Birds and Their Roles in the Agricultural Landscape of Kinangop, Nyandarua (Kenya)

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WHY BIRDS? – VALUE OF BIRDS ACROSS THE WORLD

Birds are useful indicators of how the environment and other organisms are doing

Birds for Aesthetic Enjoyment – Birds add life, sound and color to our lives. They give us enjoyment from knowing our world is still large and healthy enough to support a variety of bird species.

Birds as Indicators – birds are one of the most important indicators of the state of the environment. A decline in bird numbers tells us that we are damaging the environment through habitat fragmentation and destruction, pollution and pesticides, introduced species, and many other impacts. Birds are a part of the balance of nature. A habitat good for birds is a good environment for people.

Birds in Tourism Business – Bird watching and wildlife tourism is an increasingly important source of economic growth. Revenue is also earned through fees by licensed sport hunters.

Birds in our Culture – Birds have significance in myths, legends, symbols, ceremonies, art, names, and in many other ways.

Ecological and Economic Value – Birds provide insect, rodent and parasite control, plant pollination, and seed dispersal which result in tangible benefits to people. Vultures play role in keeping the environment clean

Food – source of protein (eggs, meat) from poultry, gamebirds; honey-guiding, etc.

Others – Fertiliser from droppings (guano), as navigational aids to locate fishing grounds, medicinal use, ceremonial use of parts (e.g. feathers), source of information (e.g. honey guides), indicating danger, etc.

Birds have ecological value, e.g. removal of pests

BIRDS IN KINANGOP

Kinangop Plateau hosts over 280 species/types of birds. Kinangop is therefore recognised internationally as an Important Bird Area (IBA) since some unique and endangered birds species are found here (e.g. Sharpe's Longclaw (*Gathonjo ka weerũ-inĩ*), Jackson's Widowbird (*Mũũrũgũ wa Jackson*). Agriculturally, Kinangop is also highly productive and currently most areas (60–70%) are now cultivated, having been converted from the original indigenous grassland cover. Most of the remaining grasslands are intensively grazed or modified to be suitable for pasture.

Sharpe's Longclaw – Kinangop is the stronghold for this bird

Research on Birds and Their Roles in the Agricultural Landscape of Kinangop

Starting May 2010, we have been **investigating the types of birds, their abundance and the roles they play in the agricultural landscapes of Kinangop.** We have been doing this through:

(a) Counting birds at 172 circular plots (called 'point counts, each of 30-metre radius) spread across three locations in Kinangop Plateau: Murungaru, Njabini and Ndunyu Njeru.

(b) Describing environmental characteristics in each of those plots (e.g. cover of each landuse, number of trees, etc.) and relating these to numbers and types of birds found there.

(c) Observing how birds are foraging (looking for food) in cultivated plots.

(d) Doing experiments to measure how much weed seeds and crop pests birds take from cultivated areas, as a way of assessing the value of birds in agricultural areas. We do this by prohibiting birds from accessing some enclosed areas or plants and comparing intensities of germinating

Investigating roles birds play in removal of pests

Rufous Sparrow, one of the birds most commonly observed foraging from cultivated areas in Kinangop

weed seeds and crop pest damage between enclosed and exposed areas.

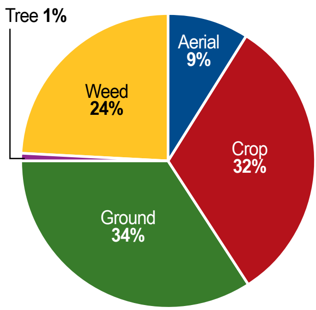
Here we briefly report some of the findings so far.

