Iran's Little Bustards *Tetrax tetrax* show the first signs of a renewed decline: an updated status, 2016-2024

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Summary: The Little Bustard *Tetrax tetrax* is a regular wintering migrant in Iran and a scarce, potentially extirpated breeder in Miankaleh Wildlife Refuge and Golestan National Park. We use recent records from citizen science platforms and communications with regional officials from the Department of Environment of Iran to update important publications by Sehhatisabet *et al* (2012) and Yousefi *et al* (2017). We posit a wintering population of between 18 000 and 40 000 birds, with large fluctuations from winter to winter, seemingly correlated with weather conditions. These Little Bustards make regular use of four regions, the most important being the Moghan plain in Ardabil province and the Sarakhs plain in Khorasan-e-Razavi province in north-west and north-east Iran respectively, with both continuing to host thousands of birds. On the other hand, the lowlands of the Caspian Sea, especially traditional wintering areas in Mazandaran and Golestan provinces as well as in Gilan province, are under threat from decreasing sea levels and ensuing vegetation changes unfavourable to the Little Bustard. Nevertheless, illegal hunting remains by far the main threat in all areas.

INTRODUCTION

Iran holds an important wintering population of Little Bustards *Tetrax tetrax* from the east of the species' range, occurring in large numbers across the northern parts of the country (Yousefi *et al* 2017). The birds are usually present between November and February, when they favour meadows and low-intensity agricultural lands near wetlands as well as extensive plains with either dry grasslands, cereal cultures or fallow fields (Sehhatisabet *et al* 2012). It is very likely that they arrive from Kazakhstan and Russia, especially those wintering in the north-west of the country on the border with Azerbaijan (Gauger 2007, Sehhatisabet *et al* 2012), although the birds found in the north-east are likely to originate from central and eastern Kazakhstan, including the foothills of the Tian Shan and Altai mountains (Kessler *et al* 2025). At least four distinct areas in northern Iran are frequently used (numbered triangles in Figure 1), with some of them hosting flocks of thousands of birds concentrated in relatively small areas. However, the use of these areas shows high annual variation (Yousefi *et al* 2017), perhaps associated with weather conditions or disturbance in other parts of their migratory pathway.

Globally, the Little Bustard is listed as Near Threatened (NT) on the IUCN's Red List and is also listed in CITES Appendix II (BirdLife International 2018). Within Iran, where there are three possible conservation designations (unprotected, protected and endangered), the species is a 'protected' regular winter migrant, meaning that its hunting is punishable by law, but that it is not considered at risk of extinction. Two recent studies assessed population trends (Sehhatisabet *et al* 2012, Yousefi *et al* 2017), with the latter recording larger wintering populations, especially in eastern Iran. Although the methodology varied between these studies, with Yousefi *et al* (2017) explicitly building upon the earlier study and covering 38 new sites, they nevertheless attribute their maximal count of 57 086 individuals, as opposed to Sehhatisabet *et al*'s (2012) 14 472 individuals, to a 'considerable population increase and probable range expansion' of the species' wintering range in Iran. Here we seek to discover whether this trend has continued and to assess the status of the species in its four key wintering areas, based on records since 2016.

