Project Update: May 2022

Objective one:

Impacts of invasive species on native habitat of the wild water buffalo Status: Fully completed

Methods

A preliminary field survey was conducted in December 2021to identify and record the alien invasive plant species (IAPS) present in the KTWR and species that are most spread in KTWR were identified during the direct observation held in regular transects. Key informant interviews were also held with the KTWR reserve staff as they are more accustomed to the area and have visited the area multiple times. Finally, five IAPS with the highest cover were identified as the *Hyptis suaveolensis, Chromolaena odorata, Ipomea carnea, Lantana camara,* and *Mikenia micrantha.*

Ten pairs of adjacent plots were measured for each species covering different vegetation types. One plot of the pair named invaded plots was placed where the invader is dominant with high cover (> 50%) and second pair of uninvaded plots was placed in an adjacent area with similar site conditions, where invader had no cover. Each of the allocated plots sized 4 x 4 m was sampled based on the work by Hejda et al., (2009). In each plot, all species of vascular plants were recorded, and their percentage cover was estimated. Similarly, height (cm) and cover (%) of the invader as well as that of dominant native species (grasses and herbs) was measured. Species richness 'S', Shannon diversity index 'H' and evenness 'J' and Sørensen similarity index was calculated, analysed, and interpreted to find out the impacts of invasive species on native plant diversity as well as different population characteristics determining the impacts.

Statistical analysis

Differences in species richness *S* of invaded and uninvaded plots were tested by independent sample T- test. The correlation between reduction in species richness *S* and Sørensen index of similarity was tested by Pearson's correlation.

Differences in impacts among the invasive species were tested by one-way ANOVAs. Differences in species richness *S*, Shannon's diversity *H* and evenness *J* between each pair of invaded and uninvaded plot were the response variables, and the individual invasive species a factor. Differences among the influence of the species were then compared by multiple comparisons among means using LSD tests.

Results

Shrestha (2016) has mentioned the occurrence of 25 IAPS in Nepal. These IAPS are either herbs (including herbaceous climbers) or shrubs; none of the alien tree species in Nepal is invasive (Bhatta et al., 2020). Out of the 25 alien invasive plant species (IAPS) 19 IAPS were documented in the KTWR, during the preliminary field survey. The species not recorded were *Ageratina adenophora, Erigeron karvinsikianus, Myriophyllum aquaticum, Gallinsoga quadriradiata, Spergula arvensis*, and *Argemone mexicana*. Lowe et al., (2000) has listed *Lantana camara, Mikania micrantha, Chromolaena*

odorata and *Eichhornia crassipies* as the world's worst top 100 invasive alien species.

Results

Impact on species composition and structure of the invaded communities

The impact of invasion on the invaded communities markedly differed among the five invading species; significant differences in species richness between invaded and uninvaded plots were found for three species. Species exhibiting the greatest impact reduced species numbers per plot (*S*) and the total number of species recorded in the communities sampled (*S*tot) by almost 35%.

The measures of impact of invading species on community characteristics were correlated. As expected from the nested arrangement of *S* within *S*tot, invasions associated with a strong reduction in species richness at the plot scale were also associated with a marked reduction in the total number of species *S*tot at the landscape scale. Reduction in species richness *S* also decreased similarity between invaded and uninvaded vegetation.

The greatest impact on species composition of invaded communities was recorded for *Chromolaena odorata* resulting in only 38% similarity between invaded and un-invaded plots. The invasion by *Mikenia micrantha,* and *Hyptis suaveolensis*, resulted in 39.25 % and 39.09 % change in species composition, respectively. Meanwhile, *Lantana camara* resulted in 42% change in species composition between invaded and uninvaded plots. In total, the similarity between invaded and uninvaded plots ranged from 38% to 53%, and *Ipomea carnea* exhibited the smallest effect on the species composition.

