Online Resource 2
Asian elephants in Cambodia: a comprehensive national assessment of conservation status, distribution, threats and negative human–elephant interactions
Biodiversity and Conservation
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Elephant questionnaire survey sent out using Qualtrics survey links with the option to select English or Khmer

Elephant Conservation Status Survey

1. Project Description: This survey is developed by Rachel Crouthers as part of a PhD project, which involves investigating and updating the Conservation status of Asian Elephants in Cambodia. You should have received an information sheet with the survey link that provides all the relevant information pertaining to this project.

If you have not received a copy of the information sheet or you have any queries prior to commencing this survey, please do not hesitate to contact me

2. Consent

Prior to commencing this survey, I would kindly like to ask you to read the below information and then select one of the consent options listed below.

- I have read the Information Sheet
- My questions, if I had any, have been answered to my satisfaction.
- I understand that I can ask further questions at any time.
- I am aware that one questionnaire is for one protected area only
- I can choose to remain anonymous
- I agree to take part in the questionnaire survey
- I understand that I may withdraw from this study at any point before the National Elephant Workshop, and any information I have provided will be destroyed.
- If this survey was completed during the workshop, I understand that I may withdraw from this study at any point before the end of the National Elephant Workshop, and any information I have provided will be destroyed.
- The identifiable information I have provided will be destroyed on 31/12/2024.
- Any identifiable information I provide will be kept confidential to the researcher, supervisors and the transcriber
- The findings will be used for a PhD dissertation, the National Elephant Workshop, academic publications, and/ or presented at conferences, conservation or results sharing meetings, and/ or other summary reports.
- Findings may be included in National level databases, if consent is provided in the options below
- My name will not be used in reports or specific result output, but results may refer to my position and/or type of organisation. However, I am aware that in small projects my identity might be obvious to others in my working community
- I can request a copy of the report/ publication when it is produced.

Q2 Select if you agree to give consent below

○ Yes
○ No

Q3: Please provide your details below (optional for name and contact details)
○ Government Department/ Organisation:
○ Position
○ First Name (Optional) _____ ○ Family Name (Optional)
○ Email address (Optional)
Q4 How many years of experience do you have working in the conservation sector in Cambodia?

○ <1 year
○ 1-5 years
○ 6-10 years
○ 11-20 years
○ >21 years

Q5 Please provide the full name of the Protected Area (PA) that you will provide information on during this questionnaire.

Protected Area Name _____

Q6 How many years have you worked in this Protected Area?

○ <1 year
○ 1-3 years
○ 3-8 years
○ 8 years+

Q7 Are wild elephants still present within **this PA**?
○ Yes – (Question 8)
○ Historically occurred but no longer present - (Question 8)
○ Never present - END SURVEY

Q8 How long ago were elephants last recorded or known to be present in **this PA**? **(If < 11 years; Skip to Q10)**

○ <5 years ago – if selected skip to question 10 ○ 6-10 years ago ○ 11-20 years ago
○ 21-50 years ago ○ >50 years ago ○ Don't know

Q9 Please select the main causes that contributed to the extirpation/local extinction of wild elephants in **this PA**? **(If more than 11 years; after answering this END SURVEY)**

☐ Targeted hunting for trade/consumption / body parts
☐ Hunting levels resulted in elephants leaving and not returning
☐ War/ civil unrest: Targeted poaching
☐ Persecution/ Defensive/ Retaliatory killing of elephants
☐ War/ civil unrest: Disturbance
☐ Captured for captive purposes (War/ local use/ international trade)
☐ Increased levels of Agro-industry: Farming/Plantations
☐ Increased levels of commercial extraction and mining
☐ Linear infrastructure & fragmentation resulted in restricted movements
☐ Deforestation and disturbance from logging
☐ Other
☐ Don't know

End of QUESTIONNAIRE IF answered Q9

Q10 Please select what scientific research method(s) have been applied in this PA to estimate the population of wild elephants?

☐ DNA survey (Go to Q11)

☐ DNA survey; but joint population estimates were produced for more than one protected area (

☐ Camera Trap (Go to Q11)

☐ Transects (Indirect) (Go to Q11)

☐ No scientific method: Only local knowledge (Go to Q15)

☐ Don't know of any methods used (Go to Q15)

Q11 Based on this method(s), are you able to provide the details for the most recent elephant population estimate in this PA?