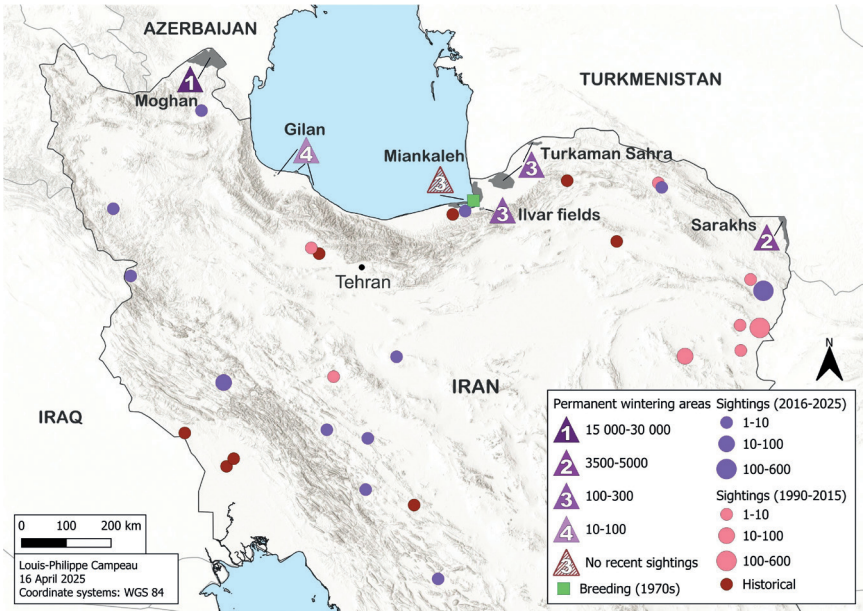

Figure 1. Current and historical wintering areas of Little Bustard in Iran.

METHODS

In order to evaluate the status of the Little Bustard in Iran, we first reviewed the published literature up to 2017, the date of the most recent research dedicated to this species in the country (Yousefi *et al* 2017). We then updated this knowledge by summarising recent sightings from the Global Biodiversity Information Facility (GBIF), as well as information sought and received from five experts working for the Iranian Department of Environment: Dr Ali Khani (Khorasan-e-Razavi provincial office), Mahmoud Shakiba (Golestan provincial office), Fazel Abdi and Mansour Javidzadeh (Ardabil provincial office) and Yaghoub Rakhshbahar (Gilan provincial office), as well as Dr Haji Gholi Kami of Golestan University. These data were complemented by oral records from birdwatchers across the country, as well as recent records from the Iranian Bird Records Committee (http://iranbirdrecords.ir).

RESULTS

Literature review

There are relatively few historical records of the Little Bustard's presence in Iran. Before or in 1876, a hunted bird from near Gharpooz Abad, Tehran, was reported to WT Blanford, who mentioned that the species was common west of the Caspian and believed his own observation of a small bustard on a Persian gulf island involved this species (Blanford 1876). In his 1896 travels, Zarudny (1900) mentioned large numbers of the species near Hossein-Abad (current Khorasan-e-Razavi province). In subsequent travels in 1898, he encountered regular 'small groups' in March in the Quchan-Mashad valley (current Khorasan-e-Razavi province), with other encounters at higher altitudes across the border from Akhal-Teke in Turkmenistan in the same month, but saw none in the autumn; he suggested that the Hari-Rud river, which is currently the border between Iran and Afghanistan, was the main migration path for Little Bustards entering and exiting Iran (Zarudny 1903). Adding information from a third trip in 1900–1901, Zarudny (1903) created a list of the birds of Persia in which the Little Bustard is reported as occurring in every

area of the country except south Baluchistan, while wintering in numbers in the Caspian lowlands and to a lesser extent in the north-west, near the Atrek river in Khorasan, in the areas of Sistan, Kermanshah and north Baluchistan, potentially along the Persian Gulf littoral, and in the Zagros mountains (for the last four areas listed, his is the last published mention or speculation of regular wintering). He also listed the Little Bustard as breeding in the Caspian lowlands (with a '!' denoting emphasis) (Sarudny [*sic*] 1911).

Following Zarudny's publications, another bird was reported by a Major Watts near Shush, Khuzestan (Ludlow 1917). In February 1964, 45 birds were reported from Meyan Kaleh (Miankaleh), with a mention that the species overwinters in numbers further east on the Turkaman steppe (Nielsen & Speyer 1964). All these records were of wintering birds, until a male in breeding plumage was caught on 13 May 1952 in the Atrek valley. It was considered an anomaly (Diesselhorst 1962, Érard & Etchécopar 1970) and despite another enigmatic record of two birds in the Miankaleh area on 31 August (seemingly in 1960: Feeny *et al* 1968) and their own observation of a male in flight on 16 April 1967 near Abadeh, Fars, Érard & Etchécopar (1970) concluded that there was no evidence for breeding other than Zarudny's 1911 mention.

