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Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India
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Cover: Parts of *Vachellia nilotica*, medium - watercolours. © P Kritika



Foraging postures and techniques used by the White-bellied Heron *Ardea insignis* Hume, 1878 (Aves: Pelecaniformes: Ardeidae) in Namdapha Tiger Reserve, India

Himadri Sekhar Mondal¹ & Gopinathan Maheswaran²

^{1,2} Zoological Survey of India, M-Block, New Alipore, Kolkata, West Bengal 700053, India.

¹ Current address: Bombay Natural History Society, Hornbill House, Shahid Bhagat Singh Road, Mumbai, Maharashtra 400001, India.

¹himadri1510@gmail.com (corresponding author), ²gmaheswaran@yahoo.com

Abstract: The White-bellied Heron *Ardea insignis* occurs in Bhutan, India, and Myanmar. Bhutan supports the majority of the known global population (approximately 30 individuals), followed by India (around 10 individuals), while only a few individuals occur in Myanmar. The population continues to decline across its range, posing a serious threat to the species' survival. This heron is unique in preferring fast-flowing freshwater rivers, yet its foraging behaviour remains poorly understood. As a fish-eating bird, a continuous supply of freshwater fish is essential for its survival and reproduction. From 2013 to 2017, its foraging behaviour was studied in Namdapha Tiger Reserve, the only site in India where most individuals are found. The aim was to understand how this visual predator forages in fast-flowing rivers, where strong currents make prey detection and capture difficult. It was found that the heron employs a variety of postures and techniques to cope with these conditions. Using continuous focal sampling, individuals were observed and documented their body postures and prey capture methods through photography. Over approximately 850 h of observation, the herons were seen feeding exclusively on fish. Their foraging behaviour was strongly influenced by water current, requiring specific techniques to maximise prey capture. The birds displayed distinctive movement patterns and postures to avoid detection by prey and to handle captured fish effectively. Some postures were associated with unsuccessful capture attempts. This study highlights previously undocumented feeding behaviours, which are important for developing conservation strategies aimed at protecting the species and its specialised habitat.

Keywords: Arunachal Pradesh, body postures, foraging technique, freshwater rivers, northeastern India, prey handling.

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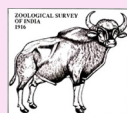
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Author details: DR. HIMADRI SEKHAR MONDAL completed his PhD on the behavioural studies of Critically Endangered White-bellied Heron *Ardea insignis* from the Pondicherry University in 2019. He has joined BNHS as scientist on 2018 and has worked on different projects since then. He is currently working on the bird disease surveillance project in Sikkim Himalaya. DR. GOPINATHAN MAHESWARAN is currently working as a senior scientist with Zoological Survey of India and his research interests include behavioural studies on the long-legged wading birds besides forest bird community studies in various protected areas in India.

Author contribution: HSM involved in data collection, analyses, conceptualization and writing of this article. GM helped in writing of this article and also accrued the fund for this study.

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INTRODUCTION

Long-legged wading birds employ a wide range of foraging techniques, which can be categorised based on posture, behaviour, and physical adaptations used to capture prey (Kushlan 1978; Maheswaran & Rahmani 2002). The choice of technique varies among species and even among individuals. Birds often select behaviours that maximise foraging efficiency (Maheswaran & Rahmani 2002; Aarif et al. 2025). According to Stephens & Krebs (1986), behavioural choices are often influenced by capture success rate or time between captures rather than net energy gain. In the case of the White-bellied Heron (WBH hereafter), despite using suitable postures and techniques, the fast-flowing rivers of Namdapha Tiger Reserve (Namdapha TR) reduce capture efficiency, allowing fish to escape easily. The average capture rate is only 0.47 fish per hour, meaning more than two hours may pass between successful attempts. This low success rate is partially offset by the consumption of larger fish (greater than 18 cm), which provide higher energy returns (Mondal & Maheswaran 2021). The species is extremely shy and avoids human presence, leading to its confinement in remote river systems. This behaviour contributes to its low population size. Given these challenges, understanding how WBH adapts different foraging strategies was a key objective of this study.

The WBH is classified as 'Critically Endangered' and is distributed across the eastern Himalayan foothills in Bhutan and northeastern India, extending to northern Myanmar (Maheswaran et al. 2021b). In India, Arunachal Pradesh is a stronghold, with nesting sites recorded mainly in Namdapha Tiger Reserve and nearby forest areas (Mondal & Maheswaran 2014, 2025). Currently, the reserve has around 4–5 individuals which is roughly 8% of the known global population (c. 60 individuals). Most previous studies have focused on population status, nesting, and conservation. However, except our previous study (Mondal & Maheswaran 2021) that determined the effects of water depth and directional orientation of herons especially while foraging 'upstream' or 'downstream' in the unique habitat of fast-flowing freshwater rivers, no other study has discussed postures and techniques used by this rare heron to capture and consume its prey in the fast-flowing rivers. As a solitary, visually hunting piscivore dependent on river systems, its survival depends heavily on habitat quality. This study is the first to document the diverse foraging behaviours of this species in fast-flowing freshwater rivers in northeastern India, providing insights essential for its conservation. Detailed quantitative analyses of

the frequency of such behaviours, success versus failure rates, time spent in shallow water, and preferred fish size classes are not presented here, as these aspects were addressed by Mondal & Maheswaran (2021).

MATERIALS AND METHODS

Study area

The study was conducted in Namdapha Tiger Reserve (27.508–27.661 °N to 96.251–96.976 °E) in Changlang District, Arunachal Pradesh, India. The Reserve covers 1,985 km² and borders Myanmar. Major rivers include the Noa-Dehing, Namdapha, and Deban Nallah, along with numerous streams. Fieldwork was carried out during winter months (November 2013 to January 2017). Observations were not conducted during the monsoon due to flooding. Approximately 1,400 h of field observation were completed, including 858.45 h focused on foraging behaviour.