○ Yes (Q13)
○ No Results were insufficient to produce a population estimate (Go to Q15)
○ No Analysis is ongoing (Go to Q15)
○ Don't know the most recent population estimate (Go to Q15)

Q13 & 14 Please fill in the details below for the most recent population estimate in this PA?

○ Method
○ Year
○ Population Estimate and confidence interval
○ Reference or citation to be quoted

Q15 Can you estimate the approximate number of elephants that exist in **this PA** based on yours or other local knowledge?

○ Yes (Go to Q16)
○ No (Go to Q17)

Q16 Please provide the estimated minimum and maximum number of elephants in the two boxes below

○ Minimum number of individuals_____

○ Maximum number of individuals _____

Q17 Over the last ten years, do you believe the elephant population in this PA is:

○ Increasing ○ Decreasing ○ Stable ○ Don't know

Q18 Do you have any records or knowledge on any human-related elephant mortalities occurring in **this PA** in the last 20 years?

○ Yes (Go to Q19)
○ No (Go to Q20)
○ Don't know (Go to Q20)

Q19 Human-related elephant mortality incidents

Please add the year and complete all three columns in the table below.
If different causes of death were attributed to more than one elephant within the same year. Please separate this information into different rows.

Year	Number of Elephants			Sex			Reason /cause of mortality
	Baby/ Juvenile	Sub-Adult/ Adult	Unsure / or not recorded	Male	Female	Unsure/ not recorded	

Q20 Threat section 1: Biological resource use in this PA: The next 4 questions on threats to wild elephants have exactly the same table format. Please indicate your response by placing an 'x' in one option for all three columns (Timescale, Impact & Severity) for each of the threats listed.

Threat	Timescale						Impact to population						Severity to population (one generation approx. 25 years). Likely to cause below % of decline						
	Historical (Unlikely to return)	Historical (Likely to return)	Ongoing	Unlikely to occur in the future	Likely to occur in the future	Don't know	Affects the whole populatio n (>90%)	Majority of population (50-90%)	less than half of population (10-50%)	minority of population (<10%)	None	Don't know	None	<5% Decline	5 -10% decline	10-30% decline	30-50% decline	>50% Decline	Don't know
Capture of wild elephants																			
Hunting for Ivory and body parts																			
Hunting for consumption (subsistence)																			
Hunting for consumption (war)																			
Sports hunting																			
Persecution and/or killing due negative interactions																			
Snaring (Indirect/by-catch)																			
Poisoning (Indirect/by-catch)																			
Extraction: Timber (Logging)																			
Extraction: NTFPs																			
Other																			

Q21 Threat section 2: Habitat modification and or loss (Permanent footprint): Please indicate your response by placing an x in one option for all three columns (Timescale, Impact & Severity) for each of the threats listed.

Threat	Timescale						Impact to population						Severity to population (one generation approx. 25 years). Likely to cause below % of decline						
	Historical (Unlikely to return)	Historical (Likely to return)	Ongoing	Unlikely to occur in the future	Likely to occur in the future	Don't know	Affects the whole population (>90%)	Majority of population (50-90%)	less than half of population (10-50%)	minority of population (<10%)	None	Don't know	None	<5% decline	5 -10% decline	10-30% decline	30-50% decline	>50% decline	Don't know
Agro-industry Farming																			
Small-holder farming																			
Commercial scale Mining & Quarrying																			
Small scale Mining & Quarrying																			
Renewable energy																			
Small-holder grazing																			
Agro-industry grazing ranching																			
Housing & Urban Areas																			
Factories, powerplants, landfills																			
Military Bases/ Border control bases																			
Airports & associated structure																			
Tourism & recreation (Largescale)																			
Other																			

Q22 Threat section 3: Habitat fragmentation (permanent) and Disturbance (short term physical footprint). Please indicate your response by placing an x in one option for all three columns (Timescale, Impact & Severity) for each of the threats listed.

