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Threatened Birds of Africa

International Action Plan for North African

Houbara Bustard *Chlamydotis undulata undulata*

A BirdLife International Africa Partnership Publication

Edited by H. Azafzaf, E. Sande, S. W. Evans, M. Smart & N. J. Collar

2005

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International Species Action Plan for the Houbara Bustard, Chlamydotis undulata undulata

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New Information

To provide new information to update this Action Plan or to correct any errors, please email birdlife@birdlife.or.ke

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Preface

The relationship between BirdLife and IUCN-The World Conservation Union stretches back into the formative years of both organisations. BirdLife International is IUCN's main partner and advisor on issues related to bird conservation and has played a leading role in the Consortium formed to develop the IUCN Red List of Threatened Species (www.iucnredlist.org) into a global tool for biodiversity conservation.

A particularly close relationship exists between BirdLife and IUCN's Species Survival Commission (SSC). Each being extensive networks of species conservation expertise, the two organisations have worked together to produce several coordinated global assessments of the world's birds since the 1980s.

As an active member of the Red List Consortium, BirdLife has taken a leading role in the development of the Red List criteria and standards, and has pioneered the development of Red List indicators. Using this system, BirdLife's 16 years of Red List data is allowing us to see meaningful trends in the status of the world's birds.

In Africa, BirdLife International has already taken a lead in site-based bird conservation, culminating in its landmark publication Important Bird Areas in Africa and Associated Islands. The concept of Important Bird Areas (at both national and regional levels) has proved very useful and is already showing direction for other types of biodiversity conservation on the continent.

However, the conservation of key sites alone may be insufficient to protect many species. Species with dispersed ranges, with only a small proportion of their population inside protected areas, or species facing a multitude of threats, often require a more integrated approach. Conservation efforts for such species require careful planning, taking into account the views and interests of all stakeholders, so allowing conservationists and ecosystem managers to mobilise their resources in an effective and strategic way.

This action plan is one in a series produced by BirdLife International for threatened birds in Africa. I urge all readers and users of this publication to push the conservation of Africa's birds, cornerstones and indicators of the continent's natural wealth, to a new level. Awareness of the need to conserve species and their habitats is slowly growing amongst policy makers. What we often lack are the tools and guidance to implement the appropriate measures. This series provides that critical service. In raising the profile of the problems facing Africa's avian species and the measures needed to secure their future, I believe, these plans will have a long-lasting impact on the conservation, not only of birds, but of the continent's rich biodiversity.

Achim Steiner
Director General
IUCN – The World Conservation Union

Foreword

Birds are part of the global ecosystem and studying them tells us about the natural environment on which we all depend and its biodiversity. Humankind values birds for educational, economic, recreational, cultural, ethical and spiritual reasons. Because birds are important, 105 organisations worldwide are working together through the BirdLife International Partnership to conserve the world's birds and their habitats.

The Africa BirdLife International Partnership, currently represented in 18 African countries, has so far documented 1,230 Important Bird Areas (IBAs), sites that are internationally important for the conservation of birds and biodiversity in Africa. Unfortunately, 43% of these have no legal protection, leaving a fifth of the continent's globally threatened bird species at greater risk of extinction.

Africa has a total of 341 globally threatened bird species. Some of these are residents of more than one country, others are migratory or widely dispersed. The conservation of cross-border, migratory or widely dispersed species requires concerted strategic species-based approaches such as Species Action Plans, to complement long-term site-based strategies such as National Parks and other protected area systems. Species Action Plans are scientifically authoritative documents that, with wide consultation and agreement with the major stakeholders, provide the relevant agencies with specific and time-bound actions for conserving priority species. Species Action Plans therefore provide a framework for action at local, national and international levels, in addition to being used as fundraising and advocacy tools.

With funding from the UK Department for Environment, Food and Rural Affaires under the Darwin Initiative for the Survival of Species and with financial and technical support from the Royal Society for the Protection of Birds (RSPB, the BirdLife International Partner in the UK), the Africa BirdLife International Partnership has developed a format and process of species action planning involving the participation of representatives from governments, species experts and interest groups, conservation NGOs and local communities. This Species Action Plan is one of seven international and 15 national plans for priority bird species in Africa which were produced as a pilot to test the new approach. It is hoped that the format and process used in the production of these plans will act as a model for the production of other plans for the conservation of priority threatened fauna and flora in different countries of Africa and beyond.

The production of action plans is just the beginning of the process, because it is important to translate the plans into action. The involvement and agreement of national government representatives in the production of these plans will help stimulate the inclusion of the plans into existing and proposed national conservation strategies. In addition, members interested in the conservation of individual species will evaluate the successes and failures of the implementation process.

It is hoped that all those interested in the wise use of Africa's natural resources and the conservation of her breathtaking bird diversity will make effective use of these plans.

Achilles Byaruhanga
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This Action Plan is an output of a three-year project entitled "Action Plans for the conservation of Globally Threatened birds in Africa", which in turn is part of the Species Conservation Programme of the African Partnership of BirdLife International. Major support for the project came from the UK Department for the Environment, Food and Rural Affairs (DEFRA) under the Darwin Initiative, and from the Royal Society for the Protection of Birds (RSPB), the BirdLife Partner in the UK. Special thanks are due to these two organisations.

The project was co-ordinated on behalf of the BirdLife Africa Species Working Group (ASWG) (a technical arm of the BirdLife International Africa Partnership) by *Nature*Uganda, BirdLife South Africa and the RSPB (BirdLife Partners in Uganda, South Africa and the UK respectively). A Steering Committee comprising members of the above organisations plus the BirdLife Africa Partnership Secretariat supervised project implementation. The project was supported and implemented by 17 African BirdLife Partner Organisations. Their efforts were unrelenting and BirdLife International thanks them all sincerely.

A network of dedicated people throughout Africa formed Species Interest Groups (SIGs) which were led at national level by National Species Action Plan Co-ordinators. The SIGs worked to promote the aims of the project and species conservation in general. The Houbara Bustard Species Interest Group played a pivotal role in developing this Action Plan by pooling and sharing information and organising an International Stakeholder Species Action Plan workshop in February 2004. Government officials, species experts, and national environmental NGOs, academic and research institutions from five out of the six North African range states, as well as representatives from Saudi Arabia, BirdLife International Secretariat and IUCN Species Survival Commission, attended the workshop. Warm thanks are due to all those involved in these organisations.

Many other individuals both inside and outside Africa contributed information, advice and support. BirdLife International thanks them all sincerely. May their efforts for species conservation continue to flourish and bear fruit.

Acronyms and Definitions

ASWG: African Species Working Group. ASWG is a technical arm of the BirdLife International Africa Partnership. Its role is to promote single species conservation initiatives within the BirdLife African Partnership through continuous development and implementation of an African Bird Species Conservation Programme.

CAP: BirdLife Council for the African Partnership *(see back cover)*

CBD: Convention on Biological Diversity

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora

CMS: Convention on Migratory Species

EN: Globally Endangered (IUCN Red List category)

HBWG: Houbara Bustard Working Group of IUCN/SSC

IBAs: Important Bird Areas. IBAs are sites of global biodiversity significance identified using international, objective standard scientific criteria. Places may be considered IBAs if they hold globally threatened species; restricted range species (world range <50,000 km^2); biome-restricted species and/or congregations of significant numbers of the global population of a bird species. An IBA should, as far as possible, be different in character from the surrounding area; exist as an actual or potential protected area; and, alone or with other sites, provide all the requirements of the birds, when present, for which it is important (Fishpool & Evans 2001).

