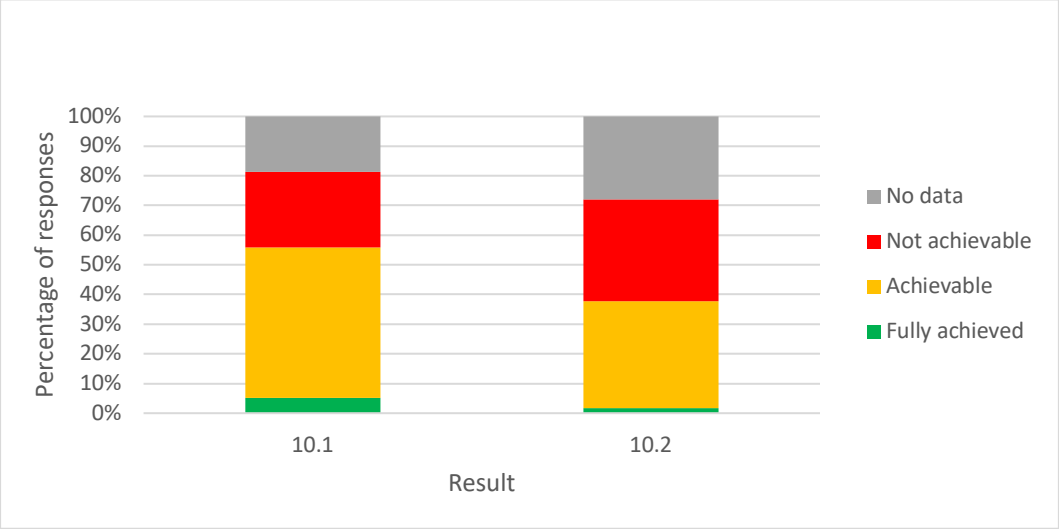


Figure 46: Percentage achievability of Objective 10 Results in the remaining 6 years of the Vulture MsAP
Note: n = 59 and 61, for Result 10.1 and Result 10.2, respectively

7.11 Implementation of Objective 11: Support vulture conservation through cross-cutting actions that may contribute to mitigation of most or all threats

Objective 11		
Result 11.1: Increased understanding of basic biological and ecological parameters and threats influencing vulture populations		
Action 11.1.1	All regions	Census 2018-2019 + census 2028-2029 of all species to monitor the population size, breeding productivity, distribution and trends across the Vulture MsAP range.
Action 11.1.2	All regions	Study breeding and spatial ecology of vulture species, and identify most important breeding, feeding and roosting sites for each, per country.
Action 11.1.3	All regions	**Undertake GPS/satellite tracking studies of vultures to determine spatial movements for all species and to identify mortality caused by full range of threats. Create a repository for all tracking data across the Vulture MsAP range.**
Action 11.1.4	All regions	Improve capacity to conduct autopsies, toxicological and other forensic analysis to determine causes of mortalities throughout the MsAP range.
Action 11.1.5	All regions	Improve regulations to facilitate the easier movement of samples between countries where capacity is lacking to facilities than can do the relevant analysis. Permitting process needs to be streamlined.
Action 11.1.6	Southern Africa, Central Asia, Europe	Promote long-term monitoring of supplementary feeding site management and use and information exchange between sites.
Action 11.1.7	Africa; Central and East Asia; Europe; Middle East	**Conduct a detailed assessment on the scale and impact of legal and illegal trade in live birds, eggs and vulture body parts across the range of the Vulture MsAP.**
Action 11.1.8	Africa, Central and East Asia; Europe; Middle East	**In light of outcome of Action 11.1.7. (above), undertake risk-benefit analysis and gauge potential support for of proposing the uplisting of individual species that meet the criteria to CITES Appendix I.**
Result 11.2: Vulture populations restored where extinct and supplemented where there is danger of extinction.		
Action 11.2.1	All regions	Assess all project proposals for captive breeding and reintroduction of vultures to ensure full alignment with IUCN Guidelines on restocking and reintroduction.
Action 11.2.2	Africa; Central and South Asia,; Europe; Middle East	Develop conservation breeding programs for Critically Endangered and Endangered vulture species, as last resort.
Action 11.2.3	Africa; Central and South Asia,; Europe; Middle East	Develop a reintroduction strategy using the IUCN guidelines and criteria for reintroduction of species.
Result 11.3: Environmental and socio-economic values of vultures is understood and promoted.		
Action 11.3.1	All regions	**Conduct a Total Economic Value (TEV) study of vultures which includes their role as providers of ecosystem services and in generating eco-tourism attraction.**
Result11.4: Promote enhanced protection of African-Eurasian Vultures in national and international legislation.		
Action 11.4.1	All regions	**Engage with Range States to promote Proposals to uplist all Endangered and Critically Endangered African-Eurasian vulture species to CMS Appendix I.**
Action 11.4.2	All regions	**Aim to ensure that vultures are afforded legal protection in all Range States.**
Action 11.4.3	All regions	**Draft guidelines to encourage and assist all Range States to develop National or Regional Vulture Conservation Plans.**
Action 11.4.4	All regions	Develop VSZ criteria and promote application and implementation of this approach to address all critical threats throughout the Vulture MsAP range.

