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Typha angustifolia L. Grass Hindering against Agricultural Productivity in Aliero River, Kebbi State, Nigeria

Zubairu S. Aliero[1*], Dharmendra Singh[1], Jibrin N. Keta[1]

[1]Kebbi State University of Science and Technology Aliero, Nigeria

**Corresponding author: zubairusani1991@gmail.com*

Abstract: This research work tries to examine the socioeconomic impact of *Typha angustifolia* L. grass in parts of Kebbi state (Aliero, Kashin Zama and Sabiyal), Nigeria. For better understanding of the field conditions with regards to the impact of the grass on the socioeconomic of the area (agriculture, fishing and the livelihood pattern), two hundred (200) questionnaires were designed and administered, out of which only One hundred and forty five (145) were returned. Findings from the questionnaire survey of some communities along river Aliero (Kashin Zama and Sabiyal) show that, there is general reduction in the flow of water in the river channel over the last few years. This was attributed to blockages by *Typha angustifolia* L. grass and silt deposits within the river channel. There is also reduced or loss of cultivation of some crops particularly irrigated crops such as millet, maize, rice, wheat and vegetables, fishing activities in the area is also affected by the grass. This situation is worst in Kashin Zama area, where many farmers reported that, before the emergence of *Typha angustifolia* grass in the area, they recorded 225bags of rice in 10hecter, and now only 60-65 bags where recorded in the same piece of land. Moreover, communities have tried communal and individual manual clearance of the Typha, while Aliero Local Government, Kebbi State and Federal Governments are also carrying out mechanical clearance work in the channel. All these efforts have little impact.

Keywords: *Aliero, River, Nigeria, Typha angustifolia L. Grass*

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1. Introduction

Cattail populations can be found throughout the world, from tropical to temperate zones, and from humid to dry climates. Their tolerance to varying climatic conditions and environmental changes helps them achieve widespread dominance in a variety of aquatic plant communities (Murkin and Ward 1980; Mitich 2000). Cattails can occur in any place where the soil remains wet or saturated: roadside ditches, reservoirs, lakeshores, bogs, wet meadows, marshes, etc. (Grace and Harrison, 1986). Typha grass, also known as cattail, is a plant locally referred to as *"Shallah"* by the people living around the Aliero (Kashin Zama and Sabiyal) wetland area (Akinsola, 2000). Typha grass is suspected to have invaded Nigerian inland wetlands from East Africa. The genus has a largely

Northern Hemisphere distribution, but is essentially cosmopolitan. The most widespread species is *Typha latifolia*, found throughout most of North America, Europe, Asia and Africa. T. angustifolia is nearly as widespread, but does not extend so far north. T. domingenis is a more southerly American species, extending from the US to South America, and it is also found in Africa, while T. laxmannii, T. minima and T. shuttleworthii are largely restricted to Asia and parts of southern Europe (Akinsola, 2000).

Typha latifolia can be found in aquatic communities at all stages, from early to late successional, whereas T. angustifolia and T. x glauca typically occur in early to midsuccessional communities and are frequently found in disturbed wetland sites (Grace and Harrison, 1986). According to Grace and Harrison, all species of Typha spp. can occur in dense, monospecific stands, or as scattered individuals, or clumps in stands of mixed vegetation (1986). Typha is a perennial herbaceous plant in the genus Typha. It is found as a native plant species in North and South America, Europe, and Africa. In Canada,

broadleaf cattail occurs in all provinces and also in the Yukon and Northwest Territories, and in the United States, it is native to all states except Hawaii. It is an introduced and invasive species, and is considered a noxious weed, in Australia and Hawaii. It has been reported in Indonesia, Malaysia, New Zealand, Papua New Guinea, and Philippines (Lansdown, 2014).

Typha also named water candle, usually grows in shallow water marshes as marsh perennial herbaceous plants. Owing to the low-cost and large surface area that are raw potential for fabricating the activated carbon adsorbent. Typha plants are widely used in constructing wetlands for ecological restoration and sewage treatment. In addition, the Typha is also the raw material for heat preservation, weaving, and paper due to its fiber length, toughness, and heat preservation performance (Lansdown, 2014). Typha (commonly referred to as 'cattail') is the only genus in the family Typhaceae. This iconic genus, comprised of nearly 40 species and hybrids, is ubiquitous across wetland ecosystems throughout the world. An abundance of wind-dispersed seeds allows Typha to colonize wetlands across great distances, and its rapid growth rate, large stature, and aggressive clonal propagation can result in dense monotypic stands (Travis et al. 2010; Freeland et al. 2013).