ISAPC: International Species Action Plan Coordinator

IUCN: The World Conservation Union

LC: Least Concern (IUCN Red List category)

NGO: Non-Governmental Organisation

NSAPC: National Species Action Plan Coordinator

NT: Globally Near Threatened (IUCN Red List category)

PAOC: Pan-African Ornithological Congress

RSPB: Royal Society for the Protection of Birds

RHBWG: Regional Houbara Bustard Working Group

SAP: Species Action Plan: "A Species Action Plan (SAP) is a scientifically authoritative, strategic document that defines specific, measurable objectives and actions for conserving priority species. The plan should be achievable, time-bound and involve all appropriate stakeholders" (BirdLife International Africa Partnership 2001).

SIG: Species Interest Group. A Species Interest Group is a group of people interested in the conservation of a species. It usually includes experts who have a lot of knowledge of the species and are interested in promoting its conservation but could also include a variety of other stakeholders such as local communities, hunters, business people etc. (BirdLife International Africa Partnership 2001).

SSC: Species Survival Commission of IUCN

VU: Globally Vulnerable (IUCN Red List category)

1 Introduction

1.1 Species Action Plan history and objectives

In Africa, action for the conservation of birds by BirdLife International has mainly been through the identification and conservation of priority sites known as Important Bird Areas (IBAs). However, a few species do not benefit from such site-based conservation approaches because they are migratory, disperse widely or occur in small, fragmented, isolated populations over a wide area, or because they are very widely distributed. They therefore need a species-based conservation approach across their entire range. The BirdLife International Africa Species Working Group (ASWG) was formed in 1998 by the BirdLife Council for the Africa Partnership (CAP) to lead single species conservation initiatives across the continent on behalf of the BirdLife Africa Partnership. It was recognised that the interests of BirdLife Partners in the conservation of particular species could be used as a nucleus to form African Species Interest Groups (SIGs), working for the conservation of their species of interest.

The Regional Houbara Bustard Working Group, which was founded on occasion of the Houbara Bustard Action Plan Workshop, comprises government, NGO and research institute representatives of the North African range states. In recognition of the fact that there is a general IUCN bustard specialist group it was recommended that the North African Group takes a lead only in the coordination of the present action plan rather than attempting a global role in Houbara conservation.

In April 2001, the BirdLife Africa Partnership started a three-year Species Action Plan (SAP) project entitled "Action Plans for the Conservation of Globally Threatened Birds in Africa", coordinated by *Nature*Uganda, BirdLife South Africa and the RSPB (the BirdLife International Partners in Uganda, South Africa and UK respectively). In the course of the implementation of the project, international action plans have been prepared for seven species: Lappet-faced Vulture *Torgos tracheliotus* (VU), Houbara Bustard *Chlamydotis undulata* (VU), Blue Swallow *Hirundo atrocaerulea* (VU), Spotted Ground-thrush *Zoothera guttata* (EN), White-necked Picathartes *Picathartes gymnocephalus* (VU), Grey-necked Picathartes *Picathartes oreas* (VU) and Grauer's Rush Warbler *Bradypterus graueri* (EN). The project has also prepared 15 national action plans for these and other species.

Prior to holding workshops for the preparation of international and national Species Action Plans, five training workshops were organised for stakeholders involved in species conservation, targeting representatives from NGOs, governments, species experts and interest groups, research and academic institutions, and the local community.

1.2 Why this plan?

The Houbara Bustard had been a globally Near Threatened species in 2004, and its threat status was upgraded to Vulnerable in 2005. Its distribution covers a huge range from North Africa to Mongolia. The population has been estimated at 49,000–62,000 individuals, but it is likely to exceed 100,000 birds (see BirdLife International 2000, 2004). The species is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and in Appendices I (North African subspecies) and II (Asian subspecies) of the Convention on Migratory Species (CMS).

1.3 Methodology

This International Action Plan was developed at an international stakeholder workshop using a process and format developed by the BirdLife International Africa Partnership (BirdLife International 2001). The workshop process involves four main steps.

1 Presentation and discussion of background information about the species in question in order to identify gaps in knowledge on the species and to obtain up-to-date information.
2 A thorough analysis of the threats to the species and the relationship between the threats using the problem analysis.

3 Assessment of the agreed threats, their interrelationship and differing strengths to develop appropriate mitigating interventions.
4 Development and agreement on a monitoring and evaluation plan to assess whether there is change as a result of the interventions.

Further details about this methodology can be obtained from a training manual developed during the project (Sande *et al*. 2004).

1.4 Geographical scope

The breeding distribution of the Houbara Bustard ranges from the Canary Islands through Mauritania, Morocco, Algeria and Tunisia to Libya, from Egypt to Palestine and the Arabian Peninsula and from the Caspian Sea eastwards into Afghanistan and Pakistan and, further north, over the Aral Sea to 120°E into Mongolia and western China. Figure 1 shows the global distribution of the three subspecies.

2 Background Information

2.1 Taxonomy and appearance

The species has three subspecies: *Chlamydotis undulata undulata* (found in North Africa), *C. u. fuertaventurae* (found in the Canary Islands) and *C. u. macqueenii* (found in Asia). Recent studies have supplied evidence that the African and Asian populations are in fact two different species, but at present the status of these two taxa is still under review by BirdLife International. For simplicity, the conventional subspecies approach is used here.

Names for the Houbara Bustard in other languages include حبار or الحباري (Arabic), Outarde Houbara (French), Oubara (Italian), Hubara (Spanish) and Kragentrappe (Germany). The North African race *C. u undulata* is a medium-sized bustard of slender appearance. Houbaras are terrestrial birds which prefer to walk although they can fly well, and cover long distances in this way. They have a tuft in the centre of the crown, a white hind-neck and sandy-grey sides of crown marked with black. The back and uppertail-coverts are sandy-grey, finely vermiculated but with bars or flecks most visible on the rear mantle. The face is buff-white, the foreneck, chest and bib white, frilled on each side with long plumes, uppermost black and lowest with black tips. The rest of underparts are white. At long range, the wings appear mainly dark with a noticeable white patch at the base of the primaries. The tail is long and square, sandy-chestnut with four obvious blue-black bars (Cramp & Simmons 1980).

2.2 Distribution and population status

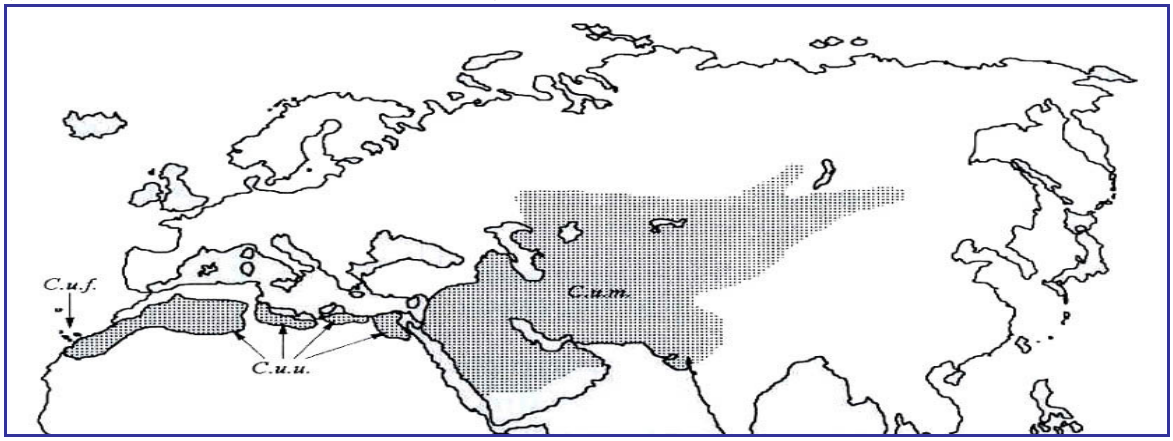
The Houbara Bustard occurs over a huge range from Africa to China (Figure 1). The population has been estimated at 49,000–62,000 individuals, but it is likely to exceed 100,000 birds (Goriup 1997).

