

Inner Niger Delta: waterbirds on the move or trapped? Report of the waterbird census in the Lake Debo area, February 2012

A&W-report 1796



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Lake Debo area, February 2012

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Jan van der Kamp,
in cooperation with
Mori Diallo

Photograph frontpage

The Inner Niger Delta accommodates 1.5 million people, most of which fully depend on its natural resources,
Leo Zwarts

Jan van der Kamp in cooperation with Mori Diallo 2012

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1 Introduction

Ongoing ornithological fieldwork in the Inner Niger Delta in Mali (Fig. 1 and 2) around the turn of the century has provided key information as to the state of this still immense wetland in the dry climate zone bordering the southern edge of the Sahara desert: the Sahel. Systematic waterbird counts in the central lakes of the Niger inundation zone (hereafter IND = Inner Niger Delta) (Fig. 2 and 3), performed by Wetlands International, A&W, the Direction Régionale de la Conservation de la Nature and other Malian partners, have enabled the assessment of short- and long(er)-term changes in waterbird populations, for which a number of relationships were either found or put forward in *Living on the edge*, published in 2009 (Zwarts et al. 2009).



Fig. 1. The Inner Niger Delta depends for its flooding on the discharge of the Niger and its main tributary, the Bani.

This report gives the results of the waterbird counts carried out in the Debo lakes, and of an additional count in the adjacent area being arbitrarily part of the Lake Korientzé zone. Next to general commentary on counted numbers we take a closer look to a dozen species occurring regularly and in substantial numbers in the central lake area censuses over the years. Trends will be tentatively discussed against the background of a) the actual infrastructural developments in and around the IND, basically consisting of land reclamation for agricultural purposes, road-building and the construction of up- and downstream dams, and b) ecological changes ensuing from these actions or caused by IND fisheries and cattle breeding. All these interventions will be succinctly described hereafter; for more ample descriptions see *Living on the edge* (Zwarts *et al.* 2009).

Acknowledgements

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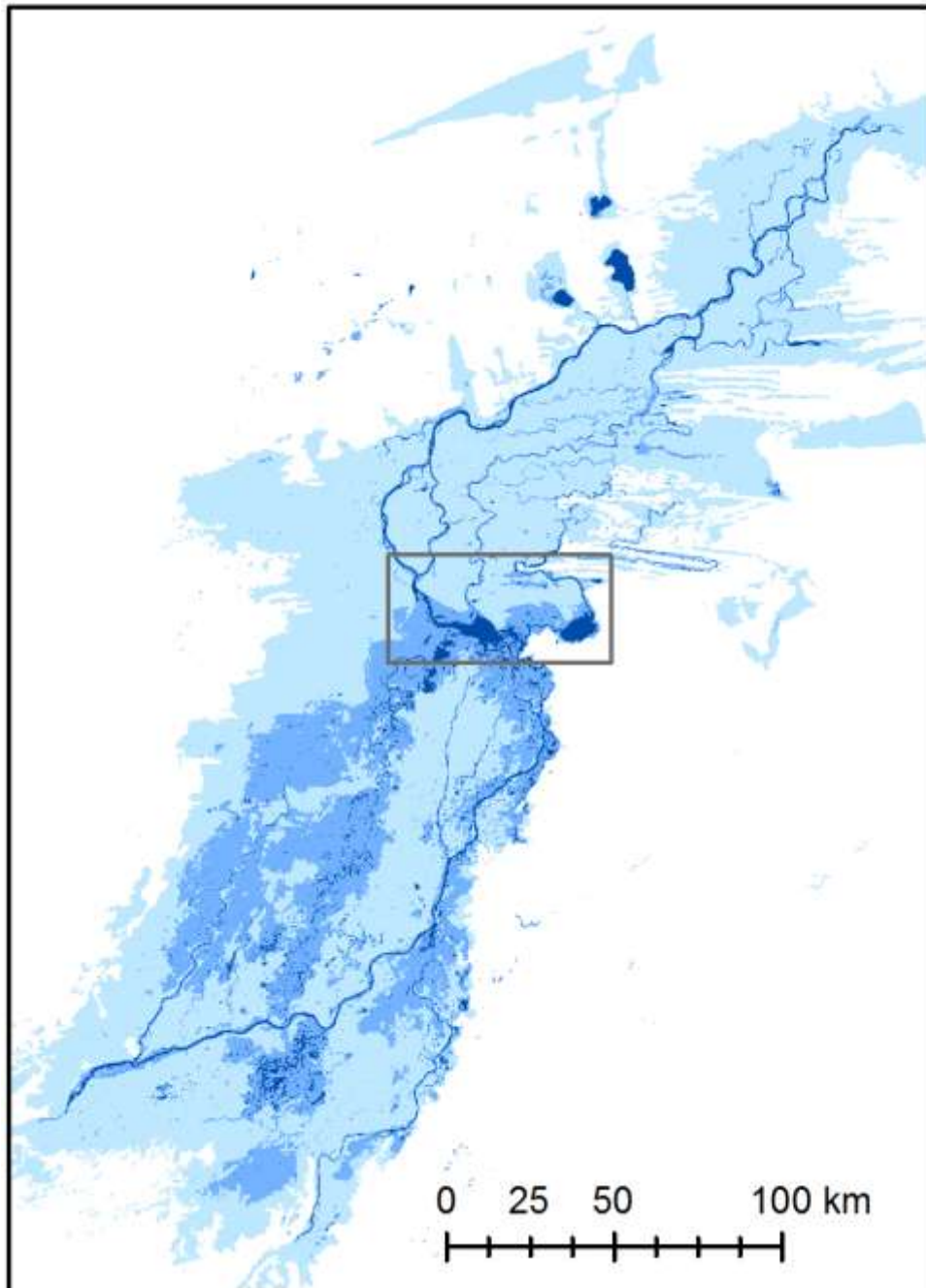


Fig. 2. Flood extent of the Inner Niger Delta. The maximal flooding in a year with a high discharge of the Niger and Bani Rivers is indicated in light blue (31,000 km²). 2011 was a dry year and not more than 10,000 km² was flooded in November (sky blue). The bird count was performed in February 2012, three months after the peak flooding. The water level has fallen from 400 cm to about 100 cm and only the area indicated in dark blue was still covered by water. That is why all water birds in the southern and central part of the Inner Niger Delta were concentrated in the central lakes within the square. Fig. 3 shows the same area on a larger scale.

The water bird monitoring system, started in 1992, is based on bird counts of the central lakes being done during the northern winter when the local water level is beneath 250 cm, i.e. the surrounding floodplains are dry and birds are forced to concentrate in the low-lying central part of the Inner Niger Delta.

2 Hydraulic works

Dams and embankments

Embankments along the Niger River are known since the late 1920s, when the gravity-fed Baguinéda polder near Bamako became operational. In the 1940s a huge irrigation scheme has been created downstream of Segou (Office du Niger), for which the Markala dam in the Niger River was built in order to guarantee sufficient water supply for this area (see below). The Great Drought starting in the early 1970s initiated other embankments along the Niger and its huge floodplain (Ségou, Ténenkou, Mopti) where in the framework of food security rice can be grown in flood-fed areas with semi-controlled water management. During the latest decades a growing energy need led to the construction of dams (Niger River: Sélingué 1982; Senegal River: Manantali 1987) for hydro-electric purposes, next to water supply for agriculture schemes.

Most recent developments in this domain are the Talo dam built near Bla and Djenné in the Bani River, the Niger's main tributary in Mali, whereas downstream of the IND a dam is (nearly) under construction near Taoussa (NW of Gao). Water stored by this downstream dam will at least impact ecological conditions in the northern IND (Wymenga & Zwarts 2009). A major impact, at last, is expected from the construction of a dam to be executed on the upper reaches of the Niger in Guinea.