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

Objective 11 includes a wide and diverse range of horizontal issues important for vultures across the Vulture MsAP range. There has been good progress across many of these, at least in some countries and regions. Box 5 provides examples of projects which fell under Objective 11, for countries which provided some description of their activities.

The Implementation Scores for critical and high priority Actions hover between 1.5 and 2 in Figure 47. There has been a significant drive in expanding knowledge on the movement and spatial ecology

(Actions 11.1.2. and 11.1.3) of all species of Old World vultures through the implementation of a range of tracking studies in all regions of the Vulture MsAP since 2017 (particularly in Europe and Africa). This provides invaluable information for conservation purposes. There has been a significant increase in the number of journal articles with this focus, and many studies are still on-going. More generally, a literature search (Annex 10.4) found that at least 525 journal articles relating to Old World vultures have been published since the Vulture MsAP was launched in 2017, providing much-needed data in support of Result 11.1, as well as many other Objectives.

One Essential Action – 11.3.1 (Total Economic Value studies) – has the worst performance and highest Action Priority Index of over 3. Some studies on ecosystem services have been done in some countries (e.g., Spain and Cyprus), but this is very limited. The Vulture Conservation Foundation is planning to invest in this in the next few years, with further studies being prepared in Croatia and Portugal. A recently published study from India (Frank & Sudarsham, 2023) provides stark evidence of the impact of losing the scavenging function of vultures to the environment and human society. More work on this aspect is however needed across the range. There are currently two studies focused on this aspect on-going in Africa.

The highest Implementation Score is for demographic surveys (Action 11.1.1) although, as Section 5 showed, demographic data remain very patchy. In some countries a national census was done and in Europe the Vulture Conservation Foundation publishes an update of demographic data every 2 years (Terraube et al., 2022).

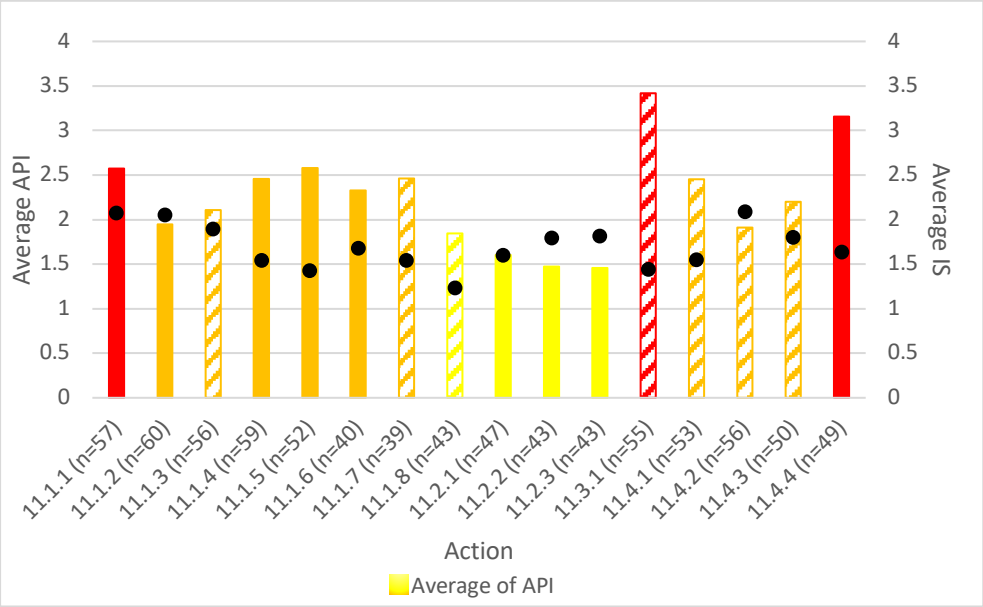


Figure 47: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 11
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed

Box 5: Examples of projects implemented under Objective 11, where these were detailed by respondents*

Albania
There is a project proposal for the re-introduction of the Griffon Vulture.
Croatia
The Eurasian Griffon was once a widespread and common species in Croatia. However, there are no plans to reintroduce Eurasian Griffon beyond the areas in which it is currently present.
Greece
The concept of vultures as ecosystem services providers is gradually being promoted at the national level.
Italy
Significant progress has been made with reintroduction for the following species: Bearded Vulture, Griffon Vulture and Egyptian Vulture. For the Cinereous Vulture some preliminary assessments have been undertaken to reintroduce the species in Sardinia and central Italy. In Italy there is one private captive breeding center for Egyptian Vulture restocking, managed by CERM Centro Rapaci Minacciati.
Lebanon
Thanks to funding from the European Union through the BioConnect project, a key species, namely the Egyptian Vulture, has been selected for assessment from the year 2022 until the year 2025. Bird experts have been reporting on their field assessments, on the threats that wild birds are exposed to, and on their recommendations for threat mitigation. These reports are in the process of being used to develop species-specific action plans, mainly for the Egyptian vulture, and to draft project proposals in the second half of 2023 in order to secure funding for the protection of this species.
Malawi
Malawi is working hard to close knowledge gaps around the behavioural ecology and population size of vultures in the country. However, more work needs to be done and a bigger focus needs to be placed on getting boots on the ground to investigate sites of use.
South Africa
Movement across the borders of South Africa and Lesotho for the study of vultures has been assessed and improved.
Tanzania
Transect and telemetry studies have been undertaken to understand population trends, identify causes of mortality, and assess habitat use (including foraging areas).