The impact of individual invading neophytes on species richness *S*, Shannon diversity *H'*, and evenness *J* was checked with one-way ANOVA. In the invaded plot for the S, significant difference was found for the species *Chromolaena odorata* and *Mikenia micrantha* with all other three pairs excluding *Hyptis suaveolensis*. Shannon-Weiner index (H) for invaded species, significant difference was found for the species pair *Hyptis suaveolensis* and *Chromolaena odorata*. Species evenness (J) for invaded plots, significant difference was found for the species pair *Hyptis suaveolensis* and *Mikenia micrantha*. LSD tests confirmed impacts of these species were significant ($P < 0.05$), that the P value is smaller and within the acceptable range compared to all the other species. Also, no significant difference was observed for S, H and J in the non-invaded plots.

	Life form	Origin	Cover range %	S (unin v)	S(inv)	Impact on S%	Stot uninv	Stot inv	impact per	Impact on Stot %	Sorens on similarity
Chromolaena odorata	Perennial shrub	America, Mexico, Carribean	60-90	10.7±2.36	7.1±2.76	33.64	107	71	66.35514019	33.65	0.3862
Hyptissuaveolensis	perennial herb	Mexico, West Indies, South America	50-87	11.5±4.08	8.8±1.39	23.47	115	88	76.52173913	23.48	0.3925
Ipomea carnea	Perennial shrub	North America, Brazil	50-87	12.3±3.46	9.1±2.76	26.01	123	91	73.98373984	26.017	0.5326
Mikenia micrantha	perennial creeper	North, Central and South America	60-90	13.4±3.03	11.2±1.98	16.42	134	112	83.58208955	16.42	0.3909
Lantana camara	perennial shrub	Central and South America	50-90	11.4±3.09	9.8±1.62	14.03	114	98	85.96491228	14.04	0.42

ANOVA

Sum of Squares			Df	Mean Square	F	Sig.
Invaded_sr	Between Groups	89.400	4	22.350	4.687	.003
	Within Groups	214.600	45	4.769		
	Total	304.000	49			
Invaded_sw	Between Groups	.792	4	.198	1.674	.173
	Within Groups	5.327	45	.118		
	Total	6.119	49			
Invaded_e	Between Groups	.119	4	.030	1.454	.232
	Within Groups	.918	45	.020		
	Total	1.037	49			

ANOVA

Sum of Squares			df	Mean Square	F	Sig.
non invaded_sr	Between Groups	42.520	4	10.630	.989	.423
	Within Groups	483.500	45	10.744		
	Total	526.020	49			
non invaded_sw	Between Groups	.380	4	.095	.573	.683
	Within Groups	7.461	45	.166		
	Total	7.841	49			
non invaded_e	Between Groups	.089	4	.022	.868	.491
	Within Groups	1.156	45	.026		
	Total	1.245	49			

Independent T-test was applied to Species richness of the invaded plot and un-invaded plots. The results showed that p value <0.05 i.e., 0.027, it suggests that there is a significant difference between the species richness of the invaded and un-invaded plots.

Sum of Squares			df	Mean Square	F	Sig.
non invaded_sr	Between Groups	42.520	4	10.630	.989	.423
	Within Groups	483.500	45	10.744		
	Total	526.020	49			
non invaded_sw	Between Groups	.380	4	.095	.573	.683
	Within Groups	7.461	45	.166		
Total		7.841	49			
non invaded_e	Between Groups	.089	4	.022	.868	.491
	Within Groups	1.156	45	.026		
	Total	1.245	49			

The correlation was run for the Sørensen similarity index and difference in species richness and was found to be negatively correlated. The Sørensen index and species richness had a significant relation (P<0.05).