- *C. u. undulata* is estimated at 9,800 birds resident in North Africa, where it has declined in Morocco, Algeria, Tunisia, Libya and Egypt (Goriup 1983, 1997).
- *C. u. fuertaventurae* population is estimated to be 700–750 birds, occurring in the Canary Islands (Spain).
- *C. u. macqueenii* is thought to occupy a continuous area from the Caspian Sea shores to Mongolia. It is both resident and migratory, breeding in the Middle East, and from eastern Iran to western Baluchistan, from western Kazakhstan to Turkmenistan, and from the Mongolian Plateau to the Gobi Desert, Mongolia and China. The population of this subspecies is estimated to be 39,000–52,000 individuals, of which 30,000–40,000 breed in Kazakhstan (Goriup 1997).

The range of *C. u. undulata* in North Africa is poorly known, but has probably been much reduced in the twentieth century owing to excessive hunting (De Smet 1989, Saleh 1989, Thévenot *et al.* 2003, Chammem *et al.* 2003). There is limited information on the status of *C. u. undulata* in all the range states. However, scant information on the distribution exists, as described below.

Figure 1: The global geographical ranges of the subspecies of *Chlamydotis undulata*

(in Saint Jalme, M. & van Heezik, Y., 1996)



C.u.f. = Chlamydotis undulata fuertaventurae
C.u.u. = Chlamydotis undulata undulata
C.u.m. = Chlamydotis undulata macqueenii

Algeria

Heim de Balsac & Mayaud (1962) saw Houbara Bustards on the southern part of the high plains, in Ouargla and the Great Erg (especially El Golea), further south of Biskra, in the Daya-region south of Laghouat, the Mzab region and Hamada du Guir. Blondel (1962) saw the birds very regularly in Djenien bou Reg (east of Figuig). Dupuy (1966, 1967, 1969) noted the species as common in the Hamada du Guir as well as in the western Erg in Hassi Fokra and south of Ain Salah. Ledant *et al*. (1981) reported it rather common in the Daya region ten years previously, but rare by 1981. The species was also hunted 45 km north of Laghouat in 1975. On the high plains, there were some local observations of vagrant birds in Boughzoul, Zmalet el Emir Abdelkader, 150 km east of Biskra and 90 km south-east of Saisa (De Smet 1989). On the high plains the species is disappearing very quickly or has already disappeared. In the pre-desert zone south of the Aures Mountains and the Sahara Atlas, the species is still rather widespread and locally even common. Houbara is also present in the west part of Algeria, southeast of Abio Sidi el Sheikh (Gaucher 1995).

In the late 1980s foreign Arab hunting parties were still killing some 1,000 bustards in that region every year (De Smet 1989). In 1997 Goriup estimated the Algerian Houbara Bustard population to be more than 5,000 individuals (Goriup, 1997). A national Houbara Bustard population survey was organised in 2000 and 69 potential sites were visited (M. Belhamra and M. Abbas, 2003), but no population estimate was published.

Egypt

The country is hosting both subspecies, *Chlamydotis undulata undulata* and *C. u. macqueenii*. Meinertzhagen (1930), El Nagoumi *et al.* (1950) and Al Hussaini (1954) reported that *C. u. undulata* is a resident breeder in the Western Desert, particularly in the Mediterranean belt extending from Alexandria to the Libyan borders. This area is characterised by winter rainfall that is sufficient to support relatively lush semi-desert vegetation (Kassas 1966). Several other areas throughout the northern part of the Western Desert were also reported to support resident populations of *C. u. undulata*. The Wadi El Natrun area, just west of the Nile Delta, midway between Cairo and Alexandria and conveniently close to both, was a favourite place for shooting Houbara Bustards up to the middle of the past century. The bird was considered a common resident breeder in that area (Meinertzhagen 1930, El Nagoumi *et al*. 1950, Al Hussaini 1954). Houbara Bustard seems to have totally disappeared since the early 1960s and no recent records of the bird in that area exist. However, it is still found and hunted regularly in the far western side of the Mediterranean coastal desert, particularly between Marsa Matruh and El Sallum. It is also hunted around the Siwa Oasis, which was considered one of the two most important Houbara Bustard areas in Egypt (Meinertzhagen 1930, El Nagoumi *et al.* 1950, Al Hussaini 1954). Uncontrolled heavy hunting combined with continuous alteration and destruction of Houbara

Bustard habitats may result in the extinction of the species in Egypt (Saleh 1989). The bird is still occurring and being hunted in the Sinai.

Libya

The status immediately east of Sirte has never been clarified, but 50–80 years ago the species was reported present on the coastal plain north of Ajadabia and south of the Jebel Akhdar in semi-deserts. The range extended east to the Egyptian frontier, but south probably no further than the 100 mm isohyet where vegetation becomes very sparse (Hartert 1923, Stanford 1954). Flocks of up to 100 individuals were mentioned by Bullman (1942) in the east, and in 2003 a number of 70 individuals was recorded during only one afternoon south of Syrte (Frédéric Launay, pers. com). It probably breeds throughout northern Libya. In this region it is rare south of 31°N, although the southern limit is unknown everywhere. Guichard (in Bundy (1976) saw it twice in the Jebel Soda in late February and early March 1955. It is described by Johnson (in Bundy 1976) as common on the Jerfa; Guichard confirms this and mentions flocks of up to 20 individuals in November and December. Bustards were much persecuted by gunners, who in the mid-1960s were shooting birds from motor vehicles; almost certainly by this time numbers must have been greatly reduced.

Mauritania

There is a breeding resident population in the north of the country on the borders with Western Sahara, Morocco and Algeria, but the current status is unknown (Morel 1989, Urban *et al.* 1986). Hunting is illegal in this country, but falconers are poaching on all bustard species.

Morocco

The species was widespread and locally abundant in the 1950s in areas where annual rainfall is less than 200 mm on the high plateaus south of Aïn Beni-Mathar and semi-desert areas in Mid Moulouya, but numbers have declined greatly since the 1960s (Brosset and Peters 1966).

In the 1960s the species was widely but sparsely distributed south of the High Atlas in both East Sahara and West Sahara. At that time, it was relatively common in remote areas that could not be reached by hunters in cars (Collar 1980). Since the 1970s, falconers from the Middle East have severely reduced all populations except those in Western Sahara (Brosset and Peters 1966). Today Houbara Bustards are hunted in the western part of the Sahara near Layoun. The Moroccan "Direction des Eaux et Forêts" estimated the national Houbara Bustard population in March 1983 at only some 2000–3000 birds (Haddane 1985, Goriup 1997).

The conservation efforts for the Houbara bustard population in Morocco was largely supported by the Emirates Center for Wildlife Propagation (ECWP) in Missour. The ECWP established a network of protected areas which covers over 14 000 km^2 and since 1999 over 1,000 houbara bustards from its capture breeding programme have been released. For this year it is planned to release another 1,500 birds (Lacroix, pers. com.)