Threat	Timescale						Impact to population						Severity to population (one generation approx. 25 years). Likely to cause below % of decline						
	Historical (Unlikely to return)	Historical (Likely to return)	Ongoing	Unlikely to occur in the future	Likely to occur in the future	Don't know	Affects the whole population (>90%)	Majority of population (50-90%)	less than half of population (10-50%)	minority of population (<10%)	None	Don't know	None	<5% decline	5 -10% decline	10-30% decline	30-50% decline	>50% decline	Don't know
Road infrastructure																			
Rail infrastructure																			
Utility / Service lines: Electrical/phone/ pipelines.																			
Internationa l border roads																			
War / Civil unrest/ Military exercises																			
Small scale recreation																			
Collection of resources																			
Work: i.e Law enforcement patrol & biodiversity research																			
Access for trade (Illegal and legal)																			

Q23 Threat section 4: Associated threats Industry & Agriculture/Mining, Natural system modification, Invasive species, Disease and Climate change. Please indicate your response by placing an x in one option for all three columns (Timescale, Impact & Severity) for each of the threats.

Threat	Timescale						Impact to population						Severity to population (one generation approx. 25 years). Causing likely to cause below % of decline						
	Historical (Unlikely to return)	Historical (Likely to return)	Ongoing	Unlikely to occur in the future	Likely to occur in the future	Don't know	Affects the whole population (>90%)	Majority of population (50-90%)	less than half of population (10-50%)	minority of population (<10%)	None	Don't know	None	<5% decline	5 -10% decline	10-30% decline	30-50% decline	>50% decline	Don't know
Seepage of chemicals /pollutants																			
Herbicides/pesticides																			
Soil erosion																			
Forest fires (Natural system modifications)																			
Dams and water management systems (Natural system modifications)																			
Invasive and non-native species																			
Disease transmission																			
Flooding																			
Extreme Temperatures																			
Drought																			

PA Management

Q24 How many rangers (PDoE/Community) currently conduct law enforcement efforts inside **this PA**?

Q25 Please select how effective current law enforcement resources/efforts inside **this PA** are in reducing each of the threats listed below.

Threat	Extremely ineffective	Slightly effective	Moderately effective	Very effective	Extremely effective	Unsure	N/A
Targeted hunting							
Persecution or Retaliatory killings							
Hunting of other wildlife species inside PAs							
Illegal logging							
Land encroachment/ clearance/ deforestation							

Q26 Please select how effective the current laws and policies are in reducing each of the threats listed below inside **this PA**

Threat	Extremely ineffective	Slightly effective	Moderately effective	Very effective	Extremely effective	Unsure	N/A
Targeted hunting							
Persecution or Retaliatory killings							
Hunting all wildlife in PA boundaries							
Illegal logging							
Small scale land clearance and encroachment							
New largescale habitat conversion (Industry i.e plantations)							
Habitat loss and fragmentation - Commercial scale Mining and Quarrying:							

Human Elephant Interactions

Q27 Do you know of any negative Human-Elephant Interactions (HEI) occurring within or close to the boundary of **this PA**?

DEFINITION:

A Negative Human-Elephant interaction (HEI) can include one or more of the following crop damage/loss property/structural damage threat to personal safety/wellbeing injury or loss of life. It may also include negative impacts on elephants: loss of natural forage/water source, loss of connectivity, inaccessibility to previous dispersal routes and threat to elephants' safety or loss of life.

○ Yes (Skips to Q30)
○ Historically, but not in the last 5 years (Please go to Q28)
○ No records of HEI (If selected, End of Questionnaire)
○ Don't know (If selected, End of Questionnaire)

Q28 Please select the main reason(s) that explain why Negative Human elephant interactions (HEI) no longer occur in **this PA**.
*More than one reason can be selected.

☐ Elephant population dramatically decreased
☐ Persecution or retaliatory killing of elephant(s) causing negative interactions
☐ Firing warning shots at elephant causing negative interactions
☐ Effective mitigation & management strategies stopped all negative interactions
☐ High levels of habitat loss/ fragmentation: disruption of dispersal routes
☐ Increased levels of disturbance within the previously affected area
☐ Other - please list reason(s) below

Q29 Please select one or more of the below options that successfully prevented all negative human-elephant interactions in **this PA**.
If known, please also write the specific methods/measures used:
(Linked to 27b & 28 only: Once completed question – ends the survey)

☐ Acoustic deterrents
☐ Visual or olfactory deterrents
☐ Physical or aggressive approaches i.e chasing elephants, firing warning shots
☐ Lethal measures
☐ Permanent barriers i.e fences
☐ Change of crops planted
☐ Other _____
☐ Don't know

Q30 In the last 12 months, how many villages have experienced some form of negative interaction with elephants? If you don't know please state.