The first exhaustive publication on the birds of Iran was released in 1975, but only mentioned the Little Bustard briefly, stating that 'it is relatively abundant in winter [and] it breeds in small numbers in Iran' (Scott *et al* 1975). This supposed breeding is based on three sightings of males near the eastern end of the Miankaleh peninsula, the first of 2 individuals on 10 July 1972, the second of 4 birds on 31 August 1972 and the third (and most important) of 2 males displaying on 9 May 1973. As far as we are aware, these are the last confirmed observations of Little Bustards in Iran during the breeding period. Scott *et al* (1975) also provided a description of the bird's wintering grounds for the whole of Iran, with regular sightings of hundreds near the Miankaleh peninsula and neighbouring areas in Golestan province, as well as a single observation each for the provinces of Ardabil (Moghan plain, November 1971) and Khuzestan (Dez river, January 1974). These flocks in northern Iran were then assumed to be declining, until larger ones were encountered during waterbird surveys in the early 1980s, a trend tentatively attributed to harsh winters further north (Razdan & Mansoori 1989). The Encyclopædia Iranica describes the Little Bustard as a rare breeding bird in the eastern Alborz mountains bordering the Caspian lowlands, but a common winter migrant to the Turkaman steppes in Golestan and the Miankaleh peninsula in Mazandaran, with much smaller numbers in Iranian Azerbaijan (A'lam & Scott 1990). Numbers at Miankaleh gradually dropped until no birds could be found by the late 1980s (Scott 1995). However, winter populations there are again mentioned in Mansouri (2008) and in Kaboli *et al* (2012), which states that the species is also a regular winter visitor to the Sarakhs plain in Khorasan-e-Razavi. Finally, single winter records outside these key wintering areas include a bird in Mooteh near Esfahan in 1994 (Evans 1994) and another near Gharpooz Abad in December 2009 (M Tohidifar pers comm).

Sehhatisabet *et al* (2012) undertook a preliminary assessment of the distribution and population size of wintering Little Bustards based on autumn and winter surveys from 2005 to 2009. They reported the bird's presence at 15 out of 84 surveyed sites. Based on these surveyed sites, three main wintering regions were identified: the Moghan plain in the north-west of the country (up to 6000 individuals), the Turkaman Sahra plain near the south-eastern corner of the Caspian Sea including the Miankaleh peninsula (up to 450 individuals), and the Sarakhs plain in the north-east, close to the Turkmen and Afghan borders (3500 individuals) (Figure 1). At the national scale, they estimated the Iranian wintering population of Little Bustard at 5000–10 000 individuals, while also highlighting occasional larger observations such as one of up to 10 050 birds during the winter of 2009 in the Moghan plain.

A second recent study, by Yousefi *et al* (2017), was based on winter surveys in northern Iran carried out between 2010 and 2015, with each site visited yearly. The authors modelled the suitability of potential winter habitat for the species to identify new areas for surveying, and upon visiting these sites indeed found new populations, notably in the eastern part of the Khorasan-e-Razavi province. In their last year of survey, they counted a maximum of 57 086 individuals spread over four key regions listed in order of importance: (1) the Moghan plain in Ardabil province, total 9500–50 000 birds; (2) the Sarakhs plain and Taybad (Rahneh) along with many minor sites in Khorasan-e-Razavi, total 1640–6268 birds; (3) the Turkaman Sahra plain including Alagol wetland and Kerend in Golestan, total 80–216 birds; and (4) the lowlands of the Caspian Sea in Gilan province, total 9–1863 birds, and the Miankaleh peninsula in Mazandaran province, total 20–32 birds.

Recent records

Following the regional classification from Yousefi *et al* (2017), we divide the subsequent sightings from 2016 onwards between the same four regions presented in order of importance: the Moghan plain, the Sarakhs plain and other parts of Khorasan-e-Razavi province, the Turkaman Sahra plain along with the Miankaleh peninsula and the south-east Caspian lowlands. We present the Miankaleh peninsula along with the Turkaman Sahra plain because the two areas are only 45 km apart and birds are known to fly between them (HG Kami pers comm). A fifth section details records from outside these core wintering zones.