Behavioral observations

Continuous focal sampling method was used (Altman 1974; Martin & Bateson 2007). Observations were conducted daily from 0530 h to 1730 h (IST). Data collection began when a heron was located and ended when it left the site or was disturbed. Observations were made using a pair of Nikon 8 x 40 binoculars and a Nikon PROSTAFF 5 Fieldscope 82-A from distances of at least 200 m. Temporary hides were constructed using natural materials at known foraging sites within Noa-Dehing and Namdapha Rivers, two of the major river systems of Namdapha. Photographs were taken using a D70S DSLR camera (with 150–500 mm Sigma lens). Multiple observation sites were selected at least 1 km apart. Recorded behaviours were compared with existing literature on long-legged wading bird foraging (Meyerriecks 1960; Kushlan 1976, 2011; Rodgers 1983; Kelly et al. 2003; Kushlan & Hancock 2005; Maheswaran & Rahmani 2008).

RESULTS

General observations

Over 850 h of observation, various postures and behaviours employed by WBH while foraging were documented in fast-flowing rivers within Namdapha TR, namely Noa-Dehing and Namdapha. The species was found to feed exclusively on live fish. Most observations were recorded on clear, sunny days. Although herons

were occasionally observed foraging during rainy conditions in winter and at the onset of the monsoon from late March, no alternative strategies were documented to compensate for reduced visibility in murkier water.

FORAGING BEHAVIOURS

1. Motion-based strategies

Stand and wait: Remaining motionless for long periods (3–4 hours or even longer) waiting for its prey (Images 1–3). In total, herons were observed spending 821.71 h (Table 2).

Scan and walk: Moving carefully to inspect potential prey areas (Image 4). Herons were seen using this mode of foraging strategy for 36.74 h (Table 2).

Walk slowly: Stalking prey with controlled movement.

Walk-stand-wait: Alternating between walking and pausing.

Walk quickly: Active searching, sometimes disturbing prey.

Crouch and chase: Rapid pursuit with submerged head and neck (Image 5).

Hopping: Short flights to new feeding locations that are at short distances (Image 6).

2. Water current-based strategies

Upstream: Monitoring incoming fish; includes foot-stirring to flush prey (Image 7), and herons were seen spending 403.97 h facing upstream (Table 2).

Foot stirring and balancing: The WBH has well-built long legs (tarsus: 176–216 mm) that enable heron to withstand the high-water current, particularly when standing amidst the fast-flowing rivers. Furthermore, WBH deploys a unique foraging technique while foraging facing 'upstream'. The WBH stands on one foot while using the other foot to slowly stir the water forward (against the current) and backwards. This behavior appears to help the bird disturb fish that are hiding beneath boulders, making them easier to catch. At the same time, this technique allows the heron to maintain its balance in fast-flowing river water.

Downstream: Waiting for fish carried by the current (Image 8) while facing downstream. Herons were seen spending 454.48 h this way (Table 2).

Body postures

Crouched: Positioning the body parallel to water for stealth (Image 1).

Upright: To have enhanced scanning ability (Image 2).

Erect: Alert posture for maximum visibility of the

targeted patch (Image 3).

Head postures and movements

Peering over: This posture reduced glare to improve vision under daylight conditions (Image 9).

Facing down: Used while preparing to strike (Image 10).

Movements include neck craning (Image 9), head tilting (Image 11), swaying, and bobbing (Image 12) to improve prey detection.

Prey capture techniques

Bill stab: Rapid strike using neck movement (Image 13).

Bill lunge: Forward thrust using body momentum (Image 14).

Prey handling (Bill capture)

Grasp capture: Grasping the fish firmly (Image 15) between the bills.

Impale capture: Used sharp bills to pierce the fish (Image 16).

Fish are swallowed head-first. The heron may toss the fish to reposition it and often moves to shore before consuming it to reduce escape risk (Image 17a–d).

Other behaviours

Bill wiping: Cleaning the bill after feeding (Image 18).

Bill opening: Observed after failed attempts; such function amongst WBHs is unclear (Image 19).

Prey dropping: Rejecting dead or unsuitable fish.

Pirating: Rare attempts by other bird species to steal prey (Image 20).

Detailed definitions of different postures and behaviour of WBH observed in Namdapha TR, and similar such postures observed among other long-legged wading birds by others are given in Table 1.

DISCUSSION

Majority of the behavioural postures exhibited by the WBHs in Namdapha TR have also have been observed and documented in other waterbird species around the world (Table 1). Herons in general exhibited a wide range of foraging postures, which they selectively employ to capture prey (Kushlan 2011). Whereas, in Namdapha TR, the WBHs are primarily found in open riverbeds, foraging in fast-flowing freshwater rivers (Mondal & Maheswaran 2021). The postures and behaviours exhibited by herons are closely interrelated and are influenced by the success or failure of foraging attempts (Image 21). As a solitary

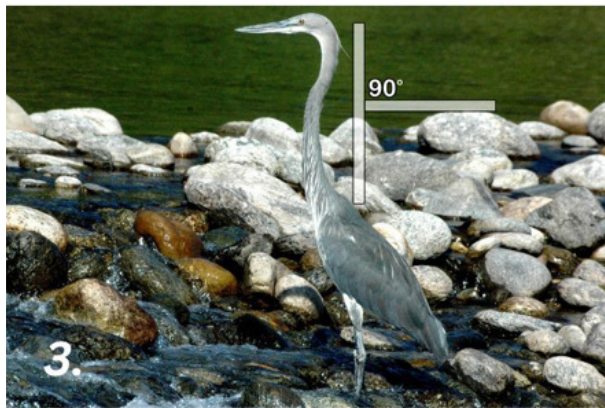
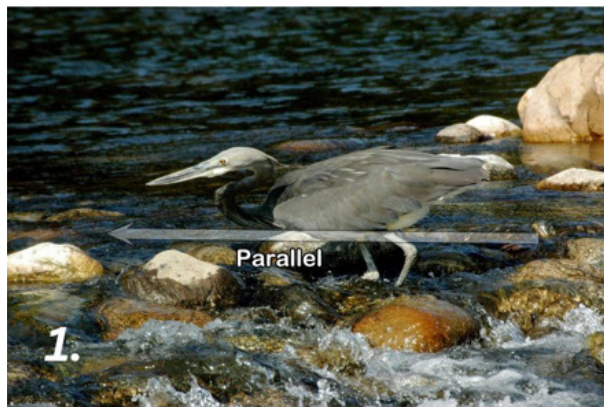


