PROJECT UPDATE

(May to July 2025)

by

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Help Earth

A SOCIETY FOR PROMOTION OF SCIENCE AND CONSERVATION OF BIODIVERSITY

Project Timeline: Project started on 1st of May 2025 and has duration of exactly 1 year.

Current Project Planning: Visiting field sites and doing at least one or two awareness workshops in Meghalaya near the field site.

Awareness workshops conducted so far: Two workshops completed (one in Siju Village, near Siju Cave, South Garo hills, Meghalaya and the other in Mawmluh village, Cherrapunjee, East Khasi Hills District, Meghalaya).

Current field sites partially visited for conducting surveys in the next few months: Mawmluh Village, Cherrapunjee, East Khasi hills, Meghalaya.

Current field sites fully surveyed: Siju Cave and Limestone Rock Formations, Siju, South Garo hills District, Meghalaya.

Figure1. An overview of the forests of Siju Wildlife Sanctuary, Garo Hills, Meghalaya.

Results and Discussion

I have just completed by pre-monsoon field surveys (1st May to 31st May 2025) in the South Garo Hills, Meghalaya and just visited Mawmluh village, Sohra, East Khasi Hills shortly for three days (from July 20th to 23rd) to give a talk regarding awareness related to herpetofauna and to check for logistics including a home stay for myself so that I can conduct field surveys in the next few months. I couldn't do surveys during the month of June till mid July because of severe landslides in the Khasi as well as Garo hills.

Coming to the surveys conducted in the South Garo hills (1st May to 31st May 2025), it has been a really productive survey. So far, there was no proper baseline data on the existing herpetofauna of the South Garo hills apart from the recent descriptions of torrent frogs (*Amolops siju*), bush frogs (*Raorchestes asakgrensis*) and two new bent toed geckos (*Cyrtodactylus agarwali* and *Cyrtodactylus karsticola*) (Purkayastha et al. 2021; Saikia et al. 2023 and Naveen et al 2024). In the last one month of survey (April to May), we encountered a total of 65 species and collected 60 of them in different microhabitat assemblages in Siju, South Garo Hills, most of which do not have any concrete data either in terms of ecology or systematics (phylogenetics).

Figure2. The habitat type inside the evergreen forests of Siju Wildife sanctuary, South Garo hills, Meghalaya.

Among the list of encountered 65 species, lots of lesser known species were encountered such as *Bufoides kempiae*, *Kurixalus*/*Chirixalus* sp (possibly a new species or a new state record), *Ichthyophis* cf. *garoensis*, *Raorchestes* sp. (possibly a new species), *Limnonectes* cf. *khasianus*, *Takydromus* cf. *khasiensis*, *Draco* sp. (possibly a new species), *Cristidorsa planidorsata* (previously known only from the type locality i.e. Khasi hills, Meghalaya), *Calotes maria*, *Calotes emma*, *Sphenomorphus indicus*, *Ovophis* cf. *monticola*, *Pareas monticola* and many more (see Table 1 and 2). Out of these 65 species, manuscripts or research papers on at-least four different herpetofauna species are being prepared for publication which includes a new country record for India (manuscript in press), two new records for the state (manuscript in preparation, not yet submitted), the first phylogenetic analysis as well as re-description of one of the lesser known species (manuscript in preparation, not yet submitted) and description of a new species is also on the way (manuscript in preparation, not yet submitted). During this project, species distributions, natural history and microhabitat preferences regarding each taxon were documented as much as possible, particularly for these collected 60 species of herpetofauna throughout Siju, South Garo Hills.

Figure3. An overview of one of the several streams occurring inside the forests of South Garo hills, Meghalaya (an ideal habitat for *Amolops siju* and many other amphibians).