Tunisia

The Houbara Bustard inhabits arid areas with between Feriana and Gabès in the salty depressions around the big saltpans of the south; in the Jeffara plain around Medenine; and in the large desert areas of Tataouine and Kebili (Amari 1992). Nowadays the Houbara Bustard is only recorded from regions far south of Medenine, Kebili and Tataouine, with few observations in central Tunisia (Azafzaf pers.com.). The frequency of records is highly variable and the breeding population must be very low, although few data on the total population exist. At the 1979 International Houbara Symposium held in Athens estimated the Tunisian population of Houbara Bustard at 3,900 individuals (Anonymous 1979). An unpublished report by the National Forest Department shows that in 1979 and 1982 1,253 and 875 individuals were recorded respectively. Goriup (1997) estimated the Tunisian population at more than 300 individuals. Recent studies show the species to be on the verge of extinction in Tunisia (Chammem *et al.* 2003). The decline is due to the hunting parties of falconers from the Gulf States, and to various other human activities.

In 2004, stakeholders from Algeria, Egypt, Libya, Morocco and Tunisia estimated the populations in their respective countries as indicated in Table 1 overleaf.

Table 1: Population, distribution, and seasonal occurrence of Houbara Bustard *Chlamydotis undulata undulata*.

Country	Population (individuals)	Distribution	Population trend	Seasonal Occurrence	Notes
Algeria	> 5,000 (Goriup 1997) ***(5,000–6,000*)***	Local; subdesert zones with 50-100 mm rainfall	Decreasing	Resident; short- mid-range movements	Population estimate needs confirmation
Egypt	> 500 (Goriup 1997)		Decreasing	Resident; short-range movements	Population estimate needs confirmation
Libya	>1,000 (Goriup 1997) ***(1,000*)***		Decreasing	Resident; short- mid-range movements	Population estimate needs confirmation
Mauritania	Unknown	North of country on border to Western Sahara	Unknown	Resident; short-range movements	Population estimate required
Morocco	2,000-3,000 (Haddane 1982 &1985) > 3,000 (Goriup 1997) ***(>1,240*)***	Oriental part from Guerif-Aïn Beni Matar to Bouarfa-Midelt and western populations to Layoun	Unknown	Partial migrant, short- and long- range movements	Population estimate needs confirmation
Tunisia	1,256 National Forest Dept. (1979); 895 National Forest Dept. (1982) > 300 (Goriup 1997) ***(<1,000*)***	Very rare; in south	Decreasing	Resident; short-range movements	Population estimate needs confirmation

** Estimates proposed by workshop participants: this estimate was proposed by the majority of the Moroccan delegation, but was contested by some workshop delegates as too low.*

2.3 Movements

Heim de Balsac & Mayaud (1962) and Etchécopar & Hüe (1967) considered *C. u. undulata* sedentary, with only accidental records outside its breeding range. The subspecies is non-migratory but carries out short to mid- movements in response to varying food supply and rainfall.

Transmitter studies on Houbara Bustard (*Chlamydotis undulata undulata)*, in the semi-desert steppes of eastern Morocco, showed differences in shape and size of home ranges between sexes and between seasons (Hingrat *et al.* 2004). The mean annual home range of males (17 km²), was smaller than that for females (146 km²; $P < 0.001$). The majority of male home ranges had a uni-modal distribution (86%) whereas 67% of female home ranges were multi-modal. Consequently, the amplitude of female movements was larger (mean: 44 km / 13 km; $P < 0.002$). In spring, male home ranges decreased in size around display sites (8 km²). Successive years of fidelity to home ranges indicate that adults are not nomadic.
More radio-tracking studies showed migration movements and fidelity to breeding sites from year to year in females.

In Morocco the Houbara Bustard fulfilled the definition of differential and partial migration (Hingrat 2005).

2.4 Conservation status

The Houbara Bustard is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and in Appendices I and II of the Convention on Migratory Species

(CMS). The Houbara Bustard was not previously listed as globally threatened by BirdLife International (2000, 2004), but in 2005 it was placed on the BirdLife/IUCN Red List with the status Vulnerable.

Twenty-five years ago, populations of Houbara were assessed as declining significantly in at least 15 of the 20 countries in its extensive range (Collar 1980). The two major reasons were and for instance remain excessive hunting and degradation of habitats through over-exploitation by man. During the last two decades the hunting of Houbara has increased. This is due in part to the increased availability of firearms but more importantly to increased pressure from Arab falconry parties. With an increase in wealth following the oil boom, and with the availability of four-wheel-drive vehicles, which allow access to virtually every square kilometre of desert, large hunting parties are now common, equipped with dozens of cars, instruments for radio communication and navigation, and accompanied by local guides who get paid for locating Houbaras.

The financial strength of most Arab falconers, and the dependence of many countries on support from Arabian states, means that hunting parties can obtain permission to hunt in almost every country where the Houbara appears, even in areas where they are protected by law.

The national legislation and the international conventions that may benefit the species in the range states are shown in Table 2. Although the species is protected by various international and national legislations, it continues to be hunted in all range states.

Table 2: National legislation and signatories to international conservation treaties relevant to Houbara Bustard *Chlamydotis undulata undulata*.

Country	National Legislation	CITES	CBD	CCD	CMS	AC	BC	RAMSAR
Algeria	• Protected by presidential decree 83-509 from 20/08/83 and from 17/10/95 • Hunting law (82-10 from 20/08/82). • Environment law (83-3 from 05/08/83)	✔	✔	✔	✔	✔	✔	✔
Egypt	• National Strategy for Conservation • National Strategy for Establishment of Protected Areas • National plan for Hunting Control	✔	✔	✔	✔	✔	✔	✔
Libya	• Hunting Law • Environmental Protection Law, paragraph 9	✔	✔	✔	✔	✔	✔	✔
Morocco	• Dahir 1923 • Annual decrees since 1962, referring to the Dahir	✔	✔	-	✔	-	✔	✔
Tunisia	Protected by the Annual Hunting Decree under Title 1, Article 7.	✔	✔	✔	✔	✔	✔	✔
Mauritania		✔	✔	✔	✔	✔	-	✔

CITES=Convention on International Trade in Endangered Species, CBD=Convention on Biological Diversity, CCD=Convention to Combat Desertification, CMS=Convention on Migratory Species, AC=African Convention, BC=Barcelona Convention

2.5 Relationship with other Species Action Plans and biodiversity conservation strategies

Other action plans or conservation strategies that have dealt with the Houbara Bustard include:

- European Action Plan for the *C. u. fuertaventurae* (Heredia *et al.* 1996)
- Action Plan for *C. u. macqueenii* (circulated in April 2005 to all range states for comments) (CMS 2002)
- National IBA Conservation Strategy in Tunisia
- National Biodiversity Conservation Strategy in Tunisia

2.6 Habitat

The Houbara Bustard is adapted to desert environments, preferentially inhabiting undulating, flat arid plains, steppe habitats and semi-deserts, often with little cover except for open or scattered desert shrubs (Coles & Collar 1980, Mendelssohn 1980, Collar & Goriup 1983). In most parts of the Houbara range rugged terrain is avoided, as are sandy deserts and barren saltpans (Ponomareva 1985). Vegetative cover consists of moderate or sparse perennials, primarily halophytes, grasses, herbs and shrubs, but sometimes including larger bushes and trees. During winter, Houbara Bustard are usually found in semi-arid to arid areas. In Saudi Arabia and in Harrat al Harrah they move between scattered food patches, foraging mainly on green vegetation in wadis and small depressions, but roosting in elevated boulder fields at night (Seddon & van Heezik 1994). The breeding habitats of the species are arid or semi-arid zones with 50-200 mm rainfall mainly in winter, falling mainly in winter. In Tunisia the species occurs in areas with sparse vegetation and scattered bushes, such as steppes with *Stipa tenacissima* and *Artemisia.*