Correlations

Sorenson			Difference in S
Sorenson	Pearson Correlation	1	-.337*
	Sig. (2-tailed)		.017
	N	50	50
Difference in S	Pearson Correlation	-.337*	1
	Sig. (2-tailed)	.017	
	N	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

Conclusion

A significant difference was found between the species richness of the invaded and un-invaded plots. The correlation was run for the Sørensen similarity index and difference in species richness and was found to be negatively correlated. The impact of invasion on the invaded communities markedly differed among the five invading species; significant differences in species richness between invaded and uninvaded plots were found for three species (*Chromolaena odorata*, *Mikenia micrantha* and *Hyptis suaveolensis)*. Sorenson similarity index between invaded and uninvaded plots ranged from 38% to 53%, and *Ipomea carnea* exhibited the smallest effect on the species composition and highest impact was exerted by the *Chromolaena odorata*. Also, significant difference was observed for S, H and J in the invaded plots for the species *Chromolaena odorata*, *Mikenia micrantha* and *Hyptis suaveolensis*.

References

Shrestha BB (2016) Invasive alien plant species in Nepal. In: Frontiers of Botany, eds PK Jha, M Siwakoti, SR Rajbhandary, pp. 269–284. Kathmandu, Nepal: Central Department of Botany, Tribhuvan University.\

Lowe S, M Browne, S Boudjelas and M DePoorter. 2000. 100 of the world's worst invasive alien species: A Selection from the Global Invasive Species Database. The Invasive Species Specialist Group (ISSG), a specialist group of the Species Survival Commission (SSC) of the World Conservation Union (IUCN), New Zealand.

Left: Field work for assessment of impacts of invasive species to the area. Right: Final presentation to the reserve authority.

Laying out the field instruments and supplies prior to the field visit and data Collection.

Objective two:

Assessment of dietary overlap Status: Partially completed

Method

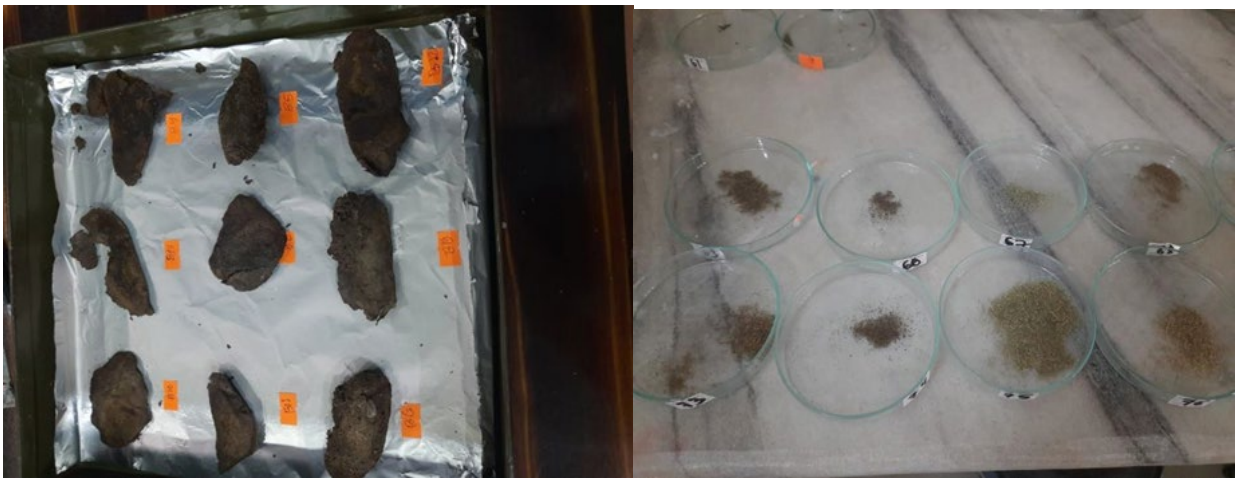
The sample of more than 100 grasses from the study area was collected in a zip lock bag in January 2021. Fifty samples each of cow, feral buffalo and wild water buffalo dung were also collected in zip lock bag and labeled properly. The plant and dung samples were first air dried and then dried in an oven at the lab of Agriculture and Forestry University. A herbarium for all the collected plants was maintained so as to facilitate the identification. The plant identification was done in the National Trust for Nature Conservation with the help of a plant identification expert.