Table1. A checklist of reptiles observed in the Siju Wildlife Sanctuary, South Garo hills, Meghalaya, India. Abbreviations for micro-habitats include PF (Paddy Fields); TF (Tropical semi-evergreen or evergreen forests in association with rocks and without streams); TFS (Tropical semi-evergreen or evergreen forests in association with rocks and with running hill streams); LC (Inside the Limestone Caves); LCE (Entrance of the Limestone cave surrounded by tropical evergreen or semi-evergreen/montane forests in association with running hill streams); LRF (In and around Limestone Rock Formations surrounded by tropical evergreen/montane forests).

REPTILIA				
Sl no.	**Family**	**Scientific name**	**IUCN Red List status**	**Place of observation**
1	Gekkonidae	*Hemidactylus platyurus*	Least Concern	TF, LCE, LRF
2		*Hemidactylus garnotii*	Least Concern	TF, LCE, LRF
3		*Hemidactylus brooki*	Least Concern	TF
4		*Hemidactylus frenatus*	Least Concern	TF
5		*Cyrtodactylus agarwali*	Not Evaluated	TF
6		*Cyrtodactylus karsticola*	Not Evaluated	LC, LRF, LCE
7		*Gecko gekko*	Least Concern	TF, LRF
8	Scincidae	*Sphenomorphus maculatus*	Least Concern	TF, TFS, LRF
9		*Sphenomorphus indicus*	Least Concern	TF, TFS, LRF
10		*Eutropis multifasciata*	Least Concern	TF, TFS, LRF
11		*Eutropis macularia*	Least Concern	TF, TFS, LRF
12		*Riopa albopunctata*	Least Concern	TF
13	Agamidae	*Calotes* cf. *irawadi*	Least Concern	TF
14		*Calotes maria*	Least Concern	TF, TFS
15		*Calotes emma*	Least Concern	TF, TFS
16		*Draco* sp.		TF, TFS
17		*Ptyctolaemus gularis*	Least Concern	TF, TFS, LRF, LCE
18		*Cristidorsa planidorsata*	Least Concern	TF, TFS
19	Varanidae	*Varanus bengalensis*	Near Threatened	TF, TFS, LRF
20		*Varanus salvator*	Least Concern	TFS
21	Typhlophidae	*Indotyphlops brahminus*	Least Concern	TF, TFS, LRF
22		*Argyrophis diardii*	Least Concern	TF, TFS, LRF
23	Natricidae	*Fowlea piscator*	Least Concern	PF
24		*Herpetoreas xenura*	Near Threatened	TFS, LRF, LCE
25		*Hebius khasiensis*	Least Concern	TFS
26	Colubridae	*Boiga gokool*	Least Concern	TF, TFS, LRF
27		*Oligodon albocinctus*	Least Concern	TF, TFS, LRF
28		*Lycodon jara*	Least Concern	TF, TFS, LRF, LCE
29		*Lycodon aulicus*	Least Concern	TF, LRF
30		*Pareas monticola*	Least Concern	TF, TFS, LRF, LCE
31	Viperidae	*Trimeresurus mayae*	Not Evaluated	TF, TFS, LRF, LCE
32		*Ovophis* cf. *monticola*	Least Concern	TF, TFS, LRF

