The Ucchali Complex, 2PK005

Country: Pakistan

Name of wetlands: The Ucchali Complex

Geographical coordinates: 32° 29' to 32° 37'N, 72° to 72°.15'E

General location: About 20km around Nowshera in Khushab district, Punjab Province.

Area: 1,243ha

Wetland type: Salt lakes (inland drainage system)

Altitude: 700-978m

Biogeographic Province: Indus Ganges Monsoon Forest

Description of site:
A group of three brackish to saline lakes with little marsh vegetation, and a little aquatic vegetation without extensive reed beds, mostly surrounded by agricultural fields, located in the heart of the Salt Range. The water level in the lakes keeps fluctuating following the rainfall pattern and the degree of human influence, and with that the ecological and limnological factors as well. The three lakes are described separately below as sites A, B and C.

Climatic conditions:
Dry sub-tropical climate with hot summers and cool winters. The annual rainfall varies from 300mm to 800mm, and the relative humidity from 22% to 85%. Temperatures range from an average minimum of 0.5°C in January to an average maximum of 36°C in June.

Principal vegetation:
The aquatic vegetation in the area includes: *Alhagi camelorum, Carex fedia, Cynodon dactylon, Haloxylon multiflorum, Hydrilla verticillate, Imperata cylinderica, Paspalum distichum, Phragmites australis, Phyla nodiflora, Potamogeton crispus, P. pectinatus, Ranunculus scleratus, Rumex* sp., *Saccharum spontaneum, Scirpus* sp. (short), *Scirpus* sp. (tall), *Sperguralis marina, Suaeda fruticoso, Typha angustata, T. elephatinum, Vallisneria spiralis* and *Zannichelia palustris*. The natural vegetation of the region is a mixture of sub-tropical semi-evergreen forest and tropical thorn forest with species such as *Acacia modesta, Adhatoda vasica, Asparagus gracilis, Cocculus laeba, Cynodon dactylon, Dononaea viscosa, Ehretia laenis, Gymnosporia royleana, Olea ferruginea, Reptonia buxifolia, Rahzya stricta, Sageretia lorrandettuana, Tamarix aphylla, Withania coagulans, Zizyphus mauritiana* and *Z. nummularia*. The natural vegetation around the wetlands has mostly been cleared for agriculture and by livestock grazing.

Land tenure:

The lakes and the adjoining lands are privately owned. The forests and grazing lands are state-owned or communal property.

Conservation measures taken:
Ucchali has been declared a Game Reserve; and Khabbaki and Jahlar are Wildlife Sanctuaries. Khabbaki lake was listed as a Ramsar site in 1976.

Conservation measures proposed:
Ramsar Monitoring Mission in May 1990 recommended the listing of all the three wetlands as a group instead of Khabbaki along as the waterfowl keep on shifting from one wetland to the other.

Land use:
Fishing at Khabbaki, domestic use, livestock grazing, recreation and illegal hunting.

Possible changes in land use:
The public opinion may change following awareness programmes, and eco-tourism activities may start. Fisheries activities are expected to be controlled and the public are now oriented towards silvo pastoral and agro forestry activities.

Disturbances and threats:
The three lakes face different problems and threats which have been detailed in their respective accounts.

Economic and social value:
The local villagers are dependent on the wetland for water for domestic use. The marshes provide grazing for livestock. The wetlands are an indirect source of irrigation water for the agriculture.

Fauna:
The three wetlands are important wintering sites for the rare/vulnerable white-headed duck, ferruginous duck, greylag goose and flamingoes. Detailed faunal records are given for each wetland.

Special floral values: None known

Research and facilities: Recorded separately for each wetland.

Criteria for inclusion: 1b, 2a, 3a, 3b (Rec C. 4.2 (Rev)).

Ucchali Lake (A)

Country: Pakistan

Name of wetland: Ucchali Lake

Geographical coordinates: 32° 33'N, 72° 01'E

General location: 13km west of Nowshera and 40km northwest of Khushab, Punjab Province.

Area: 943ha

Wetland type: Salt lake (inland drainage system)

Altitude: 700m

Biogeographic Province: Indus Ganges Monsoon Forest

Description of site:
A brackish to saline lake, the largest in the Salt Range, with little marsh vegetation, and almost entirely surrounded by agricultural land. The lake is fed by a small spring, seepage from adjacent irrigated land, and run-off from the surrounding hills of the Salt Range. The water level and salinity fluctuate according to local rainfall. The depth varies from 0.2m to 6m; and water is usually hyper-saline (41.5 p.p.t. in April 1987), and had a Ph of 10 in March 1989.