The diet of the species was analyzed using standard micro-histological technique (Norbury, 1988). The reference plant samples were dried in an oven at $60^{\circ}C$ and the dried samples were separately ground with an electric blender and sieved in a mesh of size 1–0.3 mm. The powder retained on the 0.3 mm sieve was chosen as the final sample for slide preparation. The epidermal features of plants in the dung were identified with the help of reference slides prepared from plant species collected from the study area. The final sample was placed in petri dishes and bleached with 4% sodium hypochlorite for 6–24 hours at room temperature to remove mesophyll tissue and to make the epidermis identifiable. The bleached contents were rinsed well in a sieve. Then they were treated with a few drops of staining substance-gentian violet solution (1g/100m water) for 10 seconds and again rinsed. The stained fragments were mounted on standard microscope slides in a glycerin medium and covered with a cover slip. A similar process was followed for the faecal samples. Both reference slides and faecal slides were observed at different magnifications; 100x, 200x and 400x with a compound microscope and each fragment was photographed using a digital camera for microscope (DCM510) in a laptop using software- ScopeTek Scope Photo.

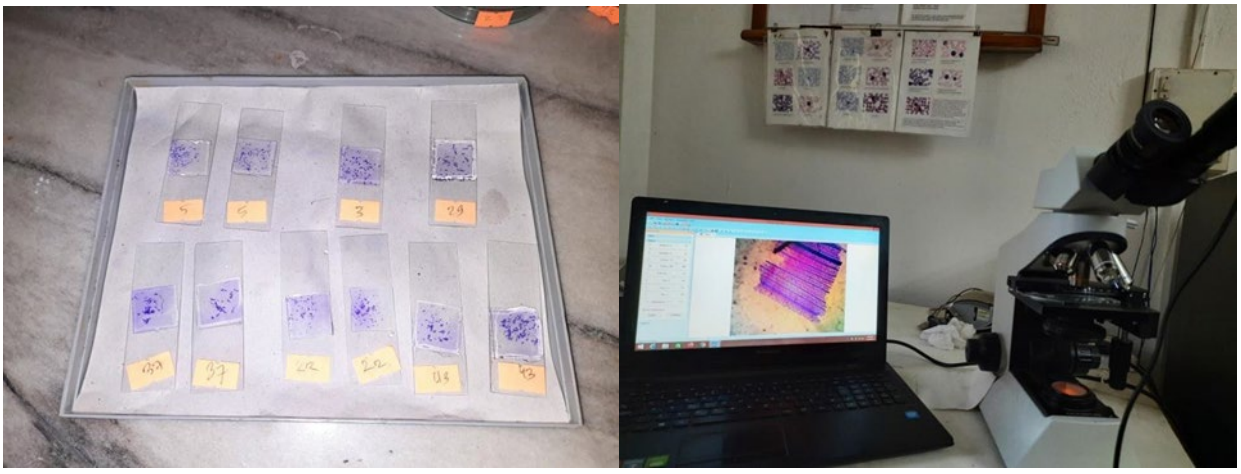
Each five dung samples of one species was mixed to prepare a composite sample. In this was 10 composite samples of cow dung, buffalo dung and wild water buffalo dung was prepared. For each fecal sample, non-overlapping and distinguishable 30 fragments, were observed while moving the slides from left to right in the microscope, were identified considering the specific histological feature of the epidermis. For each composite samples, 100 fragments were photographed. In this way, in total 3000 and 1000 photo of fragments were generated for each species.


Left: Collection of dung samples from the reserve. Right: Collection of plant samples from the reserve.

Left: Drying the dung samples in the hot air oven. Right: Hot air oven at the university lab.



Left: Dung samples laid out for drying. Right: Plant remains retrieved from the dung samples.



Left: Temporary slides prepared for viewing. Right: Viewing and photographing images of the fragments from the microscopic camera in the laptop.

