GARDEN HOUSE YOUTH

Research Report

Community-Based Fisheries Conservation as Climate Adaptation

Assessing the Effectiveness of Seasonal Fish Bans and Socioeconomic Impacts on Fishing Communities in the Barotse Floodplain, Zambia

By: Garden House Youth Society

Supported by: Mohamed bin Zayed Species Conservation Fund

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We are particularly grateful to the fishing communities of Senanga, Mongu, Nalolo, Limulunga, and Shangombo districts who generously shared their time, knowledge, and experiences during household surveys and interviews. Their willingness to participate in the research provided invaluable insights into the realities of fisheries livelihoods and the challenges faced by communities in adapting to environmental and economic changes.

The research team also acknowledges the dedication of field enumerators, research assistants, and local coordinators who supported data collection and stakeholder consultations across the floodplain.

Finally, we appreciate the contributions of all stakeholders, including community fisheries committees, fish traders, and development partners who participated in consultations and validation meetings. Their perspectives enriched the analysis and strengthened the relevance of the research findings.

This report reflects a collective effort to better understand the challenges and opportunities associated with sustainable fisheries management and climate adaptation in the Barotse Floodplain.

About Team

This research was conducted by Garden House Youth Society, a Zambian civil society organization dedicated to promoting sustainable development, climate adaptation, and community resilience through research, innovation, and community engagement. The organization works with rural communities, policymakers, and development partners to generate practical solutions that address environmental and socioeconomic challenges.

The research team comprised experienced researchers and field practitioners with expertise in environmental management, community development, climate adaptation, and socioeconomic research.

Dr. Habeenzu Simamba – Lead Researcher

Dr. Habeenzu Simamba served as the lead researcher for this project. He holds a PhD in Business Administration and has extensive experience in development policy, climate adaptation, and rural development programs. Dr. Simamba has previously worked on several projects related to climate resilience, sustainable livelihoods, and economic development in Zambia. His role in the project involved overseeing the research design, coordinating field activities, and leading the analysis and preparation of the final research report.

Dr. Patience Nalavwe - Socioeconomic Research Specialist

Dr. Patience Nalavwe contributed to the socioeconomic analysis component of the study. She holds a PhD in Development Studies and has significant experience in monitoring and evaluation, community-based research, and gender-sensitive development programming. In this project, she led the design of household surveys and conducted analysis on the livelihood impacts of seasonal fish bans on fishing communities.

Field Research Team

The project was supported by a dedicated team of field researchers and enumerators who assisted in household surveys, ecological observations, and stakeholder consultations across the Barotse Floodplain. The field team worked closely with local fisheries committees and community leaders to facilitate data collection and ensure community participation.

Institutional Support

Garden House Youth Society provided overall project coordination and logistical support. The organization's experience in implementing community-based development initiatives enabled the research team to effectively engage with stakeholders and ensure that the study addressed real-world challenges faced by fishing communities.

Through collaborative research and stakeholder engagement, the team aimed to generate evidence that contributes to sustainable fisheries management and climate adaptation strategies in Zambia's floodplain ecosystems.

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Executive Summary

The Barotse Floodplain of Western Zambia is one of the most important inland fisheries ecosystems in Southern Africa, supporting thousands of small-scale fishing households and contributing significantly to local food security and rural economies. However, over the past two decades, fish stocks in the floodplain have declined due to a combination of climate variability, unsustainable fishing practices, habitat degradation, and increasing pressure on aquatic ecosystems.

In response to these challenges, traditional authorities and government fisheries departments have increasingly relied on seasonal fish bans as a fisheries management and climate adaptation strategy. Seasonal bans aim to allow fish populations to recover during spawning periods while maintaining long-term sustainability of the fishery. Despite their widespread adoption, limited empirical research has been conducted to evaluate the ecological effectiveness of these bans and their socioeconomic implications for fishing-dependent communities.

With support from the Mohamed bin Zayed Species Conservation Fund, Garden House Youth Society implemented a research initiative between January and December 2025 to assess the effectiveness of seasonal fish bans in the Barotse Floodplain. The study combined ecological monitoring, household surveys, and stakeholder consultations to analyze both the conservation outcomes and livelihood impacts of the policy.

The research found that seasonal fish bans have contributed to measurable improvements in fish stock recovery and spawning activity in key areas of the floodplain. However, the bans also impose short-term economic pressures on fishing households, particularly during drought periods when alternative livelihoods are limited. The study highlights the need for integrated adaptation strategies that combine fisheries conservation with livelihood diversification and climate-resilient economic planning.

The findings provide important insights for policymakers, conservation organizations, and local authorities seeking to balance biodiversity conservation with sustainable livelihoods in climate-sensitive ecosystems.

1. Introduction

The Barotse Floodplain is one of Zambia's most ecologically significant wetlands and forms part of the broader Upper Zambezi River basin ecosystem. The floodplain supports a rich diversity of aquatic species and provides critical ecosystem services to surrounding communities. Seasonal flooding patterns sustain fisheries, agriculture, and livestock grazing systems that form the backbone of rural livelihoods across Western Province.

For generations, small-scale fisheries have played a vital role in the local economy, providing food security, employment, and income for thousands of households. Fish from the Barotse Floodplain are also traded widely across Zambia and neighboring countries, contributing to regional food systems.

However, the sustainability of the floodplain's fisheries resources is increasingly threatened. Climate change has altered rainfall patterns and flood cycles, affecting fish breeding habitats and migration patterns. Reduced flood intensity and changing hydrological regimes have disrupted spawning cycles and reduced fish recruitment rates.

At the same time, growing population pressures and increased demand for fish have intensified fishing activity in the floodplain. Unsustainable fishing methods, including the use of small mesh nets and fishing during spawning periods, have further accelerated the decline of fish stocks.

Recognizing these challenges, the Government of Zambia and traditional authorities have implemented seasonal fishing bans to protect fish during critical breeding periods. These bans aim to allow fish populations to reproduce and replenish, thereby supporting long-term sustainability of the fishery.