Most of the communities along Hadejia River are currently embattled with proliferation of Typha grass, which is colonizing most importantly, irrigated lands, ponds, grazing lands, river channels and reservoirs, causing blockages by the grass and siltation aided by the grass (Ramsar Swiss Grant Report for Africa, 2006). The plant produces vast quantities of long lived and persistent seeds which can out – crop even after some dry spans, thus, reemergence of Typha is very rapid after each removal. These phenomena's make the spread of this weed fast and difficult to control (Abdullahi, 2007). Out of the 10,000km2 of Kashin Zama and Sabiyal River within Kebbi State, 1,000km2 are exposed to temporary flooding and siltation, with serious ecological repercussion and detrimental economic and social impact. Reason to these annual flood seems to lie on the blockage of channels by Typha grass, growing rapidly and taking over farmlands, fishing ponds, canals, reservoirs in Hadejia and Nguru, Yobe State (Gomes et al., 2003).

Most of the areas covered by Typha fall within the critical areas that are best suitable for flood rice farming and recession farming. These are the margins of lakes and swamps of slow moving water where the soils do not dry out completely. The grass colonizes these areas very quickly due to the wide and efficient dispersal of seeds by wind and water movement (Akinsola, 2000).

Typha angustifolia L. is a serious problem threatening the sustainability of the whole irrigation scheme. Over 70% of the main canal and other water distributary channels were overtaken by this type of weed, thereby blocking the free flow of water in to the irrigation fields (Haruna, 2006). Kashin Zama and Sabiyal within Aliero Local Government, Kebbi State is currently embattled with proliferation of an invasive Typha grass which is colonizing most importantly, irrigated lands, ponds, grazing lands, river channels and reservoirs, causing blockages by the grass and siltation aided by the grass. The people are currently living in abject poverty and apprehension in fear of what to do next. Some communities are planning to migrate to either Gwandu Local Government (Tangaza) or Tambuwal local Government within Sokoto State following what they regard to as the failure of the Government to rescue their farmlands from invasion by Typha grass, which they describe as the most dreadful threat to their source of livelihood (Jewel, 2003).

Twenty years ago, waters of the River Kashin Zama and Sabiyal seasonally flooded their intricate network of smaller river channels, providing fish ponds and Fadama in abundance as productive resources for fishermen, farmers and livestock rearers. It is on record that fish catches from Kashin Zama and Sabiyal wetlands contributed about 8% of the annual national income of inland fish sales in the Aliero local government, Kebbi State and Nigeria at large. Today, it provides only 0.8%. Cultivation of wheat, maize and vegetables brought local Fadama farmers an average income of nearly N10, 000 per season (equivalent to roughly US$114) a decade ago, but now brings barely N2, 000 (US$14) even after investment in Fadama development technology. Rice production, which rapidly expanded in the wetlands during the mid-90's as a lucrative form of dry season flood recession farming, has dwindled in recent years to invisibility (John, Adom, Ishaya and Sunday, 2003).

The need to carry out this research work stems from the fact that, the plant (Typha grass) presence in the wetland has markedly interfere with the utilization of water and land resources. This inhibits agricultural development and expansion of same which is the primary occupation of the inhabitants. The aim of this study is to examine the impact of *Typha angustifolia* L. grass on the socioeconomic of some communities along river Kashin Zama and Sabiyal within Aliero Local Government, Kebbi state and identify feasible strategies to ameliorate the negative impact and improve on the positive ones (Jewel, 2007).