1. ***Moghan plain (Ardabil)***

The vast agricultural lands in the north of Ardabil province, between the cities of Pars Abad and Bile Savar Moghan along the border with Azerbaijan, are currently the main permanent wintering habitats of the Little Bustard in Iran. The Department of Environment conducts annual Little Bustard counts during which its experts drive fixed transects and count the flocks of wintering birds, either visually with binoculars and telescopes or with the help of photography. The results show regular use: 32 990 birds for the winter of 2021–22, 28 800 in 2022–23, 13 257 in 2023–24 and 25 190 in 2024–25 (F Abdi & M Javidzadeh pers comm).

2. ***Sarakhs plain (Khorasan-e-Razavi)***

Over two days in January from 2021 to 2025 (except 2022), A Khani and M Naghibi conducted Little Bustard counts in and around the Sarakhs plain. This monitoring followed the same itinerary each year and was done by car with experts stopping after sighting birds to count/take photographs. The first day was dedicated to the areas west of the Tajan river (the Sarakhs fields), with a drive of about 15 km which passed through crops such as alfalfa, cotton and wheat. Most Little Bustard observations were made over this first day. The second day followed a 45 km route toward the Dosti dam further south, with up to a few hundred Little Bustards encountered in the fields known as Shir Tappeh. In total, these January counts revealed 3500 individuals in 2021, 638 in 2023, 1500–2000 in 2024 and 1500 in 2025.

3. ***Turkaman Sahra plain (Golestan) and Miankaleh peninsula (Mazandaran)***

These areas combine coastal wetland and meadows around the Miankaleh Wildlife Refuge with dry agricultural fields and grasslands in the Turkaman Sahra plain. Taken together, they hold the longest-studied wintering population of Little Bustards with regular observations since the 1950s. Birds there were historically attracted by freshly sown wheat fields, as well as meadows near wetlands and the Caspian coast. However, the species

seems to have deserted these traditional areas, as despite annual field surveys conducted at least once a month in winter and every day over the two weeks of the January waterbird census, no birds have been seen since 2020 by M Shakiba of the Golestan provincial office of the Department of Environment and local birdwatcher S Roshanian. This contrasts with their regular observations up to that year, especially in the area from Voshmgir Dam to the Shahid Marjani fish farm and Gomishan wetland, when flocks of 5–300 birds were frequently encountered. The situation is similar at Alagol wetland, where the last observations of 8 individuals dates from 2017 (S Roshanian pers comm). The estimated total wintering population in this area during the 2010s was around 450 individuals (M Shakiba and S Roshanian pers comm).

Nevertheless, flocks of over 300 and 200–250 birds were seen in the winters of 2021–22 and 2022–23 respectively in agricultural fields north of the village of Ilvar in Golestan, which lies roughly 50 km from both the Miankaleh Wildlife Refuge and the Turkaman Sahra plain (HG Kami pers comm). It is likely that these birds used both areas during these winters, if only irregularly. However, no sightings were obtained from the Ilvar fields in 2023–24 and 2024–25, despite ongoing monitoring.

As noted above, Little Bustards were previously recorded during the breeding season in this region, seemingly the last such record being made by Scott *et al* (1975) in 1973.

Plate 1. Little Bustards landing in Bujaqh National Park, December 2017. © *Hadi Ansari*

4. *Lowlands of the south-western Caspian Sea (Gilan)*

The wintering population in this area relies on meadows near wetlands and harvested rice fields. It is usually relatively small (50–100 individuals), but in some very cold winters, such as those of 2009 and 2013, much larger flocks of 500–1000 birds have been encountered feeding in rice fields all over Gilan province, with an estimated total of 2000–3000 individuals (AA and F Naziri pers obs). Bujaqh National Park is now the most

important and safe wintering area for this species in the region, with up to 80 individuals seen regularly (Plate 1). However, in 2024 there were only two sightings of the species there, with 2 and 3 individuals respectively. A flock of 24 in November 2022 in the grasslands south of Anzali Wetland (part of the Siah Kashim Protected Area) was the largest reported in Gilan in recent years (AA pers obs).