*legislative and policy changes are summarized in Section 6.2

Action 11.2.2 (develop conservation breeding programs) has seen good progress in Europe (with Bearded Vultures), Asia (as part of the SAVE programme) and in South Africa (with the establishment of a committee to develop priorities and guidelines). Reintroduction (Action 11.2.3) of Bearded and Cinereous vultures in Europe has been key to the recovery of these species in Europe. These efforts are continuing and will probably expand to other countries (e.g., reintroduction of the Bearded Vulture will start in Bulgaria in 2025).

Working towards legal protection also has a relatively high score (Action 11.4.2) (refer to Annex 10.4 for legislation that was described by respondents). In Europe, in particular, vultures are legally protected in an adequate way across the continent. Action 11.4.3 (drafting guidelines to encourage and assist all Range States to develop conservation plans) has seen good progress with several countries in Europe (e.g., Greece) and Africa (e.g., Zimbabwe, Botswana, Kenya, Tanzania and South Africa) developing these (Annex 10.4).

As suggested by prior paragraphs, the regional comparison in Figure 48 shows that there is considerable variation in performance, although generally quantifying the ecosystem services provided by vultures is under-developed and a high priority going forward. Only between 50% and 60% of respondents have confidence that the Actions under this Objective will be fully achieved over the next 6 years (Figure 48).

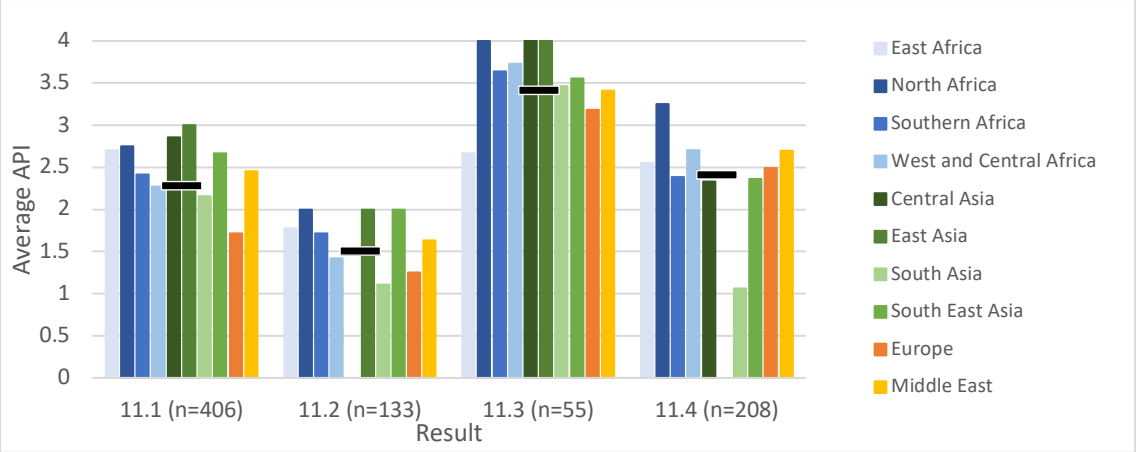


Figure 48: Average Action Priority Index (API) by Region and Result, for Objective 11
Key: horizontal black bar = average API

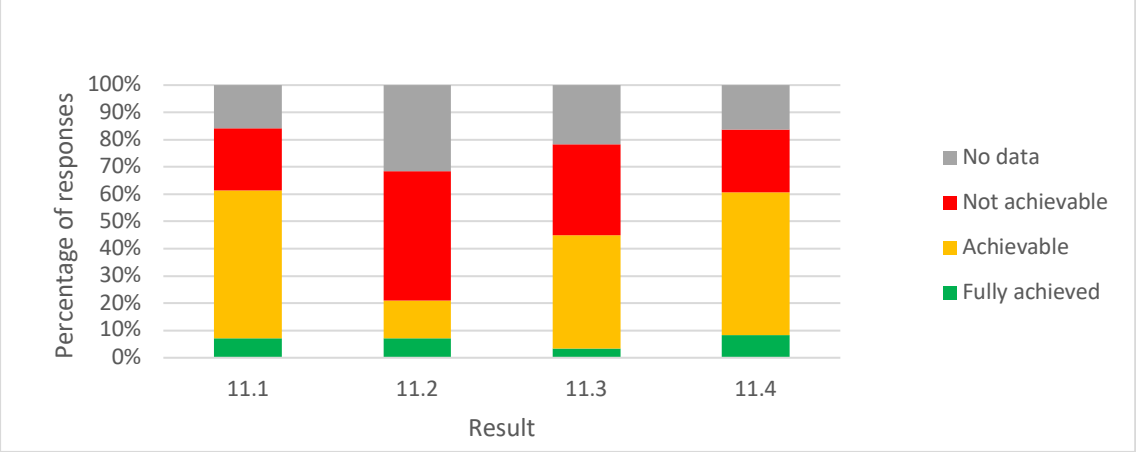


Figure 49: Percentage achievability of Objective 12 Results in the remaining 6 years of MsAP
Note: n = 57 for Result 11.1 and Result 11.2, n= 60 for Result 11.3, n = 61 for Result 11.4

7.12 Implementation of Objective 12: Advance vulture conservation by effective promotion and implementation of the Vulture MsAP.