Objective three

Human Wild water buffalo conflict Status: Fully completed

Methodology:
At first, records of the victims (injured and dead) from the reserve, from past 10 years (2012- 2021) was collected in March 2022. We conducted structured questionnaire surveys of all affected households (n = 116) in the study area. The questionnaires were rigorously tested prior to the questionnaire survey and then only finalised. Either the head of the household or another adult member was interviewed with consent. GPS location of each household was recorded. Before an interview, for a verbal consent was requested with the respondents. The questionnaire included the demographic background of the interviewee and the victim (age, sex, ethnicity), socioeconomic status (education, source of income, occupation etc.), victim behaviour/activity during attack (place of attack, activities while being attacked, characteristics of attacking wild water buffalo (adult/sub-adult bull), type of attack (injury/death), habitat

characteristics (land use type) and location (either inside or outside the reserve).

Data Analysis:
We entered all the questionnaire survey data in MS Excel. We performed data analyses in the R statistical package v. 4.0.2 (R Development Core Team, 2020). We carried out binomial logistic regression by constructing a generalised linear mixed model (GLMM) (Zuur et al., 2010) to determine the factors associated with fatalities in wild water buffalo attacks. In the GLMM, fatalities on wild water buffalo attack were used as dependent variable by coding the human fatality—1 and injury—0. Twenty explanatory variables representing wild water buffalo characteristics, human characteristics, and site characteristics were defined. Wild water buffalo behavior included social characteristics (adult male, adult female, female with calves, sub-adult male or mixed group). The human characteristics included age and sex of the victim, education, activities of the victim during attack, and location of attack. Site characteristics included place of attack, and proximity to forest. Education level of the victims was categorized into illiterate (who cannot read and write), literate (who can read/write but have not attended formal school), primary (completed primary school), and secondary or above (Ram et al., 2021).

Result
Mostly the people who were associated with agricultural activities were found to be more vulnerable to the attacks of wild water buffalo. In the land use type, forest areas were found to be more vulnerable to the fatalities. Similarly, education-wise illiterate people were more inflicted with the fatalities.

S. N.	**Predictors**	**Estimate**	**Std. Error**	**z value**	**Pr(>|z|)**
1.	(Intercept)	-6.562e+00	1.959e+00	-3.350	0.000808***
2.	Distance to reserve	-3.045e-04	7.968e-04	-0.382	0.702331
3.	Victims_Age	4.067e-04	2.740e-02	1.485	0.137646
4.	Activity_Guarding agricultural crop	3.045e+00	1.302e+00	2.339	0.019320*
5.	Activity_Open defecation	1.283e+00	1.162e+00	1.104	0.269715
6.	Activity_Bathing in river	1.458e+01	1.300e+03	0.011	0.991050
7.	Activity_Cutting grass	2.339e-02	9.926e-01	0.024	0.981198
8.	Activity_Lighting fire for warming	1.646e-01	1.790e+00	0.092	0.926749
9.	Landuse_Agricultural land	-1.470e+00	1.126e+00	-1.306	0.191648
10.	Landuse_Wetland	-1.380e+01	1.300e+00	-0.011	0.991528
11.	Landuse_Settlements	-6.290e-01	1.520e+00	-0.414	0.679111

12.	Landuse_Forest Area	2.047e+00	1.002e+00	2.044	0.040942*
13.	Adult male	1.747e+00	1.198e+00	1.458	0.144760
14.	Female with calves	1.135e+00	1.740e+00	0.652	0.514346
15.	Mixed groups	7.010e-01	1.467e+00	0.478	0.632669
16.	Education_Primary	1.357e+00	8.779e-01	1.545	0.122299
17.	Education_Illiterate	1.816e+00	8.920e-01	2.036	0.041784*
18.	Education_Literate	1.512e+00	9.342e-01	1.618	0.105649
19.	Season_Rainy	-1.046e+00	1.112e+00	-0.940	0.347064
20.	Season_Summer	-8.696e-01	1.190e+00	-0.731	0.464839
21.	Season_Winter	1.317e+00	9.038e-01	1.458	0.144948
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					