Climatic conditions:
Dry sub-tropical climate with hot summers and cool winters. The annual rainfall varies from 300mm to 800mm, and the relative humidity from 22% to 85%. Temperatures range from an average minimum of 0.5°C in January to an average maximum of 36°C in June.

Principal vegetation:
Marsh vegetation is confined to a few small patches along the lake shore, but there is a very rich growth of plankton in the lake. The dominant aquatic plants are *Carex fedia, Hydrilla verticillata, Juncus* sp., *Phragmites australis, Potamogeton pectinatus, Sperguralis marina, Suaeda fruticoso, Haloxylon multiflorum, Cynodon dactylon, Phyla nodiflora, Scirpus* sp. (dwarf), *Scirpus* sp. (tall), *Paspalum distichum, Typha angustata, Imperata cylinderica, Alhagi camelorum, Rumex* sp. *Ranunculus scleratus. Saccharum spontaneum, Typha augusta, Vallisneria spiralis* and *Zannichelia palustris*. The natural vegetation of the region is a mixture of sub-tropical semi-evergreen forest and tropical thorn forest with species such as *Acacia modesta, Adhatoda vasica, Asparagus gracilis, Cocculus laeba, Cynodon dactylon, Dononaea viscosa, Ehretia laenis, Gymnosporia royleana, Olea ferruginea, Reptonia buxifolia, Rahzya stricta, Sageretia lorrandettuana, Tamarix aphylla, Withania coagulans* and *Zizyphus mauritiana*. The natural vegetation around the lake has been cleared for agricultural use.

Land tenure:

The lake and the adjacent agricultural lands are privately owned, and the hill forests and range lands are state-owned.

Conservation measures taken:
The wetland was declared a Game Reserve in May 1986, and re-notified in May 1991. Hunting is allowed under a special permit, which has never been granted.

Conservation measures proposed:
Ucchali Lake has been proposed as designation as a Wildlife Sanctuary and for listing as a Wetland of International Importance under the Ramsar Convention, as a part of the Ucchali Complex including Khabbaki and Jahlar lakes (besides Ucchali).

Land use:
Public recreation, agricultural and livestock grazing insurrounding areas. Some mining leases have been granted in the surrounding hills.

Possible changes in land use:
Extension of agriculture, into the area under the lake by extracting land through stoppage of run-off water and construction of earthen bunds along the lake margins; intensification of agricultural practices by arranging tube well irrigation, horticultural practices and the adoption of silvo pastoral and agro-forestry practices; and the development of touristic facilities.

Disturbances and threats:
Illegal hunting, recreation, livestock grazing and agricultural activities cause some disturbance to waterfowl, and the marked fluctuations in water level and salinity are having a detrimental effect on the habitat. There has been considerable amount of illegal hunting of waterfowl by local people and by military personnel stationed in the area. The Soil Conservation and Agriculture Department advocate the stoppage of run-off water from going into the lake by constructing bunds, and directing towards the agricultural fields. In the process land is extracted from the lake which the owners use for cropping. Sinking of tubewells for irrigation purposes also affects the lake levels by drawing sub-surface water.

Economic and social value:
The lake provides excellent opportunities for scientific research and nature-oriented recreation (eco-tourism).

Fauna:
A very important wintering area for waterfowl, particularly *Phoenicopterus ruber* 2,100 recorded in March 1994, Anatidae and *Fulica atra*. The number of birds present fluctuates widely from year to year and seems to be critically dependent on the water level and salinity.

Between 1,100 and 3,100 Anatidae and coots wintered on the lake in the early 1970s, but much larger numbers have been reported in recent years. Over 100,000 waterfowl, very largely *Fulica atra,* were present in the winter of 1985/86, and 50,000 *F. atra* were reported in November 1986. The lake has the most important wintering area for the rare white-headed duck *Oxyura leucocephala* in Pakistan; over 400 have been reported on several occasions, and 667 were present on 9 January 1987.

Other noteworthy winter visitors include up to 130 *Podiceps nigricollis* and 30 *Tadorna tadorna*.

The census in mid-January 1989 revealed some 18,022 waterfowl, including: 62 *Anser anser*, 153 *Anas strepera*, 996 *Anas platyrhynchos*, 100 *Oxyura leucocephala*, 2 *Tadorna tadorna*, 306 *Anas crecca*, 6,132 *Anas clypeata*, and 10,271 *Fulica atra*.