Image 1–6. White-bellied Heron *Ardea insignis* Hume, 1878: 1—‘stand and wait’ for the prey in ‘crouched’ posture in 2015 | 2—‘stand and wait’ for the prey in ‘upright posture’ in 2015 | 3—‘stand and wait’ for the prey in ‘erect posture’ in 2015 | 4—‘scan and walk’ while searching the prey in river water in 2015 | 5—‘crouch and chase’ the prey in river water in 2015 | 6—‘hopping’ to change its foraging location in 2015. © 1,2,3,4&6—Himadri Sekhar Mondal; 5—G. Maheswaran.

forager, the WBH requires considerable time and focus to capture prey in relatively undisturbed and profitable areas, often returning to the same sites daily. The ‘standing’ posture allows the bird to remain motionless while waiting for prey to become visible in the water. According to Kushlan & Hancock (2005), successful foraging in this posture demands skill and experience, as

the bird must avoid detection while maintaining stillness in flowing water. Disturbance from intruders can disrupt both prey availability and the bird’s concentration. Thus, adopting an upright or alert posture serves as an effective strategy for both prey detection and territorial vigilance.

WBH primarily defends its foraging habitat against

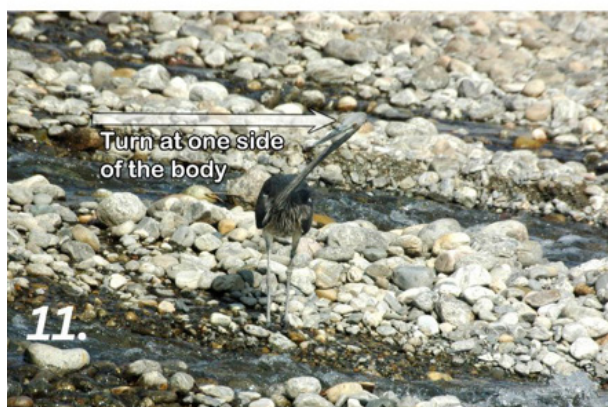


Image 7–12. White-bellied Heron: 7—Searching its prey while ‘facing upstream’ in 2014 (Mondal & Maheswaran 2021) | 8—searching its prey while its ‘facing downstream’ in 2014 (Mondal & Maheswaran 2021) | 9—searching its prey in ‘peering over’ head posture. Also, searching its prey while stretching out its head and neck together (neck craning) in 2015 | 10—Searching its prey in ‘facing down’ head posture in 2016 | 11—searching its prey while turning its head and neck together at one side of the body (head tilting) in 2015 | 12—‘Head bobbing’ while walking in 2016. © Himadri Sekhar Mondal,

solitary or paired piscivorous birds such as the Black Stork *Ciconia nigra*, Crested Kingfisher *Megaceryle lugubris*, and other WBHs, while interactions with flock-foraging species like the Great Cormorant *Phalacrocorax carbo* are rare. The presence of other waterbirds may prompt this solitary species to seek alternative microhabitats for feeding as observed in the case of Black-necked Storks (Maheswaran & Rahmani 2001).

WBH demonstrates behavioral flexibility by selecting appropriate feeding postures based on environmental conditions. This adaptability is particularly important given its low capture efficiency (35.95%) and capture rate (0.47 fish/hr) (Mondal & Maheswaran 2021). Rather than relying on a single strategy, WBH combines multiple postures and behaviours to enhance foraging success. When foraging while facing upstream, WBH

Table 1. Definition of different postures and behaviour of White-bellied Heron observed in Namdapha Tiger Reserve.

Name of the posture/behaviour	Definition	References
Stand and wait	Heron stands motionless waiting for its prey to approach.	Meyerriecks 1960; Kushlan 1976
Scan and walk	Hérons moving carefully to inspect potential prey areas	This study
Walk slowly	Stalking prey with controlled movement of less than 60 steps per minute	Rodgers 1983; Kushlan & Hancock 2005
Walk-stand-wait	Walking is used extensively by the foraging herons as they often merge walking slowly and standing together by making attempts alternatively to catch their prey	Kushlan 1976, 2011
Walk quickly	Hérons walk quickly stirring water and searching for fishes	Kushlan 2011
Crouch and chase	While standing in water waiting for fish, the heron plunges its bills in water in pursuit of fleeing fish; while doing so, heron moves in crouched posture submerging entire bill and neck in water. We have rarely seen heron catching fish employing this strategy	This study
Facing Upstream	The heron positions itself along the river with its head facing upstream, allowing it to monitor the movement of fish carried by the current	Mondal & Maheswaran 2021
Foot stirring and balancing	The heron stands on one leg while slowly moving the other backward and forward, in the direction of the current. This behaviour appears to help disturb fish hidden beneath boulders, while allowing the bird to maintain balance in the fast-flowing river.	This study
Facing Downstream	The heron occasionally positions itself facing downstream, with its tail oriented toward the oncoming current.	Mondal & Maheswaran 2021
Hopping	While foraging, the heron makes short, hopping flights from one feeding site to another	Kushlan 2011
Crouched posture	The heron bends its legs and retracts its head to keep its body parallel to the surface beneath it	Kushlan 2011
Upright posture	The heron stands upright and extends its head so that the neck angles away from its vertically aligned body	Kushlan 2011
Erect posture	The heron holds its head and neck elevated—up to 90° from the horizontal—while keeping the bill level or slightly pointed upward	Kushlan 2011
Peering over	The heron extends its neck and tilts its head to obtain a binocular view of potential prey	Kushlan 2011
Facing down	The heron lowers its bill, head, and neck to probe for or pick up its prey	Kushlan 2011
Neck craning	Heron stretch out its neck and head together in order to search for its prey	Kushlan 2011
Head tilting	The heron turns its head and neck to one side while keeping the rest of its body stationary	Kushlan 2011
Head swaying	The heron moves its head and neck to scan the surroundings for prey	Kushlan 2011
Head bobbing	It is a sinuous forward-and-backward movement of the head and neck	Kushlan 2011
Bill stab	It is a downward or lateral strike involving a rapid, directed movement of the heron's head and neck while the body remains stationary	Kushlan 2011
Bill lunge	The heron lunges its body forward while keeping its feet in place	Kushlan 2011
Grasp capture	In this bill-capture technique, prey are seized in a manner similar to a tweezer-like grip	Kushlan 2011
Impale capture	In this capture technique, the heron pierces the fish with its bill while striking at it	Kushlan 2011
Prey handling	The time taken by the bird between capturing and swallowing its prey	Maheswaran & Rahmani 2008
Bill wiping	The heron typically wipes its bill against a boulder or other available nearby structure	Kushlan 2011
Bill opening	The heron opens its bill and holds it open for a few seconds while scanning the river water	This study
Prey dropping	The heron releases the captured prey instead of consuming it	Kelly et al. 2003
Pirating	This involves stealing food from other birds	Kushlan 2011