33		*Trimeresurus erythrurus*	Least Concern	TF, TFS, LRF

AMPHIBIA				
Sl no.	**Family**	**Scientific name**	**IUCN Red List status**	**Place of observation**
1	Bufonidae	*Duttaphrynus melanostictus*	Least Concern	PF
2		*Bufoides kempiae*	Data Deficient	LRF
3	Dicroglossidae	*Hoplobatrachus tigerinus*	Least Concern	PF
4		*Hoplobatrachus litoralis*	Least Concern	TF
5		*Limnonectes* cf. *khasianus*	Least Concern	TFS
6		*Limnonectes* sp.		TFS
7		*Minervarya pierrei*	Least Concern	PF, TF, LRF
8		*Minervarya nepalensis*	Least Concern	PF, TF, LRF
9		*Minervarya teraiensis*	Least Concern	PF, TF, LRF
10		*Minervarya shyadrensis*	Least Concern	PF, TF, LRF
11	Ranidae	*Hydrophylax leptoglossa*	Least Concern	PF, TF, LRF, LCE
12		*Amolops siju*	Not Evaluated	LCE, TFS, LC
13		*Amolops* sp.		LCE, TFS
14		*Clinotarsus alticola*	Least Concern	LCE, TFS
15		*Humerana humeralis*	Least Concern	PF
16		*Oddorana chloronata*	Least Concern	TFS, LRF
17		*Oddorana mawphlangensis*	Data Deficient	TFS
18	Megophridae	*Megophrys* sp.		TFS, TF
19		*Leptolalax* sp.		TFS, LRF
20		*Leptobrachium* cf. *aryatum*	Not Evaluated	TFS, TF
21		*Megophrys robusta*	Least Concern	TFS, TF
22	Rhacophoridae	*Kurixalus/Chirixalus* sp.		TFS, TF, LRF
23		*Polypedates lecuomystax*	Least Concern	PF, TFS, TF, LRF
24		*Polypedates* sp.		TFS, TF
25		*Raorchestes garo*	Data Deficient	LCE, TFS, TF
26		*Raorchestes* sp. 1		LCE, TFS, TF
27		*Raorchestes* sp. 2		TFS, TF
28		*Raorchestes asagkrensis*	Not Evaluated	TFS, TF
29		*Rhacophorus bipunctatus*	Least Concern	TFS, TF
30		*Zhangixalus smaragdinus*	Least Concern	TFS, TF
31	Ichthyophiidae	*Ichthyophis* cf. *garoensis*	Data Deficient	TFS, TF
32		*Ichthyophis* cf. *daribokensis*	Data Deficient	TFS, TF

I am based in Guwahati, Assam and every month I am planning to visit the field sites in Garo, Khasi and Jaintia hills. Till now, I have just completed my first field visit (1st May to 31st May 2025) to the South Garo hills including Siju Wildlife Sanctuary and completed two awareness campaigns (one in the South Garo hills and the other in East Khasi hills).

Figure4. The limestone rock formations occurring inside the forests of Siju WLS, South Garo hills (an important habitat for the micro-endemic *Bufoides kempiae*).

During our first week in the South Garo hills, we conducted herpetofaunal surveys mostly in early mornings and dusk till mid night in the evergreen forests of Siju and its adjoining forests close to the Siju Guest House (i.e., 70 to 400 m asl). In the first week of May 2025, we (our Help Earth team) encountered an aggressive female Eastern Cat snake (*Boiga gokool*) at around 18:00 h which was moving slowly amongst the bushes (roughly above 2 m high) possibly to search for a sleeping agamid lizard to feed on it. Then, while doing randomized walk on the forest trails, we encountered many (at least 15 to 20 individuals) species of *Cyrtodactylus* in and around loose soils and tree barks between 17:45 to midnight 12:00 h which were all possibly *Cyrtodactylus agarwali* (presence of 12 to 18 pre-cloacal pores in males). We also encountered many other geckos such as *Hemidactylus platyurus* (more than 30 individuals spotted), *H. garnotii* (more than 15 individuals) and *H. brooki* (less than 10 individuals) in rocky habitats and loose soils either close to the forest edges or deep inside the forest mostly between dusk (17:45 h) to midnight throughout the month. Interestingly, individuals of *H. frenatus*

were only observed in and around human habitations (houses, guest house and grocery shops) throughout the survey. Members of the genus *Hemidactylus* were also observed to peep out of tree holes and shelter during early mornings till 12:00 noon, possibly for basking whereas not a single *Cyrtodactylus* were observed before dusk throughout the survey, suggesting that their movement and activity is predominantly nocturnal.

Figure5. The team leader of the project (2nd from left) along with other members of the team poses for a photograph during the dusk just prior to the herpetofauna surveys conducted at night inside the Siju Cave and its adjoining forests.

