

POPULATION AND HABITAT ASSESSMENT OF LESSER ADJUTANT STORK (*Leptoptilos javanicus*) IN EASTERN LOWLANDS OF NEPAL



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INTRODUCTION

One of the vulnerable species (according to IUCN), the Lesser Adjutant stork is a type of bird that is heavily dependent on the wetland found mainly in eastern lowlands of Nepal. This species of bird is facing high pressure due to poaching and habitat encroachment (Baral 2006, Karki 2010). As a result, they are threatened of their existence and highly endangered. It is unfortunate that the conservation activities focused on the species are limited in the country. Thus, this research has been designed to know the habitat, threat and population of this vulnerable bird and its habitat in eastern lowlands of Nepal.

OBJECTIVES

- This study has targeted to achieve following objectives.
- To determine the population of Lesser Adjutant Stork in Jhapa, Morang and Sunsari Districts of Nepal.
 - To map the habitat preferred by Lesser Adjutant Storks in Jhapa, Morang and Sunsari District using GIS
 - To Identify conservation threats of LAS

METHODS

STUDY AREA

This study was conducted in the southeastern lowland(elevation range: 57 – 500 m)of Nepal between (26°29' N and 26039' N/8700' E and 87°51' E) with an area of about 4818 km² (Figure 1). The study was mainly focused in the eastern districts–Sunsari, Morang and Jhapa districts including Koshi Tappu Wildlife Reserve (KTWR).

