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Flowering Plants Biodiversity in Hadejia-Nguru Wetlands, Nigeria (2014)

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The flowering plants (angiosperms) represent the highest extent to which plants have evolved in the establishment of vegetation on land. They dominate every land area where plant life is possible. They also occur in freshwater and marine. In this study, a preliminary survey was conducted during the 2014 rainy season to determine the spatial biodiversity of the dominant flowering plants of the Hadejia-Nguru wetlands (HNW). During the study, the wetlands were categorized into seven locations. In each location, survey of the dominant flowering plants was carried out by careful preparation of flowering plant and identified in each zone or location. Results of the survey have shown that the wetlands are covered by several invasive grasses such as *Vossiacuspidate*, *Typhadominguensis*, and several grasses which were actually not present in the past. Similarly, most of the tree plants found in most areas was those that are typically adapted to live in marshy areas such as *Mitragynainermis*, *Phoenix reclinata*, *Acacianituda*. The survey has noted a changing pattern of the vegetation of the wetlands compared with the past. It was also evident that presently there are four distinct micro-vegetation types compared to the six reported by most researchers in the past.

Keywords: flowering plants, Hadejia- Nguru wetlands, survey, 2014

INTRODUCTION

Wetlands represent one of the major productive systems of the terrestrial landscape. They are found in every continent except Antarctica and probably represent 4-6% of the earth's surface or 7-9 million km² (Mitch and Gosselink 2000:35). Typical surveys of the wetlands of the world are found in Dugan (1993), Whigham, Dykyjová & Hejny (1993), Mitsch (1994) and Finlayson & Van der Valk (1995). Swamps, bogs, mires, marshes, deltas and fens all constitute wetlands and occur in almost every climatic

regime. Wetlands have previously enjoyed an extremely bad reputation as malarial swamps hardly suitable for cultivation and in many regions of the world they have been drained both for agriculture, or simply to subdue political opponents. They are typically occupied by residents who treat the land as a CPR and are difficult to bring under state control due to the inaccessibility of their habitat.

Wetlands have undergone a spectacular reversal in image as a consequence of scientific research during the twentieth century. It is now realized that they represent major reserves of biodiversity, that they supply irreplaceable ecosystem services and that their total productivity in fish, wildlife, grazing and agriculture is far

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greater than the agriculture that very often replaces them. In many areas of the world, wetlands loss has been halted, sometimes because hunting lobbies wish to conserve waterfowl in order to shoot them, but increasingly because they are defended by environmental advocacy groups. This is very much less the case in developing countries where an unequal distribution of power often means that the livelihoods of poor and dispersed households living in inaccessible habitats are sacrificed to the interests of peri-urban, articulate pressure groups. Without modern communications, the residents of wetlands may demonstrate considerable local anger but will be unable to make their views heard at higher levels where the power lies and key decisions are made. Wetlands continue to be lost at a rapid rate and it is now thought that some 50% of the wetlands in existence 10,000 years ago have been eliminated (Mitch and Gosselink 2000). The Hadejia-Nguru wetlands falls principally within Jigawa, Yobe and Bauchi States, but Kano and Borno States also have an interest in decisions taken concerning policy and are thus treated as stakeholders.

METHODOLOGY

STUDY AREA

The Hadejia-Nguru wetlands (HNW) are situated in the Sahelian zone of NE Nigeria and have formed as a consequence of the Hadejia and Jama'are rivers encountering a series of fossil dunes aligned from SW to NE (Adams et al., 1993). The consequence has been the splitting of the rivers into multiple channels, the creation of lakes and seasonal ponds and zones of seasonally flooded land. Rainfall in the wetlands varies between 700 and 500 mm. annually, and despite strong local conviction, there is no evidence of declining precipitation (Thomas, 1995). HNW therefore located in the dry Sudan savanna region within the Komadugu- Yobe basin and is supposed to support the livelihood of several million people and their respective animals (Sunusi and Daura, 1996). The hydrology of the wetlands has been altered markedly by a series of impoundments since the early 1970s. The first of these was the Tiga Dam (constructed between 1971-74 with the reservoir filled 1974-6) on the Kano river.

The study consisted of a preliminary survey on the major flowering plants dominating the HNW in recent years. During the study, the entire wetlands were divided into seven major zones or locations for easy field work study. These zones were; River Kafin Hausa at Baturia, Maikintari flood, Kirikasamma flood, Tukuikui flood all along Hadejia-Nguru road, and DabarMagini, Ramsar site and Dagona water fowl sanctuary at Dagona village. The survey was conducted in 2014 wet season, when all flowering plants were expected to have grown up. At each zone or location, plant species were collected, prepared and identified

based on three techniques, viz: common or vernacular name of the dominant plant from personal communication of the rural people or resource persons available, physical characteristics of the flowers and leaves and identification guides by Hutchinson and Dalziel (1954-72).

