

Faunal diversity of Kitchen Gardens of Sikkim

Aranya Jha, Sangeeta Jha and Ajeya Jha

SMIT (Sikkim Manipal University), Tadong 737 132, Sikkim, India

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ABSTRACT

What is the faunal richness of rural kitchen gardens of Sikkim? This was the research question investigated in this study. Kitchen gardens have recently been recognized as important entities for biodiversity conservations. This recognition needs to be backed by surveys in various regions of the world. Sikkim, a Himalayan state of India, in this respect, is important, primarily because it is one of the top 10 biodiversity hot-spots globally. Also because ecologically it is a fragile region. Methodology is based on a survey of 67 kitchen gardens in Sikkim and collecting relevant data. The study concludes that in all 80 (tropical), 74 (temperate) and 17 (sub-alpine) avian species have been reported from the kitchen gardens of Sikkim. For mammals these numbers are 20 (tropical) and 9 (temperate). These numbers are indicative and not exhaustive.

Key words : Himalayas, Rural kitchen gardens, Tropical, Temperate, Sub-alpine, Aves, Mammals.

Introduction

Kitchen gardens have been known to carry immense ecological significance. When we, as a civilization, witness the ecological crisis that we have ourselves created we find a collective yearning for an ecologically stable world. Kitchen gardens can play an important role in this respect.

Sikkim is a veritable home of biodiversity. Telescoped within an area of just 7096 square kilometers, this Himalayan state in India, harbours faunal and floral diversity marginally less than that of entire Russia, a country approximately 2500 times larger than Sikkim. It has attracted very many a wildlife researchers and who have reported over 500 avian species (Ali, Salim, 1998) (Russia 780 species); 156 mammalian species (Avasthe, Jha, 1999) (Russia 266 species); 78 Reptilian species (Jha, Thapa 2003) (Russia 83 species); over 700 butterflies (Haribal, *et al.*, 1988) (Russia 540 species). In recent years also scores of other researchers have explored faunal diversity in Sikkim. Prominent amongst them include Chettri *et al.*, (2010) and

Acharya, (2010).

Kitchen gardens and their ecological benefits: Recently ecological issues have emerged as highly significant and naturally ecologically important facets such as agricultural lands, mountains, forests, rivers and oceans have been identified as critical entities. Kitchen gardens have not been paid much attention to so far, yet a number of researchers are now focusing on measuring their ecological value. Kitchen gardens facilitate organic food production, are good for local ecology, sustain diversity of economically important plants and are home of local fauna (Bandara, 201); Henryks, 2011; Niñez, 1987.

Kitchen garden are good for local ecology: Kitchen gardens often are a product of local geographical and climatic conditions as well as that of human experiences going back thousands of years in the history. This implies that kitchen gardens are good and healthy for local ecology. Indeed we come across Indian saying that a human dwelling have sufficient number of Banyan, Peepul, Neem, tamarind and banana trees for human welfare. Interest-

ingly scientist also agree that for Indian conditions such trees carry immense value. Kitchen gardens, therefore sustain local fauna because of connectivity these have shared since time immemorial and which in turn keeps the local web of life alive. These provide natural home to local fauna, provide green cover, keep the temperatures down and act as site for local migration of animals and birds and so on. Kitchen gardens are vital centers of agri-biodiversity (Steinberg, 1998; Trinh, *et al.*, 2003; Kandari *et al.*, 2012; Calvet-Mir *et al.*, 2012 and Gbedomon *et al.*, 2017; Anonymous (2010); Sthapit *et al.*, 2006.

Kitchen gardens are home to birds, butterflies and small mammals: A visit to a kitchen garden is an enriching experience in terms of watching diverse butterflies, other insects, birds and small mammals such as squirrels, mongoose, mice, shrew and others. These animals in turn provide fertile ground for the existence of local flora and fauna. This symbiotic living is a sacred principle that kitchen gardens uphold. It is said that sparrow, the common bird in Indian human dwellings are disappearing fast. Loss of kitchen gardens is one of the reason for this loss. This aspect has attracted less attention so far yet a few efforts have been made (Steinberg, 1998; Kimber, 2004. Bhattacharjee *et al.*, 2011 and Sharma and Singh, 2018; Sierra-Guerrero, 2017; Jana, and Roy, 2020; Goddard *et al.*, 2017; Bastien *et al.*, 2018; Matei and Chirita, 2018).