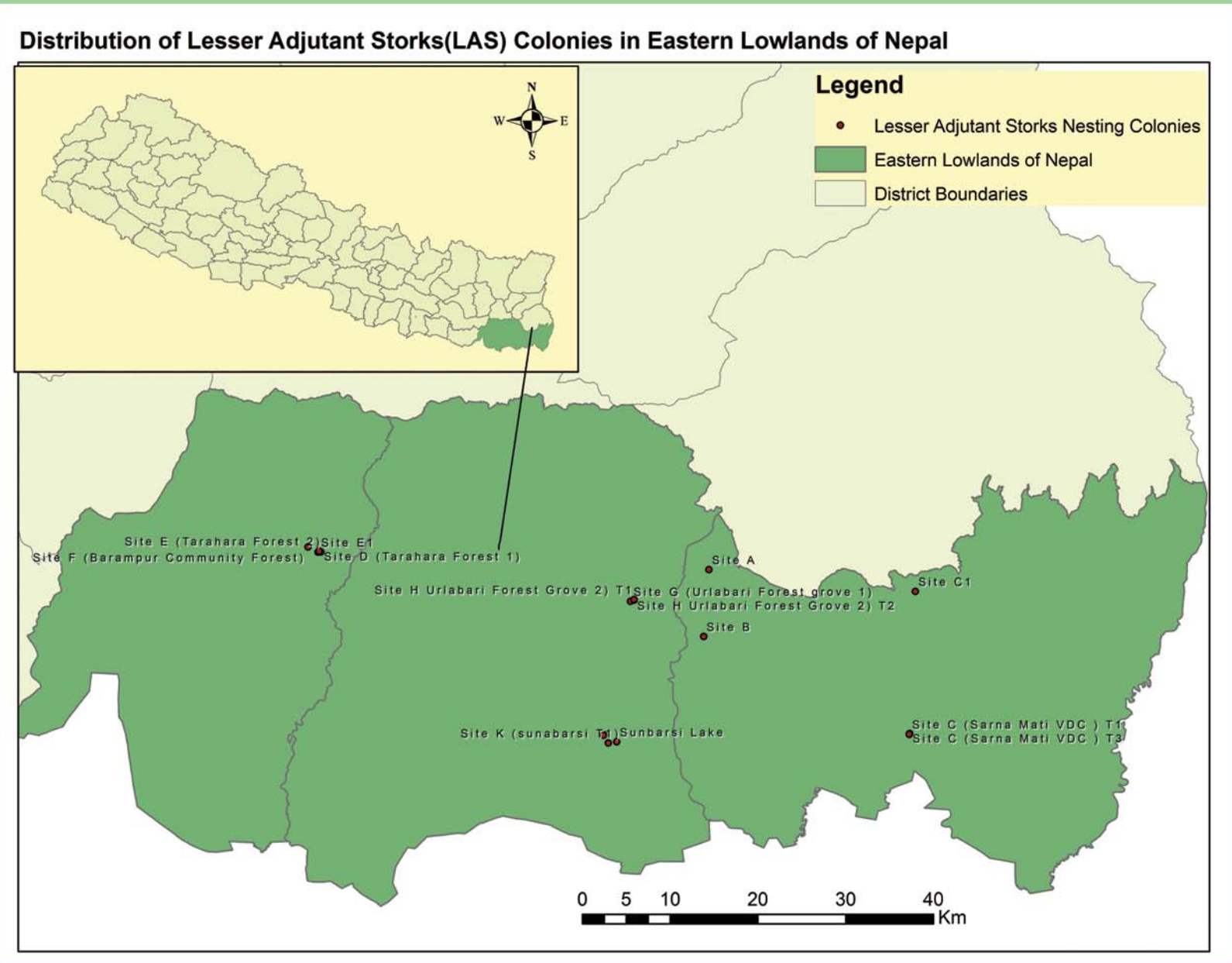


Figure 1. Population Distribution of Lesser Adjutant Stork in the study area.

METHODOLOGY

- Data was collected in breeding season (November-December 2014) and compared with the data collected in October 2010.
- Nest searches and direct count methods were used (6.00-8.00 am 12.00-1.00pm 4.00-6.00p
- Vegetation analysis of nesting site was done using quadrat method
- Questionnaire survey was done to know conservation threats of LAS
- Habitat Maps were produced using satellite imagery & topo map provided by department of survey.
- Landsat TM 5 scences of 30 m resolution of Feb 2009 were download & classified using MLSC and verification was done using ground truthing data and data from survey department of Nepal.

RESULT

Population:

- Total population in breeding season
In 2010 October: (Karki 2010)
- 11 nesting sites were found
 - Total 73 nests were marked n 14 nest trees
 - Total Population 240 (including 94 chicks)
- In 2014 December:
- 14 nesting sites were found
 - Total 51 nests were marked in 10 nest trees
 - Total population 133 (including 58 chicks)

SUMMARY

This research examines the status of distribution, nesting habitat selection and conservation threats of lesser adjutant storks (*Leptoptilos javanicus*) in eastern lowlands of Nepal from October 2010 to February 2015. Direct observation and nest searching methods were used to count total population. Habitat maps of Lesser Adjutant Stork were produced using Landsat TM 5 image and data produced by survey department of Nepal using supervised classification. Field survey & Questionnaire were used to identify threats of Lesser Adjutant Stork in the study Area. The field survey revealed that there has been significant decrease of LAS population from 240 in October 2010 to 133 in December 2014 (during breeding season). Breeding occurred from late July throughout November. Habitat preference studies shown that the nesting tree used by LAS were mainly *Adina cardifolia* and *Bombax ceiba*. They preferred cultivation area and degraded forest for its nesting. It confirms that the LAS species is facing tremendous conservation threats. The lack of conservation awareness, excessive use of pesticides, continuous degradation and encroachment of its habitat, lack of conservation efforts poses as major threat to its survival. Community level conservation programs have been carried out in the area since November 2014 to February 2015, but long term conservation strategy/program should be enforced for its long term conservation.

Habitat Preference of Lesser Adjutant Stork

From a total of 10 nesting colonies recorded in the study area, most of them were located close to human settlements, community forests, or public roads. The nest sites were found near human settlements, market areas and agriculture fields. Only two species of trees, *Bombax ceiba* and *Adina cordifolia*, were selected for nesting by the lesser adjutant storks. The heights of the trees with nests ranged from 30 to 60 m and were taller than other trees in the same sites.