Land reclamation

Growing human populations have led to continuously increasing pressure on natural resources, and the Niger River basin doesn't escape this trend. In the Delta Mort, an area along ancient river branches (so-called falas) just upstream the actual IND, almost 75 000 ha of former dryland has, since the 1940s, been turned into an irrigation scheme focusing on rice, with other crops coming up. Further upstream smaller-scale agricultural schemes have been created near Bamako and Sélingué, and recently on the Bani, the Niger's main tributary in Mali (see above). Near-future plans comprise reclamations encroaching into the southern IND, withholding more and more irrigation water and thus adversely affecting the inundation of the IND downstream. This translates into socio-economic and ecological setbacks like less grazing and fishing grounds, higher risks of rice crop failure and a further limitation of feeding areas for staging and wintering waterbirds.

Road infrastructure

Until recently the IND constituted a relatively inaccessible zone where boats play an important role in transport of men, animals and goods. However, improved roads are being or have been constructed along the western and eastern IND, thus stimulating public and business transport around the IND, and in a wider scope between southern and northern Mali. Besides, the planned extension of irrigated rice crop area within the IND implies embankments with road tracks disclosing the IND even further. Given the availability, since the latest decades, of ice used for fish transport and the assessed exploitation of waterbirds in the IND, these new roads may substantially increase the trade reach of these birds. Plucked Garganeys have already been found for sale in Bamako, whereas these are heard being traded in neighbouring Burkina Faso.



There is an intense fisheries in the Inner Niger during receding water. Until some years ago, this did not hamper water birds to exploit the floodplains, since the fishermen usually remained on the river and in the many creeks, as a consequence of which large parts of the extensive floodplains were available as feeding and resting sites for the water birds.



In recent years, fishermen have started to make large exclosures using very long, fine-meshed nets (mesh width 1 cm) to catch the fish growing up in the bourgou fields. In this way the extensive water meadows are split up in large parcels being visited regularly during receding water. This gives a lot of disturbance and severely restricts the possibilities for shy water birds to feed on the receding floodplains (e.g. Glossy Ibis, Black-tailed Godwit) or to find a quiet resting place during daylight hours (Garganey)

3 Ecological impact

Birds

As already indicated above, the hydraulic engineering works in the Upper Niger Basin have already caused a reduction of the IND's inundated surface area. With the encroachment of these activities into the Inner Delta, and taking the planned interventions upstream (Fomi dam in Guinea, extension of rice culture in the Delta Mort) into account, it leaves no doubt that bird populations, afro-tropical as well as palearctic, are actually under pressure. Dry years with limited floodplain inundation have shown, for instance, adverse effects on breeding success and survival of afro-tropical Kittlitz's Plovers and Spur-winged Geese (van der Kamp *et al.* 2005), and survival of migrant waterbirds depends on food resources (for pre-migration energy storage) which increase in harvestability with flood volume (see Zwarts *et al.* 2009). It is to be foreseen that the combination of dry years and hydrotechnical drought may incur dramatic effects on the size of breeding and wintering waterbird populations in the IND.

Grazers

In the old days the IND floodplains must have shown large herds of wild herbivores like those we are still familiar with in more eastern parts of Africa. Today these wild herds have been totally replaced by domestic grazers in the IND, their numbers still being on the increase despite serious losses during the Great Drought in the second half of the past century (1971-1993). Grazing pressure has therefore become more and more intense, which is expected and seen to impact on survival of grazers and birds, particularly under a blistering sun during the last months before the rainy season. To prevent livestock losses of this kind, many project initiatives have been taken to grow bourgou (*Echinochloa stagnina*), a widely present floodplain plant with hardly any competitors in water depths between 4 and 5 m. Bourgou is a high-quality fodder which is harvested by the end of the flood season and traded on the market to get the animals through the hot season (April-June). These bourgou projects came up during the Great Drought when the area of optimal growing habitat decreased by almost 50%, and were financed by international aid organisations. Bourgou habitat favours the fish- and insect-eating bird community, as noted during waterbird density counts carried out between 1 November and 15 March in 2001-2004.

Fisheries

The number of fishermen increased almost fourfold between 1967 and 2003, but they were unable to bring more fish to the market than they initially did; every year 10 000 to 50 000 tons were traded, whereas the annual yields turned out to be closely related to maximum flood levels in the previous year. The intensified fishing effort may be concluded from the enormous increase of fishermen, but fishing techniques also diversified. Since the 1980s the usual fishing methods comprising standing and floating nets, seines, hooklines and smaller-sized cages were added by ever more cast nets, big egg-shaped cages placed in barrage-formation across the smaller and medium-sized watercourses, and in November 2008 large heavy-quality nets tended across the stream, until then only seen in the Korientzé area canal and considered an illegal technique, were noticed throughout the southern Delta during a waterbird colonies survey. These had not been seen during earlier surveys in 2002 and 2005. All these newcomers are fine-meshed, but the existing fishing nets also reduced their mesh-size, from 50 mm at the onset of the Great Drought (early 1970s) to some 10-15 mm observed in 2007.

Fishermen in the southern IND go with the flow, fishing in receding waters behind the flood crest as it progresses from south to north through the delta. They end up in the central lakes where they mingle with the local fishing community allowing them to deploy their fishing

activities on the basis of traditional agreements. When the season ends they used to return to their villages upstream, but during the 1990s many of them started to stay in the Debo area where their originally seasonal settlements got a permanent character, particularly on the western and northern shores of Lake Debo. Walado Campement, in the Lake Walado area at the mouth of the Diaka, went through a similar process during the Great Drought and became a permanent village; this, however, was rather driven by drought and concerned fishermen living nearby, whereas overfishing with related poverty seems to have triggered permanent settlements during the 1990s.

It becomes more and more clear that fishing in the IND has no future, unless fishery measures would be taken. The latest initiatives taken by the Lake Debo fishing community, seen this year (2012), are massive bourgou plantations completely enclosed by fine-meshed nets. Fish fry in the last phase of receding waters takes refuge in the bourgou and grows for a while, being caught now effectively and leave next to nothing for the next flood. This man-made intrusion of bourgou in Lake Debo may also impact, either positively or negatively, on waterbirds aggregating in the central lakes of the IND. It causes massive disturbance in the bourgou fields, which are important feeding areas for several heron species, especially Purple Heron, Squacco Heron and Bittern (low numbers). Fish-eaters may benefit as long as sufficient fish of relevant size-classes are available, but may also suffer from increased mortality through human predation.

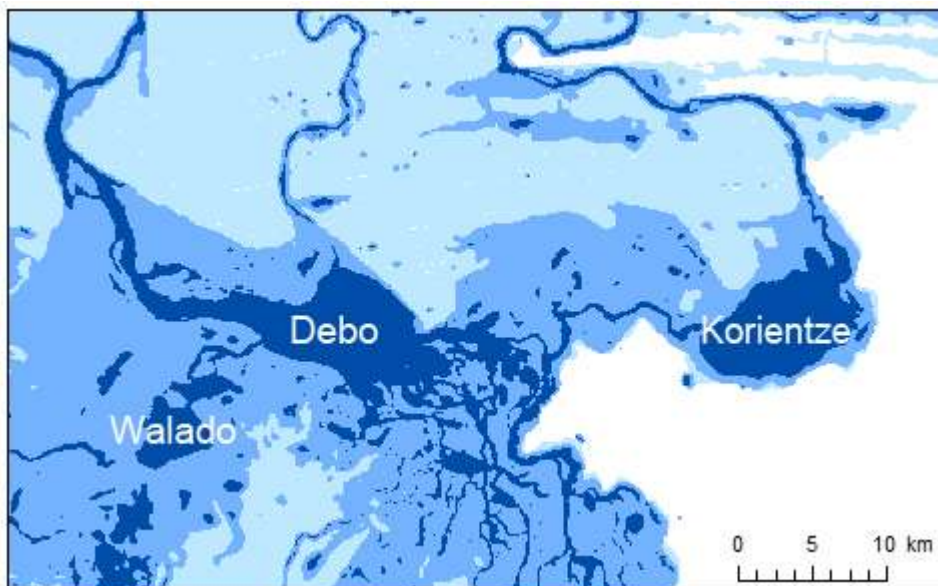


Fig. 3 The inset in Fig. 2, shown on a larger scale. The bird counts in February 2012 was restricted to Lake Debo and Lake Walado, including its direct surroundings. No count was performed of Lake Korientzé, where usually much less birds are present.