often adopts an erect or upright posture to detect fish moving with the current. It frequently employs 'walking' and 'hopping' behaviours to pursue prey that escape initial strikes. In contrast, when facing downstream, prey detection occurs only after water passes the bird, making 'crouched' and 'stand-and-wait' postures more effective.

WBH uses an upright posture while walking slowly in a crouched posture when rapidly pursuing prey (crouch and chase). 'Head swaying' is commonly observed during stationary foraging (stand and wait), while 'head bobbing'

is more frequent during active searching (scan and walk). Some behavioural patterns observed during the study—such as 'crouch and chase,' 'upstream,' 'downstream,' and 'bill opening'—are newly documented for this species. The primary function of this diverse behavioural repertoire is to maximize prey capture. In Namdapha TR, WBH was observed feeding exclusively on live fish. An unusual observation occurred on 10 December 2015, when a WBH picked up and then dropped a fish, likely dead and lodged among river boulders. Although the bird initially pursued the dropped fish, it subsequently

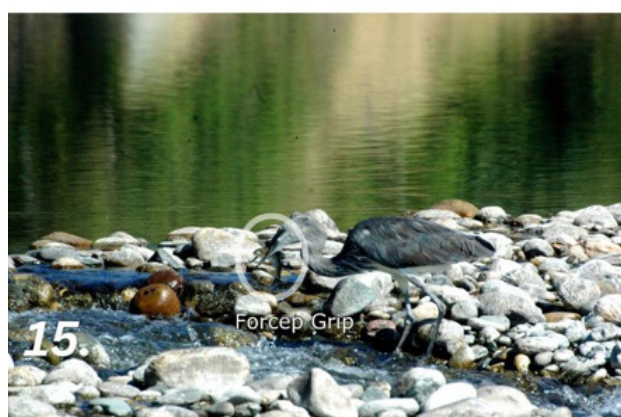
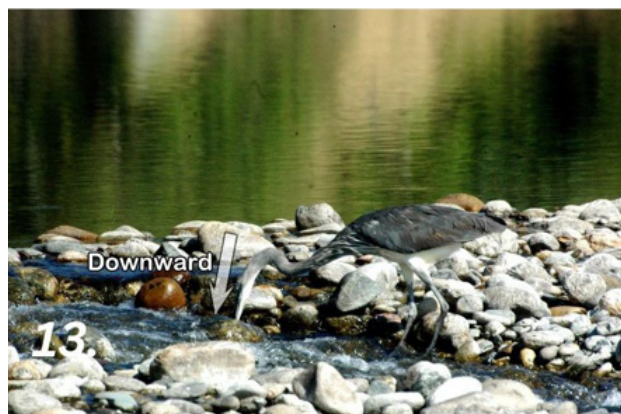


Image 13–16. White-bellied Heron: 13—‘Bill stab’ to capture its prey in 2015 | 14—‘bill lunge’ to capture its prey in 2015 | 15—‘grasp capture’ the prey in 2015 | 16—‘Impale capture’ the prey in 2015. © Himadri Sekhar Mondal,

ignored it, suggesting possible recognition and rejection of non-viable prey. Dead fish are occasionally found floating due to poisoning or illegal fishing practices such as dynamite use. Maintaining a healthy river ecosystem within Namdapha TR (Maheswaran et al. 2021a) is therefore critical to sustaining fish populations that support piscivorous birds, including the WBH.

The WBH exhibits remarkable behavioural adaptations that enable it to survive in challenging environments. Its survival is closely tied to the protection of its habitat, particularly the maintenance of healthy river ecosystems and stable fish populations. This study offers important insights into the species’ foraging behaviour, providing a valuable foundation for future conservation efforts. Any alteration in river systems—whether due to prolonged dry seasons or human activities such as debris dumping and road expansion can significantly disrupt the heron’s habitat. Furthermore, illegal fishing pressure and stinkbug collection (Maheswaran & Das 2025) inside Namdapha over the years may force herons to abandon their current stronghold and move to less suitable alternative

Table 2. Summary of the observation on the foraging behaviour of White-bellied Heron in Namdapha Tiger Reserve.

Particulars	Hours
Total time herons observed foraging	858.45
Time spent observed on motion-based foraging strategies	
- Stand and wait	821.71
- Scan and walk	36.74
Time spent observed on water current-based foraging strategies	
- Upstream	403.97
- Downstream	454.48

sites. Recently, two herons were seen in Lohit River in Walong further north of Namdapha (Reddy et al. 2021) clearly supporting the fact that individuals do disperse in search of alternative sites. Such dispersal may result from offspring seeking new territories away from their natal areas, or from shifts in habitat characteristics and disturbances as discussed above. The precise causes—and the origins of these individuals—remain unclear. Furthermore, no detailed observations have ever been made on these individuals’ foraging behaviour to elucidate what Lohit River offers herons in terms of prey.