Q31 Negative Human-Elephant Interactions (HEI): Please indicate your response in all four columns (Timescale, Scope, Frequency and Trend Impact & Severity). If any of the negative interactions listed either (a) do not occur in the PA or (b) no longer happen in the last five years, please select the appropriate option and move to the negative HEI.

Damage /Impact	**Timescale**							**Scope % villages within the PA currently experiencing negative interactions**						**Frequency How often does it occur**					**Overall Trend**		
	Never occurred	No longer happens	Ongoing (>10 years)	Ongoing (5-10 years)	Ongoing (1-5 years)	Just started	Don't know	>95%	60-95%	40-60%	5-40%	Very few	Don't know	Weekly	Monthly	Only during crop season	Occasionally throughout the year	Rarely a few times a year	Increasing	Decreasing	Remains the same
Crop loss																					
House damage																					
Other structural damage																					
Fear/ Threat to people's safety																					
Threat to people's overall wellbeing																					
Physical Injury																					
Human fatality (Loss of life)																					
Elephant fatality																					
Other																					

Q32 Crop Loss: Impact on food sufficiency (ability to provide food for dependents/family) (Answer only if crop loss occurs)

Please select the overall level of impact that elephant-related crop loss/ damage has on the food sufficiency across the majority of affected villages

○ **Negligible:** Caused negligible/minimal losses in the quantity of food supplies

○ **Minor/Low**: Small losses incurred. Still able to provide for food for dependents, although uncertainty in long term

○ **Moderate:** Unable to provide for dependents in the long term, need to find replacement provisions

○ **Major**: Unable to provide for dependents in medium to long term; likely resulting in reduced food intake. Need to buy additional food supplies - requiring major additional expenditure

○ **Severe**: Unable to provide for dependents - short & long term. Regular periods of reduced food intake throughout the year. Need to use savings/or get a financial loan for survival

○ **Don't know**

Q33 Property damage: Impact on living standards (Answer only if property damage occurs)

Please select the overall impact that property damage caused by elephants has on the daily living standards across the majority of affected villages with this PA

○ **Negligible**: Cause or likely to negligible impact to usual daily living standards/sleeping

○ **Minor/Low:** Small losses incurred. Small self-repairs needed, low impact on usual standard of living/sleeping

○ **Moderate:** Cause notable levels of damage. Short term impact on daily living. Require financial expenditure outside of normal allowance

○ **Major**: A large amount of damage was caused. Major expenditure required for materials & labour to return to usual living standards

○ **Severe:** House completely destroyed. Need to use savings/or get a financial loan to build new structure to meet usual living standards

○ **Don't know**

Q34 Fear for personal safety: Impact on daily lifestyle and psychological wellbeing (Answer for any kind of impact)

Please select the level of impact on people's daily lifestyle and psychological wellbeing across the majority of affected villages within (*PA name automated*)

○ **Negligible:** Cause negligible impact to daily lifestyle/routines
○ **Minor/Low:** Cause small modifications to usual lifestyle, but can continue with daily life without fear or stress
○ **Moderate:** Cause notable disruption to the usual lifestyle that may result in loss of sleep, change in day-to-day routines, sometimes affecting access to work & other resources. Sometimes live in fear or stress
○ **Major:** Cause major disruptions to usual lifestyle, impacting work, and family life. Live in fear/ stress up to half of the year
○ **Severe:** Cause significant disruption to a usual lifestyle most of the year. Significant detrimental impact on the whole family. Live in fear/ stress most of the year
○ **Don't know**

Q35 All negative interactions: Impact on economic status (Answer for any kind of impact)

Please select the level of impact to people's economic status due to negative interactions occurring across the majority of affected villages with this PA

○ **Negligible:** negligible impact to economic status
○ **Minor/Low:** Slight additional time and/or money required to cover losses incurred
○ **Moderate:** Additional finances are required (recoverable within 3 months)
○ **Major:** Need to borrow and/or loan money to cover losses, resulting in medium-term debt (3- 6 months)
○ **Severe:** Need to borrow and/or loan money to cover losses, resulting in additional long-term debt (>6 months)
○ **Don't know**

Q36 In the next five years, how likely it is that negative human-elephant interactions (NHEIs) will expand into other unaffected villages:

○ Extremely unlikely
○ Somewhat unlikely
○ Neither likely nor unlikely
○ Somewhat likely
○ Extremely likely
○ Don't know

Q37 Are any forms of deterrent, mitigation measure or management practices currently being implemented within this PA to reduce or prevent negative human- elephant interactions?