4 Census Debo and Walado lakes

Table 1 shows the results of the counts carried out in the central lakes of the Inner Niger Delta, 11-16 February 2012. Count conditions were optimal, with fair weather under an often veiled sky offering good visibility. For more information on the census methods see van der Kamp *et al.* (2005). The 2011-2012 flood was low (flood peak of 401 cm in Akka, Lake Debo, one meter lower than during the last four years), and during the census period the water level moved down from 110 to 80 cm. Large waterbird aggregations could therefore be expected.

However, overall numbers turned out to be relatively poor: 77 000 counted birds may have been some 25% less than the more usual 100 000+ totals of the past years. Are food shortages caused by overfishing beginning to impact on waterbird presence? Do local people increase their efforts to catch waterbirds as fish stocks vanish from the central lakes? Or does habitat change, from large-scale open sand- and mudflats towards a much more vegetated area through massive bourgou planting, play a role? These considerations urge for continued monitoring, in order to find out whether decreasing numbers (if real) in the central lakes can be explained by birds shifting to neighbouring areas within the IND, or by mortality induced, for instance, by food shortage. During the second driest flood season of the past century (1983-84) Roux *et al.* (1985) observed substantial numbers of waders and ducks along the Niger River stretch between Timbuktu and Gao, downstream of the IND, suggesting a drought-driven shift of waterbirds to places beyond the delta.



Counting waterbirds in the Inner Niger Delta.

Table 1. Water bird count in the central lakes of the Inner Niger Delta in mid-February 2012. Walado was counted on 13 February, Debo on 12 and 14-17 February. Bird numbers counted just east of Debo on 11 February in the Korientze area (Kor.) are given in the last column.

Scientific name	French	English	Debo	Walado	Debo+Walado	Kor.
<i>Pelecanus onocrotalus</i>	Pélican blanc	Great White Pelican	0	0	0	0
<i>Phalacrocorax africanus</i>	Cormoran africain	Long-tailed Cormorant	1078	388	1466	600
<i>Anhinga rufa</i>	Anhinga roux	African Darter	81	17	98	0
<i>Ardea cinerea</i>	Héron cendré	Grey Heron	1011	745	1756	485
<i>Ardea melanocephala</i>	Héron mélanocéphale	Black-headed Heron	0	0	0	0
<i>Ardea purpurea</i>	Héron pourpré	Purple Heron	320	729	1049	114
<i>Egretta alba</i>	Grande Aigrette	Great Egret	264	491	755	200
<i>Egretta ardesiaca</i>	Aigrette ardoisée	Black Heron	0	48	48	0
<i>Egretta intermedia</i>	Aigrette intermédiaire	Intermediate Egret	6	6	12	0
<i>Egretta gularis</i>	Aigrette à gorge blanche	Western Reef-Egret	65	5	70	2
<i>Egretta garzetta</i>	Aigrette garzette	Little Egret	2541	432	2973	480
<i>Bubulcus ibis</i>	Héron gardeboeufs	Cattle Egret	56	6	62	0
<i>Ardeola ralloides</i>	Crabier chevelu	Squacco Heron	73	311	384	10
<i>Butorides striatus</i>	Héron strié	Striated Heron	0	1	1	0
<i>Nycticorax nycticorax</i>	Bihoreau gris	Black-crowned Night-heron	0	280	280	0
<i>Botaurus stellaris</i>	Butor étoilé	Great Bittern	4	9	13	0
<i>Mycteria ibis</i>	Tantale ibis	Yellow-billed Stork	0	0	0	0
<i>Ciconia ciconia</i>	Cigogne blanche	White Stork	0	0	0	0
<i>Threskiornis aethiopica</i>	Ibis sacré	Sacred Ibis	119	4	123	53
<i>Plegadis falcinellus</i>	Ibis falcinelle	Glossy Ibis	1895	18	1913	1
<i>Platalea leucorodia</i>	Spatule blanche	Eurasian Spoonbill	37	0	37	0
<i>Platalea alba</i>	Spatule d'Afrique	African Spoonbill	1	0	1	0
<i>Dendrocygna bicolor</i>	Dendrocygne fauve	Fulvous Whistling-Duck	0	0	0	0
<i>Dendrocygna viduata</i>	Dendrocygne veuf	White-faced Whistling-Duck	8	0	8	70
<i>Plectropterus gambensis</i>	Oie de Gambie	Spur-winged Goose	0	120	120	0
<i>Alopochen aegyptiacus</i>	Ouette d'Egypte	Egyptian Goose	8	0	8	0
<i>Sarkidiornis melanotos</i>	Canard à bosse	Knob-billed Duck	0	0	0	0
<i>Nettapus auritus</i>	Anserelle naine	African Pygmy-Goose	0	0	0	0
<i>Anas querquedula</i>	Sarcelle d'été	Garganey	175	0	175	4500
<i>Aythya nyroca</i>	Fuligule nyroca	Ferruginous Duck	0	6	6	0
<i>Gallinula chloropus</i>	Poule d'eau	Common Moorhen	52	0	52	0
<i>Porphyrio porphyrio</i>	Poule sultane	Purple Swamphen	0	234	234	0
<i>Porzana pusilla</i>	Marouette de Baillon	Baillon's Crake	1	0	1	0
<i>Actophilornis africana</i>	Jacana à poitrine dorée	African Jacana	79	214	293	5
<i>Microparra capensis</i>	Jacana nain	Lesser Jacana	0	0	0	0
<i>Rostratula benghalensis</i>	Rhynchée peinte	Greater Painted Snipe	0	0	0	0
<i>Himantopus himantopus</i>	Echasse blanche	Black-winged Stilt	3458	79	3537	120
<i>Burhinus senegalensis</i>	Oedicnème du Sénégal	Senegal Thick-knee	3	0	3	0
<i>Pluvianus aegyptius</i>	Pluvier fluviatile	Egyptian Plover	24	3	27	0
<i>Glareola pratincola</i>	Glaréole à collier	Collared Pratincole	1657	84	1741	0
<i>Vanellus spinosus</i>	Vanneau éperonné	Spur-winged Plover	304	17	321	12
<i>Vanellus tectus</i>	Vanneau coiffé	Black-headed Lapwing	4	0	4	0
<i>Pluvialis squatarola</i>	Pluvier argenté	Grey Plover	2	0	2	0
<i>Charadrius hiaticula</i>	Grand Gravelot	Common Ringed Plover	1795	9	1804	45
<i>Charadrius dubius</i>	Petit Gravelot	Little Ringed Plover	6	3	9	0

