

Re-introduction successes of Asian houbara bustard in the Kingdom of Saudi Arabia

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Introduction

The houbara bustard inhabits in open or scrub-covered plains and occurs over a huge range from Canary Islands, Spain, across North Africa to the Middle East and Central Asia via South Asia to mainland China. The population has been estimated at 49,000-62,000 individuals, but it is likely to exceed 100,000 birds (BirdLife International, 2001). The houbara is included in App. I of CITES and in App. I & II of the Convention on Migratory Species. It was not previously listed as globally threatened by IUCN, but in 2005 it was placed on the BirdLife/IUCN Red List with the status Vulnerable (IUCN 2009). It is classified as Vulnerable because it has undergone rapid population declines estimated to be 35% over three generations, owing largely to unsustainable hunting levels (BirdLife International, 2001).



Houbara bustard © M. Z. Islam

There are three sub-species recognized 1) *Chlamydotis undulata undulata* (9,800 birds) is resident in North Africa where it has declined in Libya, Egypt and Tunisia, and probably also in Algeria, Mauritania, Morocco and Sudan; 2) *Chlamydotis undulata fuertaventurae* (700-750 birds) occurs on the Canary Islands, Spain; and 3) *Chlamydotis undulata macqueenii* is thought to occupy six sub-regions: resident and migratory birds occur in the Middle East (Turkey, Jordan, Israel, Iraq, Kuwait, Bahrain, Oman, Qatar, Saudi Arabia, United Arab Emirates, Syria, Yemen), and in Russia (including in the Asian region), Iran, Pakistan, India, Afghanistan, Uzbekistan, Tajikistan, from western Kazakhstan to Turkmenistan, and on the Mongolian plateau and in the Gobi desert of Mongolia and western China.

The population of *C. macqueenii* is estimated at 39,000-52,000 individuals, mostly breeding in Kazakhstan (30,000-40,000), although numbers in the mainland China are likely to be

much higher than the current estimate of 500 birds (BirdLife International, 2001). Declines are reported from Bahrain, Jordan, Iran, Iraq and India. Populations from some sub-regions are thought to mix on the wintering grounds. In recognition of perceived declines in houbara numbers in Saudi Arabia, the Minister of Foreign Affairs, His Royal Highness Prince Saud Al Faisal established both a captive-breeding center called the National Wildlife Research Center (NWRC) near the city of Taif in the Emirate of Makkah, and the Saudi Wildlife Commission (SWC) in Riyadh to oversee all species conservation concerns within Saudi Arabia (Seddon *et al.*, 1995).



Houbara were released by HRH Prince Khalid al Faisal in Mahazat as-Sayd Protected Area

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Goals

- Goal 1: The long-term goal of houbara conservation strategy is to secure self-sustaining wild populations of houbara throughout the Kingdom of Saudi Arabia.
- Goal 2: To determine the distribution, status and trends of houbara populations in the Kingdom.
- Goal 3: To improve our understanding of the ecology of houbara bustard.
- Goal 4: To protect and improve houbara habitat in the Kingdom.
- Goal 5: To establish and maintain an houbara captive-breeding facility (further develop the technical skills necessary to breed houbara in the captivity and to further investigate aspects of houbara biology).
- Goal 6: To develop techniques for the release of captive-bred houbara to establish new wild populations.
- Goal 7: Promote public awareness and foster public support for houbara conservation.
- Goal 8: To take a lead in initiating cooperative conservation efforts between houbara range states.

Success indicators

- Indicator 1: The captive-breeding program of houbara at NWRC has achieved its expected goals (on an average 300 birds are produced per year).
- Indicator 2: The captive herd at NWRC is maintained for re-introduction programs in other protected areas.

- **Indicator 3:** The re-introduction of houbara bustard in Mahazat as-Sayd for more than 20 years has now significant self sustaining population is considered to be a success.
- **Indicator 4:** After nine years of re-introduction in Saja Umm Ar Rimth which is also considered as partially successful.
- **Indicator 5:** A new website will be hosted by the NWRC (www.nwrc.gov.sa) that contains houbara information.

Project Summary

Houbara captive-breeding Program in Saudi Arabia: Since 1986, an important houbara project was undertaken by the National Wildlife Research Center based in Taif, western Saudi Arabia. During the first phase attention focused on the development of a houbara captive-breeding for future release and national houbara restoration program. During the initial stages captive-breeding was partially successful and the NWRC anticipated around 100-150 houbara chicks. In 2008 more than 300 chicks were produced by the NWRC, and in the second phase, the main focus of the program shifted towards the development of suitable release techniques and houbara project development (Seddon *et al.*, 1995).