RESULTS AND DISCUSSION

RIVER KAFIN HAUSA FLOOD AT BATURIA

The river was more than 50% covered with grasses and shrubs. The dominant grass discovered during the survey was water lily and the dominant shrub was *Vossiacuspidata* (Daura). By the river side, the dominant tree plant recorded was *Acacia* (Table 1.). According to literature, the Baturia game reserve located at Hadejia Barrage was about 35km².size and was dominated by *Mitragynainermis* (**Giyayya**) tree with some patches of Doumpalm (*Hyphaenethebaica*) tree. But because of more than 15 years of discontinuous inflow of water into the river, trees that could survive in less marshy lands such as *Acacianilotica* and *Acacia nituda* dominated the area some 20 years ago. This finding corroborated with an earlier one by Haruna and Bello, (2014) that as a result of man-made change, large areas of farming and grazing land and important fish ponds have either gradually dried up along blocked channels now occupied by the invasive *Typha* grass, or have been flooded. As a result, local farmers and grazers have been forced to over-harvest the fewer remaining natural resources, and encroach on some protected areas. Some villages were forced to relocate on higher grounds. Another shrub of economic importance in this location was *Phoenix reclinata* (wild date palm). Although this economic tree plant occurs in patches, it has wide spread within the barrage

MAIKINTARI FLOOD

At Maikintari flood along Hadejia – Nguru road, the wetland was an entirely different thing as it was 100% occupied or dominated by *Typha* grass, another colonizing grass of the marshy areas. One could not see any water/wetland at a glance from or by the road side. *Typha* (*Typha australis*) has become a serious menace to several human activities in the HNW. Recent researches by many workers have shown that in the past, the wetland water channels used to dry out in the dry season, there by leaving bigger pots or pools with some water remnants.

Typha Grass is a species of hardened grass that grows wildly on waterways, channels and riverbanks. This grass has become a common feature along the HNW and a nuisance to the communities. It blocks the passage of canoes used for fishing or access to remote farmlands. Some of the farmers interviewed claim that the thickness of the *typha* grass provides niche for thieves especially cattle

TABLE 1: PLANT SPECIES, LOCATION AND FREQUENCY (%) OF HNW 2014

S/N	LOCATION	PLANT SPECIES	FREQUENCY (%)
1.	KAFIN HAUSA FLOOD AT BATURIA	1. <i>Vossiacuspidate</i> 2. <i>Mitragynainermis</i> 3. <i>Hyphaenethebaica</i> 4. <i>Phoenix reclinata</i>	50 20 15 10
2.	MAIKINTARI FLOOD	1. <i>Typhaaustralis</i>	100
3.	KIRIKASAMMA FLOOD	2. <i>Vossiacuspidate</i> 3. Water Lilly 4. <i>Azadirachtaindica</i>	25
4.	TUKWIKWI FLOOD	1. <i>Eucalyptuscamaldunensis</i> 2. <i>Typhadominguensis</i> 3. <i>Mitragynainermis.</i> 4. <i>Hyphaenethebaica</i>	10 70 20 15
5.	DABAR MAGINI FLOOD	1. <i>Mitragynainermis</i> 2. <i>Hyphaenethebaica</i>	50 45
6.	RAMSAR SITE	1. <i>Typhadominguensis,</i>	100
7.	DAGONA WATER FOWL SANCTUARY	1. <i>Azadirachtaindica</i> 2. Water lilly 3. <i>Acaciaalbida</i>	15 25 50

rustlers and also for the dreaded migratory birds that destroy crops.

KIRIKASAMMA FLOOD

In the Kirikasamma flood area, the entire wetland was covered by *Vossiacuspidata* grass from the road side upto

between 800 to 1000m away within the wetland. The vegetation was generally grasses and there was no any agricultural activity taking place in the region. There were some patches of Water Lilly at some locations where there was a gap, or places not completely covered by *Vossiacuspidata* grass. *Vossiacuspidata* (Daura) is a very gregarious and aggressive grass that thrives in permanent

waters and or marshy areas. It possessobnoxious roots and hence very difficult to control (Roger and Mallam, 2006).

For the tree species, in some areas it is essentially historical, since extremedeforestation has taken out all but anthropic species in many regions. Thomas (1996) describes the type of environmental change that characterized the Hadejia-Nguru wetlands in the early 1990s. However, there are now large expanses of weedy neem (*Azadirachta indica*) in many areas, baobabs are extremely common and large clusters of coppiced dum dominate great tracts of land. Many of the swamp grasslands have dried up due to high levels of water abstraction and have been taken over by weedy species. Many channels are now clogged with the bulrush *Typhadominguensis*, an invasive species that took hold in the 1990s.