<i>Charadrius alexandrinus</i>	Gravelot à collier interr.	Kentish Plover	0	0	0	0
<i>Charadrius pecuarius</i>	Gravelot pâtre	Kittlitz's Plover	696	25	721	23
<i>Limosa limosa</i>	Barge à queue noire	Black-tailed Godwit	7670	616	8286	2
<i>Numenius arquata</i>	Courlis cendré	Eurasian Curlew	154	0	154	0
<i>Tringa erythropus</i>	Chevalier arlequin	Spotted Redshank	1495	0	1495	1
<i>Tringa totanus</i>	Chevalier gambette	Common Redshank	1	0	1	0
<i>Tringa stagnatilis</i>	Chevalier stagnatile	Marsh Sandpiper	27	0	27	0
<i>Tringa nebularia</i>	Chevalier aboyeur	Common Greenshank	878	9	887	47
<i>Tringa ochropus</i>	Chevalier culblanc	Green Sandpiper	0	1	1	0
<i>Tringa glareola</i>	Chevalier sylvain	Wood Sandpiper	163	21	184	10
<i>Actitis hypoleucos</i>	Chevalier guignette	Common Sandpiper	10	1	11	0
<i>Gallinago gallinago</i>	Bécassine des marais	Common Snipe	4	0	4	0
<i>Gallinago media</i>	Bécassine double	Great Snipe	1	0	1	0
<i>Arenaria interpres</i>	Tournepieuvre à collier	Ruddy Turnstone	0	0	0	0
<i>Calidris minuta</i>	Bécasseau minute	Little Stint	5607	134	5741	180
<i>Calidris ferruginea</i>	Bécasseau cocorli	Curlew Sandpiper	690	0	690	0
<i>Calidris alpina</i>	Bécasseau variable	Dunlin	0	0	0	0
<i>Philomachus pugnax</i>	Combattant varié	Ruff	30214	390	30604	70
<i>Larus fuscus</i>	Goéland brun	Lesser Black-backed Gull	27	13	40	0
<i>Larus cirrocephalus</i>	Mouette à tête grise	Grey-headed Gull	2	0	2	0
<i>Larus ridibundus</i>	Mouette rieuse	Common Black-headed Gull	4	0	4	0
<i>Chlidonias hybridus</i>	Guifette moustac	Whiskered Tern	862	45	907	90
<i>Chlidonias leucopterus</i>	Guifette leucoptère	White-winged Tern	952	15	967	10
<i>Chlidonias spec.</i>	Guifette non ident.	Whisk./Wh.-winged Tern	2000	0	2000	0
<i>Gelochelidon nilotica</i>	Sterne hansel	Gull-billed Tern	2437	367	2804	130
<i>Sterna caspia</i>	Sterne caspienne	Caspian Tern	1619	178	1797	7
<i>Sterna albifrons</i>	Sterne naine	Little Tern	68	7	75	0
<i>Pandion haliaetus</i>	Balbuzard pêcheur	Osprey	5	2	7	1
<i>Haliaeetus vocifer</i>	Pygargue vocifer	African Fish-Eagle	0	0	0	0
<i>Circus aeruginosus</i>	Busard des roseaux	Western Marsh Harrier	130	155	285	25
<i>Circus macrourus</i>	Busard pâle	Pallid Harrier	0	1	1	0
<i>Circus pygargus</i>	Busard cendré	Montagu's Harrier	4	1	5	1
<i>Milvus migrans</i>	Milan noir	Black Kite	12	24	36	10
<i>Falco peregrinus</i>	Faucon pèlerin	Peregrine Falcon	1	0	1	0
<i>Ceryle rudis</i>	Martin-pecheur pie	Pied Kingfisher	76	37	113	4

Species account

Table 1 also contains a number of species not observed during the 2012 census but occurring in previous censuses in January-March. Great White Pelicans, for instance, were not seen this year, whereas with this water level, their first arrivals used to be noticed until recently. They may have sensed the rapid decline in the usual fish bonanzas and have shifted to other, more pristine fishing grounds. Black-headed Herons were not seen, but like Yellow-billed and White Stork they occur in small numbers and can easily be missed; they tend to show up either in drier areas (White Storks associating with cattle) or by the end of the flood cycle when water levels are very low. Fulvous Whistling-Duck, Knob-billed Duck and African Pygmy Duck had their heydays in Debo by the end of (and caused by) the Great Drought, and their absence in 2012 fits in the observation pattern of birds seen in generally small numbers during most counts but not all. Lesser Jacana and Greater Painted Snipe are among the species hiding in vegetation; they are mostly seen at the end of the flood whilst showing up then on bare shores.

Waders observed in minimal numbers and not yearly, including vagrants (1991-2012) are Ruddy Turnstone (max. 27, Dec. 1993; none in 2012), Kentish Plover (max. 4, Mar 2011; none in 2012), Grey Plover (max. 7, Jan-Mar 1994, 2003, 2005; 2 in 2012), Bar-tailed Godwit (1, Feb. 1995), Sanderling (1, Jan.1996; 2, Aug. 1999), Broad-billed Sandpiper (1, June 2004), Dunlin (max. 3, June 2003; none in 2012), Red Knot (2, June 2001; 1, Feb 2004), Terek Sandpiper (1, June 2005) and Common Redshank (max. 8, Feb. 2006; 1 in 2012). These records seem to suggest that their distribution maps in Birds of Western Africa (Borrow & Demey 2004) should be revised or reconsidered in a number of cases. Moreover, Whimbrels have not been observed nor heard at all, whereas BWA indicates this Niger zone as one of its main winter ranges.

The Dentaka flood forest in the Walado area was standing dry, so the huge numbers of cormorants and egrets nesting and roosting here had already dissolved over the IND. Practically all African Darters had left their roost too; numbers counted in Debo were higher, this time, than those leaving the forest at dawn, whereas roosting Darters greatly outnumber the birds seen by day as long as the forest stands in water. African Darters are vulnerable, as they breed, like Black Herons, only in the Debo area. Great Bitterns were regularly seen, which is explained by the low water table at which the birds gather in the remaining areas of optimal depths. Fishermen also operate in these places, alerting and chasing them now and then. In the northern lakes of the IND they are frequently caught for local consumption, together with other waterbird species like Purple Heron and Purple Gallinule. Since monitoring started in the early 1990s and Great Bitterns were instantly spotted (new to Mali) it soon became clear that the IND hosted a regular wintering population estimated, after density counts executed in the early 2000s, at several hundreds or even a few thousand birds. Although not seen during the Debo-Korientzé census, the observation of an immature male Little Bittern (showing first black mantle feathers) in a riparian *Acacia kirkii* tree opposite Akka is worth being mentioned. The African subspecies *I. m. payesii* is a regular bird in the Delta Mort/Office du Niger zone during the rainy season (July-Aug), but for now we assume that the handful of winter records in the IND (over the latest decades) are nominate birds.

The before-mentioned density counts revealed also the presence of small crakes which were hard to identify while struggling through bourgou and other entangling vegetation. We nevertheless succeeded in identifying Little Crake *Porzana parva*, and while counting on the southern shore of Lake Debo, we ran into the ripped-off head of a freshly dead Baillon's Crake *Porzana pusilla*. Both species are given a blank for the IND in Birds of Western Africa (2004). The most numerous small waders in the central lakes are Common Ringed Plover, Curlew Sandpiper and Little Stint. The first two show aggregations up to a few thousand birds which

practically all leave for their breeding grounds at boreal latitudes (CRP), or have substantial numbers of summering birds (CS) providing maybe clues as to reproductive success in distinct areas within their breeding range. Little Stints have turned out to be almost as abundant as Ruff and Wood Sandpiper, although counted numbers in recent years tend to be somewhat lower than around the turn of the century. Two Grey-headed Gulls observed in Lake Debo correspond with their status of species close to extinction in the IND, whereas hundreds of birds could still be seen during the 1990s.

As to birds of prey seven counted Ospreys constitute a record number which might reflect the major population increase in Europe since the 1970s. However, compared to this 'record' number Osprey presence should have been next to nil in the 1970s when the European population was half as large as it is today. Aerial counts nevertheless revealed the opposite picture: on average 3-4 times more birds in the 1970s compared to 1999-2001; this might reflect increased human persecution but also hint -again- at fish stocks running out of relevant size-classes.



The floodplains Inner Niger Delta are covered by a dense vegetation of floating grasses: wild rice in shallow and bourgou, in deep water. Bourgou is also planted by local people.



Black-tailed Godwits in the Inner Niger Delta feed in rice fields, but when the low-lying floodplains start emerging, the birds switch to this bare habitat to feed in shallow water on small bivalves.

5 Species trends and 2012 census results

We selected 14 species to investigate trends in counted numbers over the years, whereas in graphs showing counted totals against water depth the census results of 2006-2012 are given in red, to find out whether counts in recent years differ from previous years; the 2012 census is explicitly indicated.

Long-tailed Cormorant – *Phalacrocorax africanus*

The IND hosts a large and stable population estimated at some 17 000 to 20 000 breeding pairs, despite a serious collapse with losses up to 75% in 2005 from which it had recovered three years later. They show up in numbers as high as 12 000-13 000 birds in the Debo area which represents not more than 20% of total numbers assessed during roost counts in the southern IND. Highest numbers occur with water levels between 2 and 4 m (Akka gauge, Lake Debo). Recent count totals appear somewhat lower, while numbers counted since 1991 show a downward trend.