Objective 12		
Result 12.1: Coordination Framework for the Vulture MsAP established, subject to available resources, including financial.		
Action 12.1.1	All regions	**Develop a Strategic Implementation Plan for the Vulture MsAP.**
Action 12.1.2	All regions	**Establish a Framework to coordinate implementation of the Vulture MsAP, including central and regional coordination units to facilitate implementation, support and review across the range.**
Action 12.1.3	All regions	**Develop and implement a fundraising strategy to secure the finances and other resources required to effectively implement the Vulture MsAP.**
Result 12.2: Effective communication strategy for the Vulture MsAP is established.		
Action 12.2.1	All regions	**Develop and implement a communications strategy, including at national level, comprising tools to promote the conservation of vultures across the flyway in a range of languages.**
Action 12.2.2	All regions	Utilise and support existing events at national level, such as International Vulture Awareness Day, to promote the conservation of vultures globally.
Action 12.2.3	All regions	**Establish a repository for relevant guidance, awareness raising materials, other publications and protocols that promote vulture conservation.**
Action 12.2.4	All regions	Create an interactive on-line version of the Vulture MsAP to enable ongoing updating and enhancement as new information and knowledge is accumulated.

Note: The Essential Actions are highlighted in red; bold writing indicates Actions meant to have been completed by this review; the regions where the Actions are relevant are also indicated.

The Coordinating Unit of the Raptors MOU published the Strategic Implementation Plan (Action 12.1.1) in 2020 (Pritchard, 2020). Action 12.1.1 has not been scored as its implementation is the responsibility of the Coordinating Unit of the Raptors MOU and not of the Range States.

A Coordination Framework (Action 12.1.2) was developed on a voluntary basis at international level by the Vulture Coordination Team composed of representatives from various organisations and institutions across the range who provide guidance on the focus and direction of work towards the implementation of the Vulture MsAP.. Despite continued efforts, no resources were obtained to support the establishment of the Coordination Framework as envisaged in the Vulture MsAP, despite this activity having been identified as critical.

The activity under this Objective which had the highest Implementation Score was the International Vulture Awareness Day (IVAD) (Action 12.2.2) (Figure 50). The event has become an institution on the global conservation calendar since it was established in 2009 and the most recent event in September 2023 saw participation from 36 countries with more than 100 organisations arranging and hosting various events. There are also plans to further expand and enhance IVAD in the next few years, so this should be well covered until the end of the Vulture MsAP timeline.

With respect to a communication strategy for the Vulture MsAP overall (Result 12.2, Figure 51), South Asia appears to have achieved more than other regions. However, only around half of respondents felt Objective 12 would be achievable as a whole within the next 6 years (Figure 52).

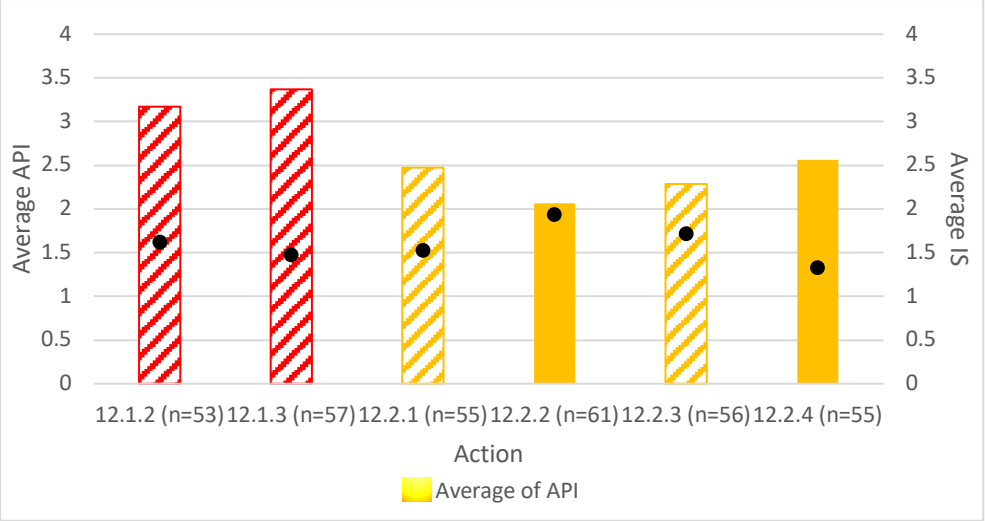


Figure 50: Average Action Priority Index (API) and Implementation Score (IS) by Action, for Objective 12
Key: red = essential, orange = high, yellow = medium; hashed = should already have been completed
Note: Action 12.1.1 is not represented in the Figure as it was completed in 2020 by the Coordinating Unit of the CMS Raptors MOU