2.7 Biology and ecology

2.7.1 Diet

Published information on Houbara diet in Pakistan, Tunisia, Morocco, Oman and Russia indicate that the species is omnivorous and opportunistic, the diet reflecting local and seasonal abundance of various plants and small animals (Ali & Ripley 1980, Coles & Collar 1980, Gallagher & Woodcock 1980, Goriup 1983, Mian & Surahio 1983, Mian 1984, Alekseev 1985, Surahio 1985, Tigar and Osborn 2000, Tourenq *et al.* 2003). There appears to be some seasonal variation, with plants being a more important source of food during winter and early spring. Vegetable matter eaten includes fruits, seeds, shoots, leaves, flowers and *Allium* bulbs, with young shoots, drupes, seeds, and berries preferred over leaves. Where available, cultivated plants are taken, such as beans, peas, alfalfa and mustard (Collar & Goriup 1983, Lavee 1985). Spring and summer foods seem to be more diverse, including invertebrates such as grasshoppers, weevils, termites, locusts, beetles, caterpillars, scorpions, spiders and ants; but also snails and small vertebrates such as snakes, lizards and geckos (Coles & Collar 1980, Collins 1980, Gallagher & Woodcock 1980, Goriup 1983, Mian 1984, Alekseev 1985, Gaucher 1991). Chicks are fed mainly on insects and small reptiles. Contradictory reports on drinking exist: Houbara have been reported to drink regularly (Meinerzthagen 1954), whereas according to Dement'ev & Gladkov (1968) they never drink.

2.7.2 Breeding

The Houbara Bustard is a polygymous bird with an axploded-lek mating system (Morales, *et al.* 2001, Hingrat, *et al.* 2004, Hingrat 2005).

C. *u. undulata* usually lays 2-3, exceptionally 4 eggs from February to June with a peak in March and the beginning of April, occasionally as early as the first days of November and as late as end of June. Houbara nests are shallow scrapes, occasionally lined with vegetation, situated on gentle slopes and elevated ground rather than in depressions. The nest is a bare scrape made by the female, 13–14 cm in diameter. Eggs are short, oval, smooth and glossy, light olive-brown, well-spotted and streaked red-brown or grey. Replacement clutches can be laid after egg loss, the laying interval is 48 hrs, incubation about 23 days with only the female brooding, fledging period roughly 35 days to 8 weeks (Saint Jalme and van Heezik 1996, Hingrat 2005, Combreau *et al*. 2002). In exceptionally dry years Houbara may not breed at all (Seddon & van Heezik 1994).

2.7.3 Predators

The main predators of eggs and chicks are jackals *Canis aureus* and foxes *Vulpes vulpes* or *V. rüppelli.* Reptiles like vipers *Cerastes cerastes* or monitors *Varanus griseus* may destroy whole clutches. The only "defence" of chicks is their cryptic plumage combined with motionless patience (Olfermann 1996, Combreau & Launay 1996, Combreau *et al.* 2000). Parents defend their chicks if necessary, even at the risk of their own life. Raptors are the main predator of adult Houbaras.

As is common in all birds, juvenile mortality is fairly high, but adult Houbaras are long-lived animals. In Morocco several adult birds were radio tracked for 4 years. One of these is being tracked for 9 years now (Lacroix, unpublished data).

2.7.4 Voice

Houbaras are virtually silent birds. In captivity, the juvenile and subadult birds of both sexes have been heard to utter a weak monotonous mewing call when alarmed or restless (Moody 1932). Adults, when alarmed and unable to withdraw from danger, produce a low ventriloquial croak. Males produce a display call (Gaucher, *et al.* 1996). The calls of female include hisses in defence of eggs and young (Poslawski 1965). The chick makes a delicate plaintive fluting like the peeping of a young turkey *Meleagris*, becoming a distinctive penetrating hoarse piping when frightened (Aharoni 1912).

2.8 Houbara stakeholder analysis

The impact of stakeholders who, directly or indirectly, positively or negatively, affect the conservation of the Houbara in North Africa was analysed. This differs from country to country, but hunters and poachers are apparently common in all countries. The details of the main stakeholders in the five range states, their interests, the impact and intensity of their activities, and how the action plan can mitigate or enhance these activities, are compiled in Annex 1.

2.9 Threats to Houbaras

All the threats or issues affecting the conservation of the species across the range in North Africa were analysed systematically. Increased adult mortality due to non-sustainable hunting practices, and reduced breeding success/ insufficient recruitment were identified as major issues. Lack of scientific knowledge was recognised to be an important issue as well, which makes it difficult to assess threats and find solutions. All these issues are indicated in the Problem Tree (Annex 2).

3 Action programme

This includes the vision, aim, objectives and projects/activities of this action plan.

3.1 Vision

The vision of this Action Plan is to "Improve the conservation status of Houbara Bustard in North Africa so that the species is no longer globally at risk". Obviously, this Action Plan will not achieve this vision during the five years of its lifetime but will only contribute towards it.

3.2 Aim

Within five years, this Action Plan aims to restore, stabilise or increase the population of Houbara Bustard in North Africa.

3.3 Objectives

Restoring, stabilising and/or increasing the populations of Houbara Bustard in North Africa within five years will be achieved through four strategic objectives as shown in Table 3. The stars indicate the objective's priority (♦=Low, ♦♦=Medium, ♦♦♦= High, ♦♦♦♦=Critical) to the conservation of the species.

Table 3: Vision, aim and objectives of the Houbara Action Plan

Vision	**Description and justification** **Indicators**
Improve the conservation status of Houbara in North Africa so that the species is no longer globally at risk	
Aim (5 years)	
Restore, stabilise or increase the population of Houbara in North Africa	• Baseline data on population in North Africa obtained • Population stable or increasing by at least 20% in North Africa

Objectives	
1 Creation/strengthening of institutions needed to maintain sustainable populations of Houbara ♦♦♦♦	• One functioning research institution in place in at least 4 of the range states by 2009 • Population in all range states known by 2007 • Programmes initiated to stabilise populations
2 Obtain detailed information on status and distribution of Houbara in North Africa ♦♦♦♦	• Population known in at least 4/6 range states by 2007 • Regional distribution map in place by 2008
3 Reduce non-sustainable hunting practices ♦♦♦♦	• Off-take numbers known in at least 4 out of 6 range states by 2007 • Off-take levels in at least 4 range states known by 2008 • Off-take levels reduced by 20% in 2 range states by 2009
4 Improve the protection of the habitat for the Houbara in North Africa ♦♦♦	• Habitat requirements of Houbara known by 2007 • At least 2 Houbara sites in at least 4 range states get a new or improved protection status by 2009

3.4 Projects

Projects or activities which are needed to be done to achieve the different objectives and ultimately the aim during the lifetime of this action plan. The projects/activities necessary to achieve each objective are given as follows.

Objective 1: Create and/or strengthen institutions needed to maintain sustainable populations (♦♦♦♦)

1.1 Create or strengthen national ornithological centres via universities, institutions or NGOs with a Houbara research section ensuring that standardised survey and conservation methodologies are used in all range states in North Africa.

1.2. Create a regional network for coordinating activities for the conservation of Houbara.

1.3 Develop and implement awareness programmes about the species for stakeholders, particularly local communities.

1.4 Encourage governments of Houbara range states in North Africa to take appropriate action to conserve the species.

Objective 2: Obtain detailed information on status and distribution of Houbara in North Africa (♦♦♦♦)

2.1 Start national programmes to survey Houbara population size, identify strongholds and assess population trends in all range states in North Africa.

2.2 Establish national programmes that will help to identify and monitor the breeding sites of Houbara in North Africa.

2.3 Research on the impact of hunting on Houbara population dynamics.

2.4 Research on the impact of disturbance and habitat change on Houbara population dynamics.

Objective 3: Reduce non-sustainable hunting practices (♦♦♦♦)

3.1 Identify legislation gaps and lobby for amendments and enforcement (including establishment of sanctuaries; identify areas where sustainable hunting is possible).