Re-introduction: Two sites selected for Houbara re-introduction were Mahazat as-Sayd and Saja Umm Ar-Rimth protected areas in 1990 and 2001 respectively. All re-introductions were done in accordance with the IUCN Guidelines for Re-introductions. These two sites have attracted winter migrant houbara and anecdotal accounts suggest breeding may have occurred here in the past.

Mahazat as-Sayd protected area (site 1): This is an area of about 219,000 ha of fairly level, sandy plain at an altitude of 900 m to 1,100 m with a few rock outcrops in Makkah province. This nature reserve was established in 1988, especially to re-introduce Arabian oryx, Gazelle and Houbara and is fenced. The vegetation is *Acacia totilis*, *Indigofera* and *Salsola* as dominant shrub/trees. The substrate at Mahazat may be sand, gravel, or alluvial clays, and is usually loose, but not shifting, forming an even surface.

Saja Umm Ar-Rimth Protected Area (site 2): This was established as an extension of the Mahazat as-Sayd protected area in 2003 by HRH Prince Saud Al Faisal as a possible re-introduction site for houbara. In 1998, a 6,000 km² area was proposed by the NWRC for the re-introduction of houbara and houbara were released into a 400 km² enclosure near Jibal Barah.

Re-introduction methods: The houbara re-introduction program has been a primary focus of work in the Mahazat since 1991 and the following techniques have been tested (Combreau & Smith, 1998):

- Sub-adult (3-5 month old) houbara whose feathers on one wing have been cut were released in a 400 ha enclosure predator free zone to acclimatize to natural habitat.
- A covey in which 30-50 day old chicks were released with a pinioned, surrogate mother, to teach the juveniles feeding, habitat use and predator avoidance.

- Captive-bred juveniles of 4-6 months translocated to long tunnel-shaped cages and after three to four weeks released in to the predator-proof enclosure.

Pre-release (predator-free) enclosure for houbara: The 4 km² enclosure was built in Mahazat in 1989, with a predator proof electric fence. Within this enclosure six tunnels were built and the houbara re transferred into these from NWRC.

Field biology of houbara bustard: Re-introduction of houbara in Mahazat and Saja reserves provide opportunities to carry out research to improve our understanding of the ecology of houbara that include trapping, tagging, habitat use, feeding and breeding. Also included in this study are land management techniques and their influence on houbara, establishing and managing a network of suitable habitats and initiate collaborative research and conservation programs within the wider Gulf Co-operation Council (GCC) States.

Breeding in the wild: Captive-bred houbara have been released in Mahazat as-Sayd protected area since 1992 by NWRC and those birds have been successfully breeding since then. Reproductive biology studies have shown that from mid-January until the end of May the males periodically make courtship displays to attract female to individual territories and the distance between territories were between one and two kilometers, displays begin before sunrise and finish at dusk. After copulating with the male, the female makes a circular nest on bare ground between 300 m to 2,000 m from the nearest male and at 450 -900 m from neighboring females. A full clutch contains three to four eggs (occasionally two or five eggs). Brooding begins after the laying of the second egg and the intensity increases and reaches a maximum at hatching. Incubation lasts for 22-24 days and after hatching the chicks remains in the nest for first two days and then moves away from the nesting site.

Causes of mortalities: It is known that released captive-bred houbara in the wild are less successful compared to wild ones. During 1990 and 1991 the releases failed in Mahazat due to houbara ontogeny was not compatible with existing habitat conditions, while experimental releases in 1992 accounted for problems resulting from adaptation of captive-bred birds to natural habitat conditions (Combreau & Smith, 1988). The key cause of mortality was predation.

Trapping of carnivores: Mammalian predators are trapped in and around the houbara pre-release enclosure in Mahazat and Saja reserves in order to temporarily decrease predator's densities and give more chance of survival to young naïve bustards after release. Key predators are the red fox (*Vulpes vulpes*), Rüppel fox (*Vulpes ruppelli*), wild cat (*Felis catus/sylvestris*) and sand cat (*Felis margarita*).