TUKWIKWI FLOOD

In this area/location, about 70 % of the wetlands was covered by daura grass on northern side of the road while on the opposite side, the wet land was covered by both typha and daura grasses. Doumpalm and some traces *Eucalyptuscamaldunensis* were also found on this side of the road

DABAR MAGINI FLOOD

The area exactly looks like a micro climate of the swamp / mangrove forest with a variety of tree plant such as doumpalm, typha, daura with typha being the dominant grass.

RAMSAR SITE

The entire wetland was covered by typha grass covering as far as 2km on both sides of the road and more 20 km along the road from Hadejia to Nguru. Farming activities were not taking place so also fishing.

DAGONA WATER FOWL SANCTUARY

This is one of the Lake Chad basin/ natural / Natural Park. The park was dominated by Acacia tree with some patches of neemtrees (*Azadirachta indica*) and doum palm. Water surface was covered by water lilly. According to some workers, *Acaciaalbida* was the dominant tree plant in this park (Roger, 2013)

REFERENCES

Acharya G, Barbier EB (1997). *Valuing the Hadejia-Nguru Wetlands of Northern Nigeria*.
Adams WM (1988). Rural protest, land policy and the planning process on the Bakolori

Adams WM, Garba-Boyi M, Hollis GE (1993). Natural resources of the Hadejia-Jama'are Agriculture and Natural Resources. Jigawa and Yobe States.
Akpata TVI, Okali eds DUU. (1986). *Nigerian wetlands*. Ibadan: Emmi Press. *Alleviate Poverty*. Report prepared by HNWCP and submitted to Jigawa State
Aminu-Kano M. ed (1995). *The Critical Water Resources of the Komadugu-Yobe Basin. and Sustainable Development of a Sahelian Floodplain Wetlands*. Gland/Cambridge:
Barbier EB, Adams WM, Kimmage (1993). An economic valuation of wetland benefits.
Becker I (1994). *Water User Groups in the Hadejia-Nguru Wetlands*. Unpublished report
Blench R.M. (in press) The transformation of conflict between pastoralists and cultivators in
Chiroma MJ, Polet G (1996). *Poplation Estimate of the Hadejia-Nguru Wetlands*,
Cline-Cole, R.A. J. A. Falola, H. A. C. Main, M. J. Mortimore, J. E. Nichol, F. D. O'Reilly
Diyam Consultants 199?. *Yobe Basin Water Resources Study*. Report on Stage 1a. Doi:10/1002/rra.663.
Doody D (2000). *Water Quality in the Hadejia-Nguru wetlands: Its Role in the Sustainability*
Dugan P (1993). *Wetlands in Danger*. London: Michael Beasley, Reed International Books. *Economy and Sustainable Development of a Sahelian Floodplain Wetlands*.
England F (1995). *Gwaiyo Forest Reserve: Wood fuel and rural energy needs*. Report to ENPLAN Group 1995. *Proposal for Study on Improvement of the Hadejia-Yobe River Environmental Protection Authority (JISEPA)*.
Ezealor AU (1995). *Ecological Profile of a Nigerian Sahelian Wetlands: Towards Integrated FEPA/EMP/97/54*.
Finlayson CM, van der Valk eds AG (1995). Classification and inventory of the world's Floodplain. In: G.E. Hollis, W.M. Adams and M. Aminu-Kano eds. 1993. *Environment, Floodplain*. In: G.E. Hollis, W.M. Adams and M. Aminu-Kano eds. *Environment, Economy Future Water Management. River Research and Application Journal*, 18. Gland/Cambridge: IUCN. 11-18.
Goes BJM (2002). Effect of River Regulation on Aquatic Macrophytes Growth and Flood in *Hadejia River Basin*. Unpublished report EX 4605. Wallingford: HR Wallingford. Hadejia-Nguru wetlands overview. Roger Blench *Hadejia-Nguru Wetlands*. Report submitted to the RNR Sector Coordinator of DFID.
Haruna HK, Bello AA (2014). Prospect And Challenges Of Farming Along The Hadejia-Nguru Wetland In Jigawa State Nigeria. *International Journal Of Academic Research In Economics And Management Sciences Nov 2014, Vol. 3, No. 6*
HNWCP 1989-2002. *Water Fowl Surveys*. Project Reports.
HNWCP (1990). *The Dynamics of Livelihood Systems and the Resources Base in the*
HNWCP 2001. *Design of a Programme for the Wise use of Jigawa State Wetlands, including*
HNWCP 2002. *Management plan for Nigeria's first RAMSAR site of international importance*
HNWCP and MA project, Geography Department, University college, London. HNWCP.
HNWCP/Global Livestock Services 1999. *Pastoralists, Grazing Reserves and stock routes in*
Hollis, G.E. Adams, W.M. and M. Aminu-Kano eds. 1993. *Environment, Economy and HR Wallingford 2002. Assessment of the 2001 floods and flood mitigation measures for the* <http://www.odifpeg.org.uk/publications/rdfn/7/b.html>
ICRA (1992). *Analysis of the Farming Systems in the HadejiaJama'are Floodplains Northern*
IIED (1995). *The hidden harvest: Economic Value of Wild Resources in the Hadejia-Nguru* In: In: G.E. Hollis, W.M. Adams and M. Aminu-Kano eds. *Environment, Economy and Inventory and Management Limited (RIM) to FDLPCS, Abuja, Nigeria*. IUCN.97-115.