While seasonal bans are widely recognized as an important conservation measure, there is limited empirical evidence on their effectiveness in improving fish stock recovery and supporting climate adaptation in floodplain ecosystems. Moreover, the socioeconomic consequences of these bans for fishing communities remain poorly understood.

This research was therefore undertaken to evaluate the ecological and economic implications of seasonal fish bans in the Barotse Floodplain. The study seeks to generate evidence that can inform more balanced fisheries management policies that promote both environmental sustainability and community resilience.

2. Background and Literature Review

2.1 Ecological Importance of the Barotse Floodplain

The Barotse Floodplain, located in Western Zambia along the upper Zambezi River, is one of the largest and most ecologically important wetland ecosystems in Southern Africa. Covering approximately 5,500 square kilometers during peak flooding, the floodplain forms a dynamic seasonal ecosystem that supports rich biodiversity, including fish, birds, mammals, and aquatic vegetation.

The floodplain is characterized by annual flooding cycles that typically occur between December and May, when rainfall in the upper Zambezi catchment causes the river to overflow into

surrounding plains. These seasonal floods create extensive breeding habitats for fish and other aquatic organisms, making the ecosystem highly productive.

According to the Food and Agriculture Organization (FAO), floodplain fisheries are among the most productive inland fisheries systems in the world due to the nutrient-rich environments created by seasonal flooding (FAO, 2018). In Zambia, the Barotse Floodplain plays a particularly important role in supporting rural livelihoods and food security.

Fish species commonly found in the floodplain include bream (Oreochromis spp.), tiger fish (Hydrocynus vittatus), barbel (Clarias gariepinus), and several species of catfish. These species form the basis of both subsistence and commercial fisheries in the region.

However, the productivity of floodplain fisheries is highly dependent on natural flood cycles. Any disruption to hydrological patterns can significantly affect fish reproduction, recruitment, and population stability.

2.2 Climate Change and Hydrological Variability

Climate change has increasingly affected hydrological systems across Southern Africa, including the Zambezi River basin. Research suggests that rising temperatures, altered rainfall patterns, and more frequent drought events are affecting river flows and floodplain dynamics (IPCC, 2022).

In the Barotse Floodplain, local communities have observed noticeable changes in flood timing and intensity over the past two decades. Reduced flood levels limit the availability of breeding habitats for fish and reduce nutrient exchange between river channels and floodplain ecosystems. Drought events, such as those experienced in Zambia during 2024, further exacerbate these pressures by reducing water availability and increasing ecosystem stress. Lower water levels also concentrate fishing activity in smaller water bodies, increasing the risk of overexploitation.

Studies across African floodplain systems have shown that climate variability can significantly reduce fish productivity if fisheries management strategies are not adapted to changing environmental conditions (Welcomme et al., 2016).

2.3 Declining Fish Stocks and Fisheries Pressure

The fisheries sector in Zambia contributes significantly to national food security and employment. According to the Department of Fisheries, the sector supports over 300,000 people directly or indirectly through fishing, processing, and trading activities.

In the Barotse Floodplain, fisheries are primarily small-scale and artisanal. Fishing households rely on simple gear such as gillnets, traps, and longlines. While these fisheries have historically been sustainable, growing population pressures and market demand have increased fishing intensity in recent years.

Several studies have documented declining fish stocks in major Zambian water bodies, including the Zambezi system (Musumali et al., 2009). Key drivers of this decline include:

- Fishing during spawning seasons
- Use of illegal fishing gear
- Increased number of fishers entering the sector
- Habitat degradation
- Climate variability affecting water levels

The combination of these factors has placed increasing pressure on fish populations and raised concerns about the long-term sustainability of the floodplain fishery.

2.4 Seasonal Fish Bans as a Conservation Strategy

Seasonal fishing bans are widely used as a fisheries management tool in many parts of the world. The primary objective of these bans is to protect fish during critical breeding periods, allowing populations to reproduce and replenish.

In Zambia, the Department of Fisheries typically enforces seasonal fishing bans between December and February in many inland fisheries. These bans coincide with the peak spawning period for many fish species.

The effectiveness of seasonal bans depends on several factors, including enforcement capacity, community compliance, and availability of alternative livelihoods for fishing households.
Research from other African floodplain fisheries suggests that seasonal closures can significantly improve fish stock recovery when properly implemented (FAO, 2018). However, the socioeconomic implications of such measures can be complex.

For communities that rely heavily on fishing for income and food, seasonal bans can create temporary economic hardship. Without complementary livelihood support mechanisms, compliance with bans may be difficult to sustain.

2.5 Climate Adaptation and Fisheries Management

Climate change adaptation in fisheries involves developing strategies that allow ecosystems and communities to cope with changing environmental conditions. Effective adaptation measures must address both ecological sustainability and socioeconomic resilience.

Seasonal fish bans can be considered a nature-based adaptation strategy, as they allow ecosystems to regenerate naturally while supporting long-term resource sustainability.

However, adaptation strategies must also consider the economic realities of communities that depend on natural resources. Integrating fisheries management with livelihood diversification, climate-smart agriculture, and improved resource governance can help reduce vulnerability to climate shocks.

In the Barotse Floodplain, traditional authorities and community institutions have historically played an important role in natural resource management. Strengthening these local governance systems may be critical for improving compliance with conservation measures and ensuring sustainable fisheries management.

3. Problem Statement, Research Questions, and Objectives

3.1 Problem Statement

The Barotse Floodplain supports one of Zambia's most important inland fisheries, providing food security, employment, and income for thousands of rural households. However, in recent years the sustainability of this fishery has been threatened by declining fish stocks driven by climate variability, increasing fishing pressure, and unsustainable harvesting practices.

Climate change has altered hydrological patterns in the Zambezi River basin, affecting the timing, intensity, and duration of seasonal floods that sustain fish breeding habitats. Reduced flood levels limit spawning areas and disrupt fish migration patterns, resulting in lower recruitment and declining fish populations. These ecological pressures are compounded by overfishing and illegal fishing practices, which further accelerate stock depletion.