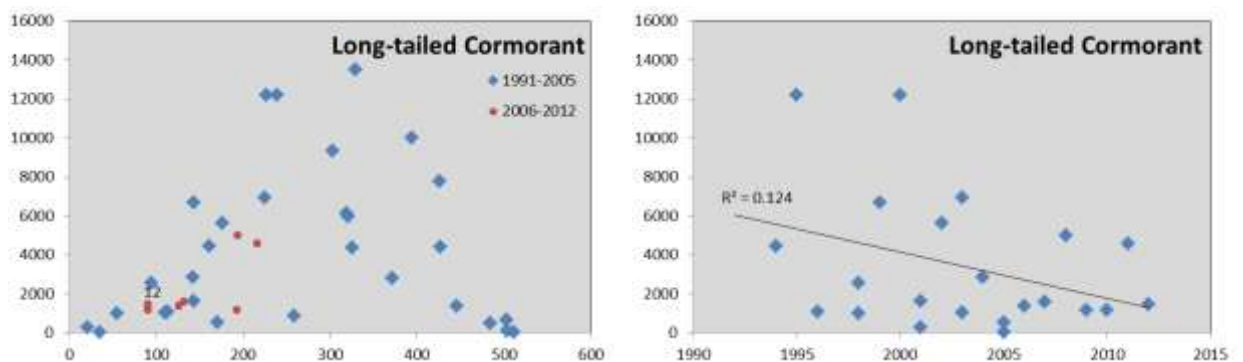


Fig. 4. Number of Long-tailed Cormorants counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Purple Heron – *Ardea purpurea*

The Purple Heron population in the IND consists essentially of palearctic migrants, although breeding has been recorded. Major numbers (> 1000 birds) are generally counted in Debo when water levels are between 1 and 2.5 m. This may seem too deep to stand fishing but Purple Herons benefit, like several other species, from the immense fields of floating bourgou on which they can stand fishing and resting. Totals in 1998-2005 usually did not exceed 2000 birds but in 2000, after a high flood, more than 3000 birds were counted. Numbers seen over the years do not show a clear trend, while numbers counted in recent years do not seem to be off-range.

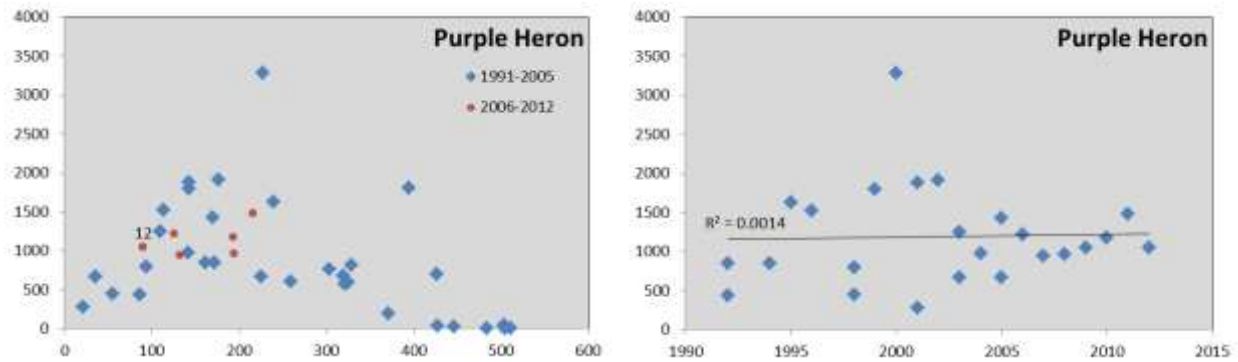


Fig. 5. Number of Purple Herons counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Grey Heron – *Ardea cinerea*

Although only a minor part of the Grey Heron population in Europe crosses the Sahara on migration, thousands are counted in the central lakes of the IND when the flood recedes. They breed irregularly, in very small numbers, and only during high floods. Their numbers keep growing at lowering water levels, even beyond the point where bourgou fields fall dry. Purple Heron are by then forced to leave the area whereas Grey Herons continue to fish in open, shallow water. The recent counts since 2005 reveal relatively low-ranging totals, and the count series since 1991 shows a clear downward trend.

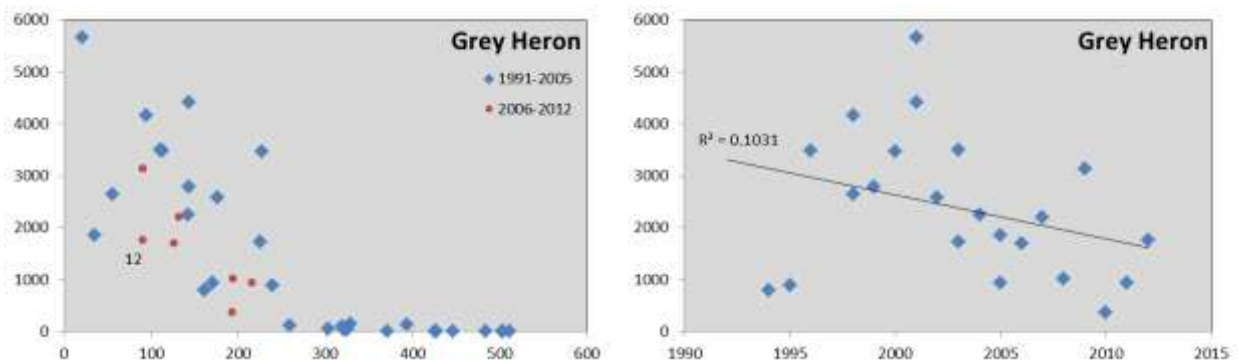


Fig. 6. Number of Grey Herons counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Little Egret - *Egretta garzetta*

The afro-tropical and paleartic populations are indiscernible in the field, and thus not more than a general impression or trend can be given of Little Egret presence in the IND. Roost counts in the first decade of this century suggested 1000-1500 bp, which might represent a major part of the Little Egrets counted in the Debo-Korientzé area. The total estimation for the IND based on density counts carried out in 2002-2004 indicates, however, a minimum wintering total of 25 000 – 30 000, which would reduce the afro-tropical share to some 20-25%.

Numbers counted peak when water levels fall beneath 2 m, whereas the recent count series (2005-2012) shows results relatively high in the numbers-water depth scatter. This supports the upward trend shown in the census results over the years 1991 – 2012. To be noted: the 2012 count result is the only one underneath the trend line; twice as much birds have been seen at similar water depth in one of the previous recent counts.

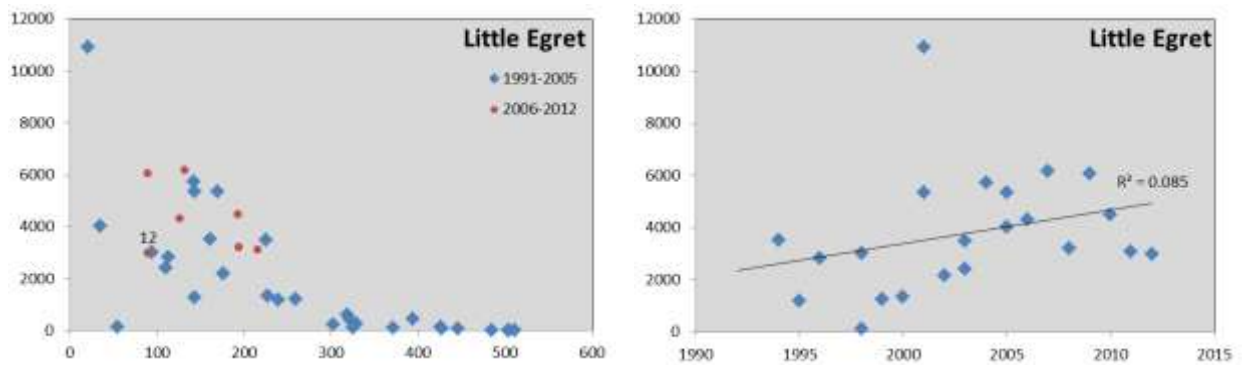


Fig. 7. Number of Little Egrets counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Black Heron - *Egretta ardesiaca*

A species of great concern as it is considered close to extinction in the IND. Skinner *et al.* (1987) estimated their population in the 1980s at 200-250 breeding pairs, whereas counts since 1991 show a rapid decline suggesting a loss of some 90% of the birds. When water depth becomes less than 3 m the species used to show up in dense, lively umbrella groups, but their present scarcity makes it hard to find such a scene.