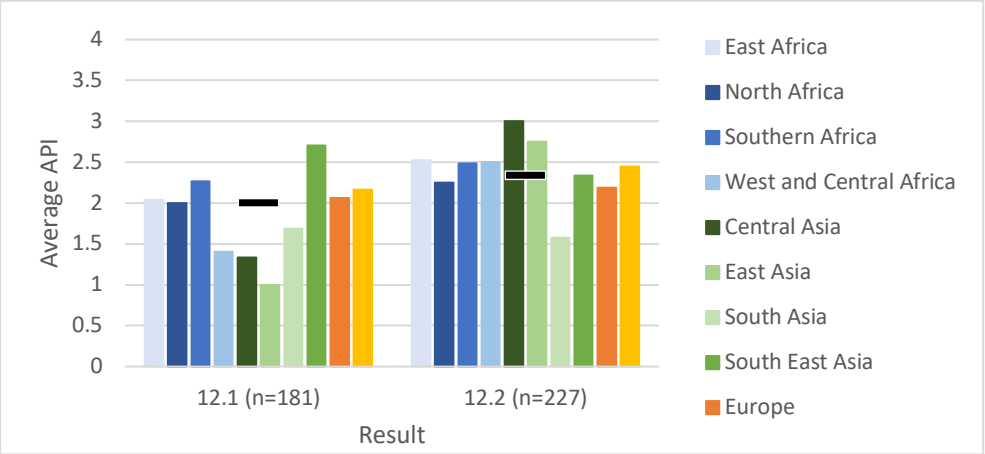


Figure 51: Average Action Priority Index (API) by Region and Result, for Objective 12
Key: horizontal black bar = average API

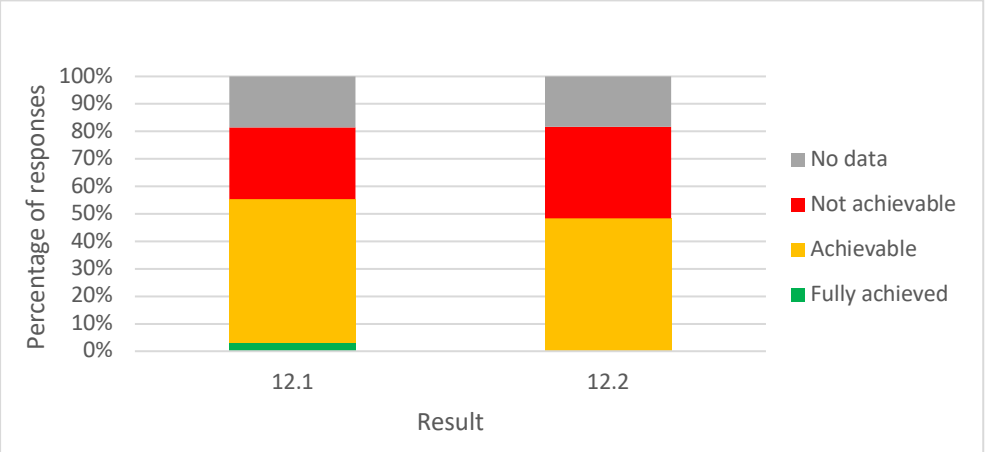


Figure 52: Percentage achievability of Objective 12 Results in the remaining 6 years of the Vulture MsAP
Note: n =65 for Result 12.1, n=60 for Result 12.2

8 Conclusions and Recommendations

The Mid-term Implementation Review of the CMS Multi-species Action Plan for African-Eurasian Vultures has provided important insights with regards to the level of engagement from various sectors, implementation of the objectives and activities across the range, as well as an estimate of the financial resources that have been invested. Based on the feedback from respondents and the results of the analysis thereof, the following recommendations are made to support an improved implementation of the CMS Vulture MsAP and to provide impetus for a review and update of this plan before the conclusion of its current implementation timeframe in 2029:

1. **Overall support and engagement**
   The overall implementation scores for the CMS Vulture MsAP clearly indicates a need for a significant increase in effort to support and provide critical resources towards the implementation and achievement of objectives and actions within the suggested timeframes thereof. Greater engagement and financial support from Range State governments and major donor institutions should be encouraged. Especially in regions that have experienced challenges and insufficient support in this regard to date, it is evident that much more work needs to be done to bring about positive change to the benefit of Old-World vultures and their habitats.

2. **Continued focus on the Implementation of Essential Actions**
   The CMS Vulture MsAP lists 17 Essential/Critical actions whose effective implementation is considered imperative to halt the decline in Old World vulture populations. Range States and stakeholders are encouraged to pay particular attention to, and support, these Essential Actions, where relevant in their countries and regions, to enable full implementation.

3. **Assistance with the establishment of the proposed Implementation Framework**
   Over the last 6 years, the Coordinating Unit of the CMS Raptors MOU have attempted on a number of occasions to acquire the resources to establish the Implementation Framework and contract relevant staff capacity to coordinate work associated with the Vulture MsAP, but without success. Donors are encouraged to consider supporting this initiative to provide greater impetus and ability to evaluate the effective implementation of the actions of the Vulture MsAP across the range.