More than 100 shore birds included *Vanellus vanellus* and *V. indica*. More than 40 bird species are normally recorded during the summer months.

Mammals known to occur in the area include *Canis aureus, Vulpes vulpes, Felis lybica* and *Lepus nigricollis*. There are no indigenous fishes in the lake.

Special floral values: None known

Research and facilities:
Annual mid-winter waterfowl counts have been carried out at the lake since 1971. Punjab Wildlife Research Centre, Faisalabad, since 1988 are conducting regular fortnightly waterfowl surveys during the winters from October to March to monitor populations with special emphasis on the white-headed duck. Summer breeding birds are under study by the scientists from Punjab Wildlife Research Centre, Faisalabad. Ecology of the wetland has been studied by M.Sc. students of Zoology Department, Government College, Lahore. A project to study the Ecology of Ucchali Complex lakes (Ucchali, Khabbaki and Jahlar) is currently underway at Punjab Wildlife Research Centre, Faisalabad which has been jointly funded by the Punjab Wildlife Department and WWF-Pakistan. A Draft Management Plan has been written for the lakes based on the findings of the project.

Jahlar Lake (B)

Country: Pakistan

Name of wetland: Jahlar Lake

Geographical coordinates: 32° 29'N, 72° 07'E

General location: Approximately 10km southeast of Ucchali Lake and 10km southwest of Nowshera, Khushab District, Punjab Province.

Area: 950ha

Wetland type: Salt lake (inland drainage system)

Altitude: 950m

Biogeographic Province: Indus Ganges Monsoon Forest

Description of site:
A small brackish to saline lake with little marsh vegetation, in the Salt Range; similar in general character to the nearby larger Ucchali and Khabbaki Lakes. The lake is fed by run-off from the surrounding hills of the Salt Range. The depth varies from 0.2m to 6m depending on the amount of rainfall received. Ph values ranged from 9 - 10 in the years 1989 to 1992.

Climatic conditions:
Dry sub-tropical climate with hot summers and cool winters. The annual rainfall varies from 300mm to 800mm, and the relative humidity from 22% to 85%. Temperatures range from an average minimum of 0.5°C in January to an average maximum of 36°C in June.

Principal vegetation:
The aquatic vegetation includes *Carex fedia, Hydrilla verticillata, Juncus* sp., *Phragmites australis, Potamogeton crispus, P. pectinatus, Saccharum spontaneum, Typha angustata* and *Zannichellia palustris*. The natural vegetation of the region is a mixture of sub-tropical semi-evergreen forest and tropical thorn forest with species such as *Acacia modesta, Adhatoda vasica, Asparagus gracilis, Cocculus laeba, Cynodon dactylon, Dodonaea viscosa, Ehretia laenis, Gymnosporia royleana, Olea ferruginea, Reptonia buxifolia, Sageretia lorandehuana, Tamarix aphylla, Withania coagulans, Zizyphus mauritiana* and *Z. nummularia*.

Land tenure:
The lake and the adjoining lands are privately owned.

Conservation measures taken:
The wetland has been declared a Wildlife Sanctuary since February 1993.

Conservation measures proposed:

The lake has been proposed to be declared a Ramsar site as part of the Ucchali Complex including Ucchali and Jahlar lakes.

Land use:
Domestic use, watering, livestock grazing in the adjoining pastures and hills, firewood collection from the forests on the hills; hunting waterfowl in the past.
Disturbances and threats: Hunting activities caused some disturbance to waterfowl populations. A metalled road has been constructed around two sides of the lake which has effectively stopped the run-off water from entering into the lake. Even though drainage pipes have been put under the road but these do not effectively drain all the run-off water which is mostly dammed up behind the road. The water level and the extent of lake, however, depends mainly on the rainfall received during the monsoons which greatly varies from year to year.

Economic and social value:
Local villagers are dependent on the wetland for water for domestic use. The marshes provide valuable grazing land for livestock.

Fauna:
Information on the lake is available only after 1987. The lake is probably a regular wintering area for the endangered white-headed duck *Oxyura leucocephala*, 68 were present in January 1987 and 132 in January 1988. Other waterfowl present on the lake included small numbers of *Tachybaptus ruficollis*, *Podiceps nigricollis*, up to 601 *Aythya ferina* in January 1990 and up to 112 *Fulica atra* in January 1988. Mammals know to occur in the area include *Canis aureus, Vulpes vulpes, Felis libyca* and *Lepus nigricollis*.