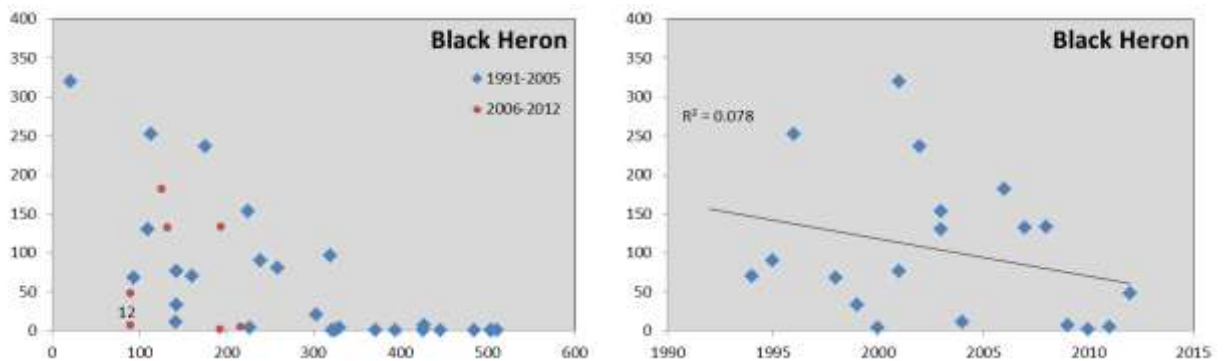


Fig. 8. Number of Black Herons counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Glossy Ibis - *Plegadis falcinellus*

Until the 1980s Glossy Ibis aggregations of 25 000 – 35 000 birds were to be observed in the Debo-Korientzé zone, but these days are long gone. Between the 1970s and the early 2000s numbers have fallen deeply, without evidence of recovery in recent time. The species has, however, recolonised the western Mediterranean (Italy, Spain, Portugal, France, Algeria, Morocco) by the end of the latest century whereas today several thousands of pairs are recorded breeding in the area. Recent observations of increased numbers during the non-breeding period along the Senegal River suggest that Glossy Ibises originating from the West-Mediterranean population have a wintering zone in this freshwater basin; so far, no colour-ringed birds from this population have been spotted in the IND.

Glossy Ibis numbers strongly rise around 2.5 m at the Akka gauge. From this moment on large areas with small molluscs, their main food during pre-migration fattening, are about to emerge. The water table graph shows under-performing count results, in line with declining census totals over the years.

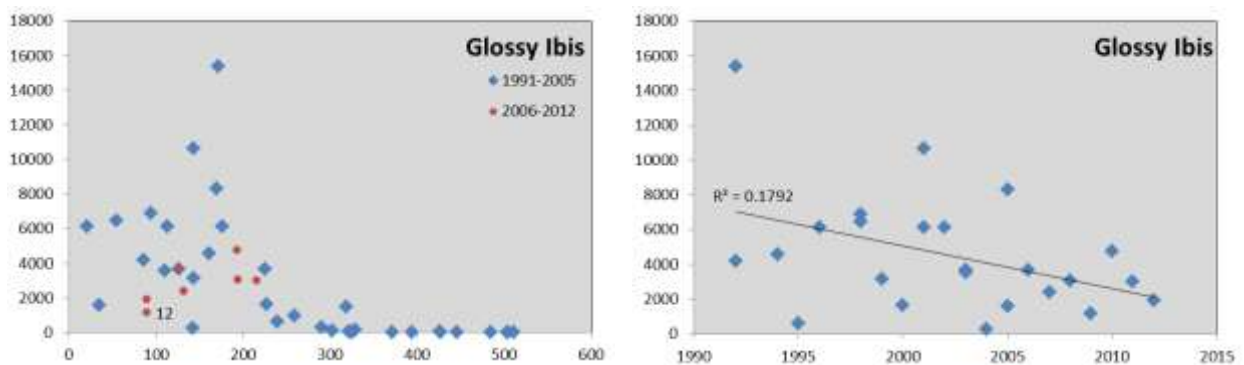


Fig. 9. Number of Glossy Ibis counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Black-winged Stilt - *Himantopus himantopus*

This wader species occurs widespread in and beyond the IND, and although its central lakes may host aggregations of more than five thousand birds this does not represent more than 50% of the total population, as during a recent aerial census by a French team more than 10 000 birds were counted. Black-winged Stilt has only once been recorded breeding in the IND (2000). The recent counts do not differ from the picture in earlier years showing a steep rise below 2 m on the gauge of Akka, where the Niger River leaves Lake Debo; no clear inter-annual trend is visible either.

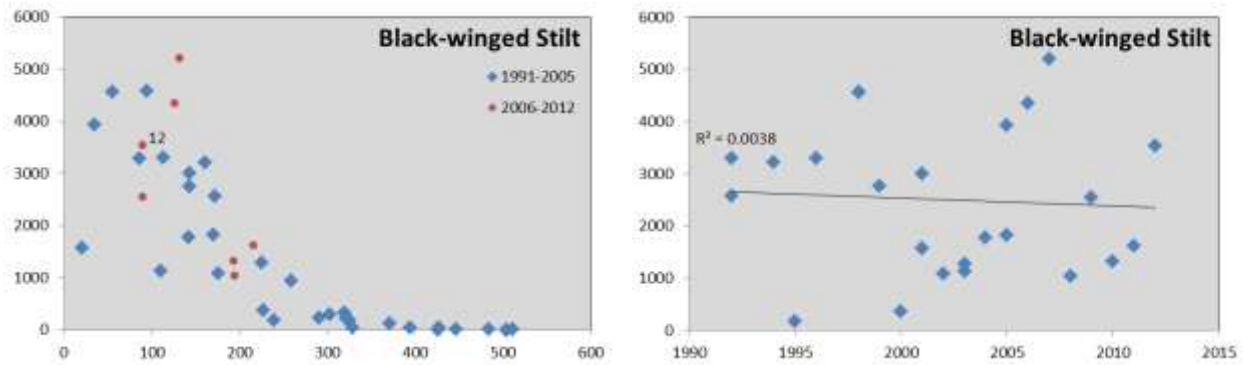


Fig. 10. Number of Black-winged Stilts counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Black-tailed Godwit – *Limosa limosa*

Black-tailed Godwits gather in huge concentrations of 10 000 to 40 000 birds in the Debo area as they seem nowadays highly dependent on the massive stock of small *Corbicula* molluscs in this area. During higher floods, when this mollusc stock cannot be sufficiently exploited as it is not harvestable in time, they have been observed feeding –again in large concentrations- on spilt rice, just as in the rice zone along the Atlantic coast. Godwits show up in high numbers as soon as the 3 m level is reached, peak between 2 and 1 m but decline when the water table drops further, unlike Black-winged Stilt numbers that continue to rise. This difference may be explained by the fact that latter species feeds not only on molluscs but also on fish which stays available when mollusc exploitation has ended.

West-European Blacktails have suffered a dramatic decline on their breeding grounds over the latest decades. This has clearly been sensed in their Atlantic winter quarters where numbers declined proportionally. IND birds originate from more eastern breeding areas where suitable habitats are presumably less affected by modern farming; numbers over the years have only slightly declined in the IND. However, the 2012 census showed an unusually low total in relation to flood level and date. Whether this is a cause of concern is as yet unclear, but as indicated above, large-scale bourgou planting may be at stake: it reduces the area of open feeding grounds, and covers the adjacent downstream sandflats with muddy substrate where filtering *Corbicula* bivalves do less well.

