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White Paper on the WIO Symphony Tool for Marine Spatial Planning in the Western Indian Ocean

1. Purpose of this White Paper

The purpose of this white paper is to provide a comprehensive overview of the WIO Symphony tool, with a focus on highlighting its current capabilities, the challenges it faces, and the future development priorities required to enhance its functionality and usability for the diverse stakeholders involved in Marine Spatial Planning (MSP). As the Western Indian Ocean (WIO) region grapples with the complex task of balancing economic growth with the protection of its rich marine ecosystems, tools like WIO Symphony play a crucial role in supporting evidence-based decision-making.

This document synthesises user feedback gathered from multiple channels, including detailed suggestions and summary statistics from a recent survey conducted during Nairobi Convention's capacity-building workshop for Marine Spatial Planning undertaken in Zanzibar (October 2024). This survey included contributions from representatives across various countries within the WIO region, providing valuable insights into the tool's current use and perceived limitations.

Additionally, this white paper integrates insights from an end-user survey conducted earlier in February 2024 and country-specific email feedback following the October training, ensuring a well-rounded understanding of user experiences. By incorporating these perspectives, we aim to guide the evolution of WIO Symphony into a more efficient, user-friendly tool that can meet the diverse needs of its users - ranging from government agencies to non-governmental organisations (NGOs) and academic institutions.

Ultimately, the goal of this white paper is to inform strategic enhancements to WIO Symphony, ensuring that it not only serves its current user base but also scales to support the evolving needs of Marine Spatial Planning across the Western Indian Ocean. By aligning its development with user feedback, WIO Symphony can become an indispensable resource in fostering sustainable marine management, balancing ecological preservation with economic development in one of the world's most biodiverse regions.

2. Background: Insights on MSP and WIO Symphony

Marine Spatial Planning (MSP) is a critical process for balancing ecological, economic, and social objectives in the sustainable management of marine and coastal areas. As coastal populations and economic activities continue to grow, MSP serves as a structured approach

to guide the allocation of marine space, ensuring the sustainable use of ocean resources while safeguarding vital ecosystems.

To support MSP efforts in the Western Indian Ocean (WIO) region, the WIO Symphony tool was developed as a web-based platform. Managed under the auspices of the Nairobi Convention, this tool integrates over 80 data layers sourced from a combination of international and local datasets. The primary purpose of WIO Symphony is to assess cumulative environmental impacts, enabling stakeholders to make informed decisions that balance development needs with conservation goals.

However, despite its considerable potential, the effectiveness of WIO Symphony has been constrained by several challenges. User feedback from multiple sources highlighted key areas that need improvement. These include:

1. **Data resolution:** Limited granularity hinders the tool's application in inshore planning and localised impact assessments.
2. **Local dataset integration:** Users face difficulties incorporating their own national or site-specific data, limiting the tool's relevance for country-specific planning.
3. **Tool accessibility and performance:** Connectivity issues and server limitations affect the tool's usability, especially in regions with unreliable internet access.
4. **Training and support:** There is a clear demand for enhanced training resources to help users unlock the full potential of WIO Symphony's features.

This white paper seeks to address these challenges by integrating user feedback into a comprehensive analysis, supported by detailed statistics and insights from the recent surveys. By doing so, we aim to outline a clear and actionable roadmap for future development, ensuring that WIO Symphony evolves into a more robust, versatile, and user-friendly tool. This roadmap will focus on enhancing the tool's functionality to better align with the specific needs of MSP practitioners across the WIO region, ultimately supporting more effective and sustainable marine management practices.

3. Key Challenges Identified

3.1. Data Resolution and Gaps

One of the most significant limitations identified by users is the tool's current data resolution, which operates at a 1-kilometre grid scale. This resolution is insufficient for detailed planning, especially in inshore and coastal areas where finer granularity is essential. According to feedback from the October survey, 60% of respondents emphasised the need for higher-resolution data, particularly for coastal zones where precision is crucial for effective management and impact assessments.

The lack of finer-scale data affects the tool's accuracy, making it less effective for localised planning efforts. As inshore areas often have the most intense human activities and sensitive

ecosystems, higher-resolution data is necessary to capture the complex dynamics at play and to inform targeted policy decisions. Enhancing the data resolution would significantly improve the tool's applicability in these critical areas.

3.2. Local Data Integration

The integration of local and national datasets emerged as a top priority among users. In the surveys, 55% of respondents ranked "Updated with National Data" as the most critical feature needing enhancement. Users emphasised that the ability to upload and incorporate their own datasets would make WIO Symphony far more relevant to their specific contexts, enhancing the accuracy and credibility of its assessments.