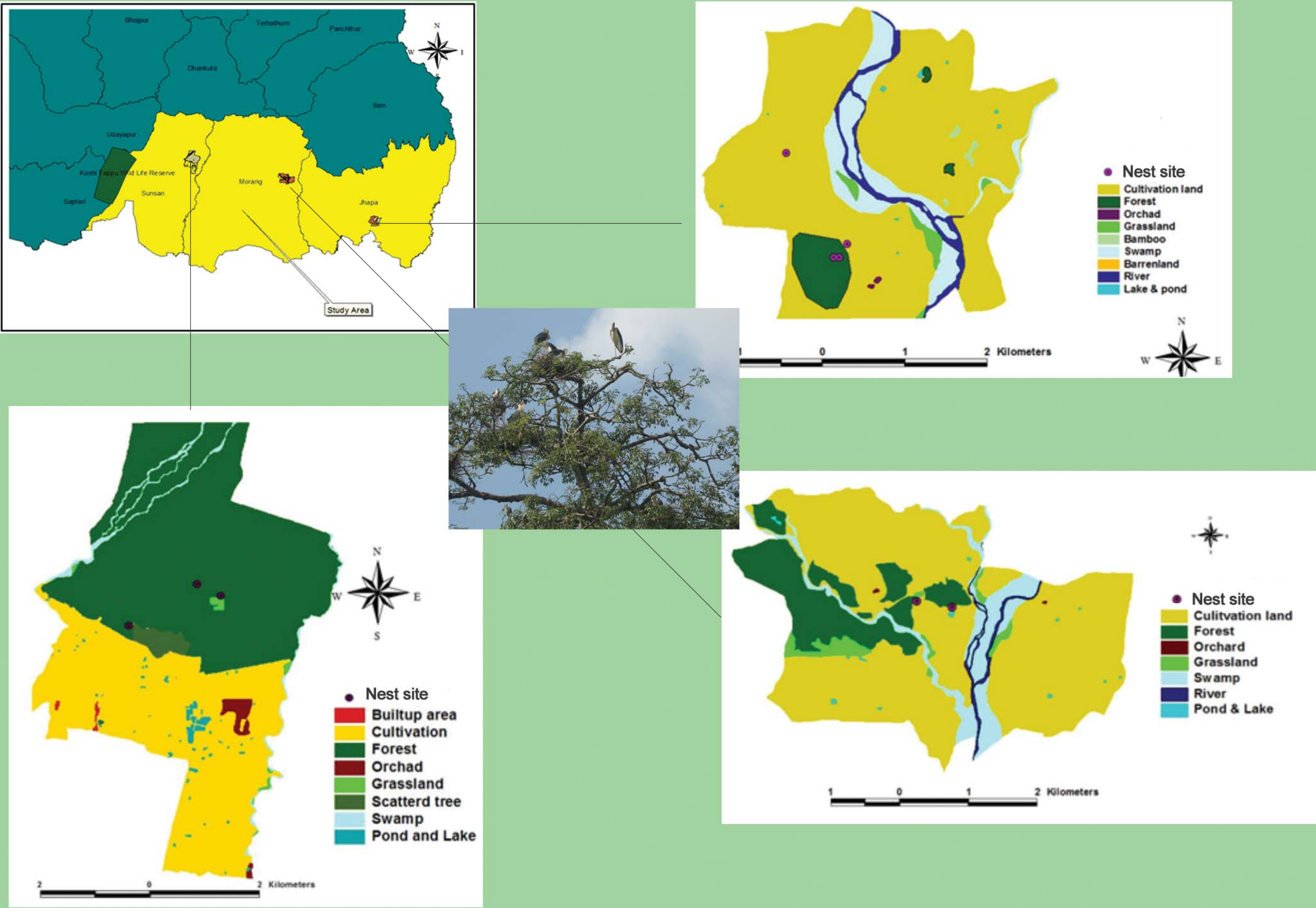


Figure 2, 3, 4 & 5. Habitat map of Lesser Adjutant Stork of different nesting sites (produced after Landsat image in GIS environment)

Table 2. Habitat preference of Lesser Adjutant Stork

SN	Habitat	Site C	%	Site D,E&F	%	Site G & H	%
1	Builtup area	ns	0	0.037207	0.14	ns	ns
2	Cultivaton land	8.896475	83.76	10.59957	40.48	10.61198	71.4419
3	Forest	0.027838	0.26	14.01794	53.54	2.370076	15.95581
4	Orchad	0.009764	0.09	0.24209	0.92	0.005822	0.039195
5	Grassland	0.126987	1.20	0.104157	0.40	0.307337	2.069052
6	Bamboo & scattered Tree	0.036152	0.34	0.385569	1.47	ns	ns
7	Swamp	1.117529	10.52	0.55425	2.12	1.354463	9.118507
8	Barrenland	0.003819	0.04	ns	ns	ns	ns
9	River	0.384125	3.62	ns	ns	0.176224	1.186374
10	Lake & Pond	0.018218	0.17	0.242652	0.93	0.028369	0.190986
Total Area in Sq. Km.		10.62091		26.18344		14.85427	

Conservation Threat

Total 145 respondent were interviewed to know their opinion about status and conservation threat of Lesser Adjutant Storks in Eastern Lowlands of Nepal. Questionnaire surveys revealed that people were not aware about conservation of lesser adjutant storks. More than 80% of respondents (n=145) opined that forest destruction was the most serious threat to storks followed by human disturbance (79%), poaching (73%), pesticide use (52%), and urbanization/industrialization (43%).