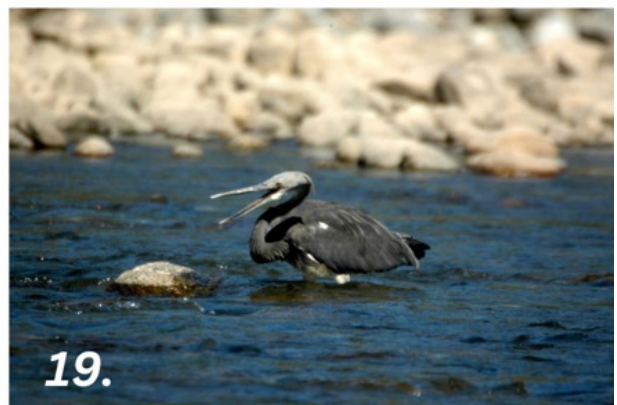


Image 17–20. White-bellied Heron: 17(a–d)—sequential steps of ‘prey handling’ in 2015 | 18—‘bill wiping’ after swallowing a fish in 2015 | 19—‘bill opening’ behaviour in 2016 | 20—a Great Cormorant chased the WBH, as it was trying to steal (‘pirating’) the fish captured in 2014.
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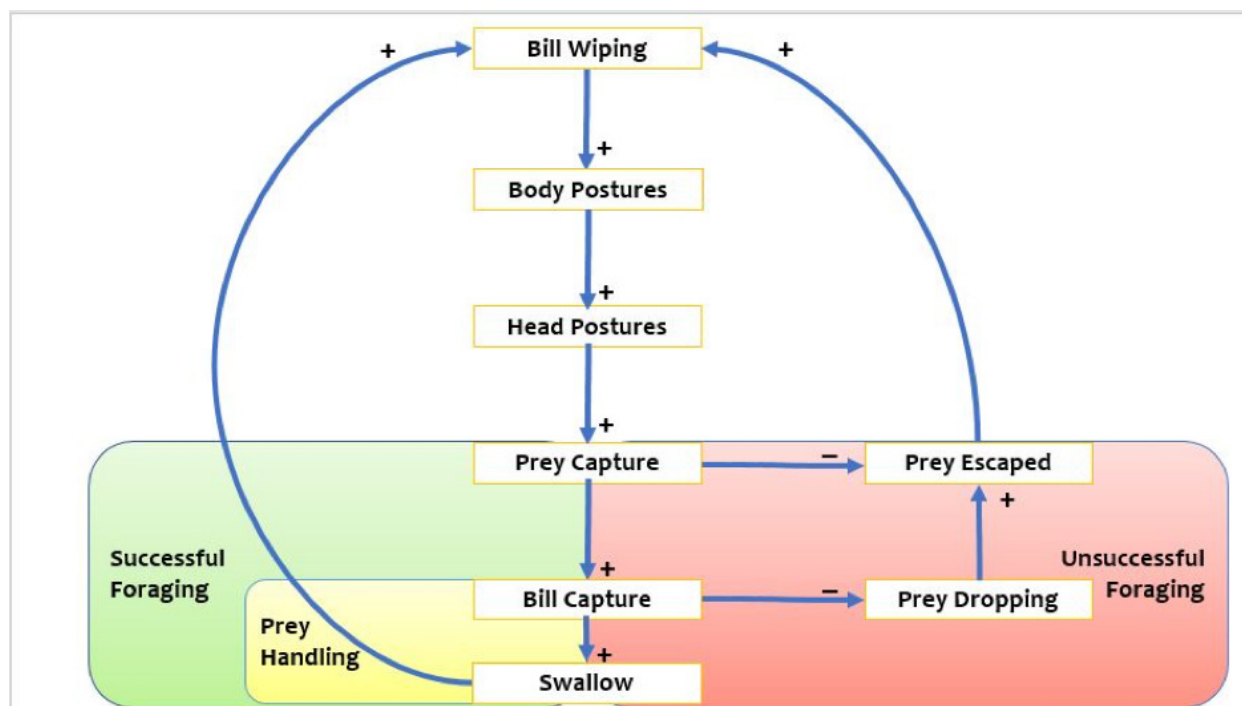


Image 21. The causal loop diagram of the White-bellied Heron foraging: WBH monitor its prey by standing or walking while keeping its body at a particular posture ('body posture'). By 'head posture' it monitored the prey in the river water. Then it attempted to catch the prey through 'prey capture'. If the prey escaped from its attempt, then this attempt resulted into an unsuccessful foraging event. The WBH can hold the fish in its bill through different 'bill capture' postures. Time between successful capture and swallow is known as 'prey handling' time and under such circumstances, the entire event resulted into a successful foraging event. Sometimes the fish might drop from the bill of WBH (during the prey handling) and escaped, resulted into an unsuccessful foraging attempt. Under both of these circumstances of success or failure, the WBH wipe its bill and stand or walk in a or a combination of different body postures.

Long-term observations in Namdapha indicate a growing concern: declining rainfall patterns over the years have led to significant alterations in riverine habitats, including the expansion of grasslands along the Noa-Dehing River. These environmental changes appear to have facilitated a rapid increase in feral buffalo populations maintained by local tribes, thereby exerting additional pressure on the ecosystem and potentially disrupting its balance.