3.2 Ensure the protection of Houbara populations in the natural environment (need for research of ecology, status, distribution and population dynamics [see projects 2.1 and 2.2] and identification of locations that need protected area status [see project 4.1]).

3.3 Where appropriate, establish captive breeding programmes that can produce birds to release into the wild (monitoring protocols, areas for release, etc.).

3.4 Stakeholders in the region to become aware of the problem and impact of Arab falconry in the region

3.5 Reduce the disproportionate impact of Arab falconry on Houbara populations.

Objective 4: Improve the protection and quality of the habitat for the Houbara in North Africa (♦♦♦)

4.1 Establish protected areas for strongholds throughout the species range.

4.2 Conduct awareness campaigns among stakeholders.
4.3 Establish sustainable land-use management practices throughout the range.
4.4 Investigate the factors relevant for habitat management.

Table 4 shows the details of how the specific project will be implemented, i.e. its priority as far as the conservation of the species is concerned (♦=Low, ♦♦=Medium, ♦♦♦= High, ♦♦♦♦=Critical), plus the agencies that will take the lead to implement the project, the time-scale, the costs and opportunities and risks. Each project would need further elaboration in advance of implementation when additional risks and opportunities would be identified. The projects are grouped into four categories: Policy & Legislation, Species & Habitat, Monitoring & Research and Awareness & Training. The numbering used in section 3.2 is maintained so that the projects in the table grouped under the four headings are linked to the objectives they contribute towards.

Table 4: The project categories, priorities, leading agencies, time scale, cost estimate, indicators, risks and opportunities for projects required to implement the Houbara Bustard Action Plan.

	Project	Overall Priority	Agencies responsible	Time scale	Cost	Indicators	Risks	Opportunities
	A) Policy & Legislation							
1.1	Create and/or strengthen national ornithological centres, and ensure that standardised methodologies are used in all range states in North Africa	♦♦♦	Universities, NGOs, governments	2005-2010	$$$	One ornithological centre established in at least 4 of the range states by 2010		Existing centres in some range states could do the task
1.2	Create a regional network (SIG) for coordinating activities for the conservation of the species	♦♦♦	Universities, NGOs, governments, research institutions and centres	2005-2007	$$	Annual workplan and reports of the SIG in place by 2005		SIG currently in place
3.1	Identify legislation gaps and lobby for amendments and enforcement	♦♦♦♦	Government departments and NGOs	2005-2007	$	Legislation gaps identified in at least 4 range states by 2007; enforcement of amendments initiated in at least 2 range states by 2009	Governments may not be willing to cooperate	
3.5	Reduce illegal hunting	♦♦♦♦	Governments, NGOs, local community	2005-2010	$$$	Hunting levels established, levels known and reduced by at least 40% by 2009	Political arguments about legal and illegal hunting	
4.1	Establish protected areas for strongholds throughout the species' range	♦♦♦♦	NGOs, governments, local community	2005-2010	$$$	Strongholds established in at least 4 range states by 2008; One new protected area established or an existing one improved with higher protection status in at least 3 range states by 2010		

	B) Species & Habitat							
3.2	Protect Houbara populations in the natural environment and identify areas that need protected area status	♦♦♦♦	Governments, research institutional centres, hunters, NGOs	2005-2010	$$$	Strongholds established in at least 4 range states by 2008; One protected area established or with higher protection status in at least 3 range states by 2010		
4.3	Establish sustainable land-use management practices throughout the range	♦♦♦	Intergovernmental agencies, NGOs, governments, oil companies	2005-2010	$$$	Increased awareness about sustainable land-use in at least 4 range states by 2008		
	C) Monitoring & Research							
2.1	Develop national programmes to survey Houbara populations and trends in all range states and identify strongholds	♦♦♦	NGOs, governments, research institutions, universities	2005-2010	$$$	National coordination entities in place by 2005; Annual SIG workplan for 2006 to include population surveys in all range states		
2.2	Establish national programmes that will help to identify and monitor the breeding sites of Houbara	♦♦♦♦	NGOs, governments, research institutions, universities	2005-2010	$$$	National coordination in place by 2005; -Annual SIG workplan for 2010 include nest searches and monitoring in all range states		
2.3	Study the impact of hunting on Houbara population dynamics	♦♦♦♦	NGOs, universities, research institutions and centres	2005-2010	$$$	Data on population status in at least 4 countries available by 2008; studies on impacts of hunting ongoing by 2009		
2.4	Research Study the impact of disturbance and habitat change on Houbara population dynamics	♦♦♦	NGOs, universities, research institutions and centres	2005-2010		Strongholds established in at least 4 range states by 2008; studies on impacts of disturbance and habitat change ongoing until 2009		
4.4	Investigate the factors relevant for optimal management of the habitat	♦♦♦	NGOs, universities, governments, research institutions	2005-2010	$$$	Studies on impacts of disturbance and habitat change ongoing until 2009;		

			and centres			habitat restoration programmes ongoing until 2010		
3.3	Where appropriate, establish captive breeding programmes for release of birds to the wild	♦♦♦♦	Governments, NGOs	2005-2010	$$$	Captive breeding programmes initiated in at least at 2 appropriate countries at ornithological centres by 2010		
	D) Public Awareness & Training							
1.3	Develop and implement awareness programmes about the species for stakeholders, particularly the local communities	♦♦♦	Governments, NGOs, universities	2005-2010	$$$	Change the attitude of local communities towards the species ; promote ecotourism and related programmes ongoing till 2010		
3.4	Sensitise all stakeholders about falconry	♦♦♦♦	Governments, NGOs	2005-2010	$$$	Increased awareness about falconry especially in government departments; hunting levels by falconry reduced buy at least 40% till 2009		
4.2	Conduct awareness campaigns among stakeholders	♦♦	Governments, NGOs	2005-2010	$$	Awareness materials produced by 2008; at least 2 people in each range state trained to conduct awareness programmes by 2008		Arabic is a common Language across all range states
1.4	Encourage governments to take appropriate action to conserve the species	♦♦♦	NGOs	2005-2010	$$	One PA established or gets a higher protection status in at least 3 of the range states by 2010; at least 4 countries have MoUs with conservation NGOs that work on Houbara conservation		All IBAs in Tunisia, some of which have Houbaras, have some form of protection status

NB: All the projects are relevant to all the 5 countries that participated in the developed the plan.

♦=Low, ♦♦=Medium, ♦♦♦= High, ♦♦♦♦=Critical, **$**=< US$ 10,000, **$$**= US$ 10,000 – US$ 50,000**, $$$=** US$ >50,000.

4 Monitoring and evaluation

What & Why? A monitoring and Evaluation (M&E) plan is needed to determine whether activities are progressing according to schedule and have an impact on the species. By obtaining information on the progress made in the implementation of the activities and using this information against the set indicators (Table 4), it is possible to assess progress of implementation of the plan towards achieving the aim and objectives (Table 3). M&E on a regular basis helps assess priorities and detect slippages, and allows for necessary adjustments if required. The M&E report also serves as a basis for keeping everyone informed.

Who? It was agreed that the M&E plan for the Houbara Bustard at international level will be coordinated by the Species Interest Group with the HBWG Coordinator of IUCN/SSC taking the lead across all range states. The task involves co-ordinating the M&E and includes financial reporting. National Focal Points will take the lead at national level and are expected to engage other important stakeholders, such as conservation NGOs, government departments, scientific experts and local community representatives. International conservation NGOs should be involved in the M&E process where appropriate, and should be encouraged to implement some of the required projects that lie in their areas of competence.