Research question on which study has been framed is which mammals and birds have been re-

corded from the respective kitchen gardens by their owners. Taking into account their limited vocabulary on bird and mammals they were assisted by showing the pictures.

Methodology

The study is based on a survey of kitchen gardens in Sikkim located at varying altitudes. In all 67 kitchen garden have been visited (32 in tropical and sub-tropical regions, 21 in temperate regions and 14 in sub-alpine regions). Taking into account owners limited vocabulary on bird and mammals names they were assisted by showing the pictures of birds and mammals found in the region. Prepared list are indicative and not exhaustive. Though attempt has been made to keep them as extensive as possible.

Results and Discussion

Kitchen gardens that we surveyed have been found to be home of a rich fauna too. Table 1 provides a list of 20 mammals reported to have been sighted at one more of the kitchen gardens. The list again is suggestive. It is quite possible that clouded leopard and Himalayan bear may have wandered through some of the kitchen garden. Only this year A huge Indian Bison moved across many a villages and the kitchen gardens. It was intercepted at Mamhring, near Rangpo in east Sikkim. Unfortunately it died while being shifted to forest region because of the overdose of anesthesia. It may be noted that a num-

Table 1. Mammals (Tropical Kitchen Gardens)

1	Muntjack (Barking Deer)	11	Tree Shrew
2	Rhesus Macaque	12	Fulvous Fruit Bat
3	Common Langur	13	Little Indian Horse-she Bat
4	Leopard Cat	14	Little Bamboo Bat
5	Jungle Cat	15	Himayan Striped Squirrel
6	Small Indian Civet	16	Hoary-bellied Squirrel
7	Small Indian Mongoose	17	House Rat
8	Jackal	18	Common House Mouse
9	Musk Shrew	19	Crestless Porcupine
10	Mouse Coloured Shrew	20	Wild boar

Table 2. Mammals (Temperate Kitchen Gardens)

1	Small Indian Civet	6	Tree Shrew
2	Himalayan Bear	7	Fruit Bat species
3	Weasel species	8	Horse shoe bat species
4	Marten species	9	Orange-bellied Himalayan Squirrel
5	Grey Shrew		

ber of secretive and tiny mammals (Mice, shrews and bats) may have been overlooked by the owners.

The list of mammals reported from temperate kitchen gardens have been shown in table. Whereas most species reported from tropical kitchen gardens are also found in mainland India, it is interesting to note that the list of mammals reported from temperate kitchen gardens represents a different kind of fauna.

Table shows a list of avifauna from tropical kitchen gardens of Sikkim. As many as 80 birds

have been reported and several more may have been missed. By preserving and enriching the kitchen gardens we have an opportunity to conserve the faunal wealth of the state. Such a opportunity enhances the value of kitchen gardens many folds. Many of the birds are migratory. Cuckoos for example arrive in February-March. According to Lepchas they are sent by Goddess *Nazongnyo* to announce the right time of sowing rice. Certain other birds such as Hoopoe and white-headed redstart arrive just prior to winters in October-November.

Table 3. Birds (Tropical Kitchen Gardens)