4. **Building capacity for implementation**
   Multiple partners raised the need for additional skilled human resources to implement conservation activities.

5. **Review and update of the CMS Vulture MsAP – 2028/2029**
   To enable continuity and maintain momentum with regard to the conservation of Old-World vultures, it is important for the CMS Raptors MoU and its partners to already start planning and securing the resources for a review and update of the CMS Vulture MsAP before the expiration of its 12-year implementation timeframe in October 2029. Based on feedback received from respondents who submitted completed questionnaires and additional comments, it is suggested that the following aspects be considered during such a process:

   a. Aim to obtain the most up-to-date and realistic population estimates on Old World vulture populations and document any changes in range or movements in individual species to update both the status and range maps for each.

b. Expand the existing threat maps that were produced for Africa in the Vulture MsAP to cover the entire flyway and all species.
c. Re-examine the way countries are grouped into regions. There are some anomalies that were due to practical reasons faced by the Vulture MsAP, related to the offices where key partners were based, or to lack of contacts and information. In future, countries should be grouped on a geographical basis (possibly using the United Nations standardized method, to avoid confusion).
d. Improve the assessment and prioritization of Actions in response to changing needs and better data. The current Vulture MsAP provided broad priorities per region, based on a generalised understanding of the priority of threats across each region. The relative priority of threats may shift within the next 6 years (there are already some indications of this) and some countries may face highly individualized problems and opportunities. The next iteration of the Vulture MsAP needs to fine-tune the prioritization of actions accordingly.

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10 Annexes

10.1 Contributors and Acknowledgements

Note: Countries shaded in yellow are considered to be core ranges for vultures, based on important breeding sites, over-wintering sites and migratory routes.

Country	Contributors (the person who submitted the questionnaire is highlighted in **bold**, followed by co-contributors)
Afghanistan	No response received
Albania	**Klea Druro** and Taulant Bino (Albanian Ornithological Society)
Algeria	**Hafeda Hasnaoui Benmammar** (Personal capacity); **Amina Fellous Djardini** (Mouvement Ecologique Algerien) and **Djardini Lahouari** (volunteer)
Andorra	No response received
Angola	**Miguel Xavier** (Ministry of Environment)
Armenia	**Karen Aghababyan** (BirdLinks Armenia)
Austria	**Andreas Ranner** (Office of the Regional Government of Burgenland)
Azerbaijan	No response received
Bahrain	No response received
Bangladesh	**Sarowar Alam** (IUCN Bangladesh)
Belarus	No response received
Belgium	No response received
Benin	**Farid Amadou Bahleman,** Sadam Mama and Rockis Ganso (SOS Savane)
Bhutan	No response received
Bosnia and Herzegovina	No response received
Botswana	**Glyn Maude** and others (Raptors Botswana); **Mpho Williart** (BirdLife Botswana)
Brunei Darussalam	No response received
Bulgaria	**Volen Arkumarev** and Dobromir Dobrev (Bulgarian Society for the Protection of Birds)
Burkina Faso	**Clement Dabone** (University Centre of Tenkodogo, University Thomas Sankara) and NATURAMA
Burundi	No response received
Cabo Verde	**Pedro Lópe**z (Bios CV)
Cambodia	**Naiky Ny** and others (NatureLife Cambodia), on behalf of Cambodia Vulture Working Group**; Mony Sang** (Sam Veasna Conservation Tours Co., Ltd)
Cameroon	No response received
Central African Republic	No response received
Chad	**Cloé Pourchier** (Sahara Conservation Foundation)
China	**Su Hualong** (Key Laboratory of Forest Ecology and Environment, State Forestry Administration, Research Institute of Forest Ecology, Environment and Protection); Ma Ming Roller (Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences)
Congo (Brazzaville)	No response received