Supporting tables

Table 1: Characteristics of victims attacked by wild water buffalo from 2012 to 2021

Victim Characteristics	**Death**	**Injury**	**Total**
Male	18	57	75
Female	6	35	41
Caste/Ethnicity			
BCT	6	30	36
Indigenous Terai	7	24	31
Janajati	1	5	6
Madhesi	8	23	31
Muslim	2	10	12
Education			
Illiterate	3	29	32
Literate	8	19	27
Primary	8	18	26
Secondary or above	5	26	31

Table 2 Characteristics of Wild water buffalo involved in attacks

Water buffalo characteristics	**Death**	**Injury**	**Total**
Group type			
Adult male	14	60	74
Adult female	1	10	11
Female with calves	2	5	7

Mixed group	4	11	15
Sub-adult male	3	6	9
Adult/sub adult bull			
Yes	21	77	98
No	3	15	18

References

R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing.

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Zuur, A. F., Ieno, E. N., & Elphick, C. S. (2010). A protocol for data exploration to avoid common statistical problems. *Methods in Ecology and Evolution*, *1*, 3–14. https://doi.org/10.1111/j.2041-210x. 2009.00001.x

Objective Four

Community mobilization and sensitization Status: Fully completed

Community mobilisation and sensitization is a major objective of this conservation-based project. It was carried out in February 2022. The awareness programme was targeted to both the young school children and adult resident of the study area. The awareness materials such as posters and leaflets on wild water buffalo conservation were prepared in Nepali language prior to the fieldwork. The posters were pasted in public places where everyone could view and read the conservational content on wild water buffalo. Few samples of the posters and leaflets were provided to the reserve authority as well.

Left: Pasting awareness related poster in a local place. Right: Sharing the leaflet and posters with the reserve personnel

Presentations were held on the selected school of the buffer zone area. In Shree Bishwanath Singh Adharvuth School presentation on wild water buffalo conservation was carried to students of grade 4 and 5; while in Sunsari Star English boarding School presentation was carried to students of grade 6 and 7. Similarly, conservation awareness was delivered to students of grade 9 and 10 in Shree Rastriya Madhyamik School Sohanpur. In Koshi Janta Secondary School, the conservation awareness was provided to the students of grade 5 and 6. Around 500 students were provided with the conservation awareness and the desired target was met in numeric terms. As the schools were geographically far and amidst ongoing Covid situation inter-school quiz competition could not be held. Therefore, during the presentation, interactive quiz related to wild water buffalo, Koshi Tappu Wildlife Reserve and wildlife were asked to the students to make the session more interactive and interesting. After the completion of the conservation awareness programme, the leaflets on wild water buffalo were distributed to the students and the posters were pasted in the classrooms and premises of the school. Few samples of the posters and leaflets were also distributed to the school administration. An essay competition was held in the Sunsari Star English

boarding School. The students who secured first, second and third position; and consolation position were provided with cash prize and stationeries. A community learning and information center (CLIC) was set up in Sunsari Star English Boarding School with the students of grade 6 and 7 under the supervision of the class teacher. They were provided with ample stationery material such as chart paper, marker etc. along with conservational materials such as poster and leaflets. They were encouraged to conduct the awareness campaign at local level on a regular basis.

Left: Awareness at Shree Bishwanath Singh Adharvuth School. Right: Awareness at Shree Rastriya Madhyamik School Sohanpur.

Left: Awareness at Sunsari Star English boarding School. Right: Awareness at Koshi Janta Secondary School

The community awareness was also held for the local residents in various buffer zone area of the wildlife reserve. Eight groups of local residents were provided with the conservation awareness. The conservation awareness to local residents consisted of two groups each in Kusaha, Prakashpur and Kamalpur along with one group each in Pathari and Haripur. Around 500 local residents were provided with the conservation awareness and the desired target was met quantitatively. After conservation awareness each participant were provided with leaflet.