1	Large Indian Kite	41	Sapphireheaded Flycatcher
2	Indian Sparrow Hawk?	42	Rufousbellied Niltava
3	Himalayan Falconet	43	Small Niltava
4	Himalayan Kestrel	44	Bluethroated Flycatcher
5	Black-backed Kaleej Pheasant	45	Greyheaded Flycatcher
6	Red Jungle Fowl	46	Yellowbellied Fantailed Flycatcher
7	Spurwinged Plover	47	Whitethroated Fantail Flycatcher
8	Pin tailed Green Pigeon	48	Sikkim Spotted Babbler
9	Indian Spotted Dove	49	Sikkim Rustycheeked Scimitar Babbler
10	Indian Redbreasted Parakeet	50	Brown Wren
11	Indian Cuckoo	51	Nepal Goldenheaded Babbler
12	Indian Drongo-Cuckoo	52	Sikkim Blackthroated Babbler
13	Large Himalayan Greenbilled Malkoha	53	White-headed Redstart
14	Himalayn Collared Scops Owl	54	Blackgorgeted Laughing Thrush
15	Collared Pigmy Owlet	55	Himalayan Whitecrested Laughing thrush
16	Himalayan Barred Owlet	56	Blackchinned Yuhina
17	West Himalayan Pied Kingfisher	57	Whitebellied Erpornis
18	Common Indian Kingfisher	58	Longtailed Sibia
19	Great Hornbill	59	Slatybellied Wren
20	The Great Assam Barbet	60	Chestnut headed Wren
21	Bluethroated Barbet	61	Greyfaced Leaf Warbler
22	Assam Blaknaped Woodpecker	62	Chestnut headed Flycatcher-Warbler
23	Large Yellow naped Wood ecker	63	Tailor Bird
24	Paleheaded Woodpecker	64	Rufous Wren-warbler
25	Pigmy Pied Woodpecker	65	Magpie Robin
26	Tickell's Goldenbacked Woodpecker	66	Himalayan Whistling Thrush
27	Indian Hoopoe	67	Slatybacked Forktail
28	Nepal House Martin	68	Brown Dipper
29	Brownbacked Pied Flycatcher	69	Hodgson' Pied Wagtail
30	Nepal Wood shrike	70	Large Pied Wagtail
31	Dark Grey Cuckoo-shrike	71	Himalayan Grey Drongo
32	Scarlet Minivet	72	Bronzed Drongo
33	GoldfrontedChlorposes	73	Haircrested Drongo
34	Whitecheeked Bulbul	74	Indian Lesser Racket-Tailed Drongo
35	Redvented Bulbul	75	Maroon Oriole
36	Whitethroated Bulbul	76	Green Magpie
37	Brownared Bulbul	77	House Crow
38	Orangeorgetted Flycatcher	78	Common Myna
39	Little Blue-and-white Flycatcher	79	Blackbreasted Sunbird
40	Slaty Blue Flycatcher	80	Spotted Munia

Indian spotted dove observes partial migration with most migrating locally but a few remaining in their vicinity. Almost all these birds have lovely folklores woven around them. As bird-tourism is gaining popularity because of the enchanting challenge it offers, kitchen gardens could be a fertile ground for ornithological and ethno-ornithological tourism.

Table provides with a list of birds documented from the temperate kitchen gardens of the state. Again it is rich by any standards. As these are quite different from the ones reported from tropical kitchen gardens, these further add to the faunal richness. There are 74 birds reported from a casual survey and many more may get added with a seri-

ous effort. Hopefully we recognize the conservation potential of the kitchen gardens and act decisively.

Birds reported from sub-alpine kitchen gardens are shown in table. These birds are rarer and to some extent endemic, if not to Sikkim, then to eastern Himalayas. Hence their conservation would be a great service to nature and humankind.

Kitchen-gardens are an exceptional repository of economically important flora and are a product of immense floral wealth and knowledge built through human ingenuity spread over thousands of years. Losing this could have disastrous consequences. So far discussion on ornamental plants have not been included in the discussion. We do find ornamental