Status of houbara in Mahazat: A total of 1,005 houbara have been shifted to Mahazat as-Sayd and 970 (493 males:477 females) were released from 1991 to 2010. The remaining birds either brought back to NWRC or some died inside the tunnels. Of those 970 birds released, 62 were still located by the mid-February 2010 and rest are missing due to transmitter reliability. More than 200 birds



Mahazat as-Sayd Reserve © NWRC

cannot be located and many of these birds had faulty or weak transmitters when last located, and may still be alive. Although very little is known about the natural density of houbara populations (this may differ according to habitat and/or species social structure), it seems reasonable to assume that Mahazat probably shelters one of the densest houbara population in the world. The present population in Mahazat ranges between 250-300 and the re-introduction should be

considered partially successful.

Status of houbara in Saja Umm Ar-Rimth Protected Area: In Saja, the re-introduction program was started in 2003 and a total of 256 (122 males:134 females) houbara were released until 2010. By mid-February 2010, around 50 houbara were still alive from the 2003-2009 cohorts. Mortality after release is the key issue in Saja, which is mainly due to predation by mammals (foxes and cats) and in some cases starvation and poaching.

Home-ranges of houbara in Mahazat: The annual home ranges for 442 birds with the mean (± 1 SE) varied from 482.02 (± 58.45) km² in 2002-2003 to 163.91 (± 24.32) km² in 1999-2000, with an overall mean of 307.76 (± 15.91) km² (Islam, 2008).

Major difficulties faced

- No suitable habitat was available during the initial stages of re-introduction due to hunting pressure, lack of fencing and protection of the re-introduction sites.
- High mortality rates of released houbara in the fenced area of Mahazat and Saja Umm ar Rimth was a serious issue.
- Species management plan was available especially in fenced re-introduction site (Mahazat) but implementation was a real difficulty.
- No study on genetic diversity of houbara in re-introduction sites in recent years.
- Lack of public support at large and awareness programs insufficient.

Major lessons learned

- Houbara were selected from populations which were identical to the same species that had been exterminated as per the IUCN Guidelines for Re-introduction (1998).

- The program for the restoration of houbara populations in Saudi Arabia is based on the provision and protection of suitable habitat under the NCWCD's PA plan, which serve as release sites for captive-bred houbara, and as refugia for migrants.
- Whether through the establishment of populations arising from released houbara, or through the attraction of migrants to stay and breed, it is intended that these areas have formed the focus of self-sustaining resident houbara populations.



NWRC staff in Mahazat as-Sayd Reserve

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- Rather than concentrating efforts in single large possibly isolated reserves containing meta-populations vulnerable to local catastrophes (droughts, locust plagues, etc.), it is planned to work towards a series of smaller reserves. This network of reserves is intended to support sub-populations of houbara in sufficiently close proximity to allow dispersal and genetic mixing.
- Prior to any translocation the range conditions in the release area have to be improved and the area protected from the onslaught of livestock exploitation. Once pasture conditions show adequate signs of improvement and the site is adequately protected, re-introduction of the birds can be contemplated.
- Release should coincide with suitable vegetation conditions to limit environmental stress on houbara.
- Keeping the birds in pre-release enclosures within the re-introduction site for acclimatization with minimal amounts of food and water as per natural conditions.
- Regulate tourism to re-introduction sites as that constitutes an additional concern related to habitat degradation.
- Strict law enforcement to minimize poaching of houbara around re-introduction sites.
- A public-awareness program to inform citizens of the biological and historic significance of the houbara in the society in order to encourage their participation in the conservation program.

Success of project

Mahazat as-Sayd Protected Area (fenced area):

| Highly Successful | Successful | Partially Successful | Failure |
|-------------------|------------|----------------------|---------|
| | √ | | |

Saja Umm Ar Rimth Protected Area:

| Highly Successful | Successful | Partially Successful | Failure |
|-------------------|------------|----------------------|---------|
| | | √ | |

Reason(s) for success/failure:

- The population of Asian Houbara bustard was seriously depleted, or decreasing due to over-exploitation or other factors, and which are at risk of becoming Endangered category of IUCN if causal factors were unchecked and now have self sustaining population in Mahazat as-Sayd Protected Area in Saudi Arabia through the captive-breeding and re-introduction programs and new areas are now proposed for protection which are At Taysiyah and Harrat al Harrah reserves, which are within the zone of historic houbara breeding.
- The NWRC is carrying out educational and awareness programs to meet these challenges for long-term survival and conservation of globally-threatened houbara in Saudi Arabia.

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