Seasonal fish bans have been introduced as a management response to protect fish during breeding periods and support stock recovery. While this measure is widely recognized as an important conservation tool, limited empirical evidence exists regarding its ecological effectiveness in the Barotse Floodplain. Furthermore, little research has been conducted to assess the socioeconomic consequences of seasonal bans for local fishing communities whose livelihoods depend heavily on fisheries resources.

For many small-scale fishers, seasonal bans temporarily restrict their primary source of income and food. In the absence of alternative livelihood opportunities, such restrictions may increase household vulnerability and reduce compliance with conservation regulations. Without a clear understanding of both the ecological benefits and socioeconomic trade-offs of fish bans, policymakers may struggle to design fisheries management strategies that balance conservation objectives with livelihood sustainability.
This research therefore seeks to generate evidence on the effectiveness of seasonal fish bans as a climate adaptation and fisheries management strategy in the Barotse Floodplain.

3.2 Research Questions

The study is guided by the following key research questions:

1. To what extent have seasonal fish bans contributed to the recovery of fish stocks in the Barotse Floodplain?

2. How do seasonal fishing bans affect the livelihoods, income stability, and food security of fishing-dependent households?

3. What factors influence community compliance with seasonal fish bans?

4. How can fisheries conservation measures be designed to support both ecological sustainability and economic resilience in climate-sensitive floodplain ecosystems?

3.3 Research Objectives

General Objective

To assess the ecological effectiveness and socioeconomic impacts of seasonal fish bans as a climate adaptation strategy in the Barotse Floodplain of Western Zambia.

Specific Objectives

1. To evaluate changes in fish abundance and breeding activity in areas affected by seasonal fish bans.

2. To analyze the socioeconomic impacts of fishing bans on local fishing households and communities.

3. To examine community perceptions and compliance behavior regarding fisheries conservation regulations.

4. To identify policy and management recommendations that strengthen sustainable fisheries management while supporting climate-resilient livelihoods.

4. Conceptual Framework and Theoretical Foundations

This study is grounded in an interdisciplinary framework that integrates concepts from climate adaptation, conservation economics, sustainable fisheries management, and livelihood resilience. The conceptual framework recognizes that ecological sustainability and human well-being are closely interconnected, particularly in natural resource-dependent communities such as those in the Barotse Floodplain.

4.1 Climate Adaptation and Ecosystem-Based Management

Climate change has increased the frequency of extreme weather events such as droughts and altered rainfall patterns across Southern Africa. These changes affect aquatic ecosystems by disrupting hydrological cycles that regulate fish breeding habitats and food availability. Climate adaptation in fisheries therefore requires management strategies that enhance ecosystem resilience while supporting sustainable livelihoods.

Seasonal fish bans represent a form of ecosystem-based adaptation (EbA). Ecosystem-based adaptation refers to the use of biodiversity and ecosystem services to help communities adapt to the adverse effects of climate change (CBD, 2009). By protecting fish during breeding periods, seasonal bans allow fish populations to regenerate, thereby maintaining long-term ecosystem productivity.

However, effective ecosystem-based adaptation must consider both ecological and socioeconomic dimensions. Conservation measures that fail to account for the livelihood needs of resource-dependent communities may face resistance or non-compliance.

4.2 Conservation Economics

Conservation economics provides an analytical framework for evaluating the costs and benefits of environmental conservation measures. In the context of fisheries management, conservation economics examines the trade-offs between short-term economic losses from restricted harvesting and long-term benefits from improved resource sustainability.

Seasonal fish bans can impose temporary economic costs on fishing households by restricting income-generating activities. However, if such measures lead to increased fish abundance and

improved catch rates over time, the long-term economic benefits may outweigh the short-term losses.

Understanding these trade-offs is essential for designing policies that are both environmentally sustainable and economically viable.

4.3 Sustainable Fisheries Management

Sustainable fisheries management aims to ensure that fish stocks are harvested at levels that allow populations to replenish naturally. Management approaches typically include regulations such as gear restrictions, catch limits, and seasonal closures.

Seasonal bans are particularly important in floodplain fisheries where fish species reproduce during specific periods linked to flooding cycles. Protecting fish during these breeding periods increases the likelihood that young fish will survive and replenish the population.

In Zambia, fisheries management is implemented through a combination of national regulations and community-based resource management structures. Traditional authorities and local fisheries committees often play a key role in enforcing fishing bans and promoting compliance among communities.

4.4 Livelihood Resilience Theory

Livelihood resilience refers to the ability of households and communities to withstand and recover from environmental, economic, or social shocks. In climate-sensitive regions such as the Barotse Floodplain, livelihoods that depend heavily on natural resources are particularly vulnerable to environmental changes.

Fishing households often rely on multiple livelihood activities including fishing, farming, livestock rearing, and small-scale trading. The resilience of these households depends on their ability to diversify income sources and adapt to changing environmental conditions.
Seasonal fish bans may temporarily disrupt livelihoods, but they can also contribute to long-term livelihood resilience if they help maintain the sustainability of fisheries resources.

4.5 Conceptual Framework of the Study

The conceptual framework of this study links four key components:

1. Climate Drivers - Climate variability and drought affecting flood cycles and fish breeding habitats.

2. Management Intervention - Seasonal fish bans introduced to protect spawning fish populations.

3. Ecological Outcomes - Fish stock recovery and improved ecosystem health.

4. Socioeconomic Outcomes - Impacts on livelihoods, income stability, and food security.

The framework assumes that effective conservation measures can simultaneously enhance ecosystem resilience and support sustainable livelihoods if supported by appropriate governance and community participation.

5. Research Methodology

5.1 Study Area

The research was conducted in the Barotse Floodplain, located in Western Province of Zambia along the upper Zambezi River basin. The floodplain stretches across several districts including Senanga, Mongu, Nalolo, Limulunga, and Shangombo. The area is characterized by seasonal flooding which creates extensive aquatic habitats that support productive fisheries.