Attitude surveys were held before and after the awareness programme to analyse the increase in knowledge of the participants and effectiveness of the conservation

programme. This included few simple questions related to the wild water buffalo conservation. After the conservation awareness programme, almost 90% of the participants were able to talk about the importance and need of wild water buffalo conservation and subsequent advantages to the community by actively participating in the conservation programme. Hence the awareness programme was rated as effective.

Left: Pasting conservation posters in the local area. Right: Conservation awareness on wild water buffalo conservation.

Left: After the conservation awareness program with the participants. Right: Prize distribution to winners of essay competition.

Leaflet on wild water buffalo conservation

अर्ना संरक्षणका चुनौतिहरू

- छाडा गाइबस्तु तथा चौपायाको चरिचरण
- आरक्ष क्षेत्रको अतिक्रमण
- कोशी नदीमा वर्षेनी आउने बाढी
- बन पैदावारको अनियन्त्रित दोहन
- मिचाहा प्रजाति फैलिनु
- अनियन्त्रित आगलागी
- अर्नाको बासस्थान खुम्चिनु

अर्नाको संरक्षण कसरी गर्ने ?

- आरक्ष र सिमसारलाई प्राकृतिक अवस्थामा संरक्षण गरेर
- चरिचरण तथा छाडा चौपाया को नियन्त्रण गरेर
- घाँसे मैदानको उचित व्यवस्थापन गरेर
- वैज्ञानिक अनुसन्धान र संरक्षण शिक्षा मार्फत
- प्राकृतिक वासस्थानको संरक्षण र सम्वर्धन मार्फत

अर्नाको संरक्षण किन गर्ने ?

- परिस्थीतिक प्रणालीको सन्तुलन को लागी
- अर्ना सम्पूर्ण कोशी टप्पु वन्यजन्तु आरक्षको प्रतिनिधित्व गर्ने जनावर भएकोले
- प्राकृतिक जैविक विविधता संरक्षण गर्नु हामि मानवको कर्तव्य भएकोले
- प्रत्येक प्रजातिलाई प्रकृतिमा बाँच्ने अधिकार छ
- भावी पुस्ताले यसलाई प्राकृतिक बासस्थानमा देख्न पाउने सुनिश्चितताको लागी

अर्ना

(Bubalus bubalis)

अवधारणा :
दिव्या भट्टराई
प्रतिक पाण्डे
सौरभ लामिछाने

परिचय

अर्ना जमिनमा पाइने एक स्तनधारी प्राणी हो । संसारमा करिब ३३०० देखि ३४०० जंगली अर्ना रहेका छन् । अर्ना नेपाल, भारत, भुटान र म्यान्मारमा थोरै संख्यामा रहेको छ । अर्ना सबैभन्दा ठुलो संख्यामा भारतको काजिरंगा राष्ट्रिय निकुञ्ज, आसाम र इन्द्रावती बन्यजन्तु आरक्ष मध्यप्रदेशमा पाइन्छ । नेपालमा अर्ना कोशी टप्पु वन्यजन्तु आरक्ष प्राकृतिक रुपमा पाइन्छ भने सन् २०१७ मा कोशी टप्पु वन्यजन्तु आरक्षबाट १२ र सदर चिडियाखाना, जावलाखेलबाट ३ वटा अर्ना चितवन राष्ट्रिय निकुञ्जमा स्थानान्तरण गरिएको थियो ।

संख्या

१ कोशी टप्पु वन्यजन्तु आरक्ष ४५८

२ चितवन राष्ट्रिय निकुञ्ज १५

अर्ना

भैसी

अर्ना	भैसी
१) यसको आकार ठुलो र सिङ्ग फराकिलो र ठुलो हुन्छ	१) यसको आकार अर्नाको भन्दा सानो र सिङ्ग पनि सानो हुन्छ
२) यसको घुडामुनिको भाग सेतो रंगको हुन्छ	२) यसको शरीर पुरै कालो हुन्छ
३) यसको बच्चा खैरो रंगको हुन्छ	३) यसको पाडो कालो हुन्छ
४) अर्नाले आफ्नो गोबर बालुवा वा माटोले पुर्ने गर्दछ	४) भैसीले आफ्नो गोबर पुर्ने गर्दैन