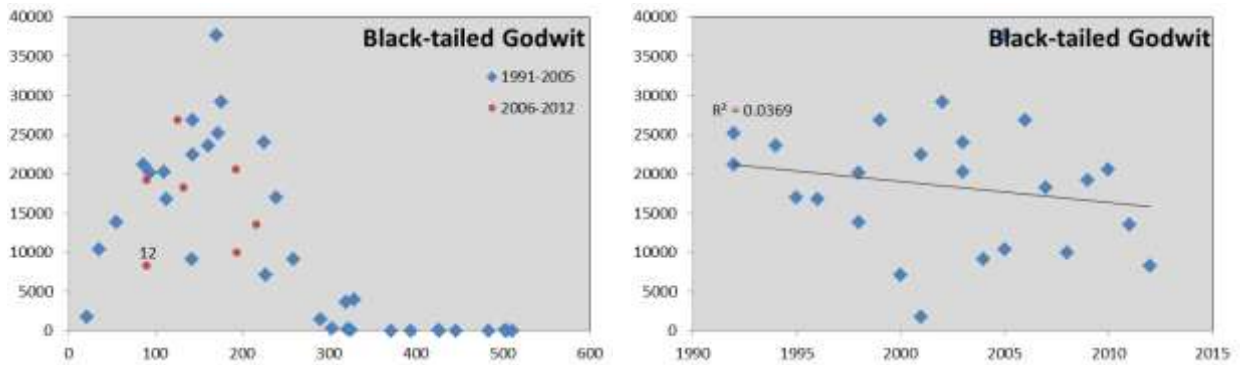


Fig. 11. Number of Black-tailed Godwits counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Common Greenshank – *Tringa nebularia*

A widespread species in the IND that concentrates partly in Debo, similar to the Black-winged Stilt distribution pattern. Their arrival is noted around 2.5 m on the Akka gauge and shows a steep rise. They may associate with Spotted Redshanks, Black-winged Stilts and Little Egrets in frenzies attracting Whiskered and White-winged Terns keen on the benefits of these communal fish chases. Greenshank numbers thrived in recent years which contributed strongly to an upward trend over the years but counted totals fell deep down since the top years 2009 and 2010. Could Greenshank be outcompeted in the quest for fish fry becoming increasingly scarce?

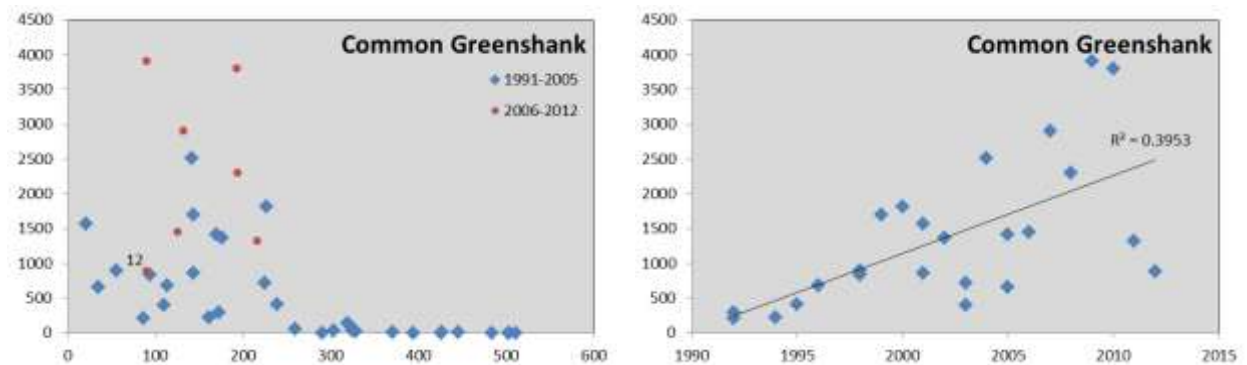


Fig. 12. Number of Common Greenshanks counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Whiskered Tern – *Chlidonias hybrid* and White-winged Tern – *Chlidonias leucopterus*

Both marsh tern species are abundantly observed in the central lakes during the flood season, with just a handful of single Black Tern records over the latest decades. The populations already present during total inundation of the area, when very few other waterbirds are seen, are joined by birds leaving more southerly whereabouts in the IND or elsewhere as these dry out. Strong SW-NE movements from both species towards Debo along the Diaka , a Niger branch, have been noticed as the Akka gauge showed water levels declining between 4 and 3 m. No real surprise, therefore, that numbers of both species rise in the course of the deflooding season. Looking separately at the graphs showing numbers against water table, the count results of recent years stand out as they show contrasting ranges in relation to trend lines. Whiskered numbers are higher than average whereas those of White-wings stay lower than expected. This is also reflected in the census results since the mid-1990s; by then White-winged Terns were usually more numerous (max. 5900, Jan. 1997) than Whiskered, whereas by the mid-2000s latter species became more common than White-wings, with an impressive maximum of 7200 birds in March 2009. It seems as yet unlikely that Whiskered Tern’s settlement as a breeding bird in the IND in the early 1990s has boosted their numbers in the central lakes, since hardly any fledglings have been observed over the years.

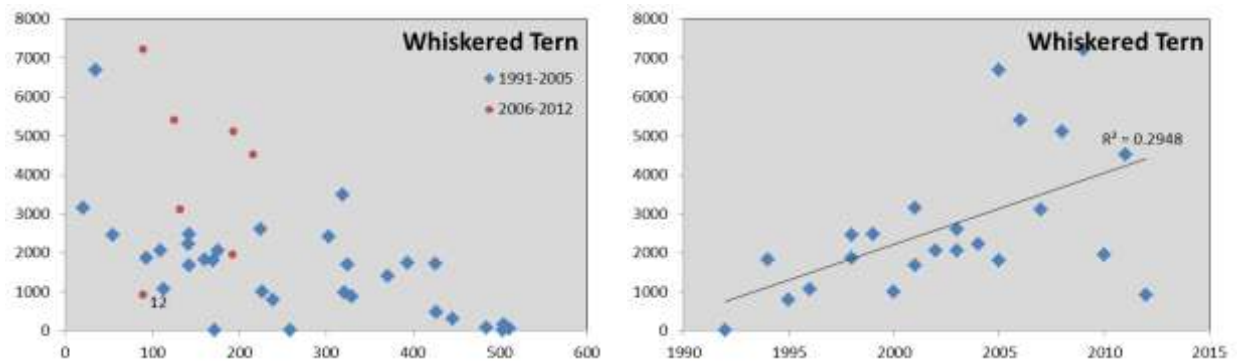


Fig. 13. Number of Whiskered Terns counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

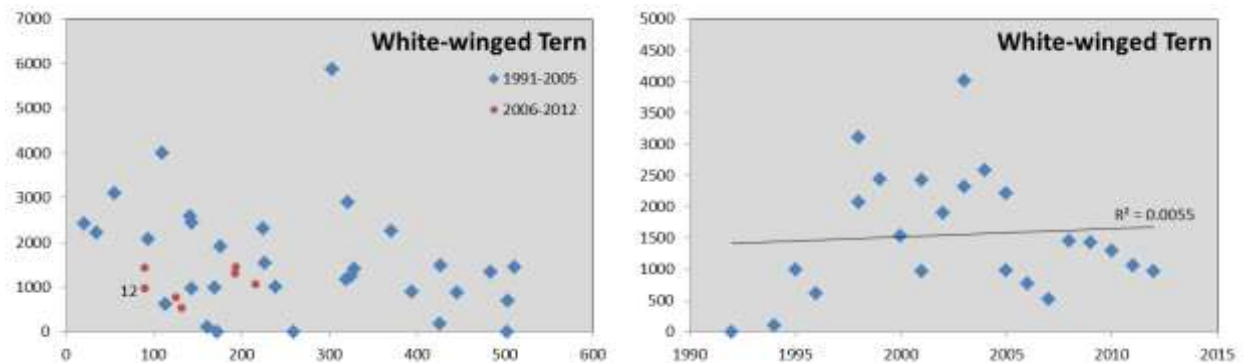


Fig. 14. Number of White-winged Terns counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Gull-billed Tern – *Gelochelidon nilotica*

Hundreds of Gull-billed Terns are already observed when the water table in the central lakes is still between 3 and 4 m. Once over thousand birds -one metre further down- the increase keeps looking steady, featuring, however, recent count totals well above the trend line. This is in line with the steady increase since the early 1990s, from some hundreds to almost 4000 birds in 2007. However, in *Living on the edge* (Zwarts *et al.* 2009) is put forward that the apparent inter-annual increase should rather be considered as a setback, since in the early 1990s (last years of the Great Drought) most Gull-billed Terns had feeding grounds beyond the central lakes area, but still roosted in Debo. Whereas hundreds of birds were counted by day, some 6000 birds arrived at their Debo roost at dusk. This suggests that the birds gradually came back to Debo when the floods improved by the mid-1990s, and turns the actual 4000 birds into a substantial decline.