- IUCN-HNWCP (1997). *A Study of Carrying Capacity of the HNW as a basis for Controlling*
- Jimoh MA (1989). *Fuelwood-fishery activities in the Hadejia-Nguru wetlands*. Report to Kano State. In: *The aftermath of the 1972-74 drought in Nigeria*. G.J. van Apeldoorn ed. *Land Degradation and Resolving Conflicts over Environmental Resources*. Unpublished M.Sc. degree in Water Resources.
- McCoy MB, Rodriguez JM (1994). Cattail (*Typhadomingensis*) eradication methods in
- Milligan S (2000). *Desk review of herder-farmer conflicts*. Report to HNWCP.
- Mitsch WJ, Gosselink JG (2000). *Wetlands*. [3rd ed.]. New York: John Wiley & Sons.
- Mitsch WJ. ed. (1994). *Global wetlands: Old world and new*. Amsterdam: Elsevier.
- NEAZDP (1991). *Trees in the Sub-Saharan Environment*. Unpublished Report.
- Network (RDFN). London: ODI. Can be downloaded at *Nigeria*. HNWCP Report.
- Nigeria. Paper accepted for a special issue of the *Journal Africa*, ed. M. Moritz *Nigeria*. Working Document Series 20 Nigeria. *Nigerian floodplain wetland*. Ph.D. Geography. Cambridge University. *of the Wetlands*. A dissertation submitted in partial fulfillment of the requirements for the Okali, D. & Bdiya, H.H (eds) 1997. *Biodiversity of the Hadejia-Nguru Wetlands: Report of a Pearce F*. 2003. Ghosts of the great eel war. *New Scientist*, 177,2386: 58-59. Proceedings of a NIPSS/HNWCP workshop. project. *Africa*, 58(3): 315-336.
- Reed (1967). *Fish and fisheries of Northern Nigeria*. Zaria: Gaskiya. Report prepared by IUCN-The World Conservation Union. report. Environmental Management Project Credit No. 2353- UNI, Contract No.
- RIM (1992). *Nigerian National Livestock Resource Survey*. (6 vols). Report by Resource
- Roger Blench (2013). *An Overview Of The Context Of The Jewel Project: Access Rights And Conflict Over Common Pool Resources In The Hadejia-Nguru Wetlands* Kay Williamson Educational Foundation. Report pp1-27 sponsored by HNWCP and International Irrigation Management Institute (IIMI).
- Stock RF (1978). The impact of the decline of the Hadejia river floods in Hadejia Emirate,
- Sule AR (1993). *Flood extent, depth and volume from Satellite Data: the Hadejia-Nguru survey*. Unpublished report.
- Sustainable Development of a Sahelian Floodplain Wetlands*. Gland/Cambridge: IUCN.
- Sustainable Development of a Sahelian Floodplain Wetlands*. Gland/Cambridge: IUCN.
- System, Miga-Damasak Reach. Komadugu-Yobe Technical Committee. Ministry of the Control of Ecological Problems associated with the *Wetlands in Ways that can*
- the Hadejia-Nguru Wetlands and Flow in the Yobe River, Northern Nigeria; Implication for
- the *Hadejia-Nguru wetlands*. Report to DFID. the restoration of tropical seasonal freshwater marsh. In: Mitsch, W.J. ed. 1994. *Global*
- Thomas DHL (1995a). *Environment, socio-economic change and sustainability in a*
- Thomas DHL (1995b). Artisanal fishing and environmental change in a Nigerian floodplain
- Thomas DHL (1996). Dam construction and ecological change in the riparian forest of the
- Thomas DHL, Jimoh MA, Matthes H (1993). Natural resources of the Hadejia-Jama'are
- Vertebrate Pest Damage Management*. Unpublished report. wetland. *Environmental conservation*, 22(2):117-126 and 142. *Wetlands, Northern Nigeria*. Report to HNWCP. *Wetlands*. London: IIED. wetlands. *Vegetatio*, 118:1-192. *wetlands: Old world and new*. 469-482. Amsterdam: Elsevier.