All the skinks (*Sphenomorphus maculatus*, *Eutropis macularia*, *Eutropis multifasciata* and *Riopa albopunctata*) were spotted during the day in and around forest edges (mostly during early to late mornings till 12:00 h noon and at times before dusk) throughout the month except a single individual of *Sphenomorphus indicus* which was caught during the dusk deep inside the forest (possibly it was looking for a leaf litter to take shelter) during the 2nd week of May. Whilst in and around the hilly streams and fast flowing waterfalls, lots of amphibians were encountered throughout the month at night (mostly after dusk) which includes *Amolops siju* (more than 55 to 60 individuals spotted), *Amolops* sp. (more than 20 individuals spotted; possibly a different species as

it looks different from *A. siju*; awaiting mt-DNA sequences), *Clinotarsus alticola* (more than 10 individuals spotted), *Humerana humeralis* (only five individuals spotted), *Oddorana chloronata* (more than 30 individuals spotted), *Oddorana mawphlangensis* (only one individual spotted; possibly the first sighting from South Garo hills), *Limnonectes* cf. *khasianus* (more than 10 individuals spotted; awaiting mt-DNA sequences), *Limnonectes* sp. (more than 10 individuals spotted; possibly a different species as it looks different from *cf. khasianus*; awaiting mt-DNA sequences), *Megophrys* sp. (Plenty of calls of atleast 10 individuals but observed only one deep inside the forest), *Leptolalax* sp. (only one individual spotted; possibly the first sighting from South Garo hills), *Leptobrachium* cf. *aryatum* (only five individuals spotted; possibly the first report of this species from Meghalaya; awaiting mt-DNA confirmation) and *Megophrys robusta* (only two specimens observed), *Kurixalus*/*Chirixalus* sp. (more than seven individuals spotted; awaiting mt-DNA sequences to confirm the exact genus) and *Zhangixalus smaragdinus* (only one individual spotted).

Figure6. An overview of the limestone habitat in association with a big stream (slow flowing) inside the Siju Dobakol Cave located in the Siju WLS, South Garo hills, Meghalaya.

In the second, third and fourth (last) weeks of May, we visited Siju Dobakol Cave and many other limestones rock formations not far from the above-mentioned cave both during early mornings and dusk (17:00 h) till 23:00 h at night. The Siju (Dobakol) Cave harbors a large stream which flows towards the outside of the cave and continues as a wide, fast flowing stream till the entrance of the cave which ultimately flows through the forest floor and meets the Simsang River. Furthermore, the entrance of the cave is surrounded by rocks and dense evergreen forests comprising of trees like *Ficus* sp., which shelters species like Malayan giant squirrel and parti-colored gliding squirrel. Apart from bats, the only vertebrate species we encountered in our survey exactly inside the limestone cave were *Amolops siju* (encountered only two individuals during the night at 20:30 h and only seen once during the day throughout the survey) and *Cyrtodactylus karsticola* (only a single individual seen at 19:45 h) at night between 19:00 h to 21:00 h. Interestingly we observed that the herpetofaunal assemblages were much more on the entrance of the limestone cave as compared to the inside of the cave. However, we are not giving any conclusion yet as we have just surveyed the mentioned cave for only three weeks.

Figure7. A congregation of more than 300 individuals of bats inside the Siju Cave, South Garo hills, Meghalaya.

The reptilian species which we encountered in the entrance of the cave were *Hemidactylus platyurus* (more than 10 individuals in the tree barks and rocks), *Hemidactylus garnotii* (only three individuals in the tree barks at night between 17:30 h to 21:00 h), *Cyrtodactylus karsticola* (only four individuals in the tree barks between 19:00 h to 21:00 h), *Ptyctolaemus gularis* (only one individual spotted during the day on a branch at around 11:00 h), *Herpetoreas xenura* (only one individual spotted during the night near the fast flowing stream at around 20:30 h), *Lycodon jara* (only one individual spotted during the night near the fast flowing stream at around 19:00 h), *Pareas monticola* (only one individual spotted during the night on a branch at around 22:00 h) and *Trimeresurus mayae* (only one individual spotted during the night on a branch at around 17:30 h) during the survey period.