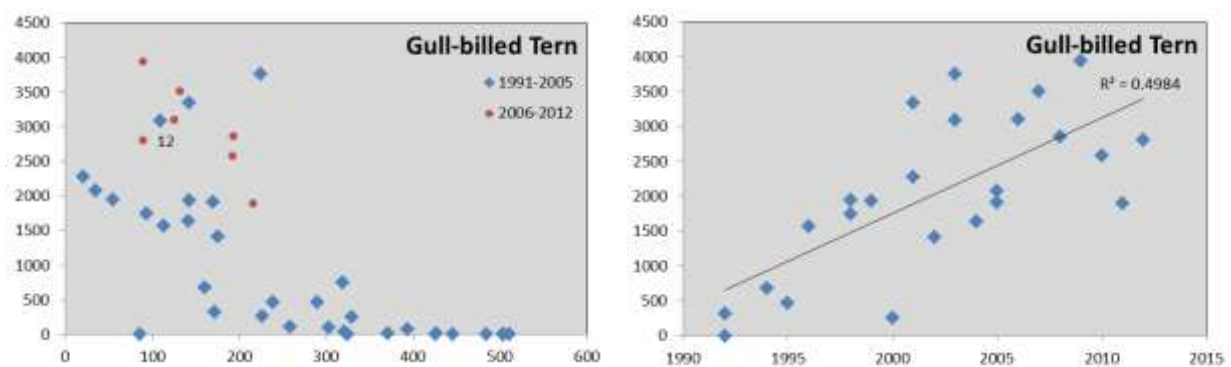


Fig. 15. Number of Gull-billed Terns counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Caspian Tern – *Sterna caspia*

The Caspian Tern population in the IND consists of palearctic migrants from the Baltic and the Ukraine, whereas on the Atlantic coast these migrants mingle with local breeding birds. Fishermen fancy Caspian Terns for their meat, and when the Debo complex is the only place left in the dry season, the entire population gathers here whilst showing up as soon as the first sandy ridges emerge, around 3 m on the Akka gauge. By 2.5 m numbers level off indicating that all birds have arrived. Numbers present show a clear relation with flooded area (km²), mortality being higher in dry years. The Debo population builds up under good flood conditions, and reacts accordingly in adverse years. However, the counted numbers in 2011 and 2012 catch the eye, as they seem disproportionately low. Similar low numbers were seen in 1995 and 1996, but Debo stayed inundated very long during these surprisingly good flood seasons, whereas 2011 and 2012 offered fine staging conditions.

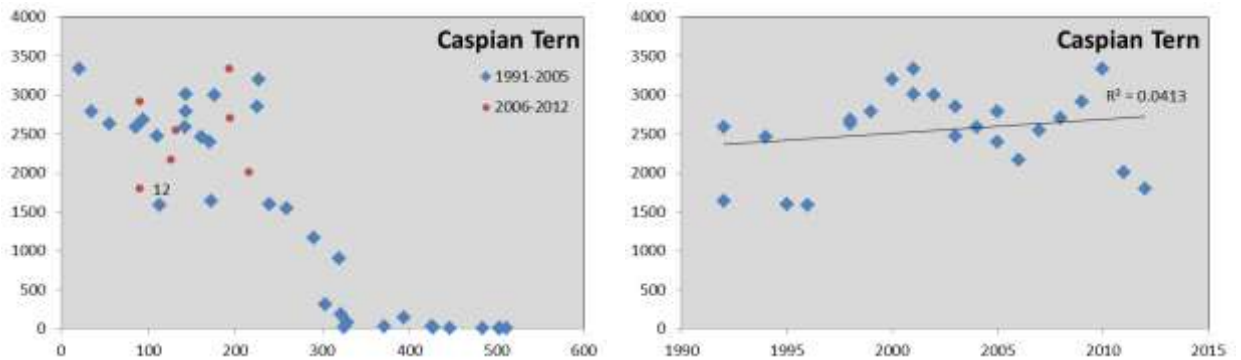


Fig. 16. Number of Caspian Terns counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.

Eurasian Marsh Harrier – *Circus aeruginosus*

Persecution and pesticides in Europe have kept Marsh Harrier breeding populations small until the 1970s. The recovery that followed led to its settlement even in habitats considered unsuitable beforehand. Notably the northern and eastern populations in Europe migrate to sub-Saharan Africa, where the large sahelian wetlands are among the first feeding areas to be encountered after crossing the Sahara desert. Most Marsh Harriers fly further south at arrival in September but some tens of birds have been counted in the central lakes around the flood peak (Oct-Dec) when the area is completely inundated. When the flood recedes they come back to Debo-Korientzé, where numbers up to some 400 birds have been counted recently. This maximum contributes, as one of the recent count results that lay relatively high in the scatter, to the upward trend over the years that has been found indeed.

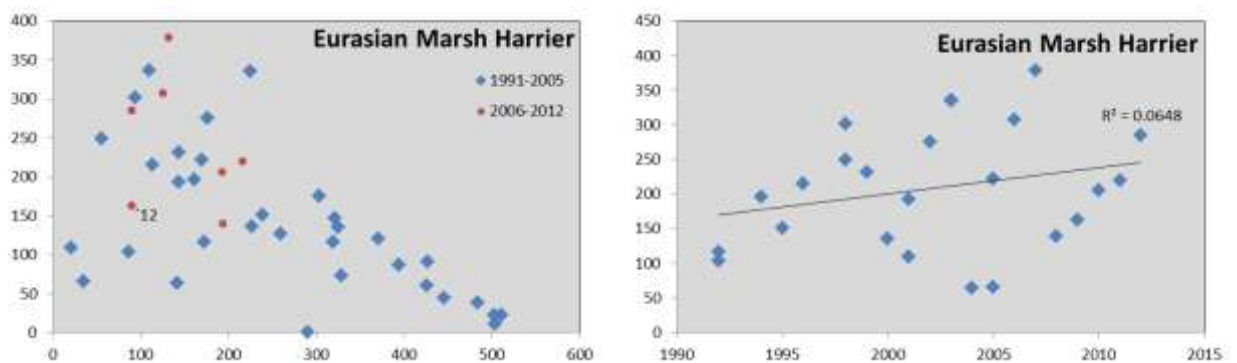


Fig. 17. Number of Eurasian Marsh Harriers counted in Lake Debo+Walado since 1991 as a function of water level (cm at the gauge of Akka; left) and during the course of the years (right) after a selection is made for counts where the water level was beneath 250 cm. The left panel shows separately the counts during the last 7 years and before. The 2012 count is indicated with the digit 12.



Enclosed bourgou plantations vs. large sandflat habitat for waders

6 Conclusions

- Fisheries have reached an alarming stage, as through overfishing even the smallest size-classes of bigger species are under attack.
- Bourgou *Echinochloa stagnina* plantations in Debo are now massively enclosed by fine-meshed fishing nets, leaving next to nothing for the next flood seasons.
- Large-scale bourgou planting by fishermen in Lake Debo, particularly during the latest flood season 2011-2012, may have adverse effects on wader survival and species distribution by reducing their feeding grounds in the only area with massive mollusc stocks, on which several wader species, like Black-tailed Godwit, Ruff and Glossy Ibis capitalize for their pre-migration energy intake.
- Pictures of 14 species show that in the latest decades (1991-2012) upward and downward trends are balanced, with some having no clear directions in between. However, the 2012 count may provide first signals of change: remarkably low totals for waders like Black-tailed Godwit and Greenshank, and for Caspian Tern where a seemingly disproportional decrease set in already in 2011, suggests that given the respective high and low floods in these two years, more than the usual mortality alone is at stake.
- Herons, egrets and other species of marshy habitat may benefit from the bourgou extensions but as these are intensively exploited their security is far from guaranteed. Fishermen have been seen shooting these birds while checking their nets.
- Without firm management measures fisheries in the IND have no future.
- This applies as well to waterbirds which would benefit from the creation of strictly protected sites where they can breed, stage and winter under good feeding and security conditions.

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