REFERENCES

- Aarif, K.M., A. Nefla, K.A. Rubeena, Y. Xu, Z. Bouragaoui, M. Nasser, C.T. Shifa, T.R. Athira, K. Jishnu, J. Anand, S. Manokaran, P.P. Moosa, A. Gopinath, O.R. Reshi, K.M. Rajaneesh, H. Byju, T.V. Joydas, K.P. Manikandan, M.I. Naikoo, C. Sonne & S.B. Muzaffar (2025). Assessing environmental change and population declines of large wading birds in southwestern India. *Environmental and Sustainability Indicators* 25: 100572. <https://doi.org/10.1016/j.indic.2024.100572>
- Altman, J. (1974). Observational study of behaviour: sampling methods. *Behaviour* 49: 227–267.
- Kelly, J.F., D.E. Gawlik & D.K. Kieckbusch (2003). An updated account of wading bird foraging behavior. *The Wilson Bulletin* 115(1): 105–07. <http://www.jstor.org/stable/4164528>
- Kushlan, J.A. & J.A. Hancock (2005). *The Herons*. Oxford University Press, Oxford, 454 pp.
- Kushlan, J.A. (1976). Feeding behavior of North American Heron. *Auk* 93: 86–94.
- Kushlan, J.A. (1978). *Feeding ecology of wading birds*. Research Report of the National Audubon Society: Report No 7. National Audubon Society, New York, U.S.A.
- Kushlan, J.A. (2011). The terminology of courtship, nesting, feeding and maintenance in herons. *HeronConservation*, The IUCN-SSC Heron Specialist Group, 1–11 pp. Accessed on 22.vi.2016. <https://heronconservation.org/media/resources/Heron-Behavior-Terminology.pdf>
- Maheswaran, G. & A.R. Rahmani (2001). Effects of water level changes and wading bird abundance on the foraging behaviour of Black-necked Stork *Ephippiorhynchus asiaticus* in Dudwa National Park, India. *Journal of Biosciences* 26(3): 373–382. <https://doi.org/10.1007/BF02703747>
- Maheswaran, G. & A.R. Rahmani (2002). Foraging behaviour and feeding success of the Black-necked Stork *Ephippiorhynchus asiaticus* in Dudwa National Park, Uttar Pradesh, India. *Journal of Zoology (London)* 258: 189–195. <https://doi.org/10.1017/S0952836902001309>
- Maheswaran, G. & A.R. Rahmani (2008). Foraging technique and prey-handling time in Black-necked Stork *Ephippiorhynchus asiaticus*. *Integrative Zoology* 3(4): 274–279. <https://doi.org/10.1111/j.1749-4877.2008.00101.x>
- Maheswaran, G., I.P. Acharja, L.K. Sharma, H.S. Mondal, T. Mukherjee, I. Alam & A. Majumder (2021a). Save the White-bellied Heron from extinction. *Science* 373(6561): 1317. <https://doi.org/10.1126/science.abl9682>
- Maheswaran, G., L.K. Sharma, H.S. Mondal & T. Mukherjee (2021b).

- White-bellied Heron, a species on the verge of extinction: ensemble model reveals loss of habitats and resultant prolonged isolation driving the species to extinction. *Ecological Informatics* 64: 101383 <https://doi.org/10.1016/j.ecoinf.2021.101383>
- Maheswaran, G. & S. Das (2025).** New threat to the Critically Endangered White-bellied Heron in Namdapha Tiger Reserve, India. *Oryx* 59(2): 150–151. <https://doi.org/10.1017/S0030605325000134>
- Martin, P. & P. Bateson (2007).** *Measuring Behaviour: An Introductory Guide*, 3rd Edition. Cambridge University Press, 186 pp.
- Meyerricks, A.J. (1960).** *Comparative Breeding Behavior of Four Species of North American Herons*. Publications of the Nuttall Ornithological Club, No. 2, 158 pp.
- Mondal, H.S. & G. Maheswaran (2014).** First nesting record of White-bellied Heron *Ardea insignis* in Namdapha Tiger Reserve, Arunachal Pradesh, India. *Birding ASIA* 21: 13–17.
- Mondal, H.S. & G. Maheswaran (2021).** Foraging Ecology of White-bellied Heron (*Ardea insignis*) in the Fast-flowing Rivers of Namdapha Tiger Reserve, Arunachal Pradesh, India. *Waterbirds* 44(4): 389–396. <https://doi.org/10.1675/063.044.0401>
- Mondal, H.S. & G. Maheswaran (2025).** Assessment of nest and nesting activities of White-bellied Heron *Ardea insignis* Hume, 1878 (Aves: Ardeidae) in the broad-leaved forests of northeastern India. *Journal of Threatened Taxa* 17(3): 26690–26696. <https://doi.org/10.11609/jott.9476.17.3.26690-26696>
- Reddy, S.K., G. Maheswaran, G.V. Gopi, A. Majumder, I. Alam, H.S. Mondal, B.B. Bhat, D. Yongam, T. Yamcha, S. Patgiri & U.K. Sahoo (2021).** Nesting of the White-bellied Heron *Ardea insignis* in Anjaw District, Arunachal Pradesh, India. *Indian BIRDS* 17(4): 115–118.
- Rodgers, J.A. (1983).** Foraging behavior of seven species of herons in Tampa Bay, Florida. *Colonial Waterbirds* 6: 11–23.
- Stephens, D.W. & J.H. Krebs (1986).** *Foraging Theory*. Princeton, New Jersey, Princeton University Press, 247 pp.