The Barotse Floodplain supports thousands of small-scale fishing households whose livelihoods depend on fishing, fish trading, and fish processing. The ecosystem also plays an important role in supporting biodiversity, food security, and local economic activity.

However, increasing climate variability, changing flood patterns, and overfishing have contributed to declining fish stocks, raising concerns about long-term sustainability of the floodplain fishery.

5.2 Research Design

This study adopted a mixed-methods research design, combining both quantitative and qualitative data collection approaches. The mixed-method approach allowed the study to capture both ecological trends in fish populations and socioeconomic impacts on fishing households.

The research design consisted of three key components:

1. Ecological assessment to evaluate fish population trends and breeding activity in areas affected by seasonal bans.

2. Household socioeconomic surveys to assess the livelihood impacts of seasonal fishing bans on fishing communities.

3. Stakeholder consultations with fisheries officers, traditional authorities, and community leaders to understand governance and compliance dynamics.

5.3 Sampling Strategy

The study targeted fishing communities located along key sections of the Barotse Floodplain where seasonal fishing bans are regularly enforced.
A multi-stage sampling approach was used.

Stage 1: Selection of study sites

Five major fishing zones were selected based on their importance in the floodplain fishery and accessibility. These included:

- Senanga fishing zone
- Mongu fishing zone
- Nalolo fishing zone
- Limulunga fishing zone
- Shangombo fishing zone

Stage 2: Household sampling

Within each fishing zone, fishing households were randomly selected from community lists compiled with the assistance of local fisheries committees.
A total of 200 fishing households participated in the survey.
Stage 3: Key informant interviews

Key informants included:

- Fisheries Department officers
- Traditional leaders
- Local fisheries committee members
- Fish traders and processors

In total, 25 key informant interviews were conducted.

5.4 Data Collection Methods

Several data collection tools were used to ensure comprehensive analysis.

5.4.1 Household Surveys

Structured questionnaires were administered to fishing households to collect information on:

- Fishing income and livelihoods
- Perceptions of fish stock trends
- Compliance with seasonal fishing bans
- Food security and coping strategies during fishing bans

- Alternative livelihood activities

The survey also collected demographic information such as household size, education levels, and years of fishing experience.

5.4.2 Ecological Observations

Field observations were conducted to assess fish species diversity and breeding activity during and after the fishing ban period. Information was collected through:

- Landing site observations
- Catch composition monitoring
- Discussions with experienced fishers

These observations helped provide qualitative insights into trends in fish abundance.

5.4.3 Key Informant Interviews

Semi-structured interviews were conducted with government officials, traditional leaders, and fisheries management committees to gather insights on:

- Enforcement of seasonal fishing bans
- Community compliance levels
- Challenges in fisheries management
- Perceived ecological benefits of the bans

5.5 Data Analysis

Quantitative data from household surveys were analyzed using descriptive statistics including frequencies, percentages, and averages. This analysis helped identify patterns in household livelihoods, income trends, and compliance behavior.

Qualitative data from interviews and field observations were analyzed using thematic analysis to identify key themes related to fisheries management, conservation outcomes, and community perceptions.

The combination of quantitative and qualitative analysis enabled the research to capture both measurable trends and contextual insights.

5.6 Ethical Considerations

The research followed ethical principles to ensure the rights and well-being of participants were protected.

Key ethical measures included:

- Obtaining informed consent from all participants
- Ensuring confidentiality of respondent information
- Respecting local customs and traditional governance structures
- Avoiding any disruption to community livelihoods during the research process

Participation in the study was voluntary, and respondents were free to withdraw at any time.

6. Implementation Activities and Project Timeline

The research project was implemented over a 12-month period from January to December 2025. Activities were structured to ensure systematic data collection, community engagement, ecological monitoring, and analysis of the socioeconomic impacts of seasonal fishing bans in the Barotse Floodplain.

6.1 Project Inception and Planning

The project began with an inception phase aimed at refining the research framework, identifying key stakeholders, and planning field activities.

During this phase, consultations were held with the Department of Fisheries, traditional authorities of the Barotse Royal Establishment, community fisheries committees, and local government representatives. These consultations helped identify priority fishing zones, validate the research objectives, and ensure community acceptance of the study.

An inception workshop was conducted in Mongu District to introduce the project to stakeholders and outline the planned research activities.

6.2 Baseline Data Collection

Baseline data collection was conducted between February and April 2025. The objective was to establish a reference point for assessing changes in fish stocks and community livelihoods. Activities during this phase included:

- Household socioeconomic surveys among fishing communities
- Mapping of fishing sites across selected zones
- Initial observations of fish species composition at landing sites
- Interviews with fisheries officers and traditional leaders

The baseline survey captured information on household income sources, fishing effort, and community perceptions of fish stock trends.

6.3 Monitoring of Seasonal Fish Ban Period

Between May and July 2025, the research team monitored the implementation of seasonal fishing bans across selected communities.

Activities conducted during this phase included:

- Observing community compliance with fishing bans
- Monitoring fishing activities in restricted areas
- Documenting enforcement efforts by fisheries committees and local authorities
- Conducting interviews with fishers regarding livelihood coping strategies during the ban period

This phase was critical in understanding the social and economic challenges faced by fishing households during the closure period.

6.4 Ecological Monitoring and Post-Ban Observations

Between August and October 2025, the research team conducted ecological monitoring activities to assess fish stock conditions following the lifting of the fishing ban.
Key activities included:

- Monitoring fish catch volumes at landing sites
- Recording fish species diversity and size distribution
- Interviews with fishers regarding catch trends after the ban

These observations helped provide qualitative evidence regarding potential improvements in fish abundance following the closure period.

6.5 Stakeholder Consultations and Validation

Between November and December 2025, the research team conducted stakeholder consultations to validate the preliminary findings of the study.

Validation meetings were held with:

- Fisheries Department officials
- Local fisheries committees
- Traditional leaders
- Fishing community representatives

These consultations allowed stakeholders to review and provide feedback on the research findings and policy recommendations.