Congo (DRC)	No response received
Croatia	**Dubravko Dender** (Association Biom); **Tamara Čimbora Zovko** (Ministry of Economy and Sustainable Development and The Institute of Ornithology)
Cyprus	No response received
Czech Republic	No response received
Denmark	No response received
Djibouti	No response received
Egypt	No response received
Equatorial Guinea	No response received
Eritrea	No response received
Estonia	No response received
Eswatini	**Thulani Methula** (Eswatini National Trust Commission); **Ara Monadjem** (Biological Sciences, University of Eswatini)
Ethiopia	**Mihret Ewnetu** (Ethiopian Wildlife Conservation Authority); **Evan Beuchley** (Peregrine Fund)
Finland	No response received
France	**Charles-henri de Barsac** (Ministere Ecologie); **Emmanuel Rondeau** (White Fox Pictures)
Gabon	No response received
Gambia	**Fagimba Camara** and lamin Jobaate (West African Bird Study Association)
Georgia	No response received
Germany	No response received
Ghana	No response received
Greece	**Apostolis Kaltsis,** Victoria Saravia and Panos Kordopatis (Hellenic Ornithological Society, BirdLife Greece), Stavros Xirouchakis (University of Crete, National History Museum of Crete), and Sylvia Zakkak (Natural Environment and Climate Change Agency)
Guinea	No response received
Guinea-Bissau	**Mohamed Henriques** (Organização para a Defesa e Desenvolvimento das Zonas Humidas, Guiné-Bissau) and Miguel Lecoq
Hungary	No response received
India	**Subbaiah Bharathidasan** (Arulagam); **Vibhu Prakash**, Nikita V. Prakash, Rohan Shringarpure, **Sachin Ranade** (Bombay Natural History Society)
Iran	**Mohammad Asghari Tabari** (Department of Environment); **Alireza Hashemi** (Tarlan Ornithological Society)
Iraq	**Arif Shamkhi Jaber Al-salim** (Iraqi Ministry of Environment); **Korsch Ararat** (Nature Iraq, University of Sulaimani)
Ireland	No response received
Israel	**Ofad Hatzofe** (Israel Nature and Parks Authority)
Italy	**Arianna Aradis** (Area Avifauna Migratrice, Dipartimento per il monitoraggio e la tutela dell'ambiente e per la conservazione della biodiversità, Higher Institute for Environmental Protection and Research), Alessandro Andreotti-Istituto superiore per la protezione e la ricerca ambientale (ISPRA); Fiammetta Berlinguer-University of Sassari; Mario Posillico-Carabinieri forestali (Reparto Carabinieri Biodiversità Castel di Sangro); Massimiliano Di Vittorio-Gruppo Tutela Rapaci/LIFE ConRaSi team; Enrico Bassi-Vulture Conservation Foundation; Fulvio Genero-Vulture Conservation Foundation; Guido Ceccolini-CERM Centro Rapaci Minacciati; Anna Cenerini-CERM Centro Rapaci Minacciati; Rosario Fico-Società Italiana di Scienze Forensi Veterinarie; **Marco Gustin** (Lega Italiana Protezione Uccelli)
Ivory Coast	No response received
Japan	No response received
Jordan	**Tareq Qaneer** (The Royal Society for the Conservation of Nature)

Kazakhstan	**Sergey Skylarenko** (Association for the Conservation of Biodiversity of Kazakhstan)
Kenya	**Ralph Buij** (Wageningen University and Research (Netherlands); **Paul Gacheru** (Nature Kenya) with Dr.Paul Matiku, James Mutunga and Brian Otiego; **Peter Njoroge** (National Museums of Kenya);
Korea (South)	**Hansoo Lee** (Korea Institute of Environmental Ecology)
Kuwait	No response received
Kyrgyzstan	**Anatoli Otashchenko** (Academy of Science)
Laos	**Santi Xayyasith** and others (Faculty of Environmental Sciences, National University of Laos)
Latvia	No response received
Lebanon	**Yara Alchammas** (Society for the Protection of Nature in Lebanon)
Lesotho	**Sonja Krueger** (Bearded Vulture Recovery Programme)
Liberia	**Dickarmien A. Deemie, Emmanuel M. Loqueh** (Society for the Conservation of Nature of Liberia)
Libya	No response received
Malawi	**Tamara Chirwa** (Wildlife and Environmental Society of Malawi); **Elanor Comley** (Lilongwe Wildlife Trust) and Olivia Sievert (previously project leader)
Malaysia	No response received
Mali	No response received
Malta	No response received
Mauritania	**Nouma Watt** (Nature Mauritanie)
Middle East and Central Asia	**Rob Sheldon** (Ornithological Society of the Middle East, the Caucasus and Central Asia)
Moldova	No response received
Mongolia	**Nyambayar Batbayar** (Wildlife Science and Conservation Center of Mongolia) with Batmunkh Davaasurenl Jugdernamjil and Otgonbayar Tsend
Montenegro	No response received
Morocco	**Mohamed Amezian** (Groupe de Recherche pour le Protection des Oiseaux au Maroc, BirLlife Morocco); **Imad Cherkaoui** (Ibn Tofail University) and Agence Nationale des Eaux et Forêts, Association Nature Solutions, Ibn Tofail University; **Hayat Mesbah** (Agence Nationale des Eaux et Forêts)
Mozambique	**André Botha** (Endangered Wildlife Trust) with the Gorongosa Restoration Project, Niassa Carnivore Project, WCS Mozambique, Chuilexi Conservancy and Boise State University
Myanmar	**Thiri Da Wei Aung** and others (Biodiversity and Nature Conservation Association)
Namibia	**Holger Kolberg** (Vultures Namibia)
Nepal	**Ankit Bilash Joshi** (Bird Conservation Nepal), Department of National Park and Wildlife Conservation; John Mallord (Royal Society for the Protection of Birds, United Kingdom)
Netherlands	**Nick Warmelink** (Ministry for Agriculture, Nature and Food Quality)
Niger	**Chloë Pourchier** (Sahara Conservation Foundation)
Niger	**Hamissou Halilou Malam Garba** (Direction Générale des Eaux, Ministère de l'Environnement et de la Lutte Contre la Désertification)
Nigeria	**Stella Egbe** (Nigerian Conservation Foundation)
North Macedonia	**Metodija Velevski** (Macedonian Ecological Society)
Oman	**Maia Sarrouf Willson** and Rabab Al Lawati (Environment Society of Oman)
Pakistan	**Muhammad Jamshed Iqbal Chaudhry** (WWF - Pakistan)
Palestine	**Imad Atrash** (Palestine Wildlife Society) and Mahd Issa Khair
Philippines	No response received
Poland	No response received