We recorded about 100 bird species, the most common ones being Streaky Seedeater (*Nyagathaanga*), Rufous Sparrow, Baglafecht Weaver (*Thonjo*), Brimstone Canary, Common Fiscal (*Thũũriũ*), Hunter's Cisticola (*Rwenji*), Yellow-crowned Canary, Common Stonechat, Long-tailed Widowbird (*Mũũrũgũ*), Grassland Pipit (*Gakumĩrĩrĩ*), Speke's Weaver (*Thonjo*), Cape Rook (*Kĩgogo*) and Hadada Ibis (*Kĩgeege/Kĩgaaga*).

Ring-necked Dove: Most of the birds take food from the ground in the cultivated areas

Where exactly do birds take food from within cultivated areas?

We observed over **56 species of birds foraging from cultivated areas,** the with Streaky Seedeater, Rufous Sparrow, Speke's Weaver and Baglafecht Weaver being the four most frequent birds found foraging in cultivated areas. Most of the birds collected/foraged for food from the **ground (34%), crop plants (32%) and weed plants (23%).** A few others foraged from the air (8%) and trees.

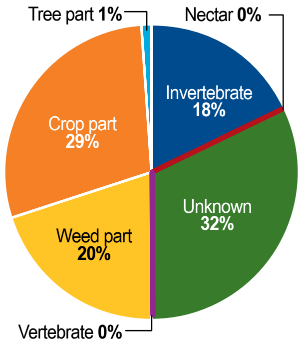


Proportions (%) of numbers of birds foraging from different substrates in cultivated areas

Pin-tailed Whydah: many birds take weed plant parts from cultivated areas

What do birds actually eat from cultivated areas?

It was relatively difficult to determine what most birds were eating especially if they were taking small food items from the ground or from dense weed or crop plants. Only 29% were confirmed to be taking crop parts. Most of remaining (71%) were likely to be beneficial or neutral roles to crops, most of them confirmed to be taking weed parts and invertebrates.

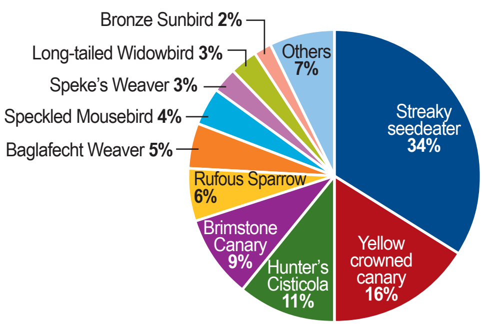


Proportions (%) of numbers of birds taking different types of food items from cultivated areas

Which birds take parts of weed plants from cultivated areas?

The birds most commonly observed taking weed plant parts (flowers, seeds, fruits, stems, leaves) were **Streaky Seedeater** and **Yellow-crowned Canary.** Other birds that take weed parts in significant numbers include Hunter's Cisticola, Brimstone Canary, Rufous Sparrow, Baglafecht Weaver, Speckled Mousebird, Speke's Weaver and Long-tailed Widowbird.

Streaky Seedeater, the bird observed most frequently taking weed plant parts



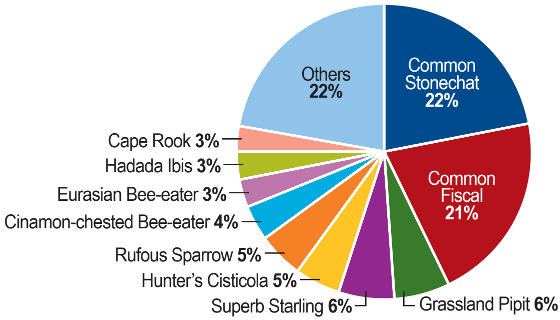
Proportions (%) of numbers of birds of different species taking parts of weed plants in cultivated areas

Which birds take invertebrates from cultivated areas?

Almost all bird species do take invertebrates when they are feeding young ones in order to provide proteins for quick growth. In Kinangop we

Common Stonechat takes many invertebrates from cultivated areas

observed almost all species taking invertebrates. However, the birds most commonly observed taking invertebrates were **Common Stonechat** and **Common Fiscal** (*Thũriũ*). Others included Grassland Pipit, Superb Starling, Hunter's Cisticola and Bee-eaters (Cinnamon-chested and Eurasian).