সাদা পেটের বক (*Ardea insignis*) ভুটান, ভারত এবং মায়ানমারে পাওয়া যায়। এই প্রজাতির বকের জনসংখ্যার অধিকাংশই (প্রায় ত্রিশটি) ভুটানে আছে। এরপরে ভারতে প্রায় দশটি এবং মায়ানমারে খুব অল্পসংখ্যক এই পাখি পাওয়া যায়। তবে এই বকের ভৌগোলিক বাসস্থান জুড়ে এদের সংখ্যা ক্রমশ হ্রাস পাচ্ছে, যা এই প্রজাতির অস্তিত্বের জন্য বেশ আশঙ্কাজনক। এই বকের একটি বিশেষ বৈশিষ্ট্য হল, এরা দ্রুত শ্রোতমুখ স্বাদু-জলের নদীকে তাদের খাদ্য সংগ্রহের উপযুক্ত স্থান হিসাবে পছন্দ করে। তবুও এই পাখিটির খাদ্য সংগ্রহ সংক্রান্ত এই বিশেষ আচরণটির (foraging behaviour) ব্যাপারে এখনও পর্যন্ত খুব কম তথ্যই উপলব্ধ আছে। তাই এই মৎস্যভুক পাখিটির জীবনধারণ এবং সফল প্রজননের জন্য এই স্বাদু-জলের নদীগুলিতে মাছের ধারাবাহিক উপস্থিতি অত্যন্ত গুরুত্বপূর্ণ। ২০১৩ থেকে ২০১৭ সাল পর্যন্ত আমরা ভারতবর্ষের নামদাফা টাইগার রিজার্ভে এই পাখিটির খাদ্য সংগ্রহ সংক্রান্ত আচরণ নিয়ে একটি গবেষণা করেছিলাম। ভারতবর্ষের এই স্থানে এই প্রজাতির বকের সংখ্যা এখনও পর্যন্ত সর্বাধিক। আমাদের এই গবেষণার মূল উদ্দেশ্য ছিল, সঠিকভাবে বুঝতে চেষ্টা করা যে কিভাবে এই দৃষ্টি-নির্ভর শিকারি পাখিটি দ্রুত-শ্রোতমুখ নদীতে টিকে থেকে তাদের খাদ্য সংগ্রহ করে। কারণ প্রবল শ্রোতের কারণে এই নদীতে শিকার শনাক্ত করা এবং তাদের ধরার কাজ অত্যন্ত কঠিন। গবেষণায় দেখা যায়, এই বকটি এমন কঠিন পরিবেশে শিকার ধরার জন্য বিভিন্ন রকমের দেহভঙ্গি ও কৌশল ব্যবহার করে। ধারাবাহিক ফোকাল স্যাম্পলিং (continuous focal sampling) পদ্ধতিতে আমরা এই পাখিদের পর্যবেক্ষণ করে আলোকচিত্রের মাধ্যমে তাদের দেহভঙ্গি এবং শিকার ধরার কৌশল নথিভুক্ত করেছি। প্রায় ৮৫০ ঘণ্টার পর্যবেক্ষণে দেখা যায়, এই বক শুধুমাত্র মাছ খায়। নদীর শ্রোতের গতি তাদের খাদ্য সংগ্রহের এই আচরণকে বিশেষভাবে প্রভাবিত করে। ফলে শিকারের সফলতা বৃদ্ধির জন্য তাদেরকে বিশেষ কৌশল অবলম্বন করতে হয়। শিকার যাতে সহজে তাদের উপস্থিতি টের না পায় এবং যে মাছ তারা ইতিমধ্যে ধরেছে, সেটা যাতে দক্ষতার সাথে সামলানো যায়, তাই তারা বিশেষ ও স্বতন্ত্র চলন পদ্ধতি এবং দেহভঙ্গি ব্যবহার করে। এখানে উল্লেখিত কিছু দেহভঙ্গি তারা শুধুমাত্র নিজেদের শিকার ধরার ব্যর্থ প্রয়াসের পরেই ব্যবহার করে। এই গবেষণায় বকদের খাদ্য সংগ্রহের বেশকিছু আচরণ প্রথমবারের জন্য নথিভুক্ত করে হয়েছে। এই সমস্ত নথিবদ্ধ আচরণবিধি এই বিরল প্রজাতির বক এবং তাদের এই বিশেষ বাসস্থান সংরক্ষণের ক্ষেত্রে গুরুত্বপূর্ণ ভূমিকা পালন করবে বলে ধারণা করা হয়।

Mr. Jatishwor Singh Irungbam, Biology Centre CAS, Branišovská, Czech Republic.
Dr. Ian J. Kitching, Natural History Museum, Cromwell Road, UK
Dr. George Mathew, Kerala Forest Research Institute, Peechi, India
Dr. John Noyes, Natural History Museum, London, UK
Dr. Albert G. Orr, Griffith University, Nathan, Australia
Dr. Sameer Padhye, Katholieke Universiteit Leuven, Belgium
Dr. Nancy van der Poorten, Toronto, Canada
Dr. Kareen Schnabel, NIWA, Wellington, New Zealand
Dr. R.M. Sharma, (Retd.) Scientist, Zoological Survey of India, Pune, India
Dr. Manju Siliwal, WILD, Coimbatore, Tamil Nadu, India
Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India
Dr. K.A. Subramanian, Zoological Survey of India, New Alipore, Kolkata, India
Dr. P.M. Sureshan, Zoological Survey of India, Kozhikode, Kerala, India
Dr. R. Varatharajan, Manipur University, Imphal, Manipur, India
Dr. Eduard Vives, Museu de Ciències Naturals de Barcelona, Terrassa, Spain
Dr. James Young, Hong Kong Lepidopterists' Society, Hong Kong
Dr. R. Sundararaj, Institute of Wood Science & Technology, Bengaluru, India
Dr. M. Nithyanandan, Environmental Department, La Ala Al Kuwait Real Estate. Co. K.S.C., Kuwait
Dr. Himender Bharti, Punjabi University, Punjab, India
Mr. Purnendu Roy, London, UK
Mr. Saito Motoki, The Butterfly Society of Japan, Tokyo, Japan
Dr. Sanjay Sondhi, TITLI TRUST, Kalpavriksh, Dehradun, India
Dr. Nguyen Thi Phuong Lien, Vietnam Academy of Science and Technology, Hanoi, Vietnam
Dr. Nitin Kulkarni, Tropical Research Institute, Jabalpur, India
Dr. Robin Wen Jiang Ngiam, National Parks Board, Singapore
Dr. Lionel Monod, Natural History Museum of Geneva, Genève, Switzerland.
Dr. Asheesh Shivam, Nehru Gram Bharti University, Allahabad, India
Dr. Rosana Moreira da Rocha, Universidade Federal do Paraná, Curitiba, Brasil
Dr. Kurt R. Arnold, North Dakota State University, Saxony, Germany
Dr. James M. Carpenter, American Museum of Natural History, New York, USA
Dr. David M. Claborn, Missouri State University, Springfield, USA
Dr. Kareen Schnabel, Marine Biologist, Wellington, New Zealand
Dr. Amazonas Chagas Júnior, Universidade Federal de Mato Grosso, Cuiabá, Brasil
Mr. Monsoon Jyoti Gogoi, Assam University, Silchar, Assam, India
Dr. Heo Chong Chin, Universiti Teknologi MARA (UiTM), Selangor, Malaysia
Dr. R.J. Shiel, University of Adelaide, SA 5005, Australia
Dr. Siddharth Kulkarni, The George Washington University, Washington, USA
Dr. Priyadarsanan Dharma Rajan, ATREE, Bengaluru, India
Dr. Phil Alderslade, CSIRO Marine And Atmospheric Research, Hobart, Australia
Dr. John E.N. Veron, Coral Reef Research, Townsville, Australia
Dr. Daniel Whitmore, State Museum of Natural History Stuttgart, Rosenstein, Germany.
Dr. Yu-Feng Hsu, National Taiwan Normal University, Taipei City, Taiwan
Dr. Keith V. Wolfe, Antioch, California, USA
Dr. Siddharth Kulkarni, The Hormiga Lab, The George Washington University, Washington, D.C., USA
Dr. Tomas Ditrich, Faculty of Education, University of South Bohemia in Ceske Budejovice, Czech Republic
Dr. Mihaly Foldvari, Natural History Museum, University of Oslo, Norway
Dr. V.P. Uniyal, Wildlife Institute of India, Dehradun, Uttarakhand 248001, India
Dr. John T.D. Caleb, Zoological Survey of India, Kolkata, West Bengal, India
Dr. Priyadarsanan Dharma Rajan, Ashoka Trust for Research in Ecology and the Environment (ATREE), Royal Enclave, Bangalore, Karnataka, India