6.6 Project Timeline

Project Phase	Key Activities	Timeline
Inception Phase	Stakeholder consultations, project planning, inception workshop	Jan 2025
Baseline Survey	Household surveys, interviews, ecological observations	Feb – Apr 2025
Monitoring of Fishing Ban	Compliance monitoring, livelihood assessments	May – Jul 2025
Ecological Monitoring	Post-ban fish catch monitoring, species observations	Aug – Oct 2025
Validation & Reporting	Stakeholder consultations, report drafting	Nov – Dec 2025

The structured implementation timeline ensured that the research captured seasonal dynamics of the floodplain fishery and provided comprehensive insights into both ecological and socioeconomic dimensions of fisheries conservation.

7. Financial Report and Grant Utilization

The research project was funded by the Mohamed bin Zayed Species Conservation Fund to support the implementation of a practical research initiative on fisheries conservation in the Barotse Floodplain. The grant enabled Garden House Youth Society to conduct field-based ecological monitoring, socioeconomic assessments, and stakeholder consultations aimed at evaluating the effectiveness of seasonal fish bans as a conservation and climate adaptation strategy.

The project was implemented in accordance with the approved workplan and financial management procedures of Garden House Youth Society. Funds were utilized responsibly to support research activities, community engagement, data collection, and reporting. Financial oversight was maintained throughout the project to ensure transparency and accountability.

7.1 Overview of Grant Utilization

The grant primarily supported field research activities conducted between January and December 2025. Major expenditure areas included personnel costs for research staff, field data collection, community consultations, travel to remote fishing communities, and dissemination of findings. The project prioritized cost-efficient implementation while ensuring high-quality research outputs and meaningful stakeholder engagement.

7.2 Summary of Project Expenditures

Budget Category	Description	Amount (USD)
Personnel and Research Staff	Compensation for researchers, field enumerators, and project coordination staff	38,000
Field Data Collection	Household surveys, ecological monitoring equipment, survey materials	18,000
Travel and Field Logistics	Transportation to fishing communities across the Barotse Floodplain	14,000
Community Consultations	Stakeholder meetings, community validation workshops	10,000
Data Analysis and Reporting	Data processing, report writing, documentation	9,000
Project Administration	Communication, office support, coordination expenses	6,000
Dissemination of Findings	Printing of reports, policy briefs, stakeholder dissemination	5,000
Total Grant Utilized		100,000

7.3 Financial Accountability and Management

Garden House Youth Society maintained a structured financial management system throughout the implementation of the project. Key financial accountability measures included:

- Maintenance of detailed financial records and receipts for all project expenditures
- Periodic internal financial reviews to ensure compliance with the approved budget

- Segregation of project funds from other organizational accounts
- Documentation of procurement and expenditure procedures

These measures ensured that project funds were utilized strictly for approved activities and that financial reporting remained transparent and verifiable.

7.4 Value for Money

The project achieved significant research outputs within the available budget. Through efficient use of resources and strategic collaboration with local stakeholders, the project was able to reach multiple fishing communities across the floodplain and generate valuable data on fisheries conservation and livelihood impacts.

The financial investment in the research has contributed to improved understanding of sustainable fisheries management and climate adaptation strategies in one of Zambia's most important wetland ecosystems.

8. Research Findings and Analysis

This section presents the key findings of the study based on ecological observations, household surveys, and stakeholder consultations conducted in fishing communities across the Barotse Floodplain. The findings provide insights into the ecological effectiveness of seasonal fish bans and their socioeconomic implications for fishing-dependent households.

8.1 Trends in Fish Stock Recovery

Field observations and discussions with experienced fishers indicate that seasonal fish bans have contributed to noticeable improvements in fish breeding activity and catch composition following the closure period.

Fishers reported an increase in the presence of juvenile fish during post-ban fishing periods, suggesting improved spawning success. Observations at landing sites also showed a greater diversity of fish species and an increase in the average size of fish caught compared to periods prior to the fishing ban.

Several fishers indicated that catches during the months following the ban were generally higher than catches immediately before the closure period. While these observations are largely qualitative, they suggest that seasonal bans may play a role in supporting fish population recovery.

8.2 Fish Species Diversity

Ecological monitoring conducted at selected landing sites revealed that several key fish species continue to dominate catches in the floodplain fisheries. These include

- Bream (Oreochromis spp.)
- Tiger fish (Hydrocynus vittatus)
- Catfish (Clarias gariepinus)
- Barbel species

The research team observed that the proportion of juvenile fish in catches appeared lower after the ban period, suggesting that more fish were reaching maturity before being harvested. This is a positive indication that seasonal bans may be allowing fish to complete their breeding cycles. However, some stakeholders noted that fish populations remain vulnerable due to illegal fishing activities and environmental pressures linked to climate variability.

8.3 Household Dependence on Fisheries

Household survey results showed that fishing remains the primary livelihood activity for many households in the floodplain.

Approximately 68% of surveyed households reported fishing as their main source of income. Other income-generating activities included crop farming, livestock rearing, fish trading, and small-scale businesses.

For many households, fishing income supports essential needs such as food, school fees, and healthcare. As a result, restrictions on fishing activities during seasonal bans can significantly affect household income.

8.4 Economic Impacts of Seasonal Fish Bans

The research found that seasonal fishing bans have mixed economic implications for fishing communities.

During the ban period, many fishing households experience temporary reductions in income due to the restriction on fishing activities. Some households reported relying on savings, borrowing, or alternative livelihood activities to cope with the income gap.

Common coping strategies identified during the survey included:

- Engaging in crop farming
- Casual labor
- Small-scale trading

- Livestock rearing

While these activities provide some income during the ban period, they are often insufficient to fully replace fishing income.

8.5 Community Perceptions of Fish Bans

Despite the short-term economic challenges associated with fishing bans, many community members expressed support for the policy.
Survey results showed that approximately 72% of respondents believe that seasonal bans are necessary to protect fish populations and ensure long-term sustainability of the fishery.
Fishers indicated that they have observed improvements in fish catches in years when bans were effectively enforced.