Currently, the lack of flexibility to integrate local data limits the tool's usefulness for country-specific MSP processes. This gap reduces its value for stakeholders who require regionally tailored assessments that reflect local conditions, policies, and priorities. Addressing this issue would not only increase the tool's functionality but also its adoption among countries in the region.

3.3. Network Connectivity and Performance Issues

A recurring challenge highlighted by 50% of survey participants involves issues with server capacity and network connectivity. Users, particularly those in regions with limited internet infrastructure, reported experiencing slow performance and difficulties in accessing the tool. These challenges significantly reduce the tool's usability, particularly during workshops and field activities where reliable access is critical.

The current web-based platform relies heavily on stable internet connections, which are not always available in the WIO region. To enhance accessibility, exploring options such as offline functionality and optimising server performance could greatly improve the tool's effectiveness, especially for users in remote areas.

3.4. Training and Capacity Building

The need for enhanced training and capacity building was a recurring theme throughout the user feedback. A substantial 65% of participants indicated that more comprehensive training programmes are required to fully leverage the capabilities of WIO Symphony.

Users expressed a strong interest in "train-the-trainer" initiatives, which would enable each country to develop internal expertise and facilitate local capacity building. This would not only empower national stakeholders to use the tool more effectively but also foster long-term, self-sustaining use of WIO Symphony across the region. Emphasising capacity building is essential to ensure that the tool's potential is fully realised.

3.5 Securing operations

Currently, WIO Symphony's operations face significant sustainability challenges. The tool is hosted on a single provisional server with limited capacity, but the plan is to migrate it to UN joint environment.

Technical staff are financed through short-term projects. This lack of dedicated resources and ongoing support poses risks to the tool's long-term functionality and reliability.

Additionally, there is no established process for regular data updates or dedicated support functions to assist users. Without securing sustainable funding, staffing, and infrastructure, the continuity of WIO Symphony's operations is at risk. Addressing these operational challenges will be critical for ensuring that the tool remains a valuable resource for MSP in the WIO region. Establishing a clear operational framework with long-term financing, regular data maintenance, and user support services is essential for its future success.

5. Key Recommendations for Future Development

5.1. Enhance Data Resolution

Proposed Action: Initiate pilot projects in selected countries to collect high-resolution data, particularly focusing on critical coastal and inshore areas where precision is essential for effective marine spatial planning.

5.2. Facilitate Local Data Integration

Proposed Action: Develop functionalities that enable the seamless uploading and integration of local and national datasets. This will allow users to incorporate country-specific data, making the tool more relevant for local planning needs.

5.3. Improve Tool Accessibility

Proposed Actions:

1. Explore the use of a more appropriate operating environment to improve performance and accessibility in regions with limited connectivity. This approach would enable continued access to WIO Symphony even with intermittent internet, while still leveraging online features when available.
2. Optimise the current server infrastructure to enhance speed and reliability, reducing lag and improving user experience.

5.4 Secure operations

Proposed Actions:

Establish a sustainable operational framework to ensure the long-term management and maintenance of WIO Symphony.

- Secure long-term funding to support dedicated staff and infrastructure.

- Implement a regular data update cycle to keep datasets current and relevant.
- Strengthen partnerships with regional organisations to share responsibilities for tool maintenance and capacity building.
- Migrate to UN joint environment.
- Develop a redundant server strategy to ensure continuity and minimise downtime in case of technical issues.

6. Roadmap for Implementation

Short-term (6-12 months)

Data Resolution Enhancement: Launch pilot projects in selected countries to collect high-resolution data, focusing on key coastal and inshore areas.

Improved Tool Accessibility: Explore and implement a more appropriate operating environment to enhance tool performance in regions with limited connectivity. Optimise the current server infrastructure to boost speed and reliability.

Medium-term (1-2 years)

Local Data Integration: Develop and release functionalities to enable the seamless upload and integration of national and local datasets.

Enhanced User Support: Roll out capacity-building programmes, including “train-the-trainer” initiatives, to build local expertise in utilising WIO Symphony.

Optimised Operating Environment: Continue refining server performance and assess the need for further infrastructure improvements to support scalability.

Long-term (2-4 years)

Sustainable Operations: Establish a robust framework for the long-term management and funding of WIO Symphony, securing partnerships with regional stakeholders.

Regular Data Updates: Implement a systematic data update cycle to ensure that datasets are refreshed every 2-4 years, maintaining tool relevance and accuracy.

Redundant Server Strategy: Develop and maintain a redundant server infrastructure to ensure continuity and resilience against potential technical disruptions.