Special floral values: None known

Research and facilities:
The Pakistan Forest Institute and Punjab Wildlife Research Department carried out mid-winter waterfowl census in January 1987 and January 1988, respectively. Punjab Wildlife Research Centre, Faisalabad, since 1988 are conducting regular fortnightly waterfowl surveys during the winters from October to March to monitor populations with special emphasis on the white-headed duck. Ecology of the wetland has been studied by M.Sc. students of Zoology Department, Government College, Lahore. A project to study the Ecology of Ucchali Complex lakes (Ucchali, Khabbaki and Jahlar) is currently underway at Punjab Wildlife Research Centre, Faisalabad which is funded jointly by the Punjab Wildlife Department and WWF-Pakistan. A Management Plan has been written for the lakes based on the findings of the project.

Khabbaki Lake (C)

Country: Pakistan

Name of wetland: Khabbaki Lake

Geographical coordinates: 32° 37'N, 72° 14'E

General location: 10km northeast of Nowshera and 38km NNW of Khushab, Khushab District, Punjab Province.

Area: 283ha

Wetland type: Salt lake (inland drainage system)

Altitude: 978m

Biogeographic Province: Indus Ganges Monsoon Forest

Description of site:
A shallow brackish lake in the Salt Range, with a little aquatic vegetation but no extensive reed-beds. The lake is fed by local rainfall and several intermittent streams rising in the surrounding hills. The water level in the years 1988-89 had risen by 30-60cm causing an increase in size of the lake and decrease in salinity. Because of the subsequent failure of rains, water level again was lowered. The trend remained up to 1992 when due to exceptionally good monsoon rains, the water level rose again. The maximum depth is about 10.5m; a salinity of 5.2 p.p.t. was recorded in April 1987, and a Ph of 7.2 in January 1987, 9.5 to 10 in 1989 and 9 in the years 1991, 1992.

Climatic conditions:
Dry sub-tropical climate with hot summers and cool winters. The annual rainfall varies from 300mm to 800mm, and the relative humidity from 22% to 85%. Temperatures range from an average minimum of 0.5°C in January to an average maximum of 36°C in June.

Principal vegetation:
The aquatic vegetation includes *Carex fedia, Chara sp., Hydrilla verticillata, Juncus* sp., *Najas marina*, *Phragmites australis, Potamogeton crispus, P. pectinatus, Saccharum spontaneum, Scirpus* sp. (short), *Scirpus* sp. (tall), *Typha angustata, Vallisneria spiralis*, and *Zannichellia palustris*. The natural vegetation of the region is a mixture of sub-tropical semi-evergreen forest and tropical thorn forest with species such as *Acacia modesta, Asparagus gracilis, Cocculus laeba, Cynodon dactylon, Adhatoda vasica, Dodonaea viscosa, Ehretia laenis, Gymnosporia royleana, Olea ferruginea, Rhazya stricta, Sageretia lorandettuana, Reptonia buxifolia, Tamarix aphylla, Withania coagulans, Zizyphus mauritiana* and *Z. nummularia*. Most of the natural vegetation around the lake in the valley bottom has been cleared for agriculture, whereas the forest vegetation on the surrounding hills is severely depleted.

Land tenure:

The lake and the adjacent agricultural lands are privately owned, and the forests and range lands in the watershed are communally owned.

Conservation measures taken:
The area was first gazetted as a Wildlife Sanctuary (283ha) in 1966. The Sanctuary was re-notified in November 1975, and listed as a Wetland of International Importance under the Ramsar Convention in July 1976. However, the Wildlife Sanctuary was denotified in 1987 because of changes in its ecological character and the decline in numbers of wintering waterfowl. Following the advice of the Ramsar Monitoring Mission, and a change in the Ecological Conditions for the better, the sanctuary was renotified in December 1992.

Land use:
Fishing, domestic use (eg. washing of clothes) and illegal hunting. The lake is being developed for fisheries exploitation; a three year project which involved stocking with exotic fish species was completed in June 1986. Tilapia was also introduced along with the carp fishes. Tilapia being a prolific breeder out-manouvered the carp, and the lake was subjected to eutrophication due to over population of Tilapia. During the summers of 1991, tilapia died off due to over crowding and the lake was again stocked with carp fishes. In 1992-93 winters, the lake was leased for fishing for a period of three years. The Government of the Punjab, Forestry, Wildlife & Fisheries Department was approached to stop fishing as a safeguard for the population of white-headed duck. No further fishing leases would be granted after the expiry of the current lease period. The principal activities in surrounding area are agriculture and livestock grazing.