Temperate Kitchen Gardens

1	Common Hill-Partridge	38	Aberrant Bush-Warbler
2	Blood Pheasant	39	Grey-sided Bush-Warbler
3	Satyr Tragopan	40	Orange-barred Leaf-Warbler
4	Himalayan Monal	41	Grey-faced Leaf-Warbler
5	Speckled Wood-Pigeon	42	Large-billed Leaf-Warbler
6	Yellow-rumped Honeyguide	43	Grey-cheeked Flycatcher-Warbler
7	Darjeeling Pied Woodpecker	44	Slaty-backed Flycatcher
8	Nepal House-Martin	45	Orange-gorgeted Flycatcher
9	Rufous-breasted Accentor	46	Slaty-blue Flycatcher
10	Maroon-backed Accentor	47	Rufous-bellied Niltava
11	Long-tailed Thrush	48	Rufous-fronted Tit
12	Greater Long-billed	49	Rufous-bellied Crested Tit
13	White-collared Blackbird	50	Brown Crested Tit
14	Gould's Shortwing	51	Green-backed Tit
15	Indian Blue Robin	52	White-tailed Nuthatch
16	Golden Bush-Robin T	53	Rusty-flanked Tree-Creeper
17	White-browed Bush-Robin	54	Yellow-bellied Flower-pecker
18	Rufous-breasted Bush-R	55	Fire-tailed Sunbird
19	White-throated Redstart	56	Yellow-breasted Greenfinch
20	White-throated Laughingthrush	57	Tibetan Siskin Serinus
21	Striated Laughingthrush	58	Dark-breasted Rosefinch
22	Scaly Laughingthrush	59	Dark-rumped Rosefinch
23	Black-faced Laughingthrush	60	White-browed Rosefinch
24	Slender-billed Scimitar-Babbler	61	Scarlet Finch
25	Greater Scaly-breasted Wren-Babbler	62	Brown Bullfinch P
26	Green Shrike-Babbler	63	Red-headed Bullfinch
27	Bar-throated Minla	64	Collared Grosbeak
28	Red-tailed Minla M	65	White-winged Grosbeak
29	Gold-breasted Tit-Babbler	66	Gold-naped Black Finch
30	White-browed Tit-Babbler	67	Yellow-billed Blue Magpie
31	Rufous Sibia	68	Slaty-headed Parakeet
32	Stripe-throated	69	Golden-throated Barbet
33	Rufous-vented Yuhina	70	Black-winged Cuckoo-Shrike
34	Myzornis Myzornis	71	Short-billed Minivet
35	Brown Parrotbill	72	Black Bulbul
36	Chestnut-headed Tesia	73	Grey-winged Blackbird
37	Chestnut-crowned Bush-Warbler	74	White-tailed Robin

plants in rural kitchen gardens, though not with the same frequency as we do in urban dwellings. Ornamental plants are ecologically important as these attract birds, butterflies and bees for pollination. Many of the birds these attract are considered auspicious perhaps because of their ecological value recognized sub-consciously by our wise ancestors. They add to the beauty and charm of these gardens. These also have immense emotional value because many of these are considered sacred and are believed to carry message of love. These are good for human psyche and are known to fill human minds with positivity.

Kitchen gardens were found to have plenty of *pioneer plants* also. *Pioneer* implies flora which may

or may not be noxious and which flourishes in disturbed, barren lands, waste areas, in multi-cropped growing areas and along garden boundaries. These are considered harmful and are often weeded out but many still persist. We came across individuals who tolerate such plants. Some out of curiosity but most because of Buddhist teaching of live and let live. Buddhists people, we know, respect each life form. Could this be an illogical belief? Our understanding of ecology provides the answer. It is possible that pioneer plants some unknown ecological purpose and which is intrinsic to web of life that we have just begun to appreciate. Also it is said that *Weed of today could become the need of tomorrow*. Who knows these weeds may carry medicinal power to

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35	Brown Parrotbill	72	Black Bulbul
36	Chestnut-headed Tesia	73	Grey-winged Blackbird
37	Chestnut-crowned Bush-Warbler	74	White-tailed Robin

Sub-alpine Kitchen Gardens

1	Tibetan Snowcock	10	Grandala Grandala
2	Tibetan Partridge	11	Smoky Warbler
3	Snow Pigeon	12	Tickell's Warbler
4	Rosy Pipit	13	Wallcreeper
5	Grey-backed Shrike	14	Hodgson's Mountain-Finch
6	Alpine Accentor	15	Black-headed Mountain-Finch
7	Robin Accentor	16	Streaked Great Rosefinch
8	Plain-backed Thrush	17	Yellow-billed Chough
9	Hodgson's Redstart		

cure future diseases and hence deserve protection. Kitchen gardens are an important repository of pioneering plants also.

Conclusion

This study was undertaken to quantify the mammalian and avian species recorded in the kitchen gardens of Sikkim. In all 80 (tropical), 74 (temperate) and 17 (sub-alpine) avian species have been reported from kitchen gardens of Sikkim. For mammals these numbers are 20 (tropical) and 9 (temperate). It is again underlined these numbers are indicative and many more perhaps have been missed during this study. Implications for the kitchen garden owners is to facilitate conservation of this natural wealth to enhance the aesthetics of their landscapes as also as a social service. Policy makers may take note of this important function being served by the state kitchen gardens and formulate policies that support continuation of kitchen gardens as centers of faunal diversity. They should also encourage individual house-holds to remain sensitive in this respect. As Sikkim is promoting eco-tourism, the kitchen gardens could attract tourists keen on bird-watching.

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