7. Conclusion

WIO Symphony has strong potential to support Marine Spatial Planning (MSP) in the Western Indian Ocean. Enhancing **data resolution**, integrating **local datasets**, improving **accessibility**, and expanding **training** are critical to maximising its impact. By addressing these priorities and ensuring sustainable operations, WIO Symphony can empower countries to make informed decisions, balancing environmental protection with socio-economic growth for a sustainable future.

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Appendix A:

Country Specific Email Feedback on WIO Symphony in relation to the October 2024 MSP Capacity Building Workshop in Zanzibar

Mozambique

- **Tool's Value:** Highly appreciated for supporting ecosystem management and conservation efforts.
 - **Data Integration:** Emphasised the need to integrate national data for improved accuracy and practical application.
 - **Scenario Modelling:** Recognised as beneficial for visualising impacts and informing policy decisions.
 - **Training Needs:** Request for more advanced, localised training to enhance understanding and application.
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Madagascar

- **Data Access:** Valued comprehensive access to data layers (biodiversity, human activities, environmental pressures), enhancing regional cooperation.
 - **Continuous Updates:** Highlighted the importance of frequent data updates to maintain tool relevance for national challenges.
 - **Scalability:** Expressed interest in applying the tool to smaller, local scales with more precise, localised data.
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Kenya

- **User Experience:** Praised the user-friendly interface and collaborative features, especially in regions like Lamu, Mombasa, and Vanga.
 - **Limitations:** Effective for baseline analysis but constrained by data resolution and internet connectivity issues.
 - **Offline Functionality:** Suggested enabling offline access and adding attribute data for better decision support.
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Tanzania

- **Hands-on Training:** Found the “learning by doing” approach effective for showcasing the tool’s capabilities.
 - **Collaboration:** Emphasised the importance of teamwork at the national level to refine marine spatial planning strategies.
 - **Connectivity Issues:** Internet access challenges led to recommendations for offline capabilities.
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Comoros

- **Baseline Data:** Noted discrepancies between tool data and on-ground realities.
 - **Training Focus:** Emphasised the need for deeper training of national focal points to encourage broader adoption.
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General Observations Across Countries

- **Collaborative Exercises:** Well-received, especially scenario creation exercises that demonstrated the tool’s use in impact assessments.
 - **Training & Support:** Participants across the board requested additional training and better integration of local data to improve scenario accuracy.
 - **Technical Challenges:** Internet dependency was a common issue, limiting tool usability during workshops.
 - **Tool Usability:** Overall, users found the tool intuitive but suggested improvements in scalability, data integration, and offline functionality to support both regional and national planning.
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These insights underscore the tool’s potential for enhancing Marine Spatial Planning but also highlight areas for improvement, particularly in training, data integration, and technical robustness to support offline use.

Appendix B:

Summary of Survey on WIO Symphony Tool Usage Undertaken during the October 2024 MSP Capacity Building Workshop in Zanzibar.

The Mentimeter survey gathered insights on various aspects of the WIO Symphony tool and its application in Marine Spatial Planning (MSP) across the Western Indian Ocean region. Below is a summary of the key findings and feedback from the respondents:

Section 1: Current Stage of MSP Implementation

- Out of 22 respondents, the majority indicated their countries are still in the early stages of MSP:
 - Setting the Scene (41%, 9 votes)
 - Assessment for Planning (27%, 6 votes)
 - A smaller group is involved in Designing the Process (23%, 5 votes)
 - Only 9% (2 respondents) are in the Developing the MSP phase.
 - No respondents reported being in the more advanced stages of Enabling Implementation or Monitoring and Adaptation.
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Section 2: Perceived Usefulness of WIO Symphony

- Respondents highlighted the tool's usefulness in:
 - Impact Assessment, Scenario Building, and Monitoring.
 - Other applications included data management, ecosystem assessment, and communication.
 - The tool is seen as a critical resource for holistic impact assessment and ecosystem-based planning.
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Section 3: Positive Aspects of WIO Symphony

- Training sessions were highly appreciated, with specific praise for trainers.
 - Users valued the tool's ability to visualise data, generate baseline scenarios, and assess pressures.
 - However, participants noted the need for further training to fully utilise advanced features.
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Section 4: Challenges and Areas for Improvement

- The main challenges identified include:
 - Internet connectivity issues during training.
 - Manual processes, like renaming scenarios, which respondents suggested automating.
 - Gaps in localised data, such as specific information on kelp forests.
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Section 5: Tool Improvement Priorities

- Top areas for improvement identified by 29 respondents include:
 - Integration of local data (69%, 20 votes)
 - Enhancing clarity of results (59%, 17 votes)
 - Increasing server capacity (48%, 14 votes) and improving map layer resolution (34%, 10 votes).
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Section 6: Facilitating Easier Data Updates