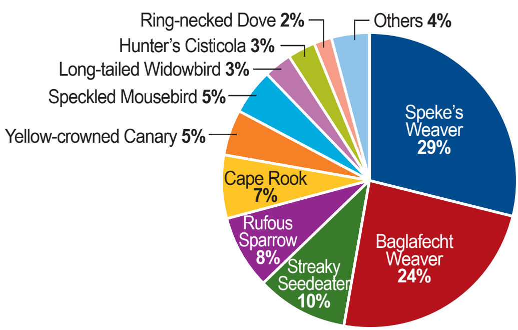


Proportions (%) of bird numbers of different species taking invertebrates in cultivated areas

Speke's Weaver frequently takes crop plant parts

Which birds actually take crop parts in Kinangop?

Usually, the natural hosting capacity of a given area is modified by agricultural activity. Thus, as the cover of natural habitats is increasingly converted in to agricultural land, birds adjust to the new food sources thus damaging crops. In Kinangop, the species which were most frequently seen taking crop parts (flowers, seeds, fruits, stems, leaves) were Speke's Weaver (29%) and Baglafecht Weaver (24%). Others seen taking crop parts at lower levels included Streaky Seedeater, Specked Mousebird and Cape Rook, among others.



Proportions (%) of bird numbers of different species taking invertebrates in cultivated areas

What habitat or conditions do some of these common bird species prefer?

Overall, grasslands had lower numbers of birds and fewer species, mainly because most of the seed-eating birds avoided grasslands and preferred cultivated areas instead. Most insect/invertebrate-eating birds preferred areas with a mix of grasslands and cultivated areas.

Examples by species:

- **Common Fiscal** mostly avoided areas which were entirely (100%) cultivated and preferred areas with a mix of grasslands, cultivation and/or some trees and shrubs.
- **Streaky Seedeater** mostly avoided areas which were entirely covered by grassland.
- **Speke's Weaver** was found only in few numbers at places which were entirely covered by grasslands, but in higher numbers in places which had both cultivated areas and grasslands.
- **Baglafecht Weaver** was found in higher numbers in cultivated land than in grasslands. It also preferred areas with a mix of planted trees and cultivation.

Common Fiscal, takes many invertebrates and avoids areas which are entirely cultivated

How much dispersed weed seeds do birds remove from cultivated areas?

Our experiments so far show that by taking dispersed weed seeds, birds can reduce weed germination levels in the cultivated areas of Kinangop by up to 22%. More data is still being collected to confirm this observation.

Germinating weed seedlings were fewer in places visited by birds

How much pests do birds remove from crop plants?

Our experiments on this aspect are still ongoing and we have no conclusive data yet. However, a trial experiment we had conducted at Ol Joro Orok (North-West Nyandarua) had shown that birds removed up to 78% of pests from Kale (*Sukuma wiki*) plants during the dry season, but had almost no effect during the wet season. This needs to be confirmed with more data.

Kale leaves not visited by birds were heavily invested by aphids

Speckled Mousebird

How much damage do birds cause to crop plants?

An experiment conducted at a farm in Mukungi where Speckled Mousebirds were known to frequently visit during the dry season, confirmed that birds only contributed to damage of about 4% of the cabbage leaves. Further experiments need to be done in this regard.

Conclusion

Birds play important roles in the environment. However as it has been said before, '*Nature has no mercy*'. As we reduce non-crop habitat (e.g. native grassland in Kinangop) and replace it with extensive cultivations, then birds adjust to the new food items provided by crop plants. Crops also attract large numbers of many seed-eating generalist bird species which in times of food scarcity turn to damaging crops. However as this study illustrates, the beneficial roles played by birds substantially exceed the negative roles. Let us strive to sustain larger areas of non-crop habitat, especially native grasslands in our farms in Kinangop.

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