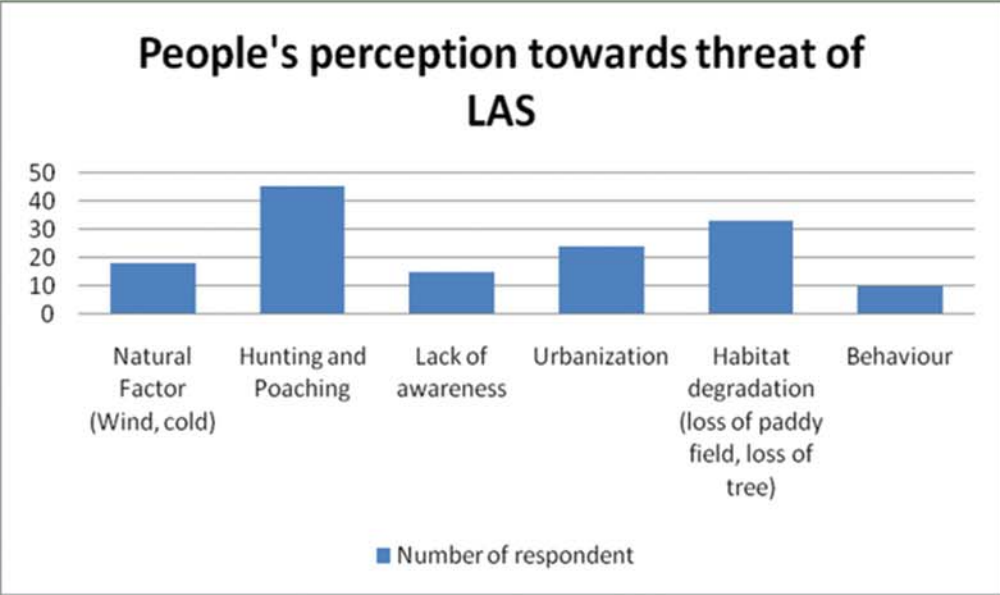


Figure 6. Conservation Threat's of Lesser Adjutant Storks



Photo 3: of a boy showing equipment which is used to hunt LAS and other birds



Photo 4: A farmer using pesticides at LAS feeding site



Photo 5: a skeleton of dead LAS at study site

CONCLUSION

Total population of LAS in Eastern lowlands of Nepal is estimated with 133 individual which shows significant decline from 240 in October 2010 to 133 in December 2014. Habitat map of LAS is prepared & it shows LAS prefers its nest in adjacent area of cultivation land, water bodies and degraded forest. This study revealed that the anthropogenic threats especially poaching, habitat destruction and poisoning of wetlands were the most serious causes for the decline of lesser adjutant storks population. Ecologically LAS are very important species thus it should be conserved and viewed with utmost conservation importance in local level and global level.

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Table 1. Total Population of Lesser Adjutant Stork

Location	No. of Nest	No. of Chicks	No. of Adult birds	Nest Trees	Current Total Population (December 2014)	Previous population (October 2010) (Karki 2010)
Site A	0	0	0		0	2
Site B	0	0	0		0	2
Site C (Sarna Mati VDC.)	11	10	22	<i>Bombax ceiba</i>	32	34 (120 Nests, 22 Adults and 22 Newly identified Location)
Site C1	2	0	4	<i>Bombax ceiba</i>	4	
Site D (Tarahara Forest 1)	7	9	12	<i>Bombax ceiba</i>	20	35
Site E (Tarahara Forest 2)	5	8	8	<i>Bombax ceiba</i>	17	17
Site E1	1	0	2	<i>Bombax ceiba</i>	2	New Nest Tree
Site F (Barampur Community Forest)	0	0	0	<i>Bombax ceiba</i>	0	18
Site G (Urulabari Forest grove 1)	0	0	0	<i>Adina Cardifolia</i>	0	52
Site H (Urulabari Forest Grove 2)	7	7	5	<i>Adina cardifolia</i>	26	6
	6	7	7	<i>Adina cardifolia</i>		
Site I (Bhaunne 1)	0	0	0			6
Site J (Bhaunne 2)	0	0	0			8
Site K (Sunabarsi T1)	3	5	4	<i>Bombax ceiba</i>	9	35
Site K1 (Sunabarsi T2)	8	12	9	<i>Bombax ceiba</i>	21	(New Location Identified)
Site K2(sunbarsi T3)	1	0	2	<i>Bombax ceiba</i>	2	(New Location Identified)
Site L (Koshi Tappu WR)	0	0	0			
Site M (Kechana)	0	0	0			
Site N (Mahendranagar)	0	0	0			
Site O (Rangeli)	0	0	0			