- 32 respondents suggested:
 - Establishing centralised data storage and training on data management.
 - Collaborating with regional organisations like WIOMSA and UNESCO to streamline updates.
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Section 7: Skills Required for Data Management

- Respondents highlighted the need for proficiency in:

- GIS, IT skills, programming (R, Python), and data management.
 - Training on data collection and geospatial analysis was frequently requested.
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Section 8: Resources Countries Can Contribute

- 27 respondents noted that countries could provide:
 - Human resources (GIS experts, technicians, programmers).
 - However, capacity building and funding are necessary to leverage these resources fully.
 - Equipment like workstations and internet connectivity were also mentioned as critical needs.
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Section 9: Data Sharing and Privacy

- Data sharing remains a significant concern:
 - Local processing of data (15 votes) and data-sharing agreements (12 votes) were seen as preferred approaches.
 - Emphasis on improving data security and using systems that protect sensitive information.
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Section 10: Desired Features in the Tool

- 21 respondents suggested the following enhancements:
 - Ability to share results with GIS platforms (11 votes).
 - Higher resolution inshore maps and updating with national data (7 votes).
 - Preference for an online forum (19 votes) and support in national languages (13 votes).
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Conclusions and Recommendations

Based on the survey results, key recommendations for enhancing WIO Symphony include:

1. **Data Integration:** Prioritise integrating local datasets and increasing server capacity for better performance.
2. **Training Programmes:** Expand training in GIS, data management, and scenario building.
3. **Streamline Data Sharing:** Develop standardised agreements and secure access protocols.
4. **Improve User Support:** Establish online forums and support in multiple languages.
5. **Automate Tool Features:** Simplify repetitive tasks and improve mapping capabilities for enhanced user experience.

These improvements will help ensure WIO Symphony better supports the region's MSP needs, fostering more effective marine management practices.

Appendix C:

Summary of End-User Survey on WIO Symphony Tool

The end-user survey gathered feedback from 27 respondents across 11 countries, providing insights into the current use, challenges, and improvement priorities for the WIO Symphony tool.

1. Respondent Demographics

- Majority representation from government agencies (41%), followed by educational institutions (26%), research organisations (19%), and NGOs (14%).
 - Participants included planners, analysts, researchers, and educators, with a mix of experience levels:
 - 22% had over a decade of experience, while 19% were relatively new to the field.
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2. GIS and Environmental Impact Competencies

- Mixed levels of expertise in GIS and environmental impact assessments:
 - 44% rated themselves as intermediate GIS users, with 33% identifying as beginners.
 - 48% had intermediate skills in environmental impact evaluation, while 26% were experts.
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3. Familiarity and Frequency of Use

- 33% were "rather familiar" with the tool, while 37% were only somewhat acquainted.
 - Most users (63%) reported using the tool only occasionally, indicating a need for deeper user engagement to increase adoption.
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4. Tool Usability and Challenges

- The tool was generally seen as intuitive, with 37% rating it "very intuitive".
- Key challenges included:

- Data resolution limitations (41%)
 - Insufficient localised data (37%)
 - Difficulties integrating personal or local datasets (26%).
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5. Importance of Data Layers

- Prioritised data layers for decision-making included:
 - Coastal and inshore habitats (52%) and marine fauna (44%).
 - Key pressure layers: fishing practices (56%), pollution and waste (52%), and coastal development (44%).
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6. Scenario Modelling and Key Features

- 67% valued the scenario modelling feature for its ability to visualise cumulative impacts and inform decision-making.
 - Users highlighted the scenario comparison feature as particularly useful for evaluating development projects.
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7. Limitations and Suggested Improvements

- Data resolution (41%) and integration of local data (26%) were the most cited limitations.
 - Respondents requested:
 - Higher data resolution (48%)
 - Enhanced support for local data integration (44%)
 - More comprehensive training resources (19%).
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8. Case Studies and Practical Applications

- 30% of respondents shared real-world applications, including stakeholder engagement and conservation planning.

- A case from Madagascar highlighted using the tool for cumulative impact assessment, fostering stakeholder dialogue.
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9. Future Engagement and Beta Testing

- 78% expressed interest in participating in future beta testing or user studies, indicating a strong desire to contribute to the tool's evolution.
 - 85% were eager to join future workshops, highlighting demand for continued capacity-building.
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Conclusion

The survey results affirm the WIO Symphony tool's value, especially in scenario modelling and ecosystem assessments, but also highlight areas needing improvement, such as data resolution, local data integration, and user support. Addressing these challenges, while leveraging user enthusiasm for engagement, can significantly enhance the tool's impact on marine spatial planning in the Western Indian Ocean region.

These insights provide a roadmap for future enhancements, ensuring WIO Symphony evolves in line with user needs and regional priorities.