Disturbances and threats:
A change in the salinity and water level has brought about a change in the ecology of the lake, and this has been compounded by large-scale stocking with herbivorous fish species. It is believed that the direct competition for food between the introduced fishes and waterfowl has been responsible for the decline in waterfowl number in recent years. The fishing activities cause a considerable amount of disturbance to waterfowl, particularly in November when the wintering birds first arrive at the lake, and there is some disturbance from illegal hunting. The situation would hopefully improve once the fishing leases are stopped, and the lake is not stocked further. An important factor disturbing the ecology of the lakes is the sinking of tube wells in the adjoining agricultural fields which while drawing water affect the water level of the lake, which also fluctuates due to the changes in the rainfall pattern from year to year. Pollution from domestic waste has also been reported to be a problem to a small extent.

Economic and social value:
The lake now supports a commercial fishery. Marsh lands support grazing livestock. Recreation and illegal hunting also are a norm. The area may be developed as a tourist resort for the city dwellers, which would help increase the income of the local population.

Fauna:
Formerly and even now a very important wintering area for the endangered white-headed duck *Oxyura leucocephala*, 700 recorded in 1965 and 1,005 in 1968, 260 in

1974, 144 in January 1992; and a regular wintering area for greater flamingo *Phoenicopterus ruber* and many other waterfowl. As many as 8,700 waterfowl were recorded in the early 1970s, including: 60 *Anser anser*, 882 *A. platyrhynchos*, 826 *Fulica atra*, 12 *Podiceps griseigena*, 62 *P. nigricollis*, 365 *Phenicopterus roseus*, 169 *Anas penelope*, 200 *A. acuta*, 185 *Tachybaptus ruficollis*, 130 *P. cristatus*, 700 *Larus ridibundus*, along with small numbers of *Phalacrocorax niger*, four species of herons and egrets, three other species of ducks, three species of shorebirds and three species of gulls. About 50 bird species are normally recorded during summers.

Mammals and amphibians known to occur in the area include *Canis aureus, Vulpes vulpes, Felis libyca, Lepus nigricollis* and *Rana tigrina*.

Introduced fishes include *Labeo rohita, Catla catla, Cirrhinus mrigala, Cyprinus carpio* and *C. tenopharyngodon idella*.

Special floral values: None known

Research and facilities:
Annual mid-winter waterfowl censuses have been carried out at the lake since 1971. Punjab Wildlife Research Centre, Faisalabad, since 1988 are conducting regular fortnightly waterfowl surveys during the winters from October to March to monitor populations with special emphasis on the white-headed duck. Summer breeding birds are under study by the scientists from Punjab Wildlife Research Centre, Faisalabad. Ecology of the wetland has been studied by M.Sc. students of Zoology Department, Government College, Lahore. A project to study the Ecology of Ucchali Complex lakes (Ucchali, Khabbaki and Jahlar) is currently underway at Punjab Wildlife Research Centre, Faisalabad which is funded jointly by the Punjab Wildlife Department and WWF-Pakistan. A Management Plan has been written for the lakes based on the findings of the project.

BIBLIOGRAPHY

Ahmad, A. 1986. Recent tragedies with the waterfowl population on some of their wintering habitats in Pakistan. WWF-Pakistan Newsletter 5(2):4-8.

Akhtar, Naveeda. 1990. Ecological studies on Khabekki lake, Salt Range, Punjab M.Sc. Zoology Thesis, Government College Lahore.

Ahmad, A. 1987. The wetland and waterfowl wealth of Pakistan. Paper presented at Conference on Wetland and Waterfowl Conservation in Asia, Malacca, Malaysia. 23-28 February 1987. IWRB & Interwader.

Anon. 1982. Pakistan National Report. In: Spagnesi, M. (ed.). Proc. Conference on Conservation of Wetlands of International Importance especially as Waterfowl Habitat, Cagliari, Italy. 24-29 November 1980. Suppl. Ricerche di Biologia della Selvaggina, VIII(1):893-905.