5. ***Other recent records of the Little Bustard in Iran***

From 2016 to 2025, there were 12 records of Little Bustards from outside the four established wintering areas described above. From west to east, these sites comprised: Mahabad county, West Azerbaijan (2024 or 2025, 1 individual), Zarivar wetland in Kurdistan (2022, 1), Qara Qayeh reservoir, Ardabil (2016, 1), Sefidkooh Protected Area near Khorramabad, Lorestan (2023, 40), Ban County, Chaharmahal and Bakhtiari (2019, 1), Ghahderijan plain, between Falavarjan and Najaf-Abad, Esfahan (2016, 8), Semirom Heights, Esfahan (2016, 1), Abbas Abad Wildlife Refuge, Esfahan (2016, 6), Kamjan international wetland in Fars (2025, 1), Galugah, Mazandaran (2021, 1) near the main Quchan–Shirvan road (2016, 3) and Torbat-e Jam in Khorasan-e-Razavi (2024, 150).

DISCUSSION

The most important threat to the Little Bustard throughout its range in Iran is hunting (Ashoori 2009, Sehhatisabet *et al* 2012, Yousefi *et al* 2017). In the lowlands south of the Caspian Sea, there is a significant risk from nets deployed by hunters over harvested rice paddies, where they often sprinkle seeds to catch wintering waterbirds (Ashoori 2008, 2009). Indeed, from October to December, live and hunted birds are sold at local markets in Gilan province; a Little Bustard carcass was seen in October 2006 alongside photographic evidence of a live one (Ashoori 2008). In December 2024, the body of a hunted Little Bustard was seized by officials near the Anzali wetland (A Aghaei pers obs).

As Yousefi *et al* (2017) showed, proximity to the border is the main factor in explaining Little Bustard densities, as these areas suffer less from hunting pressure. Both the Moghan and Sarakhs plains, hosting the largest wintering populations in Iran, are located in border zones in northern Iran that are also closer to the bird's breeding grounds. Nevertheless, proximity to the border alone cannot safeguard the species. On the Moghan plain, offices of the Department of Environment are present in both Bileh Savar and Parsabad, where biologists and rangers are tasked with protecting the wintering Little Bustards. They can also rely on an extra ranger station further west in Aslandoz, as well as on the actual military personnel on the border with Azerbaijan. Despite this significant presence, hunting continues and is usually done by night when hunters target resting flocks and can kill up to 50 individuals in one attack. These are often hunters from Ardabil province and there are currently no records of falconers targeting the area. Furthermore, the local practice of 'jaleh', which involves villagers setting numerous foot snares in farmlands near villages to capture live birds, is considered to be as damaging to the Moghan plain population as hunting, with rangers able to remove only a fraction of the traps. Thus, despite more than 10 arrests in 2024 with fines of up to 118 438 000 rials (around US$1450), poaching continues even in well-monitored areas (M Javidzadeh pers comm; Plate 2).

Studies have also found that almost all of the new important areas where Little Bustards gather are unprotected farmland and grassland. In recent years, the quality and quantity of the few protected areas used by this species in Iran, such as Bujaqh National Park and Miankaleh Wildlife Refuge, have been reduced owing to the receding waters of the Caspian Sea, and grasslands suitable for this species have been covered with shrubby plants such as *Carex* and *Rubus* that the bird avoids (Sehhatisabet *et al* 2012, Yousefi *et al* 2017). A similar trend has been noted in the Atrek river plain across the border in

Plate 2. Illegal hunting on the Moghan plain, 22 November 2024. © *Mansour Javidzadeh*

Turkmenistan, where what used to be the country's main wintering area for the species in the 20th century is now barely used (Rustamov & Shcherbina 2025). This explains why only two sightings of Little Bustards were reported from Bujaqh National Park in the autumn and winter of 2024 and none from Miankaleh over the last five years, while numbers in the Moghan and Sarakhs plains are more stable.