Figure8. One of the largest congregations of limestone rock formations (not a limestone cave) somewhere in the forests of Siju WLS, South Garo hills, Meghalaya (an important habitat for the micro-endemic *Bufoides kempiae*).

Amongst the encountered amphibians on the entrance of the cave were *Hydrophylax leptoglossa* (only two individuals spotted during the night near the fast-flowing stream at around 21:30 h), *Amolops siju* (six to eight individuals spotted during each night in and around the fast-flowing stream between 17:30 h to 22:30 h), *Amolops* sp. (three individuals spotted in and around the fast-flowing stream between 17:30 h to 22:30 h throughout the survey), *Clinotarsus alticola* (five froglet individuals and two adults

spotted in and around the fast-flowing stream between 17:30 h to 22:30 h throughout the survey), *Raorchestes garo* (four to five individuals were calling during each night from high above the branches i.e. some 6 to 9 feet above, between 17:30 h to 22:30 h) and *Raorchestes* sp. 1.(only one individual was caught throughout the survey from a branch near the bamboo thickets close to a fast flowing stream at around 21:00 h; the call couldn't be recorded).

Figure9. A photograph with the locals of the Siju Village after an awareness campaign conducted near the Siju Guest house, South Garo hills, Meghalaya.

Again, in the limestone rock formations inside the Siju Wildlife sanctuary and its adjoining evergreen forests, we encountered several herpetofaunal assemblages crawling in and around the karst associated rocks. Amongst lizards, we encountered *Hemidactylus platyurus* (six to eight individuals spotted during each night between 17:30 h to 23:30 h alongside the limestone rocks), *Hemidactylus garnotii* (only three individuals spotted during each night between 17:30 h to 23:30 h alongside the limestone rocks and roots of large trees inside the limestone rock formations), *Cyrtodactylus karsticola* (four or five individuals spotted during each night between 17:30 h to 23:30 h alongside the limestone rocks), *Gecko gekko* (nine to ten individuals spotted during each night between 17:30 h to 23:30 h alongside the limestone rocks and barks of large trees), *Sphenomorphus maculatus* (two to three individuals spotted during each day between 08:30 h to 12:30 h within the forest floor inside the limestone rocks), *Sphenomorphus indicus* (only one individual spotted throughout the survey at

around 10:30 h within the forest floor inside the limestone rocks), *Eutropis multifasciata* (two to three individuals spotted during each day between 08:30 h to 12:30 h mostly while basking within the forest floor inside the limestone rock formations), *Eutropis macularia* (two to three individuals spotted during each day between 08:30 h to 12:30 h mostly while basking within the forest floor inside the limestone rock formations), *Ptyctolaemus gularis* (only one individual spotted throughout the survey at around 22:30 h within the twigs of a low lying bush inside the limestone rocks where the individual was observed sleeping) and *Varanus bengalensis* (only one juvenile individual was spotted throughout the survey at around 09:00 h basking on the forest floor within the limestone rock formations).

Figure10. Some of the herpetofauna species encountered in the Siju WLS, South Garo Hills, Meghalaya (A: *Bufoides kempiae*; B: *Limnonectes* sp.; C: *Clinotarsus alticola*; D: *Amolops siju*; E: *Kurixalus*/*Chirixalus* sp.; F: *Raorchestes* sp.; G: *Rhacophorus bipuncatatus*; H: *Ichthyophis* cf. *garoensis*; I: *Cyrtodactylus karsticola*; J: *Calotes maria*; K: *Trimeresurus mayae*; L: *Pareas monticola*; M: *Herpetoreas xenura*; N: *Hebius khasiensis*; O: Boiga gokool; P: *Argyrophis diardii*. Please refer to table 1 to check the microhabitats of these encountered species.