Fishes

Dr. Topiltzin Contreras MacBeath, Universidad Autónoma del estado de Morelos, México
Dr. Heok Hee Ng, National University of Singapore, Science Drive, Singapore
Dr. Rajeev Raghavan, St. Albert's College, Kochi, Kerala, India
Dr. Robert D. Sluka, Chiltern Gateway Project, A Rocha UK, Southall, Middlesex, UK
Dr. E. Vivekanandan, Central Marine Fisheries Research Institute, Chennai, India
Dr. Davor Zanella, University of Zagreb, Zagreb, Croatia
Dr. A. Biju Kumar, University of Kerala, Thiruvananthapuram, Kerala, India
Dr. Akhilesh K.V., ICAR-Central Marine Fisheries Research Institute, Mumbai Research Centre, Mumbai, Maharashtra, India
Dr. J.A. Johnson, Wildlife Institute of India, Dehradun, Uttarakhand, India
Dr. R. Ravinesh, Gujarat Institute of Desert Ecology, Gujarat, India

Amphibians

Dr. Sushil K. Dutta, Indian Institute of Science, Bengaluru, Karnataka, India
Dr. Annemarie Ohler, Muséum national d'Histoire naturelle, Paris, France

Reptiles

Dr. Gernot Vogel, Heidelberg, Germany
Dr. Raju Vyas, Vadodara, Gujarat, India
Dr. Pritpal S. Soorae, Environment Agency, Abu Dhabi, UAE.
Prof. Dr. Wayne J. Fuller, Near East University, Mersin, Turkey
Prof. Chandrashekher U. Rivonker, Goa University, Taleigao Plateau, Goa. India
Dr. S.R. Ganesh, Kalinga Foundation, Agumbe, India.
Dr. Himansu Sekhar Das, Terrestrial & Marine Biodiversity, Abu Dhabi, UAE

Birds

Dr. Hem Sagar Baral, Charles Sturt University, NSW Australia
Mr. H. Byju, Coimbatore, Tamil Nadu, India
Dr. Chris Bowden, Royal Society for the Protection of Birds, Sandy, UK
Dr. Priya Davidar, Pondicherry University, Kalapet, Puducherry, India
Dr. J.W. Duckworth, IUCN SSC, Bath, UK
Dr. Rajah Jayapal, SAGON, Coimbatore, Tamil Nadu, India
Dr. Rajiv S. Kalsi, M.L.N. College, Yamuna Nagar, Haryana, India
Dr. V. Santharam, Rishi Valley Education Centre, Chittoor Dt., Andhra Pradesh, India
Dr. S. Balachandran, Bombay Natural History Society, Mumbai, India
Mr. J. Praveen, Bengaluru, India
Dr. C. Srinivasulu, Osmania University, Hyderabad, India
Dr. K.S. Gopi Sundar, International Crane Foundation, Baraboo, USA
Dr. Gombobaatar Sunde, Professor of Ornithology, Ulaanbaatar, Mongolia
Prof. Reuven Yosef, International Birding & Research Centre, Eilat, Israel
Dr. Taej Mundkur, Wetlands International, Wageningen, The Netherlands
Dr. Carol Inskipp, Bishop Auckland Co., Durham, UK
Dr. Tim Inskipp, Bishop Auckland Co., Durham, UK
Dr. V. Gokula, National College, Tiruchirappalli, Tamil Nadu, India
Dr. Arkady Lelej, Russian Academy of Sciences, Vladivostok, Russia
Dr. Simon Dowell, Science Director, Chester Zoo, UK
Dr. Mário Gabriel Santiago dos Santos, Universidade de Trás-os-Montes e Alto Douro, Quinta de Prados, Vila Real, Portugal
Dr. Grant Connette, Smithsonian Institution, Royal, VA, USA
Dr. P.A. Azeez, Coimbatore, Tamil Nadu, India

Mammals

Dr. Giovanni Amori, CNR - Institute of Ecosystem Studies, Rome, Italy
Dr. Anwaruddin Chowdhury, Guwahati, India
Dr. David Mallon, Zoological Society of London, UK
Dr. Shomita Mukherjee, SAGON, Coimbatore, Tamil Nadu, India
Dr. Angie Appel, Wild Cat Network, Germany
Dr. P.O. Nameer, Kerala Agricultural University, Thrissur, Kerala, India
Dr. Ian Redmond, UNEP Convention on Migratory Species, Lansdown, UK
Dr. Heidi S. Riddle, Riddle's Elephant and Wildlife Sanctuary, Arkansas, USA
Dr. Karin Schwartz, George Mason University, Fairfax, Virginia.
Dr. Lala A.K. Singh, Bhubaneswar, Orissa, India
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Dr. Honnavalli N. Kumara, SAGON, Anaikatty P.O., Coimbatore, Tamil Nadu, India
Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India
Dr. Spartaco Gippoliti, Socio Onorario Società Italiana per la Storia della Fauna "Giuseppe Altobello", Rome, Italy
Dr. Justus Joshua, Green Future Foundation, Tiruchirappalli, Tamil Nadu, India
Dr. H. Raghuram, Sri S. Ramasamy Naidu Memorial College, Virudhunagar, Tamil Nadu, India
Dr. Paul Bates, Harison Institute, Kent, UK
Dr. Jim Sanderson, Small Wild Cat Conservation Foundation, Hartford, USA
Dr. Dan Challender, University of Kent, Canterbury, UK
Dr. David Mallon, Manchester Metropolitan University, Derbyshire, UK
Dr. Brian L. Cypher, California State University-Stanislaus, Bakersfield, CA
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Prof. Karan Bahadur Shah, Budhanilakantha Municipality, Kathmandu, Nepal
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