भुडीफोर गरुड र यसको वास स्थानको संरक्षण गरौं

Conserve Lesser Adjutant Storks and its habitat

परिचय: भुडी फोर गरुड एक सीमसार क्षेत्रको वरपर अग्लो सिमल तथा करमको रुखमा सामुहिक गुड लगाएर बस्ने विश्वकै दुर्लभ चरा मध्ये एक चरा हो । विश्वको सिमीत ठाउँमा पाईने यस प्रजाति नेपालको तराई क्षेत्रमा पाइन्छ । औसत २५ देखी ३० मीटर अग्लो रुखहरुमा यस चराको वासस्थान रहेको पाइन्छ । यसले सीमसार लगायत कृषि जमिनमा आफ्नो आहाराको संकलन गर्दछ । यसले जुन देखी जुलाई महिनामा अण्डा पर्दछ गर्दछ र अक्टोबर, नोभेम्बर महिनामा चल्ला कोरल्ने काम गर्दछ ।

आहारा : यसले सीमसार क्षेत्रमा हुने माछा, भ्यागुता, सर्प, कीरा फट्याङ्गा आदी खाने गर्दछ । यसका लागि यो धान बारी, सीमसार क्षेत्र, खोलाको किनार, होली आदिका क्षेत्रहरुमा जाने गर्दछ ।

यस प्रजाति लोप हुनुका प्रमुख कारणहरु

- दिन प्रति दिन सीमसार क्षेत्रहरु सुग्दै जानु र सीमसार क्षेत्रहरु अतिक्रमणमा पर्नु
- खेती पातीमा रसायनिक विषादीको प्रयोग बढदै जानु
- यस चराको वासस्थानका क्षेत्रहरुको विनाश हुनु
- सीमल, करम जस्ता रुखहरु काटीनु
- यस चरालाई मासु तथा भारमौरोको लागि मारिनु
- सिमसार क्षेत्र, होली, खोलाहरु अतिक्रमण गरिनु
- खेतीमा रसायनिक विषादीको प्रयोग गर्नु



यस चराको महत्व :

- कृषि तथा सीमसार क्षेत्रको पारीस्थीतिक प्रणालीलाई सन्तुलन बनाउन मद्दत गर्दछ ।
- धान वालीमा आउन सक्ने रोग कीरा प्रकोपको नियन्त्रण गर्न मद्दत गर्दछ ।
- दिगो कृषि र सन्तुलित पारस्थीतिक प्रणालीको सूचक
- विषालु सर्प एवम् अन्य रोग किराको नियन्त्रण गर्दछ ।
- परागसेचन एवम् बीज छर्नेको लागि महत्वपूर्ण भूमिका खेल्दछन् ।



यसको संरक्षणको लागि समुदाय तथा हाम्रो भूमिका :

- यस प्रजातिले हाम्रो परीस्थीतिक प्रणालीमा धेरै नै ठूलो भूमिका खेलको हुन्छ । यसको संरक्षण गर्नु हाम्रो कर्तव्य र दायित्व हो । यिनीहरु लोप भएमा समग्र हाम्रो वातावरणमा प्रतिकूल प्रभाव पर्ने जान्छ जसले भोलीको सन्ततिहरु समस्यामा पार्न सक्छ । जस्तै रोगकारीको प्रकोप, विसालु सर्पको प्रकोप, वाली र उत्पादनमा प्रतिकूल प्रभाव आदि । त्यसकारण समुदायले निम्न भूमिकाहरु निभाउन जरुरी हुन्छ
- समुदायले यसको वास स्थानको संरक्षण गर्ने । सिमसार क्षेत्र, भोडा, होली एवम् खोलको संरक्षण गर्ने । खेती वालीमा रसायनिक विषादीको प्रयोग कम गर्ने
- चोरी तथा सिकारी गर्ने ब्याक्तिलाई बन्देज गर्ने र सो को बारेमा नजिकको वन कार्यलय तथा प्रहरी समक्ष जानकारी दिने ।
- यस दुर्लभ प्रजातिको वासस्थान पत्ता लगाई त्यस क्षेत्रलाई महत्वपूर्ण चरा क्षेत्र घोषणा गर्ने र संरक्षणको काम गर्ने, जसले त्यस क्षेत्र विश्वमै पनि बनाउन सक्छ
- विद्यालयमा तथा समुदायमा यसको संरक्षण र रेखदेख गर्ने संरक्षण समितीहरु बनाउने र संरक्षणका क्रियाकलापहरु एवम् जनचेतनामुलक कार्यक्रम संचालन गर्ने



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