How & How Often? Annually (two to three months before the end of the year), the HBWG Coordinator will circulate a table for monitoring and evaluating implementation of the Houbara Bustard Action Plan (a derivative of Table 4) with 2 additional columns, one for completion date and another for remarks. The national Focal Points will provide information on national progress and return the table to the International Coordinator before the end of the year. A regional M&E report will be circulated by the International Coordinator in the first quarter of the following year.

5 Factors influencing success of action plan implementation

The opportunities and risks listed below may respectively enhance or impede the implementation.

Opportunities

- Population densities are low and populations are small but some of these small populations have existed for a long time and in some parts of the range such as Algeria populations are declining rather slowly.
- Houbara Bustard is a focus for birdwatchers, tourists and scientific researchers. Since the 1990s, it has become an iconic symbol and flagship species for conservation in North Africa.
- In some parts of the range (e.g. Tunisia) a proportion of individuals occur in protected areas.
- There are already research projects in some countries such as Morocco and Tunisia that may benefit the species.
- National laws in some countries such as Algeria, Egypt, Libya, Morocco and Tunisia protect the species.
- BirdLife International has a strong stake in the Houbara Bustard and was represented at the stakeholder workshop to develop this plan.
- Captive breeding programmes are already in place in some range states such as Morocco.
- The international concern in effective conservation of the species is high (e.g. IUCN Resolution Number 2.61 in 2000, BirdLife International publications).

Risks

- Protective legislation enforcement is poor.
- Political and short term economic interests override the conservation concerns for the species.
- Coordination efforts between the governments of the range countries, with respect to an effective conservation plan for the species, fail.

- Poaching of the Houbara, especially during the breeding period, continues to reduce the species' population.
- Reintroduction of individuals from captive breeding programmes might be ineffective.
- Low capacity to maintain and adequately manage protected areas that harbour parts of the population of the species.
- Resources to implement the Action Plan have to be found

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Annex 1: Stakeholder Analysis for Houbara Bustard in North Africa.

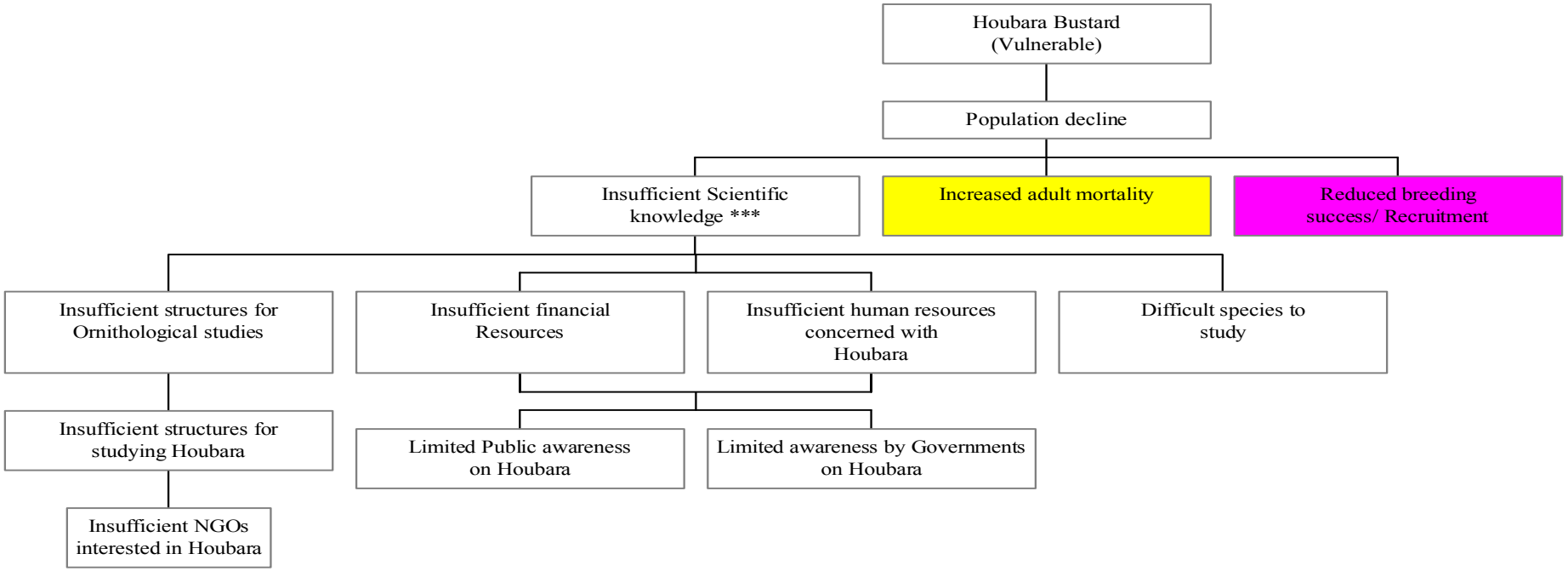
Stakeholders	Interest	Activities	Impact	Intensity	Proposed activities
Algeria					
Direction Générale des Forêts and its structures	Conservation	- Legislation - Monitoring	+	**	- Creation of centres - Awareness campaigns - Updating law texts
Direction des Services Agricoles	Exploitation of the habitat	- Management - Land use planning	-	**	Land development
Ministère de l'Aménagement du Territoire et de l'Environnement Direction Biodiversité	Conservation of habitats and species	Legislation	+	*	Creation of protected areas
NGOs	Conservation	Awareness raising	+	**	Awareness campaigns
Media	Conservation	Awareness raising	+	**	-Media-supported awareness campaigns
Universities	Conservation	Research	+	*	- Research projects - Impact studies
Agency Nationale pour la Conservation de la Nature	Conservation	- Legislation - Monitoring	+	*	- Monitoring and population estimates - Awareness campaigns - Creation of protected areas
Poachers	Trophies and leisure	- Poaching - Falconry	-	****	
Centre Cynégétique	Conservation	- Re-introduction	+	****	Houbara programme
Centre de recherches scientifiques et techniques dans les regions arides	Conservation	- Habitat studies	+	*	Ecosystem studies
Oil-producing companies		- Destruction of habitats	-	***	
Tunisia					
Institut des Régions Arides in collaboration with Tunisian scientists and experts and foreign research centres	Restoration of the Tunisian Houbara population	Research about the species in the wild and in captivity	+	***	- Estimation of population - Captive breeding
Direction Générale des Forêts representing the Tunisian Government	Conservation	- Management - Law enforcement	+	*	- Intensify research - Establish Houbara Sanctuary and enlarge protected areas to be recognised and respected by everybody
Nomadic shepherds and camel drivers	Meat and eggs for food	Poaching	-	*	- Awareness campaign

Stakeholders	Interest	Activities	Impact	Intensity	Proposed activities
Army, Customs and National Guard	Law enforcement	Consolidation of stakeholders' efforts	+	*	- Consolidation - Conservation
Association "Les Amis des Oiseaux" and other NGOs	Conservation	- Monitoring - Research - Awareness campaigns	+	***	- Research - Regular review of status and population estimates - Awareness campaigns
Local communities	Meat and eggs for food	Poaching	-	*	- Awareness campaigns
Tunisian poachers	Meat for food	Poaching	-	*	- Awareness campaigns
Foreign poachers	Leisure Trophies Tradition Meat for food	Falconry Poaching	-	****	- Law enforcement - International conventions
Association Nationale Tunisienne pour la Protection de la Faune Sauvage	Conservation	- Monitoring - Awareness raising	+	***	- Contribution - Monitoring - Awareness campaigns
Morocco					
Government agency	Conservation	- Legislation - Management - Monitoring	+	**	- Coordination between Ministry of Water and Forests and Ministry of Environment
Administrations	Conservation	- Law enforcement	+	**	-
NGOs	Conservation	- Awareness raising - Projects - Publications	+	**	Capacity building
Research centres	Research	N	N	N	- Development of research and training programmes
Media	Dissemination of information	- Documentaries - Articles - Broadcast - Telecast	+	**	- Awareness raising programmes - Articles and broadcasts on the Houbara - Web pages
Educational institutions	- Environmental education - Schoolbooks	N	N	N	- To develop special programmes to make children discover nature and environment - Present film and slide shows
Farmers	Farming	- Farming - Pesticides	-	***	- Awareness campaigns - Training - Restoration of habitats
Nomads	Livestock	- Overgrazing	-	**	- Effective management of grazing grounds