2. Materials and methods

Kashin Zama and Sabiyal in Aliero Local Government Area of Kebbi State, Nigeria. The Aliero local government area is located at approximately latitudes 110 03' S, 120 47'N and longitudes 30 6'W and 40 27'E. In Kebbi state, north western part of Nigeria, It also has a total area of 412 square kilometer and is bordered in the east by Tambuwal Local government area of Sokoto state in the North West by Birnin Kebbi local government area in the South West by Jega local government area (Singh,2013). Aliero local Government area is dominated by massive flood plains of the in- land river valley system. Thus, it typically has a flat but undulating elevation of about 150 m in the flood plains. The alluvial sediment in the flood plains ranges from gravel level to clay level. It is this sediment which get saturated during the rains, to store water in the sands for dry season use. The geology of

Aliero local government is characterized by thick sedimentary deposited of the Sokoto-Rima basin. And it also under laid by Precambrian Basement Complex rocks (Singh, 2013). The study seeks to find out through questionnaire administration, the impact of *Typha angustifolia* L. grass on the Socio-economic of the people in the study area. Three hundred (300) respondents were issued with questionnaire (Appendix), one hundred (100) questionnaire was distributed in each of the two (2) villages. Relevant documents from Kebbi State Enhancement of Wetland Livelihoods office, Kashin Zama and Sabiyal River Basin Development Authority (KASZASA), Gwandu Emirate Development Association (GND), Coalition for Change C4C (DFID), Integrated Water Resources Management committee (IWRM), Federal and State Ministries of Environment and other stakeholders in the area were reviewed (Sabo, Karaye, Garba, and Ja'afar, 2016).

3. Results and discussion

3.1. Presence of *Typha angustifolia* L. grass in the area

Many of the people (78%) in the sampled villages argue that, *Typha angustifolia* L. grass was first noticed in the area in 1970's, whereas 22.2% contend that, it was noticed in 1980's.This corresponds with the work of Hamza (2007), JWL (2004), in Hadejia – Komadugu River basin, who reported that, Typha grass was first noticed in the area in 1972. While majority of the people in the area are in the opinion that, the coming of the *Typha angustifolia* grass which dries away and make water movement difficult was caused by water and air movement, some believe that, it was brought to the area as a result of introduction of wheat cultivation in the area, while some people argue that, the coming of *Typha angustifolia* grass was a curse from God in order to punish the people for disobedience. This contradicts with the work of Hamza (2007) in the Hadejia – Komadugu basin, which reported that, Typha grass was brought about by the activities of environmental conservationists for the purpose of using the grass to preserve endangered birds that have migrated to Africa from Europe. He added that, the endangered migrant's birds which landed in the area in the 1970's became visible when the Typha grass appeared in the water. Anonymous (2007), reported that, the Typha grass grow in the area naturally and moves along with running waters just like the stubborn hyacinth, a kind of bulbous perennial herbs which is found in lagoons and creeks in Lagos, some Northern States and South Western part of Nigeria. Typha grass is suspected to have invaded Nigerian inland wetlands from East Africa. This aquatic has become a problem in the last 15 years in the

Hadejia-Nguru wetlands and the water resources of the Komadugu-Yobe Basin (Nigeria Conservation Foundation; Country Report on Invasive Alien Species in Nigeria, 2004).

(A) Root of Typha Plant (B) Stem of Typha Plant

(C) Leaves of Typha Plant (D) Complete image of Typha Plant

Figure 1: Different Stages of *Typha angustifolia* L.

3.2. Impact of *Typha angustifolia* L. grass on the productivity of farmlands in an area

Results show that, there is reduced or complete loss of cultivation of some crops, particularly irrigated crops such as maize, wheat, rice and vegetables in all the areas. This situation is worst in Kashin Zama area, where many farmers reported that, before the emergence of *Typha angustifolia* grass in the area, they recorded 225bags of rice in 10hectare, and now only 60 – 65 bags where recorded in the same piece of land. This corresponds with the work of Heda (2004) and Ramsar Swiss Grant Report (2006), which reported that, Typha grass has taken over farmlands, which consequently lead to the reduction in harvest from farmlands (Wajahat, Sajida, and Syed, 2006).

Table 1: Study population and sample size

Groups	Villages	Number of respondents
A	Kashim Zama	75
B	Sabiyal	70

3.3. Socioeconomic use in *Typha angustifolia* grass in the study area

The presence of large quantity of *Typha angustifolia* grass in the area has provokes challenge of finding a use of it by the local people. Results of the study shows that, in all the sampled villages, Typha angustifolia grass is used for thatching, roofing huts, as firewood for cooking, use leaves to cover onion seedless, and use for construction of local storage facility (Rumbu). This corresponds with the work of Tyler and Walters (2002), which reported that, Typha species are harvested today in

Britain for thatching They were once harvested for fuel where better sources were unavailable and may hold promise as an energy crop in the future (Yobe, 2006).