○ Yes (Q38)
○ No (End survey)
○ Don't know (End survey)

Q38 Mitigation & Management approaches section 1: Acoustic deterrents

The last 4 questions focus on Mitigation and management approaches. All sections have exactly the same table format.

Please indicate your response by filling in the circle for all three columns (Timescale, Scope & Efficacy) for each of the approaches listed. If that approach/method is not used, please select that option and move to the next row.

Measures used	Timescale & Frequency							Scope: % villages experiencing HEI implement this approach							Effectiveness					
	Not used	Historical: no longer used	Ongoing: Weekly	Ongoing: Monthly	Ongoing: Regularly (crop season)	Ongoing: Occasionally	Ongoing: Rarely	Don't know	>95%	60-95%	40-60%	5-40%	<5%	Don't know	Not at all effective/ Extremely ineffective	Slightly effective	Moderately effective	Very effective	Extremely effective	Don't know
Banging pans, metal/ other instrument/ shouting /speakers/																				
Fire crackers/ fireworks/ Home-made cannons/ loud explosions																				
Beehives/Bee Fences (bio-acoustic)																				
Fence line with plastic/ bells or some other auditory system																				
Trigger/alarm system on forest edge																				
Audio playbacks (people shouting, large felids, other elephants etc)																				

Q39 Mitigation & Management approaches section 2: Visual and Olfactory deterrents

Measures used	Timescale & Frequency								Scope: % villages experiencing HEI implement this approach						Effectiveness					
	Not used	Historical: no longer used	Ongoing: Weekly	Ongoing: Monthly	Ongoing: Regularly (crop season)	Ongoing: Occasional	Ongoing: Rarely	Don't know	>95%	60-95%	40-60%	5-40%	<5%	Don't know	Not at all effective/ Extremely ineffective	Slightly effective	Moderately effective	Very effective	Extremely effective	Don't know
Fires near farm/ house boundaries																				
Flaming torches/flashlights																				
Permanent light around house/ farmlands																				
Automated lights: based on movement																				
Scarecrows																				
Home-made fence line with visual objects																				
Smoke fences																				
Burning chillies or dung-chilli briquettes																				
Chillies- grease or chilli oil smeared along fence																				
Fences/ Barriers: other scents/smells																				
Intersperse or buffer crop systems with scent based crops																				

Q40 Mitigation & Management approaches section 3: Physical / Aggressive / Lethal

Measures used	Timescale & Frequency								Scope: % villages experiencing HEI implement this approach						Effectiveness					
	Not used	Historical: no longer used	Ongoing: Weekly	Ongoing: Monthly	Ongoing: Regularly (crop season)	Ongoing: Occasionally	Ongoing: Rarely	Don't know	>95%	60-95%	40-60%	5-40%	<5%	Don't know	Not at all effective/ Extremely ineffective	Slightly effective	Moderately effective	Very effective	Extremely effective	Don't know
Chase elephants (< 5 people)																				
Chase elephants (large, coordinated group of people)																				
Early detection & warning: watch towers or community groups																				
Throw objects/ use sling shots catapults																				
Fire armed weapons																				
Release dogs																				
Use poison around property or farm boundaries																				
Place snares around property or farm boundaries																				

Q41 Mitigation & Management approaches section 4: Exclusionary/ Barriers & Long term & others

Measures used	Timescale & Frequency								Scope: % villages experiencing HEI implement this approach						Effectiveness					
	Not used	Historical: no longer used	Ongoing: Weekly	Ongoing: Monthly	Ongoing: Regularly (crop season)	Ongoing: Occasionally	Ongoing: Rarely	Don't know	>95%	60-95%	40-60%	5-40%	<5%	Don't know	Not at all effective/ Extremely ineffective	Slightly effective	Moderately effective	Very effective	Extremely effective	Don't know
Electric fences																				
Large live fences (i.e. big large thorny vegetative fences)																				
Trenches/ ditches																				
Planting of buffer crops																				
Crop diversification/ to unpalatable to unattractive crops																				
Produce & promote elephant friendly products																				
Move away from on-farm livelihoods																				
Reduce illegal habitat conversion for agriculture																				
Other: Traditional praying or sacrifice																				