Portugal	**José Pedro Tavares** and Milene Matos (VCF), Paulo Monteiro, Joaquim Teodósio (SPEA), José Pereira, Ivan Gutierrez (Palombar), Eduardo Alves (ATN), Pedro Rocha (Herdade da contenda); Samuel Infante (Quercus)
Qatar	No response received
Romania	No response received
Russia	No response received
Rwanda	**Jean Claude Dusabimana** (Nature Rwanda); **Elie Sinayitutse** (Nature Rwanda)
Saudi Arabia	**Mohammed Shobrak** (National Center for Wildlife)
Senegal	**Mamadou Bassirou Diallo** (Nature Communités Développement) with Yaya Souleymane Bodian, Mariama Diouldé Bah, Thérèse NDiaye, Abdou Kadri Sambou, Abdoulaye Kanté and Ramatoulaye Diallo
Serbia	**Milan Ruzic** (Bird Protection and Study Society of Serbia)
Sierra Leone	No response received
Singapore	No response received
Slovakia	No response received
Slovenia	**Primož Kmecl** (DOPPS BirdLife Slovenia)
Somalia	**Ahmed Osman** (Ministry of Environment and Climate Change, Federal Government of Somalia)
South Africa	**André Botha** (Endangered Wildlife Trust); **Brent Coverdale** (Ezemvelo KwaZulu-Natal Wildlife) with Ian Rushworth and Sonja Krueger; **Chris Kelly** (Wildlife Conservation Volunteering in Africa); **Humbu Mafumo** (Department of Forestry, Fisheries and the Environment); **Gareth Tate** (Endangered Wildlife Trust); **Linda van den Heever** (BirdLife South Africa)
Southern Africa and South Asia	**Campbell Murn** (Hawk Conservancy)
Spain	**Rubén Moreno-Opo** (Ministerio para la Transición Ecológica y el Reto Demográfico)
Sri Lanka	No response received
Sudan (Republic of)	No response received
Sudan (South)	**Iubna Hassan** (Wildlife Research Center)
Switzerland	**Sabine Herzog** (Federal Office for the Environment) and Swiss Ornithological Institute; **Nicolas Strebel** (Swiss Ornithological Institute) and Daniel Hegglin (Stiftung Pro Bartgeier)
Syria	**Nabegh Ghazal Asswad** (Syrian Society for the Conservation of Wildlife)
Tajikistan	**Muhammadsoleh Oev** (Tajikistan Nature Foundation, working with the Nature and Biodiveristy Conservation Union)
Tanzania	**Corinne Kendall** (North Carolina Zoo, USA); **Alpha E. Mfilinge** (Nature Tanazania); **Emmanuel F Mgimwa** (Nature Tanzania) and Edwin Kamugisha
Thailand	No response received
Togo	No response received
Tunisia	No response received
Türkiye	**Şafak Arslan** (Doga Dernegi (BirdLife Turkey))
Turkmenistan	**Eldar Rustamov** (Menzbier Ornithological Society)
Uganda	**Michael Kibuule** (Nature Uganda)
Ukraine	No response received
United Arab Emirates	**Habib Altaf** (Emirates Nature - WWF); Salim Javed
United Kingdom	No response received
Uzbekistan	**Anna Ten** (Institute of Zoology)
Vietnam	No response received
Yemen	**Omer Baeshen** (Environment Protection Authority)

Zambia	**Mary Malasa** (Birdwatch Zambia) with Kelvin Mkandawire and Frank Willems; **Frank Willems** (BirdWatch Zambia, Birding Zambia)
Zimbabwe	**Leeroy Moyo** (BirdLife Zimbabwe)

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The remaining Annexes may be found online at:
https://www.cms.int/raptors/en/workinggroup/multi-species-action-plan-conserve-african-eurasian-vultures#midterm-review

10.2 Threat assessment data

10.2.1 Perceived changes in threats to vultures at a country level, as identified by respondents

10.2.2 Detailed threat maps

10.3 Demographic data by vulture species

10.3.1 Updated demographic status of each species

10.3.2 Updated demographic data for each species

10.3.3 References for demographic data (where provided)

10.4 Legislation, policies and protocols developed since the Vulture MsAP, by region

10.5 Literature search

Coordinating Unit of the CMS Raptors MOU
Convention on Migratory Species Office – Abu Dhabi
United Nations Environment Programme
c/o Environment Agency – Abu Dhabi
P.O. Box 45553
Abu Dhabi
United Arab Emirates
Tel. +971 2 6934 437
Email: cmsoffice.ae@cms.int
Website: www.cms.int/raptors

UNEP/CMS Secretariat
UN Campus
Platz der Vereinten Nationen 1
53113 Bonn
Germany
Tel. +49 228 815 2401
Email: cms.secretariat@cms.int
Website: www.cms.int