3.4. Impact of the *Typha angustifolia* L. grass on fishing

The impact of blockage caused by Typha angustifolia grass has resulted in reduced flow of water in the area. This has consequently results in reduction of fish catch in the area. This corresponds with the work of JWL (2004), in the area, which reported that, the average fish catch, fishermen per day has reduced from 3-4 basins (worth over N1, 000 per day) to just half a basin of catch per day. Also, most people in the area reported that, there is reduction in fish species.

Moreover, fishermen in the entire sampled village revealed that, though fish catch has reduced, but, the size of the fishes is bigger when compared with the size before the emergence of Typha, this might probably because, *Typha angustifolia* grass provides hiding ground for fishes.

3.5. Effort made to control *Typha angustifolia* grass in an area

All the sampled villages (Kashin Zama and Sabiyal) within Aliero, communal efforts have been made to clear channels manually and construction of local dykes by the people to prevent flooding which pose threat to their settlement. The Kebbi State government did some mechanical excavation work and also construct large sand embankments to protect the communities against flood. The communities also mentioned that, Aliero local Governments give them assistance in the form of bags used for dyke construction. There is also the presence of some Non-Governmental Organizations (NGO's) in the area. These NGO's helps in channel clearance, raise awareness for the people to engage in communal efforts and also funds some proposals by the communities. Some of these NGO's operating in the area include; Kebbi Wetlands Project (BNK), Nigeria Conservation Foundation (NCF), Hadejia – Nguru Wetland project (HNWP), Coalition for Change C4C (a DFID project), IUCN ROCA, LCBC/GEF project, Ramsar Swiss Grant, Komadugu Yobe basin Development Initiative, and Hadejia – Komadugu –Yobe basin trust Fund (Yobe, 2006).

Moreover, there is also the presence of some Government agencies in the area, these include; Federal Ministry of Water Resources, Kashin Zama and Sabyal river Basin Development Authority, Federal and State Integrated Water Resources Management Committees and Kebbi State Ministry of Environment (Yobe, 2006).

3.6. Some other effects of *Typha angustifolia* grass in the area

People in the area argue that, Typha grass herbivores birds, snakes and mosquitoes. More than 30% of cereal crops by the communities are consumed by quell birds. In most of the villages, many people spend day in the farm scaring away birds. In Hadin village some respondents reported that, during 2007 season they recorded less than a quarter of the expected harvest, and they attributed this to quella birds invading their farm. There are few species recognized as prolific and invasive in the animal world, the most commonly mentioned being locusts and grasshoppers. Quelea, of which there have been large populations these past few years should be added to these arthropod insects. The proliferation of this species is often associated with the development of *Typha australis* which provides them with an ideal medium for protection and reproduction (Sabo, Karaye, and Ja'afar, 2016).

Respondents also pointed out that, they are suffering from lack of irrigation water due to the blockage of main channels distributing water to their areas, while others are facing serious all year round flooding during rainy season, all as a result of blockage by *Typha angustifolia* grass and siltation aided by the grass. For example in Lagarde village, flooding has taken over farmlands. Some respondents attributed the low production of crops, particularly rice and maize to excessive flooding. This corresponds with the work of Uchytl (1992), Akinsola (2000), Jewel (2003), Haruna (2006) and in Hadejia – Komadugu – Yobe basin, which reported that, excessive flooding caused by blockage of river channels and siltation has led to adverse consequences of low productivity of crops particularly rice. Jewel (2004), added that, in some cases such as in Zugo, Kabak Maguwa and Kasaga villages in the area, more than 90% of lands hitherto used for cultivation and or grazing have been overtaken by flood (Jewel, 2007).