बासस्थान र आहार

अर्ना नदीको बगर धेउधाउ र पानी जमेको क्षेत्रमा बस्ने गर्दछ । यसले खाएको कुरालाई गाई र भैसीले जस्तै उग्राउने गर्दछ । अर्ना खुला घासे मैदान, पानी जम्ने दलदल, र मसिलो चरणमा पाइन्छ । तापनि यसले जंगलाई पानी र नमीबाट शितलता लिन प्रयोग गर्दछ । यसको मनपर्ने आहार कास, नर्कट र भौवा हो । अर्नाले जंगलधेउधाउ पसी धान, उखु र जुट पनि खाने गर्दछ । अर्ना प्राय दिनभरी जंगल र पानी जमेको ठाउमा बस्छ । यसले गर्मीवाममा किराको टोकाई र घामबाट बच्न हिलोमा आहाल बस्छ । ठुलो पानीमा पनि अर्ना सजिलै पानीमा पौडिन सक्छ ।

अर्ना सामाजिक प्राणी हो र सामान्य रुपमा १० देखि २० पोथी अर्ना आफ्नो बच्चा सहित समुहमा रहन्छ । अर्नाको समुहमा एक वा दुइटा भाले अर्ना पनि हुन्छ । भाले अर्नाको झुण्डको सुरक्षामा सतर्क रहन्छ र कुनै खतरा आइपर्दा सुरक्षा कवच को रुपमा खडा हुन्छ । वयस्क भाले अर्ना एक्लै बस्छ र खतराको समयमा अग्लो घास वा जंगलमा लुक्छ ।

सारिरिक बनावट र आयु

अर्ना घरेलु भैसीजस्तै देखिने भएपनी यसको शरीर ठुलो र सिङ्ग घुमाउरो हुन्छ । वयस्क अर्नाको घुडामुनिको भाग सेतो हुन्छ । वयस्क अर्ना २ देखि ३ मीटर अग्लो र यसको तौल ८०० देखि १२०० केजी सम्म हुन्छ । भाले अर्ना ४ वर्षमा वयस्क हुन्छ र पोथी अर्ना ३ वर्षमा वयस्क हुन्छ । पोथी अर्नाले १५ वर्ष सम्म गर्भधारण गर्दछ र गर्भधारण समय १० देखि ११ महिनासम्म हुन्छ । अर्नाको बच्चा खैरो हुन्छ र छ महिना पछि कालो हुन थाल्छ । अर्नाले बच्चालाई ६ देखि ९ महिनासम्म हेरचाह गर्छ । अर्नाको प्रजननको समय जेठ र असार महिना हो ।

कानूनी प्रावधान

अर्ना राष्ट्रिय तथा अन्तरास्ट्रिय कानुनद्वारा संरक्षित जनावर हो । यो CITES को अनुसुची ३ मा सुचिकृत छ । IUCN को खतरा सुची अन्तर्गत अर्ना संकटापन्न (Endangered) जनावर हो । त्यसैगरी नेपालको राष्ट्रिय निकुञ्ज तथा बन्यजन्तु संरक्षण ऐन २०२९ अन्तर्गत अर्ना संरक्षित जीव हो । यस ऐन अन्तर्गत जंगली अर्ना मर्ने वा घाइते बनाउनेलाई ५ लाखदेखि १० लाख रुपैयासम्म जरिवाना वा १ वर्षदेखी १० वर्षसम्म कैद वा दुवै सजाय हुनेछ । अर्नाले आक्रमण गरि घाइते बनाएको वा मृत्यु भएको अवस्थामा वा बालीनाली नोक्सान गरेमा राहत निर्देशिका २०६५ र त्यसको संसोधन २०७४ अनुसार समेत राहतको व्यवस्था गरिएको छ ।

Poster on wild water buffalo conservation