Amongst snakes in the limestone rock formations, we encountered *Indotyphlops brahminus* (only one adult individual was caught throughout the survey underneath a

fallen log at around 20:00 h), *Argyrophis diardii* (only one adult individual was caught throughout the survey underneath a fallen log at around 16:00 h), *Herpetoreas xenura* (only one adult individual was caught throughout the survey close to a temporary water body inside the rock formation at around around 21:40 h), *Boiga gokool* (only one adult male individual was caught throughout the survey close to a low lying bush inside the rock formation at around around 18:30 h), *Oligodon albocinctus* (only one individual was seen throughout the survey which couldn't be caught as it retreated under a fallen limestone rock at around 22:30 h, possibly in response to our presence), *Lycodon jara* (only one individual was caught throughout the survey from one of the crevices in the rock formations some 4 to 5 feet above at around 21:10 h), *Lycodon aulicus* (only one individual was caught throughout the survey from one of the crevices in the rock formations some 2 to 3 feet above the ground at around 19:00 h), *Pareas monticola* (two adult individuals were caught throughout the survey from the forest floor in the rock formations between 21:00 h to 23:00 h), *Trimeresurus mayae* (only one adult individual was seen throughout the survey; the individual was seen high up on a tree (i.e. some 7 to 8 feet above the ground) at around 19:25 h due to which the specimen couldn't be caught), *Ovophis* cf. *monticola* (only one dead specimen was found in the forest floor throughout the survey at around 08:00 h in the morning) and *Trimeresurus erythrurus* (three individuals were caught throughout the survey; all between 17:30 h to 23:00 h). Amongst the amphibian species recorded inside the limestone rock formations, we got the micro-endemic *Bufoides kempiae* (only three individuals were encountered throughout the survey either from the branches or limestone rocks some 4 to 4.5 feet above the ground between 19:00 h to 21:00 h), *Hydrophylax leptoglossa* (more than six individuals were seen either on the forest floor or temporary pools between 19:00 h to 21:00 h throughout the survey), *Oddorana chloronata* (more than five individuals were seen either on the forest floor or temporary pools between 19:00 h to 21:00 h throughout the survey), *Leptolalax* sp. (only a single individual was seen on the forest floor close to a temporary pool between 20:30 h to 21:00 h throughout the survey), *Kurixalus*/*Chirixalus* sp. (four individuals were seen in and around the bushes close to a temporary pool between 20:30 h to 21:30 h throughout the survey), *Polypedates lecuomystax* (six individuals were seen in the forest floor close to temporary pools between 19:30 h to 21:30 h throughout the survey). At last, we encountered more than six individuals of *Minervarya pierrei*, *Minervarya nepalensis*, *Minervarya teraiensis* and *Minervarya shyadrensis*, all from the vicinity of temporary pools in the forest floor within the limestone rock formations (Please refer to Table 1 to check the microhabitat of the encountered herpetofauna species).

Now, coming to the seminar conducted regarding awareness of herpetofauna and their associated limestone karst habitats in the Khasi hills, it has really been a productive seminar. We conducted the seminar on 22nd of July 2025 in an indoor hall in Mawmluh Village, Cherrapunjee/Sohra, East Khasi hills District, Meghalaya. Many renowned

personalities such as the Respected Headman and the General Secretary of Mawmluh Village, Cherrapunjee/Sohra Division along with more than 300 students as well as more than 15 teachers from various schools and colleges were present in the seminar. We (Me and my team members) discussed about the basics of snake identification, snake bite management (including the necessary dos and don'ts) and importance of limestone caves as well as their conservation.

Figure11. A, B, C, D and E: The team leader of the project in action with the locals (including school and college students) while giving a talk regarding awareness on basics of snake identification, snake bite management and importance of limestone caves in Cherrapunjee/Sohra, East Khasi Hills, Meghalaya.

With this, I am ending my monthly report for the months of May to July and I am about to visit Meghalaya again this month for conducting field surveys for at least next three months (August to October) in Khasi, Garo and Jaintia hills as well. I aim to submit my next field report by November 2025 alongside possible publications (research papers).

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