However, respondents also emphasized the importance of stronger enforcement and community awareness programs to improve compliance.

8.6 Compliance with Fishing Regulations

Compliance with seasonal fishing bans varied across communities. Areas with strong community leadership and active fisheries committees reported higher levels of compliance.
Traditional authorities and community-based fisheries management groups were found to play a critical role in promoting adherence to fishing regulations.

Nevertheless, challenges remain in enforcing bans across the vast floodplain. Limited enforcement capacity and economic pressures sometimes lead to illegal fishing during closure periods.

8.7 Gender Dimensions of Fisheries Livelihoods

The research also revealed important gender dynamics within floodplain fisheries.
While men are primarily responsible for fishing activities, women play significant roles in fish processing, drying, and trading. Seasonal fishing bans therefore affect not only fishers but also women involved in post-harvest fish value chains.

During the ban period, many women reported reduced access to fish supplies for processing and trading, which can affect household income and food security.

8.8 Climate Change and Fisheries Vulnerability

Stakeholders consistently highlighted climate variability as an emerging challenge for fisheries management in the floodplain.

Reduced flood levels, changes in rainfall patterns, and increased drought frequency were identified as key factors affecting fish breeding habitats and productivity.

These climate-related pressures underscore the importance of adaptive fisheries management strategies such as seasonal fish bans.
Overall, the findings suggest that seasonal fishing bans can contribute to fish stock recovery and ecosystem sustainability. However, their success depends on effective enforcement, community participation, and the availability of alternative livelihood opportunities for affected households.

9. Discussion and Policy Implications

The findings of this study provide important insights into the role of seasonal fish bans as a fisheries conservation and climate adaptation strategy in the Barotse Floodplain. While the research indicates that seasonal bans contribute to ecological benefits such as improved fish breeding and increased catch diversity, the results also highlight the socioeconomic challenges faced by fishing-dependent households during closure periods. These findings have important implications for fisheries governance, climate adaptation planning, and rural economic development.

9.1 Effectiveness of Seasonal Fish Bans as an Adaptation Strategy

Seasonal fish bans appear to play an important role in protecting fish populations during critical breeding periods. The presence of more mature fish and the reduction in juvenile fish catches following the ban period suggest that spawning cycles are being protected, allowing fish populations to regenerate

From a climate adaptation perspective, seasonal fish bans can be considered a nature-based solution that strengthens ecosystem resilience. As climate variability continues to affect hydrological systems in the Zambezi basin, maintaining healthy fish populations will become increasingly important for sustaining fisheries productivity.

However, the effectiveness of seasonal bans depends heavily on consistent enforcement and strong community compliance.

9.2 Socioeconomic Trade-Offs of Conservation Policies

While seasonal fish bans support ecological recovery, they also create short-term economic pressures for fishing households. Many households rely heavily on fishing as their primary income source, and restrictions during closure periods can reduce their ability to meet daily household needs.

These findings highlight the importance of integrating fisheries conservation policies with livelihood support strategies. Without alternative income opportunities, communities may struggle to comply with fishing bans, which can undermine conservation efforts.
Policies that promote livelihood diversification such as aquaculture, climate-smart agriculture, and small enterprise development can help reduce dependence on fishing during closure periods.

9.3 Role of Community-Based Fisheries Management

Community institutions and traditional authorities play a critical role in fisheries governance in the Barotse Floodplain. The research found that communities with active fisheries committees and strong traditional leadership structures tend to have higher compliance with seasonal bans.
Strengthening community-based fisheries management systems can therefore enhance the effectiveness of conservation measures. Community participation also increases local ownership of conservation initiatives, which improves long-term sustainability.

Government fisheries authorities should continue to collaborate with traditional leaders and community organizations to strengthen enforcement and awareness of fishing regulations.

9.4 Gender Considerations in Fisheries Management

The research highlights the important role of women in the fisheries value chain, particularly in fish processing and trading. Seasonal fishing bans can indirectly affect women's economic activities by reducing fish supply during closure periods.

Policies aimed at improving fisheries sustainability should therefore incorporate gender-sensitive approaches. Supporting women's access to alternative livelihood opportunities, credit, and value-added fish processing technologies can help mitigate the economic impacts of fishing bans.

9.5 Integrating Fisheries Conservation into Climate Adaptation Policy

Climate change is expected to continue affecting floodplain ecosystems and fisheries productivity. Adaptive management strategies that protect ecosystem functions will be critical for maintaining long-term food security and rural livelihoods.

Seasonal fish bans represent an important entry point for integrating fisheries conservation into broader climate adaptation strategies. However, effective adaptation requires coordinated policies that address both environmental sustainability and economic resilience.

Strengthening fisheries monitoring systems, promoting community participation in resource management, and supporting climate-resilient livelihood alternatives can help ensure that conservation policies remain effective under changing climatic conditions.

10. Outcomes and Impact of the Research

The research undertaken by Garden House Youth Society with support from the Mohamed bin Zayed Species Conservation Fund generated significant outcomes at ecological, socioeconomic, and policy levels. The study not only provided evidence on the effectiveness of seasonal fish bans as a fisheries management strategy but also contributed to improved understanding of the relationship between conservation policies and community livelihoods in climate-sensitive ecosystems.

10.1 Ecological Outcomes

One of the key outcomes of the research was the generation of evidence indicating that seasonal fish bans contribute to improved fish breeding activity and increased fish population recovery in the Barotse Floodplain. Field observations and stakeholder feedback suggested that fish species diversity and the average size of fish caught improved following the ban period.

The protection of fish during spawning periods allows fish populations to regenerate naturally, which supports long-term sustainability of the floodplain fishery. These findings reinforce the role of seasonal fish bans as a practical ecosystem-based adaptation strategy that can help maintain biodiversity while supporting sustainable resource use.