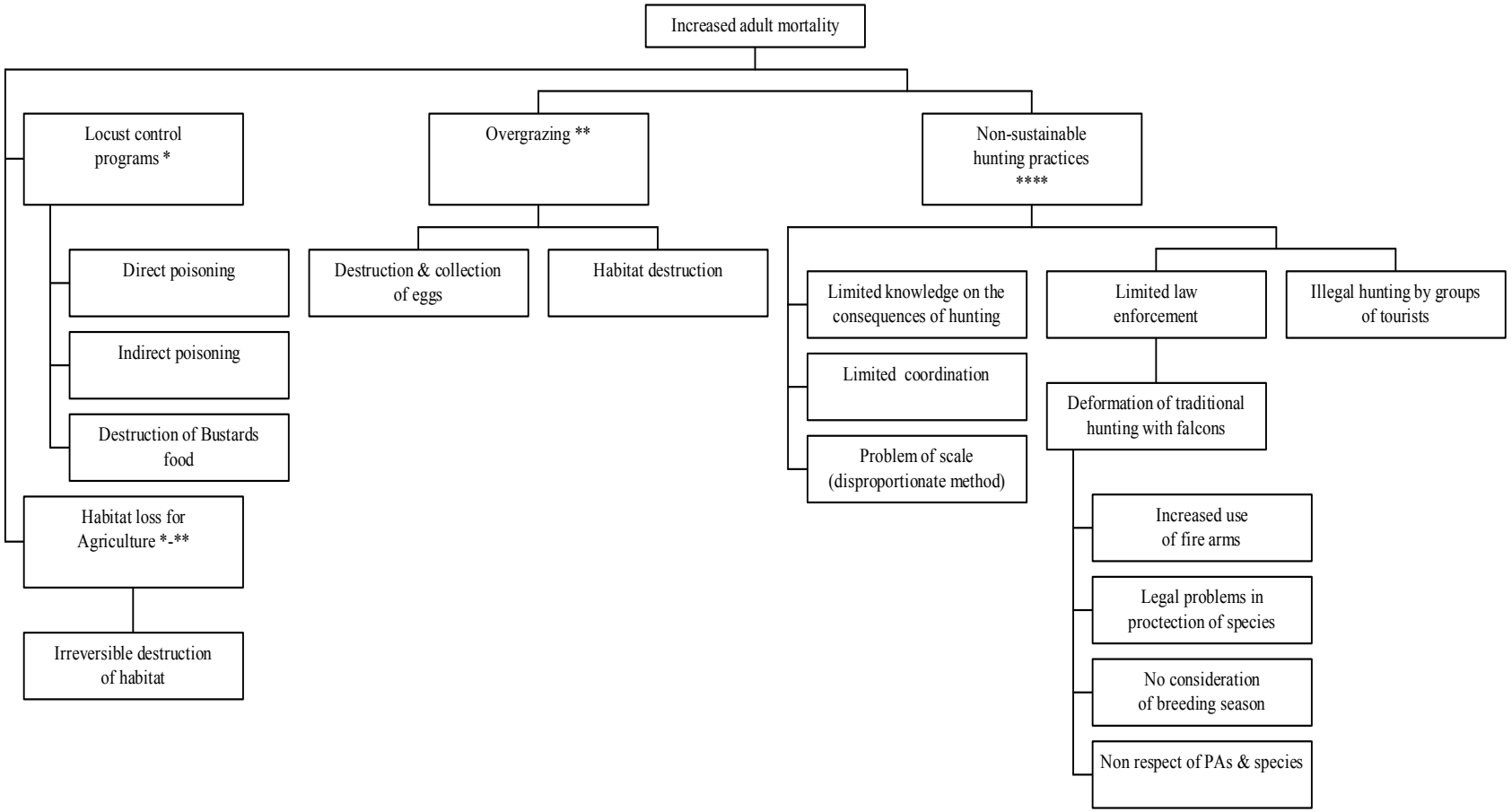
Stakeholders	Interest	Activities	Impact	Intensity	Proposed activities
		- Egg collecting - Destruction of nests			- Awareness raising - Participation in local development programmes
Tourists	- Ornithology - Nature discovery	- Leisure - Bird watching	+	*	Ecotourism
Hunters and Falconers	- Meat - Leisure - Tradition - Falcons	- Hunting - Training of falcons - Fire arms - Egg collecting	-	****	- Ensure that protected areas are respected - Awareness campaigns
Hunters	Conservation	-Funding of research centres and projects for sustainable development	+	*	- Funding of conservation projects - Develop campaign for a traditional hunting code
Breeding and research centres	- Captive breeding - Sustainable management	- Captive breeding - Release - Protection of the wild populations - Research	+	**	- Build up international collaboration - Establish national and international research networks - Intensify ecological research programmes: - Exchange information on biology, geographical distribution and census
Egypt					
Ministry of Environment (NCS)	Conservation	Species and habitat protection	+	***	National Action Plan for species
	Legislation	PA management	+	***	Strengthen running existing management activities in protected areas
		Law enforcement (hunting control)	+	**	-Strategy for hunting control -Training in species conservation
Ministry of Agriculture	Increase in agriculture production	Land reclamation	-	****	-Promote environmental impact assessments for proposed development projects- -Coordination with Ministry of Environment -Awareness and environmental education
Ministry of Tourism	Tourism development	Sport hunting	-	*	Coordination with Ministry of Environment
		Safari tours	-	***	Support birdwatching tours
Ministry of Foreign Affairs	Improve political relations	Control Houbara hunting	+	*	Diplomatic control of falconers
Local communities	Food	Hunting	-	**	Participation in SAP activities
	Traditional uses	Egg collection	-	**	Education and awareness
	Livestock	Overgrazing	-	***	Control of overgrazing
Universities and research institutions	Participation in species	Research	+	***	Intensify research

Stakeholders	Interest	Activities	Impact	Intensity	Proposed activities
	conservation	Technical support	+	***	Coordination with Ministry of Environment
NGOs	Participation in species conservation	Awareness	+	**	Bird-friendly NGOs
		Ecotourism	+	*	Participation in SAP implementation
		Species & habitat protection	+	**	Coordination between NGOs
Libya					
Environment General Agency	Management legislation and public awareness	Acting upon monitoring results	+	**	Increase collaboration with other sections
National Oil Company	Oil exploration & development	Development	-	*	Environmental Impact Assessment
Regional community representatives	Law enforcement	Law enforcement	+	*	- Awareness raising - Collaboration with other stakeholders
Farmers	Maximise production	Land reclamation	-	**	- Awareness rising - Collaboration with other stakeholders
Hunters	Trophies, sport and meat	Hunting	-	**	Assist in the implementation of existing laws
Centre for Arid Zone Research	Research	Technical support	+	**	Support research components of plan
University	Research	Research and technical advice	+	**	Education and awareness
Local communities	Livestock farming	Grazing	-	**	Promote wise use of rangelands

Annex 2: Problem Tree



Problem tree - Adult mortality factors



Problem tree – Poor breeding success factors