4. Conclusion

The floodplains along Kashin Zama and Sabiyal river within Aliero, produce an agricultural surplus in most years (particularly of rice and vegetables), and support a substantial population at relatively high levels of nutrition and income. Floodplains provide a vital element in the pastoral economies of Fulani who move into them in search of grazing in the dry season. Floodplains are also important sources of fish. Kashin Zama and Sabiyal floodplain wetlands facilitate and support the productive economy over an area far beyond their own borders, and are important elements within both the local and national economies. The economy and ecology of the Kashin Zama and Sabyal floodplain are threatened with proliferation of an invasive Typha grass which is colonizing most irrigated lands, ponds, grazing lands, river channels and reservoirs, causing blockages by the grass and siltation aided by the grass. The people are currently living in abject poverty, because, the plant presence in the area has markedly interfere with the utilization of water and land resources. This inhibits agricultural development and expansion of same which is the primary occupation of the inhabitants. The consequences of these have been, loss of farmlands, fish, grazing lands etc., leading to migration and increased poverty in the basin.

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References

Akinsola, A.O. (2000). *An assessment of Typha Specie: Problems in the Hadejia – Nguru Wetlands Area, IUCN – Hadejia – Nguru Wetlands Conservation Project.*

Australian National Botanic Garden (2003). *Aboriginal plant use in the South eastern Australia*, Phragmites australis. Blackburn, R.D.

Chow-Fraser, P. (2005). Ecosystem response to changes in water level of Lake Ontario marshes: lessons from the restoration of Cootes Paradise Marsh. *Hydrobiologia, 539*, 189-204.

Christensen, N.L. (1988). *Vegetation of the southeastern Coastal Plain.* Cambridge University Press.

DFID – JEWEL Project. (2003). *Stakeholders workshop: A report of the materials produced during the workshop*.

Duke, J.A. (1998). Hand book of energy crops; Phragmites australis (cav). Trin-ex. Steud Centre for New Crops and Plant Products, Purdue University, West Lafaayette, Inc.

Duruibe, J.O., Ogwuegbu, M.O.C. & Egwurugwu, J.N. (2007). Heavy metal pollution and human biotoxic effects. *International Journal of Physical Science, 2(*5), 112-118.

Levi, E. (1960). Chemical Control of *Typha angustifolia* L. *Weeds. 8(*1), 128-138

Gomes, H., Alves, E. & Dau, M.A. (2003). *Dealing with Flooding and Ponding Regime in Jigawa State.*

Graduate College Of Marine Studies (2003). *Optimized Reeds (Phragmites australis),* University of Delaware, New York.

Grace, J.B. & Harrison, J.S. (1986). The biology of Canadian weeds. *Typha latifolia* L. *Journal of Plant Science, 66*, 361-379.

Gucker, C.L. (2008). *Typha latifolia*. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.

Jewel. (2007). *Wetland management: The problem is typha grass*

Jewel. (2003). *Poverty, environment & livelihoods issues relating to crops in the Hadejia-Nguru wetlands.*

John, R., Adom, G., Ishaya, B.B. & Sunday, P.M. (2003). *A report on institutional mapping of Jigawa enhancement of wetlands livelihood project.*

JWL/TAC. (2004). *Survey on the impact of blockage and siltation on the socioeconomy of communities on the Burum Gana and Marma Channels.*

Labrada, R. (2004). *Present trends in weed management raw materials research and development council (RMRDC).*

Lansdown, R.V. (2014). *Typha latifolia*. IUCN red list of threatened species.

MES (2004). *Prevention and management of invasive alien species: Forging cooperation throughout west Africa.* Ministry of Environment and Science, Ghana and United State Government.

Mitch, L.M. (2000). Common cattail, *Typha latifolia* L. *Weed Technology, 14*, 446-450.

Murkin, H.R. and Ward, P. (1980). Early spring cutting to control cattail in a northern marsh. *Wildlife Society Bulletin, 8*, 254-256.

Musa, A.A. (2005). *Investigation for antibactterial activity of extracts of the leaves of Typha autralis.*

Omijeh, J.E. (2022). Tree Growth Analysis as a Panacea for Sustainable Forest Management in Northeast Nigeria: Study of Lannea Kerstingii (Anacardiaceae). *Journal of Sustainability and Environmental Management, 1(*2), 182-187.

Singh, D. (2013). Phenology of selected woody species in Aliero local government area Kebbi State, Nigeria. *Equity Journal of Science and Technology, 1(*1), 23-36.

Wajahat, N., Sajida, P. & Syed, A.S. (2006). Evaluation of irrigation water for heavy metals of Akbarpura area. *Journal of Biological Science*.