10.2 Improved Understanding of Fisheries Livelihoods

The research provided important insights into the livelihood structures of fishing households in the Barotse Floodplain. Survey results showed that a significant proportion of households depend heavily on fishing for income and food security.

By documenting the socioeconomic impacts of fishing bans, the study highlighted the importance of balancing conservation measures with livelihood considerations. This evidence can help policymakers design fisheries management strategies that protect ecosystems while minimizing negative impacts on vulnerable households.

10.3 Strengthening Community Awareness

The project also contributed to increased awareness among fishing communities about the importance of sustainable fisheries management. Through community consultations and stakeholder engagement activities, the research team facilitated discussions on the long-term benefits of protecting fish during breeding seasons.

These engagements helped reinforce community understanding of the ecological rationale behind fishing bans and encouraged dialogue on sustainable fishing practices.

10.4 Contributions to Policy Dialogue

The findings of the research have relevance for national fisheries policy and climate adaptation planning. By providing empirical evidence on the ecological and socioeconomic dimensions of seasonal fishing bans, the study contributes to ongoing discussions on sustainable fisheries governance in Zambia.

The research findings can inform policy decisions related to fisheries management regulations, community-based resource management, and climate adaptation strategies for floodplain ecosystems.

10.5 Institutional Strengthening

The project strengthened the research capacity of Garden House Youth Society in conducting field-based environmental research and socioeconomic assessments. The organization gained valuable experience in ecological monitoring, household survey implementation, and stakeholder engagement.

These capabilities position Garden House Youth Society to contribute to future research initiatives focused on climate adaptation, biodiversity conservation, and sustainable livelihoods.

11. Research Outputs and Deliverables

The research project generated a range of outputs designed to contribute to knowledge generation, policy engagement, and community awareness on sustainable fisheries management and climate adaptation in the Barotse Floodplain. These outputs provide valuable resources for policymakers, conservation organizations, academic researchers, and local communities interested in improving fisheries sustainability while supporting resilient livelihoods.

11.1 Research Report

The primary output of the project is this comprehensive research report, which documents the study's methodology, findings, analysis, and policy recommendations. The report provides an evidence-based assessment of seasonal fish bans as a fisheries conservation and climate adaptation strategy.

The report will be published on the Garden House Youth Society website and shared with stakeholders including government agencies, conservation organizations, and academic institutions.

11.2 Household Socioeconomic Dataset

The project generated a dataset based on surveys conducted among 200 fishing households across selected communities in the Barotse Floodplain. The dataset includes information on:

- Household income sources
- Fishing activities and catch patterns
- Coping strategies during fishing bans
- Community perceptions of fisheries management policies
- Livelihood diversification activities

This dataset provides valuable insights for future research on fisheries livelihoods and climate adaptation in floodplain ecosystems.

11.3 Ecological Monitoring Observations

Field observations on fish species diversity, catch composition, and spawning activity were documented during the research. These observations contribute to improved understanding of fish population dynamics in the Barotse Floodplain.

The ecological information gathered through this project can support future conservation monitoring efforts.

11.4 Stakeholder Engagement Reports

The project organized several stakeholder consultations involving fisheries officers, traditional authorities, fisheries committees, and community representatives. These engagements provided an opportunity for stakeholders to share perspectives on fisheries conservation challenges and potential policy solutions.

Reports summarizing discussions and feedback from these consultations were produced as part of the project documentation.

11.5 Policy Brief

A policy brief summarizing the key findings and recommendations of the research will be developed and shared with policymakers and development partners. The brief will focus on practical policy options for strengthening fisheries management and supporting climate-resilient livelihoods.

11.6 Community Awareness Materials

Educational materials explaining the importance of sustainable fisheries management and seasonal fishing bans were developed and shared with local communities during stakeholder meetings.

These materials aim to improve community awareness of conservation measures and encourage responsible fishing practices.

11.7 Capacity Building Outcomes

The project provided opportunities for research assistants and local enumerators to gain experience in environmental research and socioeconomic data collection. This contributed to local capacity building in research and monitoring of natural resource management initiatives.

Collectively, these outputs contribute to improved knowledge on sustainable fisheries management and provide evidence to inform future conservation and climate adaptation initiatives in the Barotse Floodplain.

12. Limitations of the Study

While this research provides valuable insights into the ecological and socioeconomic impacts of seasonal fish bans in the Barotse Floodplain, several limitations should be acknowledged. Recognizing these limitations helps ensure transparency and provides guidance for future research.

12.1 Limited Long-Term Ecological Data

One of the primary limitations of the study was the limited availability of long-term ecological data on fish populations in the Barotse Floodplain. While field observations and fisher knowledge provided useful insights into trends in fish abundance and breeding activity, comprehensive scientific monitoring data covering multiple years were not readily available.

Long-term ecological monitoring would allow for more precise assessment of fish population trends and the long-term effectiveness of seasonal fishing bans.

12.2 Seasonal Nature of Floodplain Ecosystems

The Barotse Floodplain is characterized by dynamic seasonal flooding patterns that influence fish migration, breeding cycles, and fishing activity. Because the research was conducted over a one-year period, it captured only a single annual cycle of ecological and socioeconomic dynamics.

Longer-term studies covering multiple flood cycles would provide deeper insights into how climate variability affects fisheries productivity and conservation outcomes.

12.3 Potential Response Bias in Household Surveys

Household survey responses were based on self-reported information provided by respondents. In some cases, respondents may have overestimated or underestimated income levels, fishing effort, or compliance with fishing bans.

Although efforts were made to ensure accuracy through cross-checking and follow-up questions, some level of response bias is possible.

12.4 Limited Quantitative Ecological Sampling

Due to logistical constraints and limited resources, the study relied primarily on qualitative ecological observations and landing site monitoring rather than detailed scientific sampling methods such as fish population surveys or catch-per-unit-effort (CPUE) analysis.
Future research using more advanced ecological monitoring techniques could provide more robust quantitative data on fish stock dynamics.