In Ardabil province, the largest concentration of this species occurs in mid- to late autumn, while in Golestan province this takes place in January and February. Both these periods coincide with the local rapeseed and wheat sowing and early plant growth period. Little Bustards show a clear preference for rapeseed crops when available, with reports from 2021 and 2022 near Ilvar village, Golestan, of flocks arriving when the crop reached 10–15 cm in height and bore 4–5 leaves, the birds eating all the leaves and forcing the farmers to re-plow the fields to sow wheat and barley (HG Kami pers comm). Conflict between farmers and Little Bustards also arises when the birds leave pastures and stubbles to feed in recently sowed fields (A Khodkar and S Roshanian pers comm). There is concern over the intensive use of chemical fertilisers, especially in Golestan province, although no casualties have yet been observed (S Roshanian pers comm).

Amplifying habitat degradation, climate change could make many of the current wintering areas unsuitable in the future. It seems clear that annual variations in weather affect the size of wintering flocks, with thousands of birds present in severe winters and none in warmer ones, such as the winter of 2008–09. Iran's eastern provinces (along with southern ones where no Little Bustard are regularly found) are becoming significantly warmer, particularly in winter (Ahmadi *et al* 2017). In the long term, this may limit or prevent Little Bustards from overwintering in areas like the Sarakhs plain, although north-west Iran, which includes the Moghan plain, is currently less affected by temperature changes (Ahmadi *et al* 2017).

Table 1. Population estimates for the Little Bustard in key areas of Iran. Quality of estimate: 1 = low, 5 = high.

Geographic region	Season	Numbers	Important sites	Quality of estimate	Population trend			
					1950–1990	1990–2020	2020–2023	1950–2023
Moghan plain (Ardabil)	Wintering	15 000–35 000	3	3	No data	→	→	→
Sarakhs plain (Khorasan-e-Razavi)	Wintering	3500–5000	1	4	No data	↗	↘	↘
Turkaman Sahra plain (Golestan) & Miankaleh peninsula (Mazandaran)	Breeding	0–10	—	1	No data	↘ ?	↘ ?	↘ ?
	Wintering	250–500	3	4	↘	↗	↘	↘
Lowlands of SW Caspian Sea (Gilan)	Wintering	25–80	2	3	↘	↗	↘	↘
Totals for all provinces	Breeding	0–10	1	—				
	Wintering	18 775–40 580	9	Average 3.5				

Finally, collision with electrical powerlines is a known threat to all bustard species (Silva *et al* 2022). Although no specific research on this issue has been conducted in Iran, three female-type birds were found dead under powerlines in agricultural fields near Ilvar, Golestan, over the winters of 2021–22 and 2022–23 (HG Kami pers comm).

Our review of both literature and recent sightings suggests a limited decrease in the number of wintering Little Bustards in Iran since the publication by Yousefi *et al* (2017), with between 18 000 to 40 000 birds seen per year (Table 1), thereby reversing the trend that the latter authors registered. Setting aside anomalously large flocks, such as the 50 000 birds in winter 2014–15 in the Moghan plain (Yousefi *et al* 2017), it appears that two of the four main wintering areas in Golestan and Gilan now hold much reduced numbers. Indeed, all experts consulted voiced concerns about a decline since 2016, except for the Moghan plain where numbers are currently stable. As Little Bustards winter near international borders, to evaluate this decline, the eastern population as a whole should be assessed, with management and action plans implemented at the regional level. Since the presence of the Little Bustard in Iran is highly affected by weather patterns, notably very cold winters when more birds fly in to overwinter, it could be that the reason for this apparent national decline is linked to climate change and warmer winters further north, in the Caucasus and Central Asia, as suggested by evidence from Uzbekistan in such years (Ten *et al* 2025).

ACKNOWLEDGEMENTS

We are very grateful to the Provincial Offices of the Department of Environment in Ardabil and Gilan, and Dr Ali Khani, Dr Haji Gholi Kami, Mahmoud Shakiba, Fazel Abdi, Mansour Javidzadeh, Yaghoub Rakhshbahar, Asghar Khodkar, Siavash Roshanian, Hojat Sayadi, Mehdi Naghibi, Fardin Naziri and Amin Aghaei for providing data.

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