Anon. 1984. National Report of Pakistan. In: Proc. Second Conference of the Contracting Parties, Convention on Wetlands of International Importance especially as Waterfowl Habitat, Groningen, Netherlands. 7-12 May 1984: 381-390. Gland, Switzerland: IUCN.

Anon. 1987. National Report of Islamic Republic of Pakistan. Paper presented at Third Conference of the Contracting Parties, Convention on Wetlands of International Importance especially as Waterfowl Habitat, Regina, Canada. May/June 1987.

Carp, E. 1980. Directory of Wetlands of International Importance in the Western Palearctic. Gland, Switzerland: IUCN.

Chaudhry, A. Aleem and Akhtar, M.S. 1991. Habitat loss causes a decline in white-headed duck population. Proc. Pakistan Congr. Zool. vol. 11. pp. 245-252.

Chaudhry, A. Aleem, Naveeda, A. Jabeen, P., and Naseem, F. 1990. White-headed duck and its habitat in Salt Range. Abstracts. 10th Pakistan Congr. Zool. pp. 91-92.

IUCN. 1975. A Classification of the Biogeographical Provinces of the World. Gland.

IUCN. 1987. Directory of Wetlands of International Importance: Sites designated under the Convention on Wetlands of International Importance especially as Waterfowl Habitat. Gland and Cambridge: IUCN.

Jabeen, Poonam. 1990. Ecological studies on Jahlar lake, Salt Range, Punjab, M.Sc. Zoology Thesis, Government College, Lahore.

Karpowicz, Z. 1985. Wetlands in the East Asia - A Preliminary Review and Inventory. ICBP Study Report No. 6. Cambridge: ICBP.

Koning, F.J. and Dijksen, L.J. 1971. IWRB Mission to Pakistan and Afghanistan, February 1971. Unpublished report submitted to IWRB.

Koning, F.J. and Koning-Raat, M.J. 1974. IWRB Mission to Pakistan, Winter

1973/1974. Unpublished report submitted to IWRB.

Koning, F.J. and Koning-Raat, M.J. 1975. IWRB Mission to Pakistan, Winter 1974/1975. Unpublished report submitted to IWRB.

Koning, F.J. and Koning-Raat, M.J. 1976. IWRB Mission to Pakistan, 1976. Unpublished report submitted to IWRB.

Koning, F.J. and Walmsley, J.G. 1972. IWRB Mission to Pakistan, February 1972. Unpublished report submitted to IWRB.

Koning, F.J. and Walmsley, J.G. 1973. IWRB Mission to Pakistan, February 1973. Unpublished report submitted to IWRB.

Naseem, Farkhanda. 1990. Ecological studies on Ucchali lake, Salt Range, Punjab. M.Sc. Zoology Thesis, Government College, Lahore.

Ramsar Convention Bureau. 1990. Proceedings of the Fourth Meeting of the Conference of Contracting Parties. vol. I.

Rao, A.L. 1989. Wetlands of International Importance-Pakistan. In: A Directory of Asian Wetlands, IUCN 295-365 (Ed. Derek Scott).

Roberts, T.J. 1984a. Pakistan National Report on Wetlands and Waterfowl Conservation. Paper presented at the 10th Asian Continental Section Conference ICBP, Kandy, Sri Lanka, April 1984. ICBP.

Roberts, T.J. 1984b. Brief Review of the Status of Wetlands in Pakistan. Paper presented at the 10th Asian Continental Section Conference of ICBP, Kandy, Sri Lanka, April 1984. ICBP.

Roberts, T.J. 1991. The Birds of Pakistan, Vol. I. Non-Passeriformes, Oxford.

Roberts, T.J. 1992. The Birds of Pakistan, Vol. II. Passeriformes, Oxford.

Savage, C.D.W. 1965. White-headed ducks in West Pakistan. Wildfowl Trust, 16th Annual Report 1963-64: 121-123.

Savage, C.D.W. 1968. The Wildfowl and Wetland Situation in West Pakistan. In: Proc. Technical Meeting on Wetland Conservation, Ankara- Bursa-Istanbul, 9-16 October 1967. IUCN Publications New Series, No. 12:122-128.

Savage, C.D.W. 1972. Wetlands of Asia. The Outdoor Man Vol. 2(9&10): 57-63.

Scott, D. 1989. A Directory of Asian Wetlands. IUCN. H 1181 pp.

Scott, D., Rao, A.L. and Beg, A.R. 1990. The Wetlands of Pakistan and the Ramsar Convention. Unpublished Report to Ramsar Secretariat. 29pp.