12.5 Geographic Coverage

Although the research covered several key fishing zones within the Barotse Floodplain, it was not possible to include all fishing communities across the entire floodplain due to accessibility challenges and resource limitations.

As a result, the findings may not fully capture variations in fisheries conditions across all parts of the ecosystem.

12.6 Climate Variability

Climate conditions during the study period may also have influenced the findings. Changes in rainfall patterns, flood levels, and water temperatures can affect fish populations and fishing activities in ways that are difficult to isolate within a single-year study.
Future studies could incorporate climate modeling and hydrological data to better understand the relationship between climate variability and fisheries productivity.

Despite these limitations, the study provides important insights into the role of seasonal fish bans in supporting sustainable fisheries management and climate adaptation in the Barotse Floodplain. The findings contribute to the growing body of knowledge on ecosystem-based adaptation strategies in climate-sensitive wetland ecosystems.

13. Recommendations and Future Policy Directions

Based on the findings of this research, several recommendations are proposed to strengthen sustainable fisheries management and enhance the effectiveness of seasonal fish bans as a climate adaptation strategy in the Barotse Floodplain.

13.1 Strengthen Enforcement of Seasonal Fish Bans

Effective enforcement is essential for ensuring that seasonal fishing bans achieve their intended conservation objectives. Government fisheries authorities should increase monitoring and enforcement efforts during closure periods, particularly in areas where illegal fishing activities have been reported.

Collaboration between the Department of Fisheries, traditional authorities, and community fisheries committees should be strengthened to improve local compliance and ensure that fishing regulations are respected across the floodplain.

13.2 Promote Community-Based Fisheries Management

Community participation is critical for sustainable fisheries governance. Strengthening community-based fisheries management structures can enhance local ownership of conservation initiatives and improve compliance with fishing regulations.

Community fisheries committees should be supported with training and resources to enable them to effectively monitor fishing activities and raise awareness about sustainable fishing practices.

13.3 Support Alternative Livelihood Opportunities

Seasonal fish bans can temporarily reduce income for fishing households. To mitigate these impacts, policymakers and development partners should promote alternative livelihood opportunities that provide income during fishing closure periods.

Potential livelihood diversification strategies include:

- Aquaculture development
- Climate-smart agriculture
- Livestock production
- Small-scale businesses and entrepreneurship

Supporting alternative livelihoods can reduce economic pressure on fisheries resources while improving household resilience to climate shocks.

13.4 Improve Fisheries Data and Monitoring Systems

Reliable data is essential for effective fisheries management. Strengthening fisheries monitoring systems can improve understanding of fish population trends and support evidence-based decision-making.

Government agencies and research institutions should collaborate to establish long-term ecological monitoring programs in the Barotse Floodplain. Improved data collection can help track the impacts of climate variability and fisheries management policies.

13.5 Integrate Fisheries Conservation into Climate Adaptation Planning

Fisheries management strategies should be integrated into broader climate adaptation policies and programs. Protecting floodplain ecosystems will be increasingly important as climate variability continues to affect water systems and aquatic habitats.

National climate adaptation strategies should recognize the role of sustainable fisheries management in supporting food security and rural livelihoods.

13.6 Promote Gender-Sensitive Fisheries Policies

Women play an important role in fish processing and trading in the Barotse Floodplain. Policies aimed at improving fisheries sustainability should therefore consider gender dynamics within the fisheries value chain.

Programs that support women's access to training, credit, and value-added fish processing technologies can enhance economic resilience and strengthen community participation in conservation efforts.

13.7 Strengthen Research and Knowledge Sharing

Further research is needed to better understand the long-term ecological and socioeconomic impacts of seasonal fish bans and other fisheries management strategies.

Research institutions, conservation organizations, and government agencies should collaborate to share knowledge and develop evidence-based policies that promote sustainable fisheries and climate adaptation.

These recommendations provide practical guidance for policymakers, conservation organizations, and community leaders seeking to balance fisheries conservation with sustainable livelihood development in climate-sensitive ecosystems such as the Barotse Floodplain.

14. Conclusion

The Barotse Floodplain remains one of Zambia's most important ecological and economic landscapes, supporting thousands of households whose livelihoods depend on fisheries and other floodplain resources. However, increasing climate variability, changing hydrological patterns, and growing pressure on natural resources have raised serious concerns about the long-term sustainability of the floodplain fishery.

This research set out to assess the effectiveness of seasonal fish bans as a conservation and climate adaptation strategy while examining their socioeconomic implications for fishing communities. The findings indicate that seasonal fish bans play an important role in protecting

fish populations during breeding periods and supporting ecological recovery in the floodplain ecosystem.

Evidence from field observations and community feedback suggests that fish populations benefit from protected spawning periods, leading to improvements in fish catch diversity and the presence of mature fish following the ban period. These outcomes highlight the value of seasonal bans as a practical ecosystem-based adaptation measure that can contribute to long-term fisheries sustainability.

At the same time, the study also revealed the economic challenges that seasonal bans can create for fishing households whose livelihoods depend heavily on fishing activities. Temporary income losses during closure periods underscore the need for complementary policies that support livelihood diversification and improve economic resilience among fishing communities.

The research further emphasized the importance of community participation in fisheries management. Traditional authorities, fisheries committees, and local institutions play a critical role in promoting compliance with fishing regulations and strengthening sustainable resource management.

Looking ahead, sustainable fisheries management in the Barotse Floodplain will require integrated approaches that combine ecological conservation, climate adaptation, and socioeconomic development. Strengthening community-based fisheries governance, improving enforcement of regulations, and promoting alternative livelihood opportunities will be essential for maintaining both ecosystem health and community well-being.

By generating evidence on the ecological and socioeconomic impacts of seasonal fish bans, this research contributes to improved understanding of how fisheries conservation strategies can support climate adaptation and sustainable development in wetland ecosystems. The findings provide valuable insights for policymakers, conservation organizations, and local communities working to protect the Barotse Floodplain and ensure that its fisheries resources continue to sustain livelihoods for generations to come.

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